

Transportation Planning in Texas Has Deep Roots Thanks to TxDOT/TTI Relationship

Counting Heads, Allocating Dollars – Decennial Population Projections Foretell a Transit Funding Boost for Texas

TTI/TxDOT-Developed Test Method Recognized as Official ASTM Standard for Erosion Control on Slopes

TEXAS TRANSPORTATION

VOL. 56 | NO. 3 | 2020

Researcher

Texas Innovations,
GLOBAL SOLUTIONS

TEXAS TRANSPORTATION Researcher

VOL. 56 | NO. 3 | 2020

ON THE COVER: TTI's Sediment and Erosion Control Laboratory provides the transportation industry with a research and performance evaluation program for roadside environmental management. The lab's rainfall simulator enables researchers to test erosion control materials, evaluating their performance under real-world environmental conditions.



3

TTI Advisory Council Meeting Goes Virtual

4

Transportation Planning in Texas Has Deep Roots Thanks to TxDOT/TTI Relationship

6

Road Safety Study During the Pandemic Shows Risk of Death or Injury Is Greater When Roads Are Clearer

8

Counting Heads, Allocating Dollars – Decennial Population Projections Foretell a Transit Funding Boost for Texas

10

TTI/TxDOT-Developed Test Method Recognized as Official ASTM Standard for Erosion Control on Slopes

12

TTI Research on I-20 Dallas Project Succeeds in Cutting Construction Time

14

COVID-19 Uncertainty Leads to Opportunity: Record Attendance at the 2020 Texas Pedestrian Safety Forum

15

With Both Floodwaters and Pandemics, Survival and Recovery Hinge on Being Prepared

16

2020 Texas Child Passenger Safety (Virtual) Conference Provides a Realistic Event Experience

17

TTI News

19

The Last Stop with Greg Winfree: Partners in Problem-Solving — TTI and TxDOT Celebrate 70 Years of Teamwork

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Texas Transportation Researcher (ISSN 00404748) is a quarterly publication of TTI Communications, Texas A&M Transportation Institute, 3135 TAMU, College Station, Texas 77843-3135. Periodicals postage paid at College Station.

TTI.RESR2100/6815.1020.4000

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TTI Advisory Council Meeting Goes Virtual

The Texas A&M Transportation Institute (TTI) Advisory Council held its first-ever virtual annual meeting Sept. 22. The meeting is normally a two-day, in-person affair and was originally scheduled for the spring time frame, but due to continued COVID-related restrictions, TTI leadership decided to host the meeting virtually.

The meeting commenced with a welcome and introductions by David Cain, former Texas state senator and chair of the council. Approximately 30 council members participated in the meeting.

TTI Agency Director Greg Winfree provided an update on the agency and its recent research initiatives, including discussion of about 20 research projects underway at the Institute applicable to COVID-19 transportation impacts.

“Some of these projects involve examining transportation as a disease vector; studying public safety and operational impacts on transit agencies; tracking key economic indicators as a result of the pandemic; and analyzing the impacts of the virus on statewide multi-modal freight movement,” Winfree said. “TTI researchers believe that our nation’s transportation system will be significantly impacted by COVID-19 for the longterm — which makes TTI’s expertise even more important going forward.”

“TTI researchers believe that our nation’s transportation system will be significantly impacted by COVID-19 for the longterm — which makes TTI’s expertise even more important going forward.”

Greg Winfree
TTI Agency Director



TTI Agency Director Greg Winfree provides an update on the agency and its recent research initiatives.



David Cain, former Texas state senator and chair of the council, welcomes attendees to the TTI Advisory Council meeting.

Winfree also reported that research expenditures were up slightly, topping \$66.7 million for fiscal year 2020, which ended Aug. 31. He closed by discussing TTI’s contributions to supporting the Texas Legislature by providing invited testimony and responding to multiple inquiries from policymakers.

Texas A&M University System Chancellor John Sharp joined the meeting to welcome the council, thank members for their service, and introduce the guest speaker, Texas State Representative Terry Canales, chairman of the House Transportation Committee.

Chairman Canales discussed the Texas legislative landscape and possible transportation initiatives, including transportation funding broadly and as related to infrastructure surrounding the state’s land and sea ports, which are so crucial to the Texas economy. He mentioned the need to address a volatile revenue stream for maintaining the state’s roadways in this era of booming population growth.

After answering questions from council members, Chairman Canales thanked TTI for being a resource to his committee and said he would be leaning on the agency leading up to the 2021 legislative session, which begins in January.

“When we need transportation data, you all are able to provide it quickly, and it is always based on facts and science,” Canales said. “TTI is a ‘well’ of information, and your experts provide the information in a format that legislators can easily digest and understand. Keep educating us,” he said.

The meeting concluded with TTI Deputy Director Bill Stockton and Senior Research Engineer Ginger Goodin leading a discussion about potential future research opportunities, transportation issues facing the state, and how TTI can contribute to improving our transportation system. ■



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TRANSPORTATION PLANNING in Texas Has Deep Roots Thanks to TxDOT/TTI Relationship

A little known but decades-long relationship between the Texas Department of Transportation (TxDOT) and the Texas A&M Transportation Institute (TTI) has led to the development of a popular travel demand model application tool. The tool is the Texas Package Suite of Programs (simply known as TexPACK), and it's receiving praise from transportation professionals across the state.

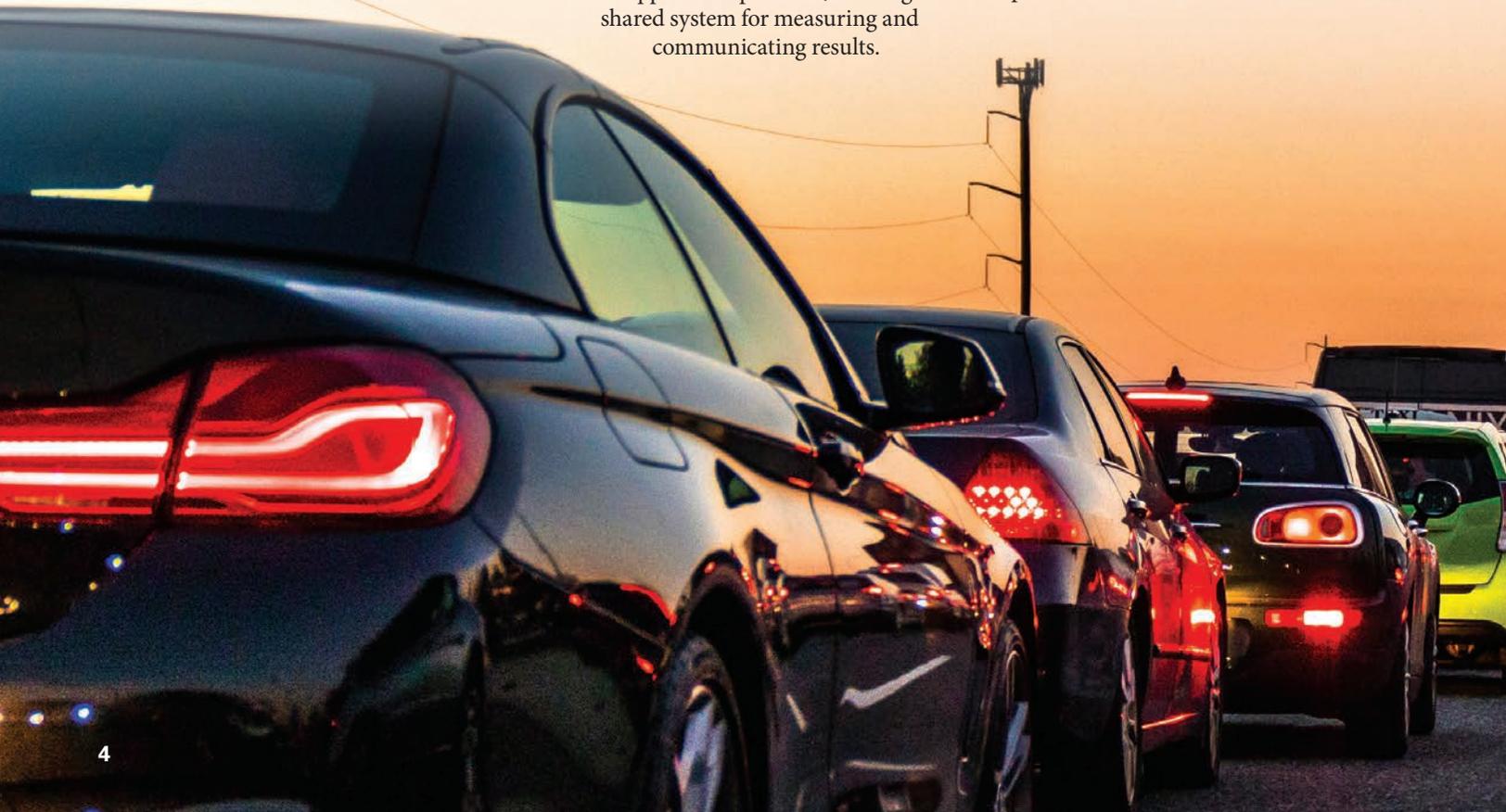
TexPACK is a computer software interface used by many of the state's metropolitan planning organizations (MPOs) and TxDOT district planning offices. Transportation planners are embracing its user-friendly interface and newly added data visualization features. First developed for TxDOT in 2014, TexPACK helps planners tailor transportation demand models (TDMs) to the needs of their regions. A vital part of transportation planning since the 1950s, TDMs are used to forecast future travel demand for planning freeways, roadways, transit, and bicycle and pedestrian facilities. TDMs

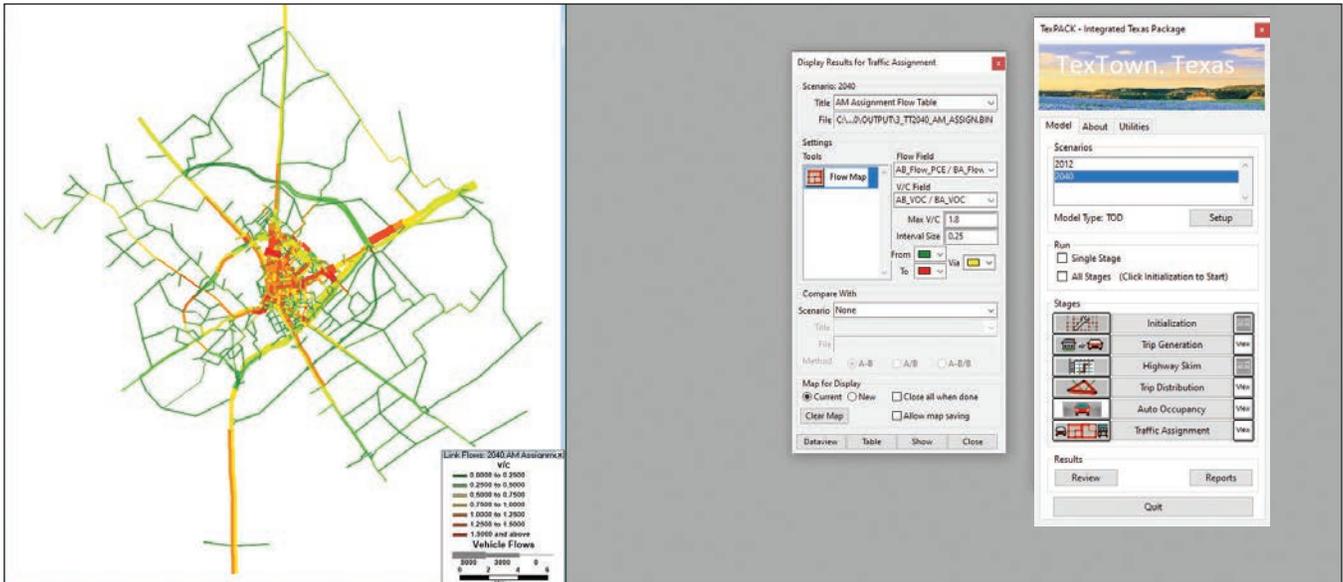
are derived from complicated mathematical equations and assumptions involving current and future population, households, employment, trips and numerous other variables.

"TexPACK is about six years old, but this latest version developed by TTI software engineers is wowing our customers and users," says Bill Knowles, TxDOT's traffic section director in the Transportation Planning and Programming Division. "TexPACK is helping unite our specialized community, especially with these recent improvements." Knowles points out that the tool offers planners a single model application platform, creating a shared system for measuring and communicating results.

"TexPACK Version 2.5 simplifies the process and provides a common application platform for all uses in the state," says Research Scientist Andy Mullins, manager of TTI's Travel Forecasting Program. "TTI staff [led by Senior Research Scientist Kevin Hall and including Associate Research Scientist Shoupeng Tang, Assistant Research Scientists Hao Pang and John Murray, and Research Specialist V LD White] have assisted TxDOT with continuously improving the product, most recently with several substantial technical and results visualization enhancements. The latest of these were delivered within a month of being requested and ahead of the original development schedule."

Hall explains that the latest version includes new trip generation software and an HTML-based model results tool. In one recent case, a contractor recommended that an MPO use TexPACK instead of having a customized version created by a contractor. "And that enthusiastic reception by transportation professionals is really growing," explains Mullins.





The TexPACK Model Scenario Manager dialog box shows volumes that are color themed by volume-to-capacity ratios. The thickness of the link is determined by the amount of traffic on the link.

“Travel demand models are part science and part art,” explains Chris Didear, branch manager, TxDOT Transportation Analysis System Support. “TTI accomplished both with TexPACK. The tool takes very complex modeling technology and simplifies it into an automated function so that users don’t have to worry about the formatting of inputs, manually processing model steps or calculation errors. And in our world, that is a big hurdle.”

Didear says the success of TexPACK shines a light on the transportation planning collaboration between TTI and TxDOT, which began 70 years ago when the Texas Highway Department

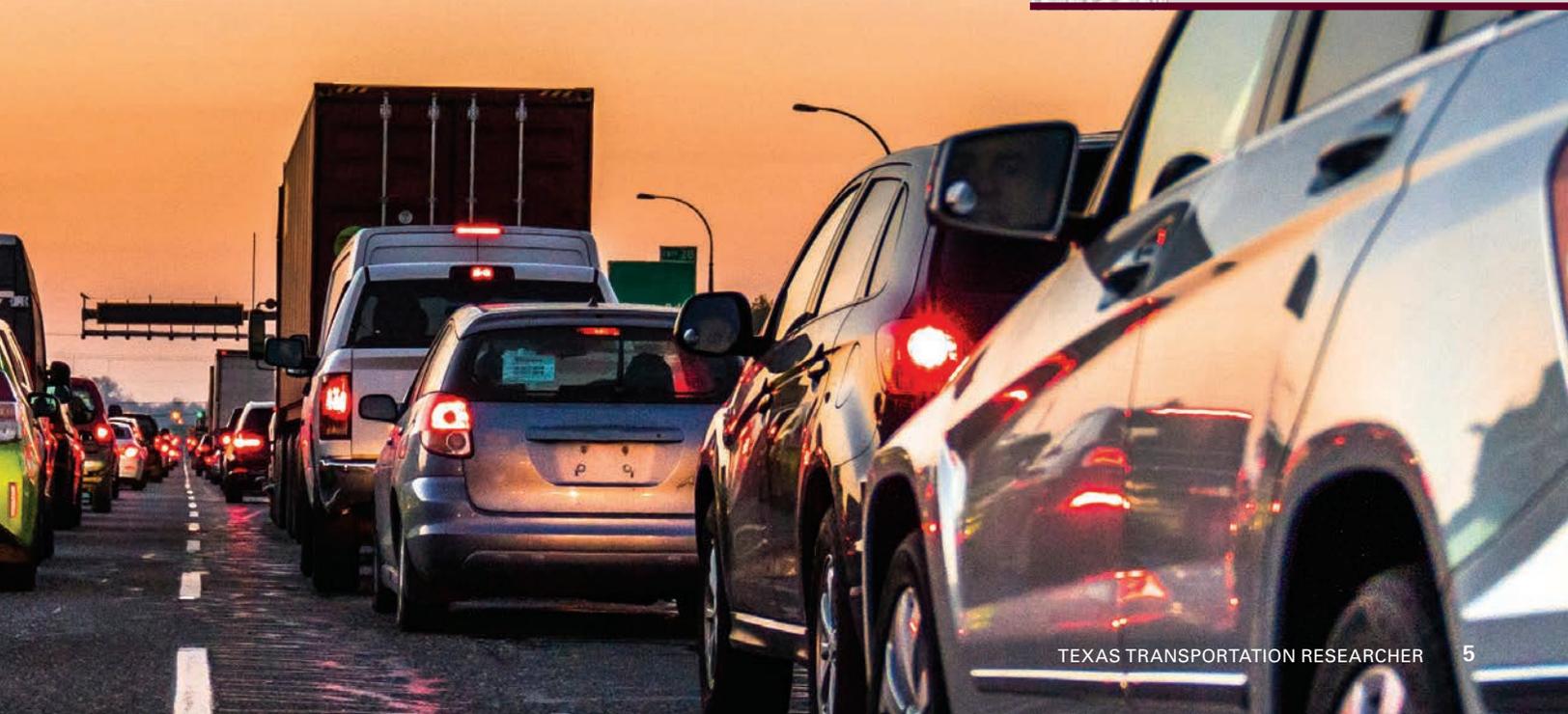
first asked the Institute to help it create transportation planning models.

The partnership may not be well known since most people outside the transportation planning community don’t know about this unique aspect of the TxDOT/TTI relationship. As part of an interagency agreement (IAC) — and especially because the modeling has become ever more complicated — TTI offers a two-person help desk and in-person training to TxDOT and its regional and local planning partners. That same IAC expedited the creation of TexPACK and development of the subsequent, improved versions to date.

“We have identified improvements for future versions of the TexPACK tool several releases out and have a new release well underway,” Hall says. “Chances remain good that motorists won’t know about us or TexPACK. However, we do think they appreciate what the TexPACK software helps create — better transportation planning for the future. We are working to make that happen every day.” ■



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Road Safety Study During the Pandemic Shows Risk of Death or Injury Is Greater When Roads Are Clearer

by Ann Kellett, Texas A&M University
Division of Marketing & Communications
Special to the *Texas Transportation Researcher*

Although the risk of death or injury proved to be greater, the number of traffic crashes in Texas dropped during the pandemic.

The number of Texas traffic crashes in April dropped by almost 50 percent compared to 2017–2019 averages, according to a study by the Center for Transportation Safety (CTS) at the Texas A&M Transportation Institute (TTI). The number of fatalities also dropped by about 20 percent.

But while there were fewer crashes early on in the COVID-19 pandemic, there were about 50 percent more crashes resulting in a fatality during this time period compared to previous years.

TTI Senior Research Engineer and CTS Director Robert Wunderlich says their study on the effects of social distancing on traffic safety shows the risk of death or injury is greater when roads are more clear.

TTI researchers studied traffic in urban and rural settings in Texas, as well as crashes involving just one vehicle and those with more than one. They then grouped crashes into several categories: all single-vehicle, all multi-vehicle and urban multi-vehicle, urban single-vehicle, and rural single-vehicle and rural multi-vehicle.

While the numbers for both multi- and single-vehicle crashes were down by 55 percent and 23 percent,

Other risk factors for increased fatalities identified in the Texas Strategic Highway Safety Plan are impaired driving and distracted driving.

respectively, the proportion of crashes with at least one fatality rose by 14 percent for single-vehicle crashes and 59 percent for multi-vehicle crashes.

“With fewer vehicles on the road in April, it makes sense that we had fewer multi-vehicle crashes,” Wunderlich says. “And there is evidence that the relationship is exponential, meaning that decreases in volume can have a greater than proportional effect on crashes. The reduction in single-vehicle crashes is more likely to be proportional to the decrease in traffic.”

Wunderlich’s team found that the proportion of urban multi-vehicle crashes that resulted in a fatality almost doubled.

Wunderlich says two factors affect traffic crashes: exposure and risk. Exposure is the amount of travel, and risk is the chance that travel will result in a crash, injury or death. Because there was less exposure to risk in April with fewer

“We found that peak-period average speeds on Houston freeways increased from less than 45 miles per hour to 65 miles per hour. So all crashes occurred at higher, yet legal, speeds. We also found that the fatality risk in single-vehicle crashes rose only 10 percent in Texas urban areas and 18 percent on rural roads. This may indicate that excessive speeds are not as big an issue as the increase in average speed.”

*Robert Wunderlich
TTI Senior Research Engineer and TTI’s Center for
Transportation Safety Director*

drivers on the road, the number of crashes went down. But fatal crashes only dropped by 20 percent during that period, so the risk of a fatal crash was greater than normal.

Speed is a primary determinant of crash severity, Wunderlich says, with a 10 percent decrease in speed producing 38 percent fewer fatalities and 27 percent fewer serious injuries. But excessive speed wasn’t the only culprit for the increase in fatality risk in April, he notes.

“For example, we found that peak-period average speeds on Houston freeways increased from less than 45 miles per hour to 65 miles per hour,” he says. “So all crashes occurred at higher, yet legal, speeds. We also found that the fatality risk in single-vehicle crashes rose only 10 percent in Texas urban areas and 18 percent on rural roads. This may indicate that excessive speeds are not as big an issue as the increase in average speed.”

Other risk factors for increased fatalities identified in the Texas Strategic Highway Safety Plan are impaired driving and distracted driving. Pedestrian safety is also one of the areas of growing concern in the plan. An examination of fatal pedestrian crashes indicated that the levels of prior years were matched in 2020.

“It’s an issue of how we behave when we’re behind the wheel,” Wunderlich says. “Basically, we reduce our risk when we slow down, pay attention and stay sober. Until we get self-driving cars, the best way to reduce risk is the old-fashioned way: by making safer choices.” ■



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Counting Heads, Allocating Dollars



2020 PROJECTIONS: Texas by the Numbers

29.9M
TOTAL
POPULATION



19%
POPULATION
INCREASE
(2010–2020)

\$65.5M
Urban formula funds for
STATE-FUNDED URBAN SYSTEMS

9.3%
Portion of
U.S. URBAN
POPULATION

9.7%
Portion of
U.S. LARGE
URBAN POPULATION

7.7%
Portion of
U.S. RURAL
POPULATION

\$51.7M
RURAL
FORMULA
FUNDS

*All funding forecasts assume FY2020 levels of transit service, and available federal funding. Rural formula-funding forecast includes FTA 5311 formula apportionments (including Texas' 5340 apportionment). Urban formula-funding forecast includes FTA 5307 formula apportionments to all Texas urbanized areas served by state-funded urban transit districts (excluding 5340 apportionments).

Decennial Population Projections Foretell a Transit Funding Boost for Texas

Like virtually all major transportation systems, public transit services are supported by federal funding. In fact, according to the Congressional Research Service, these funds accounted for 16.5 percent of transit revenues nationwide in 2017. Exactly how much annual federal funding comes to a given area in the United States hinges, in part, on the outcome of the U.S. decennial census.

Federal funding allocations are driven largely by formulas based on population and other census-related metrics. The Federal Transit Administration (FTA) allocates urbanized area program funds using formulas that consider an urban area's classification as *small or large*. (Large urban areas are defined as having a population of 200,000 or more people.) Rural program funds flow through a statewide entity, which in Texas is the Texas Department of Transportation (TxDOT), which has its own formula to allocate funds

to rural transit systems. The urban and rural programs constitute the bulk of FTA's formula-based funding programs.

In a project sponsored by TxDOT's Public Transit Division, Texas A&M Transportation Institute (TTI) researchers, led by Research Scientist Michael Walk, recently estimated the projected impacts of America's decennial head count on transit funding in Texas. TTI researchers were assisted by the Institute for Demographic and Socioeconomic

“TTI’s work contributes greatly to our understanding of potential funding changes for critical mobility programs in Texas. Strategically, having this information now allows us to make decisions in advance of these changes to anticipate and, in many cases, mitigate impacts on services, particularly in the rural and non-metropolitan urbanized areas of Texas.”

Eric Gleason
TxDOT Director of Public Transportation

Research at The University of Texas at San Antonio, which produced the 2020 population projections.

The projections show the Lone Star State’s forecasted population will grow from 25.15 million a decade ago to 29.9 million in the new census — a 19 percent jump. That growth is one factor in determining federal apportionments, but it’s not the only one, Walk explains.

“Holding all other factors constant,” he says, “it’s Texas’ increase in the *share* of the U.S. population in a given area type that drives increases in the state’s share of federal funding for that area.”

Current outlooks point to Texas’ share of the nation’s urban population growing slightly, to 9.3 percent, compared to the 2010 census, in which Texas had 8.5 percent. The large urban population share is set to grow to 9.7 percent, with small urban share falling to 7 percent. The rural population share is projected to increase to 7.7 percent.

Based on the population projections, TTI forecasted the resulting funds from FTA’s urban and rural formula programs. Forecasts indicate annual increases in both of the programs: the total allocation for rural systems should increase to \$51.7 million, up by 8 percent from the current level. State-funded urban systems (those small and large urban systems that receive some funding from TxDOT) may see a total of \$65.6 million available post-census, an increase of 9 percent. These forecasts assume no changes in the total national amount of funding available in each FTA program.

The various factors in the federal funding formulas produce a range of forecasted impacts for individual systems in Texas:

- Nearly all rural transit districts are set to receive funding increases post-census; the exceptions are the Southwest Area Regional Transit District and the Lower Rio Grande Valley Development Council, both of which will move to the small urban designation due to



population increases (thereby reducing their population classified as rural).

- Overall funding for state-funded large urban transit districts will increase too, although three districts that will move to the large urban designation will see a decrease in federal funds. Those are the districts in Amarillo, College Station–Bryan, and McKinney.
- Every small urban transit district except one will see a modest funding boost due to relatively fast population growth. The exception is Wichita Falls, where population is receding.

Formula-funding allocations are based on available funds, Walk says, and any changes in those available amounts would necessitate an update in TTI’s funding forecasts.

“TTI’s work contributes greatly to our understanding of potential funding changes for critical mobility programs in Texas,” says TxDOT Director of Public Transportation Eric Gleason. “Strategically, having this information now allows us to make decisions in advance of these changes to anticipate and, in many cases, mitigate impacts on services, particularly in the rural and non-metropolitan urbanized areas of Texas.”

As mentioned earlier, all of the impacts are based on projected population tallies. Those forecasts will be replaced by actual census results, which are expected in 2022. Rather than waiting for those official counts, TxDOT and local transit system agencies are using TTI’s projections to prepare for anticipated shifts in funding.

“In some cases those shifts can be dramatic and difficult, and it’s critical for Texas to be ready,” Walk says. ■



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TTI/TxDOT-Developed Test Method Recognized as Official ASTM Standard for Erosion Control on Slopes



TTI researchers evaluated methods for protecting the area near a roadway, shown here, from uncontrolled erosion.

“This standard proves the test method’s ability to identify the most effective slope protection devices, which will result in better protection of our water and environment. We’re currently working on developing additional standards for sediment control devices as well as channel protection.”

*Jett McFalls
TTI Assistant Research Scientist*

BUILDING ROADS isn’t just about pouring pavement. Keeping the bed beneath the roadway stable is vital to avoid sooner-than-necessary maintenance and promote safety by preventing wear and tear. Controlling erosion around and below the roadbed itself is key to ensuring that roadbed stability. Further, uncontrolled erosion can negatively impact the environment as well by, for example, contaminating the water table with runoff.

But not all erosion-mitigation products are created equal. To determine which ones are most effective, the Texas A&M Transportation Institute (TTI) Sediment and Erosion Control (SEC) Lab and the Texas Department of Transportation (TxDOT) have developed a testing procedure that is now an official ASTM test standard recognized across the globe: ASTM D8297 / D8297M–20. Named Standard Test Method for Determination of Erosion Control Products (ECP) Performance in Protecting Slopes from Sequential Rainfall-Induced Erosion Using a Tilted Bed Slope, the standard represents the culmination of more than 20 years of TTI–TxDOT collaboration. The ASTM standard’s official status was about a decade in the making. TTI and TxDOT worked with the ASTM D18 Soil and Rock Committee on questions, clarifications and justifications to finalize the standard.

TTI Assistant Research Scientist Jett McFalls says, “This standard proves the test method’s ability to identify the most effective slope protection devices, which will result in better protection of our water and environment. We’re currently working on developing additional standards for sediment control devices as well as channel protection.”



TTI researchers used soil-filled test beds, shown here, to measure soil loss and evaluate the effectiveness of erosion control products.

Founded in 1898, ASTM International is one of the largest international standards development organizations in the world, serving 30,000 members from more than 140 countries. ASTM publishes more than 12,000 ASTM standards each year in a volume of the *Annual Book of ASTM Standards* or via the ASTM website. Many global industries, institutions and individuals recognize and use ASTM standards to improve performance and processes across a wide array of industries.

Michael Robeson, technical development manager for Profile Products LLC, served as primary editor and technical contact throughout the development process. “ASTM is a consensus-based standards development organization,” says Robeson, “and it’s excellent to have been a part of the large undertaking it was to formalize a testing method that TTI and TxDOT have been using for decades.”

TTI Research Specialist II Derrold Foster comments, “We’re excited here at the TTI SEC lab that this test method, which is such an effective and accepted test procedure within our industry, has gained ASTM approval. We would like to thank Michael Robeson, who initially drafted this test method as an ASTM work item, served as primary editor and technical contact throughout the development

process, and worked so effectively with us at TTI and so tirelessly to see this come to fruition.”

For more than three decades and to refine the method until it was suitable for adoption, TTI researchers at the Institute’s SEC Lab tested and evaluated how effectively erosion control products protect hillsides and slopes along roadways from erosion due to rainfall. The lab’s team built portable tilting test beds and conducted tests via the lab’s indoor rainfall simulator. TTI and TxDOT worked together to initiate and refine these tests, originally known as the “TxDOT test method.” The erosion control industry has widely used the method for years, and in that time it gained recognition as one of the most effective test methods available. Not only is the new standard currently the sole test method for testing and approving slope protection products for TxDOT, it is also used and accepted — either exclusively or as one of only two approved test methods — by departments of transportation, counties and municipalities worldwide.

“Working together to create this test method is a first-rate example of interagency teamwork,” states Dennis Markwardt, former director of vegetation management for TxDOT. Now retired, Markwardt oversaw

“The approval of this test method is another excellent example of TxDOT and TTI’s long-standing partnership. Our two agencies have collaborated on several initiatives that have set national and global standards in the transportation industry.”

James Stevenson
TxDOT Maintenance Division
Director

the method’s development for the department. “TxDOT’s collaboration with TTI produced the best test method for erosion control products in the nation,” he says. “And now that it’s recognized by ASTM, agencies at all levels around the globe can benefit from it.”

The procedure’s effectiveness and wide acceptance contributed to the ASTM D18 Soil and Rock Committee’s decision in June 2020 to adopt it as an official ASTM test standard. The DOI is 10.1520/D8297_D8297M-20, and the most recent version is online at <http://www.astm.org/cgi-bin/resolver.cgi?D8297D8297M>.

“The approval of this test method is another excellent example of TxDOT and TTI’s long-standing partnership,” says James Stevenson, TxDOT Maintenance Division director. “Our two agencies have collaborated on several initiatives that have set national and global standards in the transportation industry. I greatly appreciate our partnership with TTI and look forward to our continued work with them in this area, as well as in other areas that improve the way TxDOT connects the people of Texas.” ■



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TTI Research on I-20 Dallas Project Succeeds in Cutting Construction Time



“We are using all of these nondestructive testing data to significantly reduce the cost and time often involved in traditional field coring practices. This ‘Smart Coring’ strategy is much more beneficial and economical than traditional methods that involve randomly coring every mile of the roadway. We get fewer but more accurately revealing locations to pull the cores.”

*Darlene Goehl
TTI Research Engineer*



High-speed ground penetrating radar (GPR) is an important tool in the first step to finding the best rehabilitation method.



Rubblization rehabilitation methods used on the last 6 miles of the project resulted in significant time savings.

Texas A&M Transportation Institute (TTI) researchers are working with multiple Texas Department of Transportation (TxDOT) districts on case study projects to accelerate overall pavement construction project times. Using a wide variety of pavement forensic evaluation tools and an innovative traffic control plan, the bulk of the work happens before letting a project and is intended to evaluate alternative rehabilitation methods. Developed through previous research and implementation efforts, the tools and processes also help pinpoint the most effective repair for various sections of the corridor under construction.

Using alternatives to the originally planned and recommended pavement design in targeted areas avoids the time-honored practice of using a single pavement design or rehabilitation method for an entire corridor. That allows a targeted focus, tailoring construction solutions to unique problems along a discrete part of the roadway rather than applying a one-size-fits-all method.

“The traditional approach is often not 100 percent successful because different parts of the corridor may have different types of issues and problems underneath the pavement,” says TTI Senior Research Engineer Tom Scullion. “That means different solutions may be quicker and more effective in certain areas of the overall project.”

A key to this analytical approach is segmenting the entire corridor into sections that are then classified and evaluated separately based on the existing pavement conditions noted in the initial evaluation. In this process, the first step is to use a combination of GPR and high-definition video along the entire corridor to quickly identify the specific problem areas where moisture-related damage has occurred. Next, researchers do a structural check of the road by collecting deflection data using either traditional methods employing a falling weight deflectometer or TxDOT’s recently developed rolling deflectometer. Last, field cores are taken in targeted areas and analyzed extensively in the lab.

After it was determined that the two sections required different rehabilitation strategies, the original effort was divided into two projects. Using the innovative traffic control plan, the overall construction time for both projects was reduced.

“We are using all of these nondestructive testing data to significantly reduce the cost and time often involved in traditional field coring practices,” says TTI Research Engineer Darlene Goehl, who leads the project. “This ‘Smart Coring’ strategy is much more beneficial and economical than traditional methods that involve randomly coring every mile of the roadway. We get fewer but more accurately revealing locations to pull the cores.”

The first case study in the Dallas-Kaufman area on I-20 between I-635 and State Highway 34 is nearing completion. Researchers evaluated approximately 20 miles that included two distinct rehabilitation methods done across two projects. For approximately 14 of the 20 miles (sections 1 and 2), the rehabilitation included spot repair and an overlay. For the remaining heavily distressed 6 of the 20 miles (section 3), researchers recommended rubblizing the existing concrete pavement and then adding hot-mix overlays.

“One of the success stories on the I-20 rehabilitation/reconstruction project was the use of rubblization,” confirms Nic Wadlington, TxDOT assistant area engineer in the Kaufman/Rockwall Area Office. “While some sections of the project required a more traditional method, the lower traffic volume in others made it ideal for this method. Working 1 to 2 miles at a time, TxDOT reduced the existing concrete into rubble along the roadway. Rather than remove the rubble, the department used it as a base for the new roadway.”

Overall, the rubblization rehabilitation of the last 6 miles saved time and money, with reduced transportation and material costs compared to the traditional alternative of full-depth reconstruction. By designing the right process for the right section of roadway, the overall project time decreased significantly. Further, rubblization is not a frequently used process by TxDOT; therefore, it would not be unreasonable to assume the design strategy would have included removing and replacing the existing pavement structure, which would have substantially increased the project time and cost. ■



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THE FIRST-EVER VIRTUAL TEXAS PEDESTRIAN SAFETY FORUM



2020 TEXAS STATEWIDE PEDESTRIAN SAFETY FORUM

COVID-19 Uncertainty Leads to Opportunity: *Record Attendance at the 2020 Texas Pedestrian Safety Forum*

The Texas A&M Transportation Institute (TTI) hosted the first-ever virtual Texas Pedestrian Safety Forum Aug. 6, 2020. Supported by the Texas Department of Transportation (TxDOT) and the TTI's Center for Transportation Safety, the event focused on pedestrian safety issues.

By moving to a virtual platform, the 2020 Texas Pedestrian Safety Forum team provided 588 people from across Texas and the country the opportunity to attend. The one-day forum helped attendees learn more about pedestrian safety from industry leaders. One significant benefit of the virtual platform is the ability of attendees to view recordings of all sessions for up to one year.

“Dealing with the uncertainty of COVID-19 prompted us to move the forum to a virtual platform,” says TTI Senior Research Scientist Michael Manser. “Hosting the forum online allowed us to attract speakers and attendees from all over the state and country.”

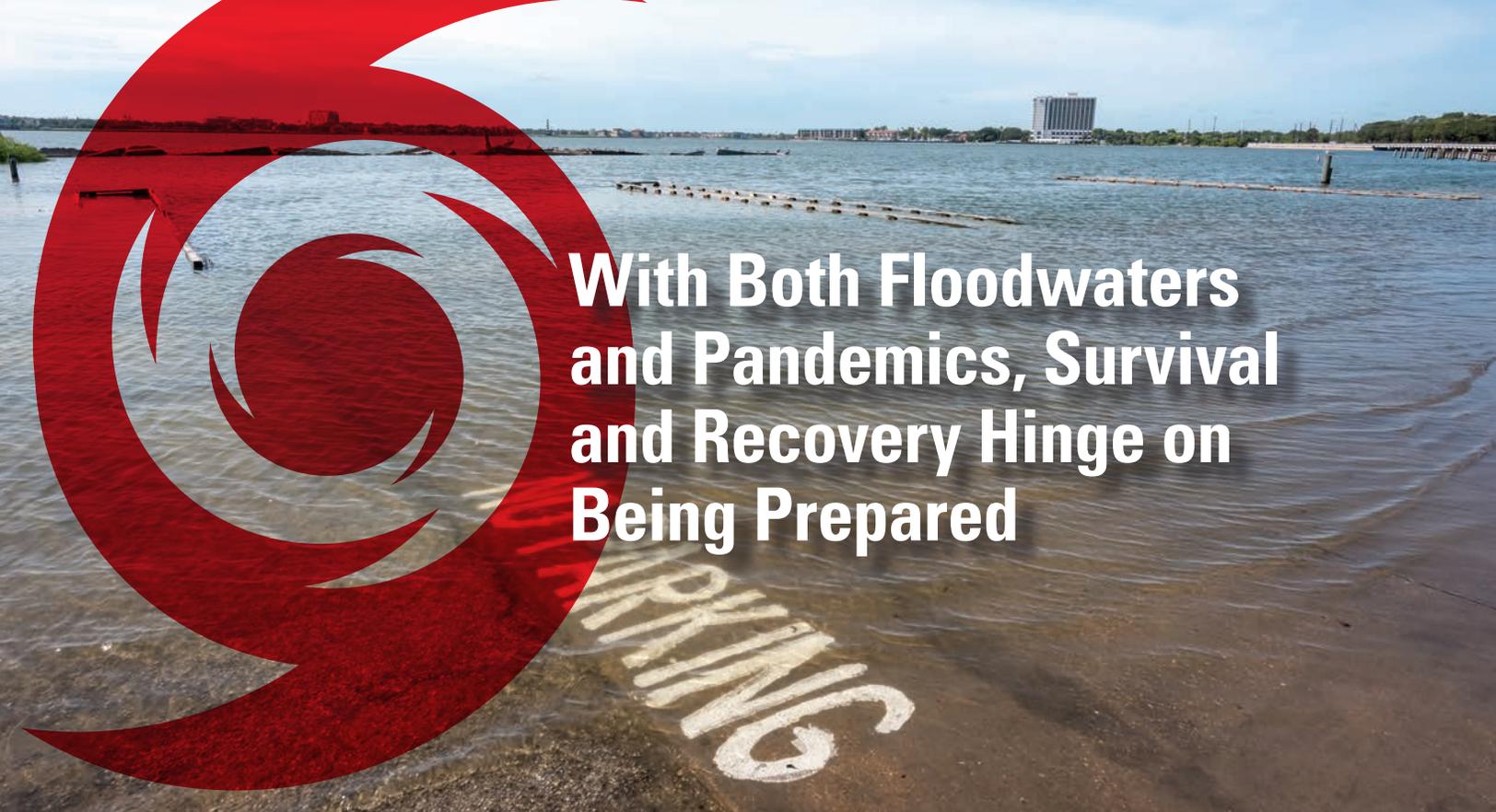
The forum had a diverse list of speakers from various sectors that deal with pedestrian safety, including public health and law enforcement, among others. Richard Retting, national practice leader for safety and research at Sam Schwartz Consulting, delivered the keynote address, providing insights into what data tell us about the current trends in pedestrian fatalities and how we might address them in the future.

“We were extremely pleased with the breadth of expertise and the diversity of topics that our presenters brought to the table at this year’s forum,” says TTI Assistant Research Scientist Ben Ettelman. “Our goal at these events is to ensure that every attendee — regardless of background or level of pedestrian safety expertise — will walk away having learned something that will assist them as they strive to make Texas safer for pedestrians. We feel confident that the 2020 Texas Pedestrian Safety Forum met this goal.”

TTI would like to thank everyone involved in setting up this conference, including Ettelman, Event Coordinator Stephanie Ferguson, Senior Administrative Coordinator II Christie Havemann, Associate Research Scientist Laura Higgins, Senior Research Scientist Michael Manser, Assistant Transportation Researcher Katherine Murdoch, and Communications and Marketing Coordinator Olivia Thomas; the eShow team, whose platform presented the conference; the webinar hosts and moderators; and the presenters for their time and flexibility. ■



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With Both Floodwaters and Pandemics, Survival and Recovery Hinge on Being Prepared

Storm surge flooding on Clear Lake from Hurricane Laura, Aug. 27, 2020, in Pasadena, Texas. Using TTI's warning system, traffic management agencies can better predict flooding during extreme weather events, thereby improving the odds of survival for those fleeing approaching storms. Photo Credit: Shutterstock/Mark Taylor Cunningham.

The COVID-19 pandemic is testing America's emergency responsiveness like never before. Adding a natural disaster to the mix (such as occurred with Hurricane Laura in August) has further stretched federal, state and local emergency management agencies' capacity to deal with multiple threats at one time. In a perfect storm of this magnitude, first responders need all the help they can get to reach those in need quickly and safely. Knowing in advance what to expect from post-hurricane flooding could make a life-saving difference on a widespread scale.

While we can't minimize the force of an approaching hurricane or change the currents of its resulting deluge, we can reduce the magnitude of its impact and how it might blindside us. Predictive models are currently helping public health experts anticipate where and when coronavirus infections might peak, which has aided in resource allocation, timing for stay-at-home policies, and other planning. Similarly, computer software can also help forecast where to expect roadway flooding during a hurricane, tropical storm or other significant rainfall event. Researchers at the Texas A&M Transportation Institute (TTI) have developed such a warning system, which combines rainfall and stream elevation data with real-time traffic information, helping drivers alter travel plans and avoid flooded routes following extreme weather events. The system uses a comprehensive network of sensors to estimate areas of roadway flooding risk, as well as alert travelers to

areas where the danger of flooding is high — in near real time. Sponsored by the Texas Department Transportation, system development was also supported by Houston TranStar partners including the City of Houston and the Harris County Flood Control District.

The tool can also serve as a route planning resource for essential emergency response functions; health care; and delivery of goods, fuel and water. A mechanism like that is especially important now, during a very active 2020 Atlantic hurricane season.

“We can use the data resources and analytics tools at our disposal to recognize where an approaching threat will be most severe and how it might progress,” TTI Researcher Mike Vickich says. Vickich and his colleagues in TTI's Research & Implementation–Houston Region Office work closely with local agencies and organizations through technology transfer and by implementing and evaluating advanced technologies in the urban transportation environment. “With that knowledge, we can increase our chances of survival and recovery and enhance our preparedness and resiliency for subsequent events.” ■



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2020 Texas Child Passenger Safety (Virtual) Conference Provides a Realistic Event Experience



The vendor, eShow, provided a template that TTI used to design the virtual entrance to the conference, pictured here. Source: eShow.

The 2020 Texas Child Passenger Safety Conference held Sept. 9–11 was the first virtual version of the event and the fourth such gathering to bring together child passenger safety technicians (CPSTs) from around the state of Texas. Sponsored by the Texas Department of Transportation (TxDOT) and organized by the Texas A&M Transportation Institute (TTI) and the Texas A&M AgriLife Extension Service, the annual gathering helps CPSTs learn about the latest research and trends in child passenger safety (CPS) while providing them with continuing education credits for recertification. This year’s conference boasted a record attendance of 400 participants.

Attendees participated in general and breakout sessions on a variety of CPS topics. They also had access to a virtual social hour, chats with fellow attendees and presenters, and various engagement activities unique to the virtual format.

Maggi Gunnels, the National Highway Traffic Safety Administration (NHTSA) Region 6 administrator who opened the conference, says her favorite part is seeing how passionate the CPS community is. “I really appreciate everything you do,” Gunnels told attendees. “It’s your leadership that makes all the difference in the world.”

Keynote speaker Laura Dunn, CPS subject matter expert in NHTSA’s

Office of Occupant Protection, develops CPS programming at the national level in collaboration with government and non-profit agencies. Dunn shared her own experience of becoming certified and how her passion for keeping children riding safely led to her education and career path to a national position, where she can more effectively promote best practices as a CPS champion. She also let technicians know about NHTSA’s national digital car seat check form, which CPSTs can use to track and make progress on car seat checks while working from the safety and comfort of their own homes. The form is available at <https://carseatcheckform.org/>.

Keynote speaker Laura Dunn shared her experience of becoming certified and how her passion for keeping children riding safely led to her career promoting child passenger safety best practices.

On Sept. 11, the conference’s opening session honored those who lost their lives in the attacks in 2001. The CPS community filled the chat section with memories about 9/11.

TTI Senior Research Scientist Katie Womack coordinates the conference for TTI. Looking back on this year’s online event, she says, “Putting on this conference is one of the most gratifying things we are privileged to do. The virtual conference was a new but exciting experience for us, and truly a team effort. We’re very pleased with the positive response from attendees.”

The next Texas Child Passenger Safety Conference will be held June 29–July 1, 2021, in Sugar Land, Texas. ■



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TTI-Produced TRB Video Wins Multiple Telly Awards



A five-minute video celebrating the Transportation Research Board's (TRB's) centennial has been awarded three 2020 Telly Awards. Produced by TTI for TRB, the video highlights the excitement and challenges of working in transportation research. The video premiered during TRB's 99th Annual Meeting in Washington, D.C., in January.

TRB, a division of the National Academies of Sciences, Engineering, and Medicine, turns 100 years old Nov. 11, 2020. The organization is celebrating its centennial by promoting the value of transportation research and celebrating the achievements of TRB's volunteers, sponsors, affiliates and staff.

"This award-winning video puts a spotlight on how young people have the opportunity to make a difference

in the world by choosing transportation as a career path," says Sandra Larson, chair of the TRB Centennial Task Force.

Founded in 1979, the Telly Awards showcase the best work created across various video platforms each year. The awards program is considered the most prestigious, independent evaluator of small screen productions worldwide. TRB's video won a gold award in the general recruitment category, as well as silver awards for craft writing and in the general, not-for-profit category.

"TTI and its transportation research experts have been active TRB volunteers for six decades, and we are pleased to have had the opportunity for our video production team to work with our partners at TRB on this award-winning production about the future of transportation and transportation careers," says TTI Agency Director Greg Winfree. ■

TTI Researchers Receive U.S. Patents for Pedestrian Safety, Traffic Data Systems

TTI Research Engineer Tony Voigt, TTI Software Applications Developer IV Mike Vickich, and TTI Software Applications Developer IV Micah Montoya received U.S. patent no. 10,535,262 on Jan. 14, 2020, for an active pedestrian warning system for rail and bus transit routes.

The active pedestrian warning system uses a Bluetooth® beacon transmitter synced with a vehicle, such as a train or a bus. The transmitter picks up mobile devices nearby, determines which devices are relevant, and sends an audible, visual or tactile (or all three) alert to the mobile devices. Receiving this alert on their mobile device, pedestrians can be warned they're about to walk in front of a bus and avoid the collision.

"The Bluetooth Proximity Alert System can be used by transit agencies to enhance safety for pedestrians and bicyclists by raising awareness of approaching transit vehicles. It's also relatively simple to implement, making it an attractive tool for the safety toolbox," says Vickich.

Additionally, Vickich and TTI Research Scientist Darryl Puckett received U.S. patent no. 10,726,717 on July 28, 2020, for a traffic monitoring system used on roadways in real time. Traditionally, transportation



Montoya

Puckett

Vickich

Voigt

agencies use toll tags or license plate recognition to collect data; but these methods are often costly and can involve privacy issues for the traveling public.

The traffic monitoring system uses multiple reader devices that pick up wireless signals from devices (such as mobile phones) in vehicles within the reader device's range. Each reader device categorizes a vehicle with a time stamp, which is compared to other time stamps associated with that vehicle. This method provides a way to gather data in real time and determine how to make improvements to travel-time accuracy.

"This application has been implemented in more than 5,000 specific locations worldwide since its development," Puckett says. "It's widely regarded as state-of-the-art for traffic monitoring and continues to evolve with additional improvements as technology changes." ■

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TTI's Pedestrian Hybrid Beacon Study Wins National Award

TTI conducted an Arizona Department of Transportation (ADOT)-funded research study about pedestrian hybrid beacons that received the 2020 American Association of State Highway Transportation Officials' (AASHTO's) Sweet 16 award.

The study, *Evaluation of Pedestrian Hybrid Beacons on Arizona Highways*, examined pedestrian hybrid beacons, which increase driver awareness of pedestrians crossing at uncontrolled marked crosswalks. This special type of traffic control device uses a system of beacon lights along with signs to alert drivers and control vehicle traffic. The TTI team included Senior Research Engineer Kay Fitzpatrick, Senior Research Scientist Eun Sug Park, and Assistant Research Engineer Mike Pratt.

"This project was an example of the quality that can result when the panel and the researchers have effective communication and support," Fitzpatrick says. "Deadlines were shifted to ensure timely data collection and timely tech transfer. The team appreciates the opportunity provided by this project along with the added AASHTO recognition for the work." ■

TTI, German Aerospace Center Promote Mutual Research and Technology Transfer

TTI and the German Aerospace Center — *Deutsches Zentrum für Luft- und Raumfahrt e.V.* (DLR) — recently signed a memorandum of understanding (MOU) to encourage international collaboration on transportation research, technology transfer and education.

With locations across Germany, DLR is one of the largest aeronautics and space research centers in the country. DLR research explores fields such as aeronautics, space, energy, transportation, digitalization and security.

"The MOU provides access to a wide range of international expertise," says TTI Executive Associate Director Katie Turnbull. "We look forward to working with DLR to address critical transportation issues with innovative services and emerging technologies."

TTI and DLR will work together on a variety of research activities that include facilitating information exchange between like-minded researchers, securing funding for and conducting joint research projects, as well as developing and teaching courses and professional development.

"We're very excited about collaborating with DLR to positively influence mutual transportation challenges," says TTI Mobility Division Head Bill Eisele. "To kick off our partnership, we're determining interest for a virtual information exchange related to passenger and freight travel impacts due to the ongoing global pandemic." ■

TTI, Texas A&M Partner on Senior Driver Assistance Technologies Study



Manser

TTI Human Factors Program Manager and Senior Research Scientist Michael Manser recently concluded a study in which he partnered with Ranjana Mehta, associate professor in Texas A&M University's Department of Industrial and Systems Engineering and director of Texas A&M's

NeuroErgonomics Laboratory. The study, co-funded by TTI's SAFE-D University Transportation Center and Center for Transportation Safety, examined how senior drivers prefer to learn about assistance technologies. Researchers discovered that senior adults were more likely to use advanced driver assistance systems if they learn about them via videos instead of manuals or in-person demonstrations. Study findings were printed in the January issue of the journal *Applied Ergonomics*.

"Determining how drivers learn to use advanced vehicle technologies is increasingly critical as our vehicles become increasingly complicated but are not accompanied by proper training," Manser says.

Senior drivers often have a hard time multitasking, for example, simultaneously using cruise control while reading road signs. The research team studied responses from 20 drivers aged 58 to 68, who completed participant evaluations in the TTI Driving Simulator that replicated driving on a roadway. Researchers tracked where the drivers were looking and monitored brain activity as well.

"[Project results] have already been shared with driver education and training agencies throughout the United States and abroad to aid in the design of curricula for all ages," Manser says. "This was a great opportunity for work conducted at Texas A&M to impact driver safety." ■



THE LAST STOP

with Greg Winfree, Agency Director

Partners in Problem-Solving

TTI AND TxDOT CELEBRATE 70 YEARS OF TEAMWORK

Seventy years! That’s how long TTI and the Texas Department of Transportation (TxDOT) have partnered to solve transportation problems for Texans. In 1950, the then-Texas Highway Department approached Texas A&M College to leverage the best and brightest academic minds to meet the most pressing challenges of the day: potholes, traffic snarls and threats to driver safety, to name a few.

What a journey it’s been!

If the past is prologue, then there are amazing times ahead. You’ll find TxDOT-funded TTI innovations on roads across the globe. Breakaway signs designed to limit injury on impact; roadside safety devices aimed at “forgiving the physics” when a vehicle runs off the road; new materials and pavement recipes that make longer-lasting roadways needing fewer repairs.

In this issue, you read about the alliance creating the internationally accepted ASTM Standard D8297/D8297M-20, a test method developed in TTI’s Sediment and Erosion Control Laboratory for evaluating erosion control materials for TxDOT. Now, that’s the way it’s supposed to work — sponsored research yielding local solutions the entire world can use.

And we’re just getting started. There’s a long road ahead as our network evolves to meet future needs. Advanced transportation infrastructure, necessary for deploying autonomous vehicles; the Texas Strategic Highway Safety Plan, which recommends ways to save lives and prevent injuries; traffic pattern and impact analyses in West Texas that improve safety and reduce congestion while encouraging energy development — these are a few of our joint initiatives.

And we’ve accomplished those under rather difficult circumstances. The COVID-19 pandemic has forced us to adapt many aspects of everyday life, including how we view our transportation system. While the loss of life has been terrible, the crisis has shown the Institute and TxDOT how strong



our bonds of partnership really are. Our collaboration has continued — indeed, been enhanced in some areas — as we reimagine how, for example, research can help mitigate the spread of infectious diseases like COVID-19 through our global transportation system.

Honest, effective communication has always been key to the success of the TTI-TxDOT relationship, and now — when face-to-face discussions are safest at a distance — it’s absolutely essential. As we seek to recover from the pandemic, the investment we’ve made in understanding one another will yield high returns. What brought TTI and TxDOT together in the first place — the need to solve transportation problems for Texans — hasn’t changed. And neither has our shared commitment to fulfilling that mission.

We know one another, we trust one another, and we know we can rely on one another. The formula works: TxDOT’s strategic vision + TTI’s solutions = a more resilient, robust and responsive transportation system for Texas and the world. Here’s to the next 70 years of working together to build the network we need for the 21st century. ■



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