

# 2013 ANNUAL REPORT



Center for International Intelligent  
Transportation Research

El Paso, Texas



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## Annual Report



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# FROM THE DIRECTOR

Center for International Intelligent Transportation Research

**Today's** integrated world economy requires economic development across borders for the mutual benefit of all nations involved. But to move goods effectively from one country to the other requires a vital, efficient transportation system.

Since 2006, when the Texas Legislature established the Center for International Intelligent Transportation Research, our overarching goals have been to facilitate cross-border economic competitiveness while improving the quality of life in border communities.

## CIITR's mission:

- maintain and improve mobility in the face of growing traffic and shrinking resources,
- increase border-crossing efficiency while maintaining security, and
- improve air quality to advance public health.

Beginning with this annual report, CIITR is expanding coverage of its non-center funded research and implementation projects. Center researchers are performing work not only in the El Paso-Juarez region, but elsewhere in Texas and internationally as well.

Sponsors in the El Paso region and in other communities along the U.S.-Mexico border are applying center research findings to develop innovative solutions to area problems. For example, in 2014, the City of El Paso will begin operating the first of its four Rapid Transit System corridors. CIITR researchers developed an innovative method for projecting ridership numbers that overcome existing data and time constraints while still being acceptable to the Federal Transit Administration. The ability to deliver such analyses more quickly improves the

ability of transit agencies to meet federal funding deadlines and enables them to bring projects to fruition faster. And more satisfied customers across El Paso equates to an improved quality of life for those using transit services.

In another case—seven years after our researchers began studying alternatives to measure border wait times—technological concepts first developed and successfully tested in El Paso (using RFID and Bluetooth® technology) are being transferred to ports of entry throughout Texas and Arizona. Improved wait-time measurements can help regulatory agencies better manage traffic volume, security agencies achieve more thorough oversight without slowing down traffic queues, and distributors realize shipping efficiencies that, eventually, are passed along to consumers via lower prices.

On the international front, our researchers are assisting the municipality of Ciudad Juarez and the World Bank in developing one of the first urban-freight regulatory plans for a major city in Latin America. Ultimately, the plan will help make urban freight in Ciudad Juarez—including freight to and from El Paso—safer and more efficient, while improving overall mobility and the quality of life for residents all along the corridor.

Though center research sponsorship has broadened as local solutions find wider application, our mission remains the same: to enhance the lives of people affected by international trade by improving the efficiency of the trade transportation network via technological and process innovations. We've only just begun fulfilling that mission.

**Rafael Aldrete, Ph.D.**  
Director, Center for International  
Intelligent Transportation Research



# OPERATIONS

## Traffic Operations

Through new applications of traffic modeling and data management, CIITR researchers are enhancing transportation system efficiency and improving regional mobility.

### IN THIS SECTION

**Building a Master Road Network for Paso del Norte**

**DTA-Based Congestion Mitigation Strategies for El Paso**

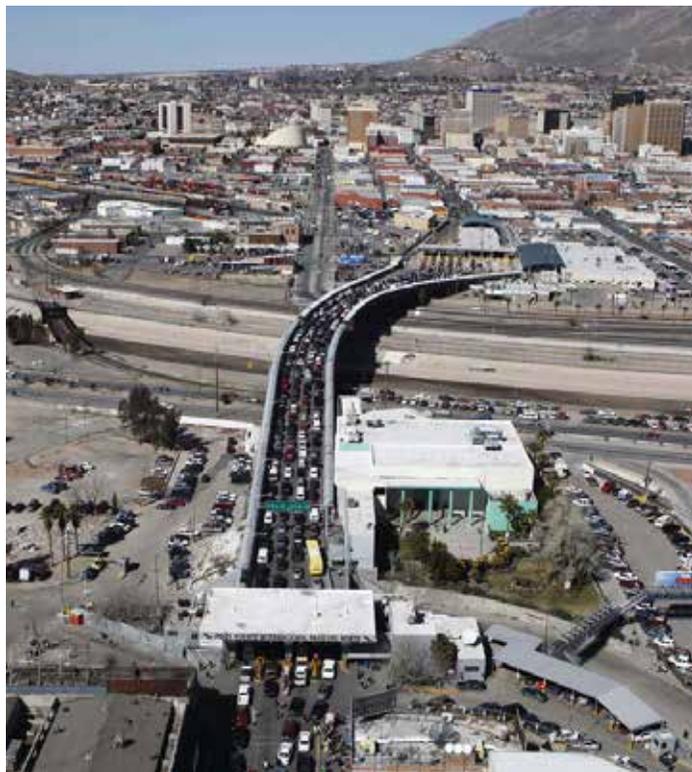
**Risk-Based Toll Revenue Analysis for the Loop 375 Border Highway West Project**

**Sharing the Road in El Paso: An Examination of Flexible Carpooling Systems**

**Technical, Institutional and Financial Structuring of the Corredor Pacifico Project**

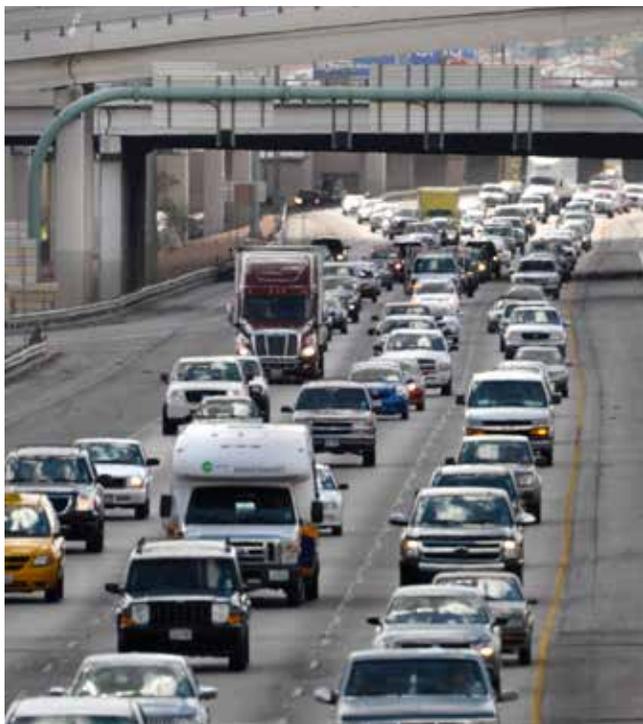
## Building a Master Road Network for Paso del Norte

In fiscal year 2013, researchers with CIITR recommended a combination of methods and technologies for creating a transportation master-road network and traffic analysis for the Paso del Norte region. An integrated road network would be compatible with the various modeling platforms used by other transportation professionals in the field. Working with reliable and updated information, the integrated road network would improve regional and local travel-demand estimations, ensuring a better utilization of both, time and resources. For fiscal year 2014, researchers determined the best way to develop a regional Origin-Destination (O-D) matrix that complemented the master road network. In order to do so, the research team conducted a literature review and an analysis on the various origin-destination data collection techniques. They considered the cost, advantages and disadvantages of each method. The researchers determined that the most appropriate methods include a combination of traffic counts, information from local travel demand models and the use of computer based iterative O-D calibration tools.



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## DTA-Based Congestion Mitigation Strategies for El Paso



In most cases, road construction is designed to alleviate congestion by providing additional lanes of travel. Unfortunately, the road-construction project itself usually increases the congestion problem — at least until the new lanes are available. How the construction project is conducted will determine the severity of the problems. In the El Paso area, one planned capacity-improvement project involves the widening of Interstate 10 between US 54 (Patriot Freeway) and Zaragoza Road. Researchers compared numerous alternative-construction scenarios with different lane-closure configurations and schedules to determine which procedure would have the least negative impacts. Researchers used DynusT, an open-source mesoscopic dynamic traffic assignment (DTA) model, to predict each scenario's traffic pattern changes and impacts. As a result of the analysis, recommendations were made as to which construction scenario is preferable. Researchers found that the DTA-based tool could also be used for other construction projects to determine which intersections and corridors will be impacted the most. Anticipating problems, traffic-control measures could be improved at those locations during the construction process.



**For more information** contact Geza Pesti at (979) 845-9878 or [g-pesti@tamu.edu](mailto:g-pesti@tamu.edu).

## Risk-Based Toll Revenue Analysis for the Loop 375 Border Highway West Project



**Construction** will begin next year on a toll road in El Paso designed to provide commuters with an alternative to Interstate 10. At a cost of \$800 million, the nine-mile, Loop 375 Border Highway West project should alleviate some of the congestion in the region, provide better connectivity for motorists and provide additional infrastructure to accommodate future growth. But, as with any toll road, how do officials know what to charge to ensure that people will use the facility? CIITR researchers are currently developing an innovative risk-analysis toll-revenue modeling methodology to identify the variables that affect financial performance of toll road projects and provide a more realistic probability-based estimate of future traffic revenues. The researchers have been asked to conduct a test of the methodology using the Border Highway Project as a case study. After examining numerous variables — speed, capacity, toll rates, population and employment density along the corridor, and many others — researchers will assess the suitability of the methodology for investment-grade traffic and revenue studies.



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## Sharing the Road in El Paso: An Examination of Flexible Carpooling Systems

**Faced** with a growing population, tight budgets and little-to-no room to build high-occupancy vehicle (HOV) lanes, the El Paso region is considering a flexible carpooling program to alleviate congestion and environmental concerns. This research project included a literature review to analyze the leading flexible carpooling systems around the country, including those that use smart-phone applications that do not require pre-arrangement measures by users. Following a survey, researchers discovered a strong interest among area-college students in the use of a dynamic carpooling system. The project examines how other flexible carpooling systems are operated and financed, and documents their strengths and weaknesses. In order for such a system to be successful at area-college campuses, researchers point out that an aggressive publicity campaign and the use of various communication channels would be crucial.



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## Technical, Institutional and Financial Structuring of the Corredor Pacifico Project

**The** Inter-American Development Bank (IDB) hired the consulting services of Castalia-TTI partnership to recommend a technical, institutional and financial framework for the implementation of the project Corredor Pacifico (CP), as well as an action plan for implementing the recommended structure, a regional integration project aimed at developing a 2,700-kilometer highway corridor from Panama to Puebla (Mexico) as a Public-Private Partnership (PPP). To achieve this goal, Castalia and TTI first evaluated the existing technical, institutional and financial resources previously developed by the IDB and complemented these studies with recommended strategies and necessary analysis for a successful implementation of the Corridor. TTI was responsible for leading the technical component of the project, which included:

- independent assessment of transport and traffic demand projections,
- independent assessment of project costs, and
- develop an action plan and scope of work for future preliminary technical studies.

Based on the preliminary assessment, CIITR researchers developed a three-stage implementation plan for the financial, institutional and technical structuring of the Corredor Pacifico PPP. The plan included the necessary studies; preliminary structuring and additional steps to follow; project duration recommendations; estimated costs; and suggested leading institutions for the successful completion of each stage.



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# EFFICIENCY

## Border-Crossing Efficiency

CIITR researchers are developing solutions to help agencies enhance border crossing operations and enable the safe, secure and efficient movement of people and goods at one of the busiest border crossing in North America.

### IN THIS SECTION

**Economic Costs of Critical Infrastructure Failure in the El Paso-Ciudad Juarez Region**

**Increasing the Trusted Shipper Program at the Border**

**Investigating New Detectors for Border Traffic Counts**

**Making Reliable Border Crossing Time Predictions**

**Time Savings Benefits Assessment for Secure Border Trade Program**



## Economic Costs of Critical Infrastructure Failure in the El Paso-Ciudad Juarez Region

**Cross-border** trade with Mexico forms the backbone of economic growth in the United States. The interdependence of U.S. national and global transportation supply chains means that any kind of disruption in one supply chain can have a significant impact on the chains it connects to. The specific objectives of this study were to: develop and calibrate a simulation-based dynamic traffic assignment (DTA) model for the bi-national region and to assess the effect of a critical infrastructure failure; determine the traffic impact on the border region after the transportation infrastructure closure, specifically, at POEs; and analyze the economic consequences of disruptions to the critical infrastructure using the DTA model developed. In addition to developing the model, TTI derived a method to link the DTA modeling method to a cargo diversion method for analyzing the economic costs of a critical transportation infrastructure failure. The research team developed an assessment of costs based on connections between origin-destination pairs for three major trip types: base case, short term, and long term. While both regions stand to lose economically, it is a given that these costs will ripple not only across the El Paso–Juarez bi-national region, but also to the main trading partner regions across the United States. However, the El Paso region has more to lose financially. To minimize these kinds of losses, effective mitigation planning that takes into account the traffic and business continuity effects of disasters is key. The DTA model route choice effects after a disruption in the network provided insight regarding how traffic can propagate across the entire network and over time. Behavioral effects and queuing effects are a significant component requiring follow-up investigation in the context of binational commodity flow.



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## Increasing the Trusted Shipper Program at the Border

**Since** “trusted shipper programs” (CTPAT, FAST And NEEC ) were established several years ago, participants have experienced reduced border wait times and improved just-in-time inventory delivery reliability. Established jointly by the U.S. Customs and Border Protection and its Mexican counterpart, Aduana, trusted shipper status was granted to shippers who met pre-approved security criteria. Their cargo travels in a secure supply chain and is pre-screened, resulting in fewer inspections and reductions in border crossing times. Even so, some companies choose not to join the programs. To find out why, researchers conducted a survey among manufacturers, assembly plants, customs brokers, importers, logistics providers and transportation companies. The survey revealed the reasons why some of the companies do not join trusted shipper programs, and the researchers recommended several ways membership can be increased. Among the recommendations, researchers suggest the establishment of a strategic plan that gains access to the leaders and decision-makers of manufactures to explain the benefits of joining the trusted shipper programs. Companies were also encouraged to form a partnership with public- and private-information providers to help decision-makers better understand the benefits of joining trusted shipper programs.



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## Investigating New Detectors for Border Traffic Counts



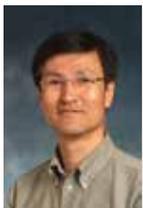
**The** quest continues for a cost-effective, reliable way to count the thousands of cars and trucks that cross the border between the U.S. and Mexico every day. Although counting vehicles may seem like an easy process, traffic counts are sometimes unreliable because of the stop-and-go environments typical at border crossings. In fiscal year 2013, researchers examined two products in their ongoing study examining the technologies best suited to measure traffic volumes in a border-crossing setting. One product being tested is a laser scanner that measures the distance from the device to the vehicle. Another product being studied is a pavement-mounted micro-radar inserted into a four-inch pavement core, about two inches deep. The radar unit faces traffic and is able to count the vehicles that pass by. A final report is being prepared on the products that have been tested. Researchers will include recommendations based on which products and technologies that worked the best.



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## Making Reliable Border Crossing Time Predictions

**With** the use of historical and current real-time data, researchers have developed statistical prediction models that are being used to determine how long it will take for commercial vehicles to cross the Texas-Mexico border. The prediction model project has its roots in the 2009 installation of radio frequency identification (RFID) technology devices at the Bridge of the Americas. The devices measure wait and crossing times for commercial vehicles. As of July 2014, RFID readers are supplying the wait and crossing-time data from seven ports of entry (POEs) and that data is used at the Border Crossing Information System (BCIS) website, located at <http://bcis.tamu.edu/Commercial/en-US/index.aspx>. Because each POE is unique, researchers customized algorithms and performed sensitivity analysis in order to fine-tune the accuracy of the prediction models. As a result of this project, the crossing times used on the BCIS website are forecast up to one hour in advance. Separately, researchers are building a prototype web dashboard designed to test the quality of their prediction models.



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**The** initial phase of this study, which related to the issue of security, trade efficiency and economic development along the U.S.-Mexico border, was completed by researchers in 2013 as part of the El Paso Secure Border Trade (SBT) project (began in 2011). In the SBT project, both tractor and trailers from three maquilas were outfitted with GPS devices. In addition to collecting detailed travel-time data between twin plants located in El Paso, Texas, and Ciudad Juarez, Mexico, the SBT project has other goals, including enhancing relationships between the maquilas, customs, transporters and border security personnel. The CIITR study centers on the analysis of the GPS data generated by the participating SBT trucks that ship goods across the border. In phase one of the CIITR study, researchers determined the availability and quality of the data and conducted a preliminary analysis using the data collected during the first half of the SBT project to present preliminary findings. In phase two of the study, researchers will continue the process of collecting and analyzing the data, refine the metrics and conduct a final assessment and report.



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# AIR QUALITY

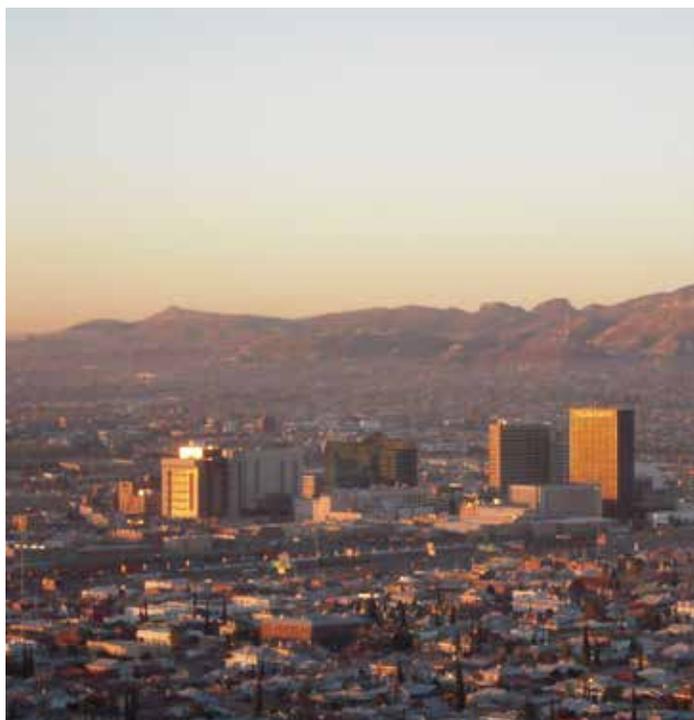
## Air Quality Initiatives

Vehicle emissions testing and data analysis tools are employed by CIITR researcher to better understand regional environmental conditions and improve air quality.

### IN THIS SECTION

**El Paso Socio-Economic-Health Data Assessment**

**Estimating Traffic-Related Air Pollution in El Paso**



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**Communities** are vulnerable. While transportation can benefit local communities—facilitating evacuations during disasters, for example—it can also present hazards. Knowing more about a local population can help engineers, planners, and policymakers minimize potential threats and better serve a community's needs. The goals of this project included identifying where data about social, economic, and health vulnerability can be obtained, how agencies in El Paso are currently using these data, and making recommendations for improving both processes. CIITR researchers queried local/state agencies and other organizations in El Paso regarding their use of social, economic, and health data. The team then cataloged federal, local/university, and private data resources and identified limitations with currently available data sources. Suggestions for stakeholders to effectively use population data in their planning processes include:

1. Train personnel on data sources and availability and ensure resources are available to integrate data into community planning.
2. Improve communication with national/state agencies that might already have existing data resources for a given topic.
3. Leverage existing expertise by using a third party to access the data needed.
4. Establish relationships with Census Data Research Centers to access micro-level data not otherwise easily accessible.
5. Identify specific information particularly relevant to stakeholders and use appropriate statistical techniques to achieve more thorough analyses across variables.
6. Use social, economic, and health variables to enhance assessment and analysis aspects of planning studies for transportation, health, and emergency management.

**According** to the Texas Commission on Environmental Quality (TCEQ), El Paso is the only border area in Texas that has violated national air quality standards. Mobile source emissions (including vehicle exhaust) contribute significantly to the problem, along with other sources including industrial, residential, and cross-border. CIITR researchers used multivariate receptor modeling—specifically positive matrix factorization (PMF)—to separate unobserved vehicle emissions from air-pollution mixtures indicated by ambient air quality data. They collected and analyzed two sets of multivariate air pollution data: 1) speciated PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter less than 2.5 microns) mass concentrations (measured every 3 days from 2006 to 2008) and 2) hydrocarbon hourly concentrations (measured in 2008) at El Paso's Chamizal monitoring station. The team also used wind-direction analysis to estimate the contribution of sources from Mexico. Regression models were applied to relate traffic levels to vehicle emissions (taking the other sources into account).

The findings of this project may interest local stakeholders—such as the El Paso Metropolitan Planning Organization, the Texas Department of Transportation, the City of El Paso, and TCEQ—in understanding source apportionment of pollutants measured in El Paso. It can potentially inform transportation planning strategies aimed at reducing emissions across the region or the development of more efficient traffic-management strategies. Other broader applications of this approach include supporting health impact analyses and risk analyses for border communities.



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# PROGRAM SUPPORT

## Other Program Support

In addition to the many examples of CIITR-based initiatives, center staff members are also involved in a wide range of externally funded innovations that provide substantial economic and security benefits to the region.

### IN THIS SECTION

**Addressing Environmental Justice Concerns When Developing Tolling Policies for the Border Region**

**Restoring the Presidio International Freight Rail Crossing**

**Teens in the Driver Seat – El Paso**

**Transportation Reinvestment Zones**

## Addressing Environmental Justice Concerns When Developing Tolling Policies for the Border Region

**The** Texas Department of Transportation (TxDOT) and the Camino Real Regional Mobility Authority (CRRMA) are constructing toll lanes in El Paso along the César Chávez Border Highway. Under the auspices of environmental justice (EJ), the toll lanes could severely impact residents in this community who live below the poverty level. TTI assessed EJ concerns in the area and offered TxDOT tolling policy options that consider the needs of the lower-income populations, while keeping in mind the need to recover bonded construction costs. TTI used a state-of-the-art simulation-based dynamic traffic assignment modeling to analyze baseline static toll rates, assess variable pricing, and model a scenario using an innovative algorithm that dynamically changes toll rates based on managed lanes' speed to determine which option maximizes revenue. Regarding EJ issues, TTI used geographic information systems (GIS) and demographic data to identify low-income populations within the border region and mapped these to corresponding traffic analysis zones. Values-of-time were adjusted to determine how often drivers in these areas were diverting to non-tolled facilities. TTI then compared the diversion trends and assessed any potential changes in transportation service within the region. Researchers found that the César Chávez lanes should benefit income classes equitably without substantially impacting bike/pedestrian safety, air pollution, or—with noise abatement measures in place—noise pollution. Regarding modal equity—or travelers choosing a single- versus multi-occupancy vehicle mode of travel—TTI found no benefit/incentive for multi-occupant travelers unless high occupancy is considered for future operations and toll rates.



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Jeff Shelton at (915) 532-3759 or  
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## Restoring the Presidio International Freight Rail Crossing



**For** more than six years, the international freight-rail crossing at Presidio has been closed following a bridge fire. The Presidio/Ojinaga crossing, though traditionally low in traffic, was one of only eight rail border crossing areas between the U.S. and Mexico. Plans are underway to replace the bridge late in 2015; however, the benefits that might come from reopening the crossing are largely unknown. Owned by the Texas Department of Transportation, the 391 miles of track from Presidio to San Angelo Junction are operated by the Texas Pacific Railroad. In a white paper, researchers examined the issues in light of the recent oil and gas production in West Texas and the improved sections of the rail line from Sulphur Junction (a few miles north of Fort Stockton) and San Angelo, allowing for increased rail speeds. Among the issues, the paper addresses the potential impacts of a reopened Presidio/Ojinaga crossing on the existing rail traffic flows, the need for additional customs inspection facilities and the potential for rail-served industry development in the region.



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**The** El Paso region of Teens in the Driver Seat represents one of the strongest concentrations of activity in Texas for the Teens in the Driver Seat® program. Teens in the Driver Seat is the nation's first peer-to-peer program focusing solely on teen-driver safety. The program is different from other teen-driver safety initiatives in two ways. First, it focuses on the most common dangers for young drivers: driving at night; distractions such as cell phones, texting and other

teen passengers; and speeding. Second, the program relies on the teen audience to both develop and deliver safety messages to their peers, minimizing the "adult fingerprints" that characterize other teen-driver safety efforts. During 2013, the Teens in the Driver Seat program was active in 10 area high schools and 8 junior high schools. Teen participants planned and led a wide array of activities that creatively reached thousands of their peers, as well as

school administrators and parents. Other examples of the region's standout status include the awarding of the TDS Cup to six area schools and student awards presented to 10 students for their service in the name of TDS in their local schools. The following teachers received the SponStar award this year: Laura Rizo (Desert View Middle School), Janice Briones (El Dorado 9th Grade Academy), and Sylvia Garcia (Jefferson/Silva High School).



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## Transportation Reinvestment Zones

**Value Capture (VC)** is a land market-based innovative financing method that leverages the real estate potential brought by infrastructure improvements in a specific area. In transportation, VC can be simply defined as the means by which transportation infrastructure investment is funded by “capturing” either some or all of the added value of real-estate property that results directly from that investment. Texas is one of the first states in the United States to develop a legislative framework that allows local governments (e.g., municipalities and counties) to use VC specifically to fund transportation infrastructure through a mechanism called transportation reinvestment zones (TRZ). Based on a breakthrough combination of GIS and advanced financial modeling tools, TTI has developed a methodology to evaluate TRZ revenue-generation potential, and has been using it to assist municipalities and counties throughout the state to assess their capacity to fund specific roadway projects through the TRZ mechanism. One of these communities is the City of El Paso, where the first operating TRZ in the state was set up in 2010. Since 2009, TTI researchers have also been providing training to local agencies in communities, where there is growing interest in using the TRZ mechanism as a funding alternative for transportation infrastructure.



**For more information**

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# EL PASO SUPPORT

## El Paso Regional Support

As a microcosm of border trade, tourism and commerce, El Paso offers a unique opportunity for CIITR researchers to study border issues and improve the region's transportation system and environment while finding solutions to problems experienced in other communities along the U.S.-Mexico border.

### IN THIS SECTION

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## Economic Costs of Critical Infrastructure Failure in the El Paso-Ciudad Juarez Region

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1. Train personnel on data sources and availability and ensure resources are available to integrate data into community planning.

2. Improve communication with national/state agencies that might already have existing data resources for a given topic.
3. Leverage existing expertise by using a third party to access the data needed.
4. Establish relationships with Census Data Research Centers to access micro-level data not otherwise easily accessible.
5. Identify specific information particularly relevant to stakeholders and use appropriate statistical techniques to achieve more thorough analyses across variables.
6. Use social, economic, and health variables to enhance assessment and analysis aspects of planning studies for transportation, health, and emergency management.

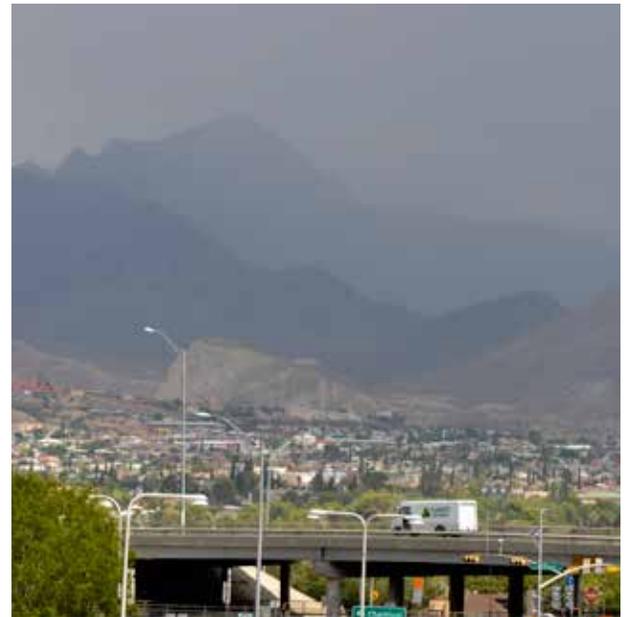


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## Estimating Traffic-Related Air Pollution in El Paso [FPO]

**According** to the Texas Commission on Environmental Quality (TCEQ), El Paso is the only border area in Texas that has violated national air quality standards. Along with vehicle exhaust (technically known as “mobile source emissions”), multiple sources—industrial, residential, and cross-border—contribute significantly to the problem. CIITR researchers used multivariate receptor modeling—specifically positive matrix factorization (PMF)—to separate unobserved vehicle emissions from air-pollution mixtures indicated by ambient air quality data. They collected and analyzed two sets of multivariate air pollution data: 1) speciated PM2.5 (particulate matter with an aerodynamic diameter less than 2.5 microns) mass concentrations (measured every 3 days from 2006 to 2008) and 2) hydrocarbon hourly concentrations (measured in 2008) at El Paso’s Chamizal monitoring station. The team also used wind-direction analysis to estimate how much Mexican sources add to El Paso’s pollution problem. Regression models helped identify how traffic relates to vehicle emissions (taking the other sources into account). Stakeholders (including the El Paso metropolitan planning organization, the Texas Department of Transportation, the City of El Paso, and TCEQ) can use the project’s findings to

1. Create more effective transportation planning strategies to reduce emissions, particularly hydrocarbons, across the region.
2. Estimate cross-border contributions to local air pollution when forging legislation or making environmental policy in both countries.
3. Develop more efficient traffic management strategies (e.g., restricting truck traffic where significant vehicular pollution exists) to help reduce traffic-related pollution.
4. Provide risk estimates of pollution-related mortality for different ethnic groups in El Paso, subsequently improving the region’s overall public health.



### For more information

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## Risk-Based Toll Revenue Analysis for the Loop 375 Border Highway West Project



**Construction** will begin next year on a toll road in El Paso designed to provide commuters with an alternative to Interstate 10. At a cost of \$800 million, the nine-mile, Loop 375 Border Highway West project should alleviate some of the congestion in the region, provide better connectivity for motorists and provide additional infrastructure to accommodate future growth. But, as with any toll road, how do officials know what to charge to ensure that people will use the facility? CIITR researchers are currently developing an innovative risk-analysis toll-revenue modeling methodology to identify the variables that affect financial performance of toll road projects and provide a more realistic probability-based estimate of future traffic revenues. The researchers have been asked to conduct a test of the methodology using the Border Highway Project as a case study. After examining numerous variables — speed, capacity, toll rates, population and employment density along the corridor, and many others — researchers will assess the suitability of the methodology for investment-grade traffic and revenue studies.



### For more information

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## Sharing the Road in El Paso: An Examination of Flexible Carpooling Systems

**Faced** with a growing population, tight budgets and little-to-no room to build high-occupancy vehicle (HOV) lanes, the El Paso region is considering a flexible carpooling program to alleviate congestion and environmental concerns. This research project included a literature review to analyze the leading flexible carpooling systems around the country, including those that use smart-phone applications that do not require pre-arrangement measures by users. Following a survey, researchers discovered a strong interest among area-college students in the use of a dynamic carpooling system. The project examines how other flexible carpooling systems are operated and financed, and documents their strengths and weaknesses. In order for such a system to be successful at area-college campuses, researchers point out that an aggressive publicity campaign and the use of various communication channels would be crucial.



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## Teens in the Driver Seat – El Paso



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**The** El Paso region of Teens in the Driver Seat represents one of the strongest concentrations of activity in Texas for the Teens in the Driver Seat® program. Teens in the Driver Seat is the nation's first peer-to-peer program focusing solely on teen-driver safety. The program is different from other teen-driver safety initiatives in two ways. First, it focuses on the most common dangers for young drivers: driving at night; distractions such as cell phones, texting and other teen passengers; and speeding. Second, the program relies on the teen audience to both develop and deliver safety messages to their peers, minimizing the "adult fingerprints" that characterize other teen-driver safety efforts. During 2013, the Teens in the Driver Seat program was active in 10 area high schools and 8 junior high schools. Teen participants planned and led a wide array of activities that creatively reached thousands of their peers, as well as school administrators and parents. Other examples of the region's standout status include the awarding of the TDS Cup to six area schools and student awards presented to 10 students for their service in the name of TDS in their local schools. The following teachers received the SponStar award this year: Laura Rizo (Desert View Middle School), Janice Briones (El Dorado 9th Grade Academy), and Sylvia Garcia (Jefferson/Silva High School).



**The** initial phase of this study, which related to the issue of security, trade efficiency and economic development along the U.S.- Mexico border, was completed by researchers in 2013 as part of the El Paso Secure Border Trade (SBT) project (begun in 2011). In the SBT project, both tractor and trailers from three maquilas were outfitted with GPS devices. In addition to collecting detailed travel-time data between twin plants located in El Paso, Texas, and Ciudad Juarez, Mexico, the SBT project has other goals, including enhancing relationships between the maquilas, customs, transporters and border security personnel. The CIITR study centers on the analysis of the GPS data generated by the participating SBT trucks that ship goods across the border. In phase one of the CIITR study, researchers determined the availability and quality of the data and conducted a preliminary analysis using the data collected during the first half of the SBT project to present preliminary findings. In phase two of the study, researchers will continue the process of collecting and analyzing the data, refine the metrics and conduct a final assessment and report.



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# INTERNATIONAL

## International Research Initiatives

CIITR research expertise is helping to improve the international transportation network's efficiency across borders in North and Central America.

### IN THIS SECTION

- Building a Master Road Network for Paso del Norte**
- Increasing the Trusted Shipper Program at the Border**
- Investigating New Detectors for Border Traffic Counts**
- Making Reliable Border Crossing Time Predictions**
- Restoring the Presidio International Freight Rail Crossing**
- Technical, Institutional and Financial Structuring of the Corredor Pacifico Project**

## Building a Master Road Network for Paso del Norte

In fiscal year 2013, researchers with CIITR recommended a combination of methods and technologies for creating a transportation master-road network and traffic analysis for the Paso del Norte region. An integrated road network would be compatible with the various modeling platforms used by other transportation professionals in the field. Working with reliable and updated information, the integrated road network would improve regional and local travel-demand estimations, ensuring a better utilization of both, time and resources. For fiscal year 2014, researchers determined the best way to develop a regional Origin-Destination (O-D) matrix that complemented the master road network. In order to do so, the research team conducted a literature review and an analysis on the various origin-destination data collection techniques. They considered the cost, advantages and disadvantages of each method. The researchers determined that the most appropriate methods include a combination of traffic counts, information from local travel demand models and the use of computer based iterative O-D calibration tools.



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## Increasing the Trusted Shipper Program at the Border



Since “trusted shipper programs” (C-TPAT, FAST And NEEC ) were established several years ago, participants have experienced reduced border wait times and improved just-in-time inventory delivery reliability. Established jointly by the U.S. Customs and Border Protection and its Mexican counterpart, Aduana, trusted shipper status was granted to shippers who met pre-approved security criteria. Their cargo travels in a secure supply chain and is pre-screened, resulting in fewer inspections and reductions in border crossing times. Even so, some companies choose not to join the programs. To find out why, researchers conducted a survey among manufacturers, assembly plants, customs brokers, importers, logistics providers and transportation companies. The survey revealed the reasons why some of the companies do not join trusted shipper programs, and the researchers recommended several ways membership can be increased. Among the recommendations, researchers suggest the establishment of a strategic plan that gains access to the leaders and decision-makers of manufactures to explain the benefits of joining the trusted shipper programs. Companies were also encouraged to form a partnership with public- and private-information providers to help decision-makers better understand the benefits of joining trusted shipper programs.



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## Investigating New Detectors for Border Traffic Counts

**The quest continues** for a cost-effective, reliable way to count the thousands of cars and trucks that cross the border between the U.S. and Mexico every day. Although counting vehicles may seem like an easy process, traffic counts are sometimes unreliable because of the stop-and-go environments typical at border crossings. In fiscal year 2013, researchers examined two products in their ongoing study examining the technologies best suited to measure traffic volumes in a border-crossing setting. One product being tested is a laser scanner that measures the distance from the device to the vehicle. Another product being studied is a pavement-mounted micro-radar inserted into a four-inch pavement core, about two inches deep. The radar unit faces traffic and is able to count the vehicles that pass by. A final report is being prepared on the products that have been tested. Researchers will include recommendations based on which products and technologies that worked the best.



### For more information

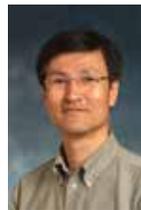
contact Dan Middleton at (979) 845-7196 or [d-middleton@tamu.edu](mailto:d-middleton@tamu.edu).



## Making Reliable Border Crossing Time Predictions



**With the use** of historical and current real-time data, researchers have developed statistical prediction models that are being used to determine how long it will take for commercial vehicles to cross the Texas-Mexico border. The prediction model project has its roots in the 2009 installation of radio frequency identification (RFID) technology devices at the Bridge of the Americas. The devices measure wait and crossing times for commercial vehicles. As of July 2014, RFID readers are supplying the wait- and crossing-time data from seven ports of entry (POEs) and that data is used at the Border Crossing Information System (BCIS) website, located at <http://bcis.tamu.edu/Commercial/en-US/index.aspx>. Because each POE is unique, researchers customized algorithms and performed sensitivity analysis in order to fine-tune the accuracy of the prediction models. As a result of this project, the crossing times used on the BCIS website are forecast up to one hour in advance. Separately, researchers are building a prototype web dashboard designed to test the quality of their prediction models.



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## Restoring the Presidio International Freight Rail Crossing

**For more than** six years, the international freight-rail crossing at Presidio has been closed following a bridge fire. The Presidio/Ojinaga crossing, though traditionally low in traffic, was one of only eight rail border crossing areas between the U.S. and Mexico. Plans are underway to replace the bridge late in 2015; however, the benefits that might come from reopening the crossing are largely unknown. Owned by the Texas Department of Transportation, the 391 miles of track from Presidio to San Angelo Junction are operated by the Texas Pacific Railroad. In a white paper, researchers examined the issues in light of the recent oil and gas production in West Texas and the improved sections of the rail line from Sulphur Junction (a few miles north of Fort Stockton) and San Angelo, allowing for increased rail speeds. Among the issues, the paper addresses the potential impacts of a reopened Presidio/Ojinaga crossing on the existing rail traffic flows, the need for additional customs inspection facilities and the potential for rail-served industry development in the region.



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## Technical, Institutional and Financial Structuring of the Corredor Pacifico Project

**The Inter-American Development Bank (IDB)** hired the consulting services of Castalia-TTI partnership to recommend a technical, institutional and financial framework for the implementation of the project Corredor Pacifico (CP), as well as an action plan for implementing the recommended structure, a regional integration project aimed at developing a 2,700-kilometer highway corridor from Panama to Puebla (Mexico) as a Public-Private Partnership (PPP). To achieve this goal, Castalia and TTI first evaluated the existing technical, institutional and financial resources previously developed by the IDB and complemented these studies with recommended strategies and necessary analysis for a successful implementation of the Corridor. TTI was responsible for leading the technical component of the project, which included:

- independent assessment of transport and traffic demand projections,
- independent assessment of project costs, and
- develop an action plan and scope of work for future preliminary technical studies.

Based on the preliminary assessment, CIITR researchers developed a three-stage implementation plan for the financial, institutional and technical structuring of the Corredor Pacifico PPP. The plan included the necessary studies; preliminary structuring and additional steps to follow; project duration recommendations; estimated costs; and suggested leading institutions for the successful completion of each stage.



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# PARTNERSHIPS

## Key Partners

The significant contributions of TTI's Center for International Intelligent Transportation Research are made possible through the support, dedication and expertise of our many partners.



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Ciudad Juarez  
Ciudad Juarez Instituto Municipal de Investigacion y Planeacion

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# 2013 ANNUAL REPORT



Center for International Intelligent  
Transportation Research

El Paso, Texas