



# 2012 ANNUAL REPORT



Center for International Intelligent  
Transportation Research

El Paso, Texas



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## Annual Report



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# INTRODUCTION

Center for International Intelligent Transportation Research

The interdependence between economic development and transportation has never been more profound. Consequently, economic competitiveness has become more reliant on safe and efficient transportation — especially for international urban regions such as El Paso. In recognition of this need, the Center for International Intelligent Transportation Research (CIITR) is pursuing innovative solutions to evolving challenges.

Established by the Texas Legislature in 2006, CIITR seeks to

- 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.

In each of these missions, CIITR is committed to enhancing the quality of life and economic vitality for the Paso Del Norte (PDN) region and to developing solutions that can be successfully applied in other states and U.S. border environments.

# 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:

- **Minimizing traffic impacts of potential extreme events**
- **Integrating road network models for the Paso del Norte region**
  - **Providing for safer movement of hazardous materials**
- **Using active traffic management for more immediate congestion relief**
- **Envisioning a one-stop shop for vehicle, transit and air travel information at airports**

## Minimizing traffic impacts of potential extreme events

Interstate Highway 10 in the border region is a major corridor that carries thousands of vehicles through the city and through several ports of entry on a daily basis. Any disturbance to the transportation system has severe impacts in terms of traffic congestion and economic activity. The objective of this research was to assess the impacts of several different types of nonrecurring extreme events in the El Paso region, including hazardous-material traffic accidents, inclement weather and catastrophic infrastructure failure.

To capture the impacts from a reliability perspective, an innovative modeling method was used to capture both the short- and long-term impacts to the transportation system. The results will help identify areas that are the most vulnerable to being affected by traf-

fic pattern changes and will provide valuable information for daily commuters as well as local and international carriers that transport commodities across the U.S.–Mexico border.

The results of this research will provide insights and identify possible improvements to existing emergency plans and will assist the metropolitan planning organization in selecting projects for its long-range Metropolitan Transportation Plan.

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## Integrating road network models for the Paso del Norte region

Currently, an integrated regional road network for traffic modeling does not exist for the Paso del Norte (PDN) region, which includes El Paso, Ciudad Juarez and Las Cruces. In the past, various network formats and inconsistent data have created a barrier to reliable information sharing between transport modeling platforms. A regional network would allow CIITR researchers and regional transportation planners (such as the El Paso Metropolitan Planning Organization, the Texas Department of Transportation, and the

Ciudad Juarez Instituto Municipal de Investigacion y Planeacion) to work with the entire regional transportation network for various types of planning and research studies — such as transportation demand modeling, environmental and land use studies, etc. — all in one master road network.

CIITR researchers are creating a GIS-based regional transportation master road network compatible with multiple transportation modeling platforms to include the PDN region. The network will not only improve the travel demand estimation in the region, but will also eliminate network compatibility issues that can result in missing links, incorrect attributes or names, a lack of projection/ coordinated systems, interconnection, etc., and will save valuable time and resources.

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## Providing for safer movement of hazardous materials

Hazardous materials are transported on the highway system regularly and can pose a potential threat to the traveling public. It is important for emergency planners, managers and responders to have current and valid information on the movements of these materials in case of an emergency, but existing data are very limited. Information from federal databases is usually too general for local planning, and federal agencies restrict access to hazardous-material transport data. Private data are closely guarded by shippers and carriers.

To address this issue, researchers collected information from hazardous-material shipping documents at Department of Public Safety commercial vehicle inspection stations. The data were then evaluated, summarized and presented to local and state emergen-

cy planning and response agencies as part of a hazardous-material commodity flow study. This information is important because it aids in reducing the uncertainty about the types of incidents that emergency responders are likely to encounter and helps identify the what, where, when and how of potential incident scenarios. By collecting and providing this information, CIITR is helping local and state emergency planners, managers and responders in their efforts to reduce hazards and risks to local communities and the driving public.

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## Using active traffic management for more immediate congestion relief

As is the case for many major metropolitan areas, El Paso suffers with congestion issues that affect the quality of life for travelers and residents of the surrounding areas. Active Traffic Management (ATM) strategies offer transportation planners the potential of providing temporary, short-term congestion relief until more permanent, long-term capacity enhancements can be made in high-priority corridors. ATM uses a combination of operational strategies – such as variable speed limits, shoulder running, dynamic lane assignments, adaptive ramp metering strategies, dynamic rerouting and signing, etc. – to fully optimize the use of the existing roadway infrastructure in a region.

Through a series of workshops hosted by TxDOT, researchers coordinated with local agency officials to examine the potential of deploying ATM strategies and techniques to address congestion issues in El Paso. As part of the workshops, local agencies were instructed on the benefits; costs; and institutional, technical, and procedural issues associated with different types of ATM strategies. Using the strategy selection tool developed by TTI for assisting the local agencies in identifying locations and strategies where could be provide temporary relief to congestion. Issues related to inte-



grating ATM strategies with existing ITS deployments were also identified by local agencies. As a result of the project, local agencies now have the tools and knowledge that can assist them in incorporating the ATM into the long-term planning process.

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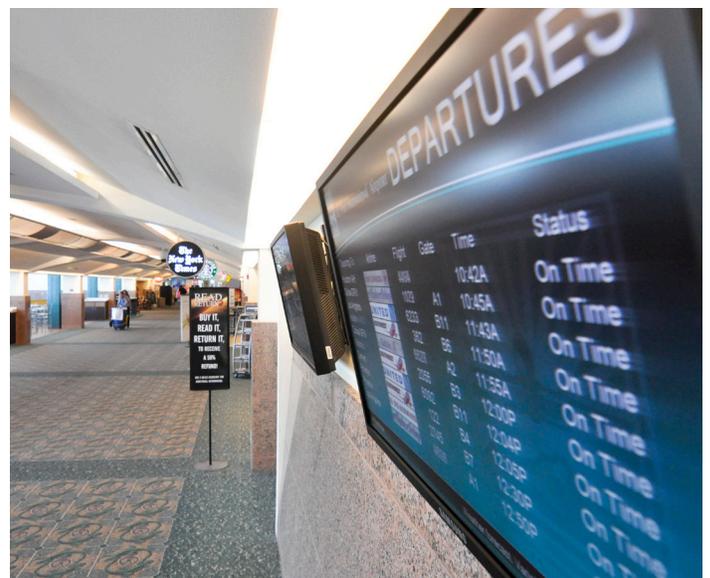


## Envisioning a one-stop shop for vehicle, transit and air travel information at airports

The existing traveler information resources in the El Paso area primarily serve road users. For those using vehicle, transit and air travel in succession, the typical travel information experience remains a disjointed effort; users must access different websites or information sources with little or no integration between the agencies that provide the information. These other modes of travel also have sizeable impacts on the regional transportation system and would greatly benefit by having a one-stop shop for the multimodal traveler.

CIITR researchers were tasked with introducing the state of the practice regarding gathering and distributing advanced traveler information to the El Paso International Airport and other stakeholders. Researchers held a stakeholder workshop to identify information needs, sources and time frames; then they summarized their findings to provide a framework to establish a truly regional shared traveler information system.

By facilitating the dynamic sharing of traveler information across multiple modes of transportation, the overall travel experience of a significant portion of the traveling public will be greatly enhanced. Researchers are optimistic that the workshop will be the beginning of an ongoing discussion and eventually lead to the creation of a regional advanced traveler information system that integrates vehicle, transit and air travel information.



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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 crossings in North America.

### IN THIS SECTION:

- **Making truck traffic volume data available in real time**
- **Measuring northbound and southbound traffic trends**
- **Gaining a better understanding of cross-border pedestrian traffic**
- **Communicating the economic impact of delays at border crossings**
- **Assessing multiple layers of security screening for trucks**



## Making truck traffic volume data available in real time

Thousands of trucks cross the U.S.–Mexico border every day. Because many of the ports of entry are reaching their capacity level, it is becoming increasingly important to know the exact number. This knowledge can assist transportation decision makers in planning efforts to look for trends and needs for expansion, assessing the need for allocation of lanes at ports, and monitoring the productivity of each port of entry. In this effort, researchers tested the use of the Wavetronix SmartSensor SS-125 as a means to calculate the number of trucks at the Bridge of the Americas port of entry. Knowledge of the number of trucks crossing the border allows decision makers to better understand the dynamics involved as dispatchers and users make decisions about which ports to use to cross the border. Through this evaluation, researchers gained a better understanding of which products are most applicable and best suited to accurately monitor traffic volume.



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## Measuring northbound and southbound traffic trends

Cross-border freight activities are one of the key indicators of the status of the economy. Recent negative trends in the global and U.S. economy have resulted in a significant decline in trade and freight movement worldwide. Since 2009, CIITR has been studying freight activities across ports of entry on the U.S.–Mexico border and has published the results in the 2009 and 2010 issues of the Northbound Traffic Trends Research Brief.

The 2011 Research Brief presents traffic trends and analysis that can help estimate future freight activities and help identify ports of entry where capacity improvements may be needed. The results can also help decision makers in allocating resources for border-crossing operations and activities.



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## Gaining better understanding of cross-border pedestrian traffic



The Paso del Norte Bridge is one of the busiest border pedestrian crossings between Texas and Mexico, and as such supports the economic development of both Ciudad Juarez and El Paso. Pedestrian traffic volumes have been falling significantly at the border crossing over the last several years. This decrease is partially due to long wait times, which have become a critical issue for retail businesses, because the drop in cross-border pedestrian traffic has started to impede economic growth in the border region.

The main objective of this project was to gain a better understanding of what factors influence cross-border pedestrian retail shopping travel decisions. Ultimately, knowing these motives will provide policy makers with analytical support for proposing strategies to improve the flow of pedestrian traffic and will aid in the prediction of future travel behavior. The overall results of this study will allow researchers to explore the factors that motivate or demotivate pedestrian travel and the issues they face, as well as provide insights to alleviate these issues.

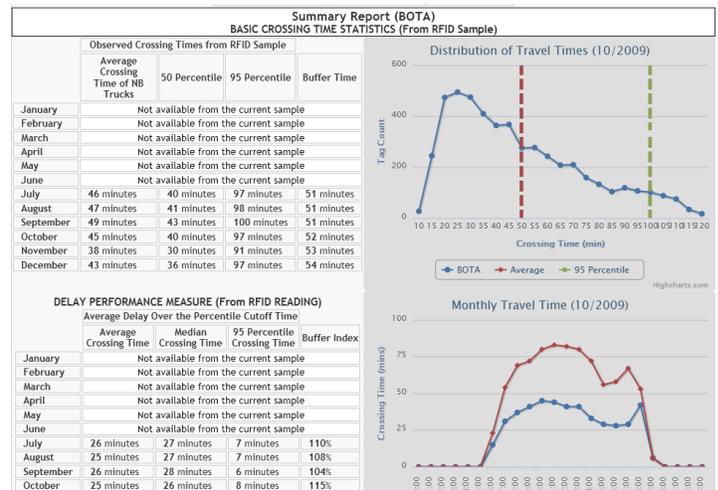
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## Communicating the economic impact of delays at border crossings

For commercial border-crossing users, time delays are not only inconvenient but can also be very costly. If users were able to estimate border wait times more accurately, they might be able to build in additional buffer times or adopt alternative methods on their side to reduce delays.

Using radio frequency identification (RFID) tags, researchers at CIITR developed a website that combines commercial border-crossing performance measures (such as crossing time delays) with economic factors (such as fuel costs and driver wages). Combining this information is important because it allows users, including shippers, to determine departure time and port-of-entry selection to aid in reducing direct delay costs. The information accessible on this website (shown at right) is also beneficial to agencies and policy makers because it provides a way to track and analyze trends associated with delay costs at ports of entry. Officials will also be able to make more informed planning and policy decisions regarding border crossings. The website will provide users at all levels with a robust source of delay-related performance measures.



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## Assessing multiple layers of security screening for trucks

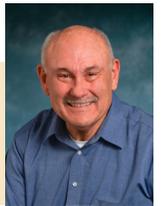
The two primary international bridge crossings — the Bridge of the Americas and Zaragoza — in El Paso are very crowded, and are quickly approaching their saturation point for commercial truck crossings. The delays at the bridges restrict the economic growth on both sides of the border. The Customs and Border Protection trusted shipper program exists to help relieve border congestion by expediting border crossing and reducing border wait times. However, the program adds an additional cost to the shipper; therefore, many are less inclined to participate in the program.

The purpose of this study was to investigate ways to mitigate the cost of the trusted shipper program, thereby creating a greater incentive for more shipping companies to use the program. Researchers found that profit margins for shippers along the border are very narrow, and any additional costs — such as those associated with joining established trusted shipper programs — are too expensive for many manufacturers and truckers. CIITR staff researched possible methods

to reduce or share the costs of the trusted shipper program. As one possible solution, researchers are examining the feasibility of how the added cost can be shared by other governmental agencies such as municipalities, which often own and operate bridge crossings, or counties, which are responsible to the federal government for quality of life and meeting air pollution standards.

Any solution that reduces border wait times will benefit the people and businesses that use the bridges, as well as improve the overall economic and environmental condition of the area.

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# INITIATIVES

## Air Quality Initiatives

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

### IN THIS SECTION:

- **Developing more precise emissions estimates for Clean Air Act compliance**

The El Paso area is currently in nonattainment for particle pollution and on the verge of being in nonattainment for carbon monoxide emissions. Areas that are in nonattainment of the Environmental Protection Agency's standards risk losing federal highway funds if they do not comply with Clean Air Act deadlines. Nonattainment areas need to develop accurate estimates of emissions from all sources in the area because these estimates are used to demonstrate conformity, develop State Implementation Plans, and analyze alternative strategies. Current emissions estimation models are based on average national values, but these default values do not represent the unique characteristics of the border crossings, such as a diverse vehicle mix and varied operational conditions, along with longer border wait times. A robust method to estimate emissions would make it possible to include the overall impact of cross-border vehicle activity and how control strategies would impact emissions.

To develop an estimation tool to calculate the emissions impact of cross-border traffic, researchers first had to address the gaps in emissions estimation methodologies for border-crossing activities, and develop a way to extract the second-by-second emissions rates from the Motor Vehicle Emission Simulator (MOVES) model and real-world emissions measurements.

The proposed methodology will help El Paso-area agencies accurately include the impact of control strategies and future port-of-entry improvements into their decision-making process. This proposed model can be applied for emissions estimation at other border locations and can be used to quantify the pollution impact of cross-border vehicle traffic. The model can also be used to assess the effectiveness of emissions control strategies applied in other border regions.

To leverage CIITR funding, researchers secured \$122,000 from the U.S. Environmental Protection Agency (through the Texas Commission on Environmental Quality) to support the second-year completion of this effort, in which the emissions estimation tool will be developed and validated.

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# 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:

- **Enabling peer influence to prevent teen-driver crashes**
- **Improving border security through better tracking of goods movement**

## Enabling peer influence to prevent teen-driver crashes



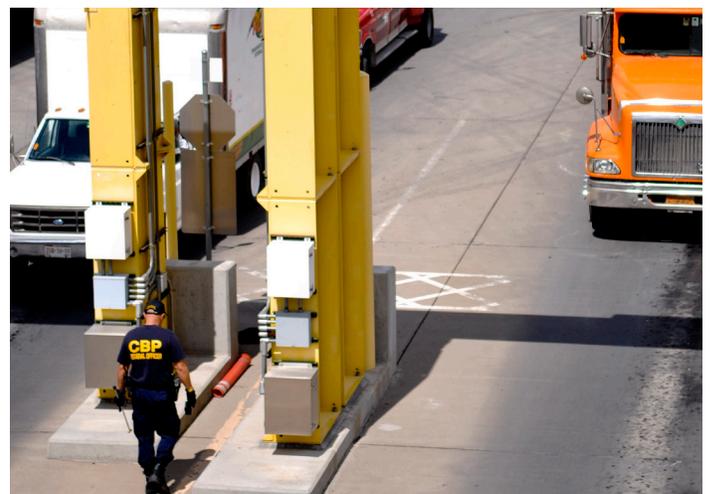
The El Paso region of Teens in the Driver Seat represents one of the strongest concentrations of activity in Texas for the Teens in the Driver Seat® program. Teens in the Driver Seat is the nation's first peer-to-peer program focusing solely on teen-driver safety. The program is different from other 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 2012, the Teens in the Driver Seat program was active in 20 area schools and 13 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 appointment of three students — Velia Martinez, Naomi Cadena and Asia Phompany — to the program's statewide advisory board, and the selection of teachers Susan Wiggs (Irving High School) Laura Rizo (Desert View Middle School) and Janice Briones (El Dorado 9th Grade Academy) as the recipients of the program's SponStar Award. Two El Paso-area schools were 2012 Teens in the Driver Seat Cup winners — El Dorado 9th Grade Academy won second place in the 2A/3A high school category, and Desert View Middle School won first place in the junior high category.



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## Improving border security through better tracking of goods movement

Border-crossing efficiency and security can be compromised by limited monitoring ability. The El Paso County Secure Border Trade (SBT) Demonstration Project — funded by the U.S. Department of Transportation — introduces electronic tracking, reporting and monitoring technology that will expand the capabilities of the private and public sectors to monitor the loading of tractor-trailers and track the movement of goods and the operation of vehicles, from origin to destination. The SBT project will also verify the identity of drivers and other participants in the cross-border supply chain in real time. In doing so, the project will heighten security, increase participation in trusted shipper programs, promote economic development, and facilitate border trade efficiency by enhancing collaboration between maquiladoras (maquilas), customs brokers, transporters and border security personnel. The CIITR staff is providing technical support to the county for this project by performing technology monitoring based on systems engineering practices. In addition, the staff is assisting the county throughout the life of the project by coordinating with the vendor on behalf of the county for successful completion of the project.



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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.

### >> PUBLIC SECTOR

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Border Environment Cooperation Commission  
City of El Paso  
County of El Paso  
El Paso Metropolitan Planning Organization  
El Paso Area Independent School Districts  
Federal Highway Administration  
Texas Commission on Environmental Quality  
Texas Department of Public Safety  
Texas Department of Transportation  
The University of Texas at El Paso  
The State of Texas  
U.S. Environmental Protection Agency

### >> PRIVATE SECTOR

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Battelle  
Mesilla Valley Transportation  
Modelistica  
PTV America

### >> BINATIONAL AND INTERNATIONAL

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Ciudad Juarez  
Ciudad Juarez Instituto Municipal de Investigacion y Planeacion  
United Nations World Health Organization/Pan American  
Health Organization

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