Texas A&M
Transportation
Institute

FY15-16
ANNUAL REPORT

Center for International Intelligent Transportation Research

El Paso, Texas

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Annual Report

A LETTER FROM THE DIRECTOR

Community Solutions, Home Grown

El Paso has grown by leaps and bounds over the past decade. Since 2006, when the Center for International Intelligent Transportation Research (CIITR) was founded, new businesses have opened, new housing and hotels have been built, and new colleges, like the Texas Tech Medical School, have become part of our community. We even opened our own baseball stadium, Southwest University Park, in 2014.

Growing pains inevitably accompany such growth. The 2010 Census recorded just over 800,000 residents of El Paso County. According to the 2016 Regional Water Plan, the county is projected to grow to more than 900,000 residents by 2020; then by another 40 percent to more than 1.5 million residents by 2070. That's nearly double our current population in the next 50 years. Increased cross-border trade and the expansion of Fort Bliss have both been crucial engines for encouraging development.

Growth is good; but more residents, more businesses, increased traffic via our sister city of Juárez, Mexico—all challenge the capacity of the local transportation network to meet the needs of those varied stakeholders. In an age where terrorism is all too real, increased security at border checkpoints can sometimes be frustrating for businesses whose just-in-time models require minimal time spent waiting at the border. As you'll see in this annual report, CIITR researchers are using technology to help U.S. Customs and Border Protection, other agencies, and the trade community balance security with more reliable travel-time predictability.

Likewise, as new residents make their homes here, traffic congestion has increased, bringing with it safety concerns and air quality issues. Part of the solution—as well as to help El Paso reach attainment in terms of Environmental Protection Agency air quality standards—is encouraging residents to use alternatives modes—like transit, biking, or walking to work. In

2016 and on behalf of the El Paso Metropolitan Planning Organization (MPO), CIITR researchers created a new methodology for qualitatively scoring local infrastructure. We also identified areas where the MPO can improve its connectivity across modes and measured local attitudes toward active travel modes like biking and walking.

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.

The regional agencies' massive investment in enhancing its infrastructure's capacity—from the Border Highway West to expanding Cesar Chavez Highway to the El Paso Streetcar Project—will help improve mobility while emphasizing safety, reliability, and economic development. Those projects and the work zones they require can cause short-term frustration but, ultimately, yield long-term dividends.

Center researchers seek to help mitigate those growing pains as much as possible. We find solutions to problems through technological innovation. We create new methodologies and processes to address challenges unique to the El Paso Region. We provide expert advice to decision makers who shape public policy.

More than intellectual curiosity drives us to find those solutions: El Paso is our home, too.

Rafael Aldrete, Ph.D.
Senior Research Scientist and
Director, Center for International
Intelligent Transportation Research
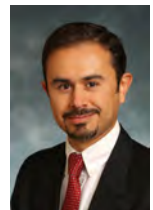
SUPPORT

El Paso Regional Support

For CIITR researchers, the El Paso Region is not just a testbed for innovative intelligent transportation solutions—it's home. Working with local partners like the El Paso Metropolitan Planning Organization, the County of El Paso, the City of El Paso, and Sun Metro, CIITR is helping local stakeholders on both sides of the border create a more reliable transportation system as El Paso and its sister city, Ciudad Juárez, grow closer economically.

SAFETY AND MOBILITY

As evidenced by numerous work zones around
the city, El Paso is growing. But with growth comes
challenges. Aging infrastructure requires maintenance,
and construction alone isn't always the answer. Local
CIITR research focuses on improving mobility and
enhancing safety, especially among younger drivers,
through smarter planning and helping the city better
assess what its citizens need.

**CIITR Develops Unique Methodology,
Action Plan to Help El Paso MPO**

Visualizing the El Paso Multimodal Plan Project

Encouraging Teen Driving Safety in El Paso

CIITR Develops Unique Methodology, Action Plan to Help El Paso MPO

An extensive, 240-page report compiled by a team of more than ten CIITR researchers will aid the El Paso MPO in developing a regional transportation plan that focuses on reducing congestion and improving regional health by encouraging alternative travel modes like transit, bicycling and walking. A connected circulation network that takes into account all modes of transportation will help the MPO have a more efficient and safer transportation system.

The wide-ranging report gives the El Paso MPO a blueprint for improving alternative transportation options in the region. As part of the study, researchers examined key centers and corridors and developed a first-of-its-kind scoring methodology that ranks areas for their multimodal infrastructure. The researchers put together four heat maps that identify those different modes of travel (transit, bicycling, walking and cumulative) where connectivity is lacking.

Researchers conducted or analyzed a population survey, a literature review, methods to promote active transportation, the region's current active travel, and information about the current transit, sidewalk and bike connectivity, as well as other transportation components. In addition to providing policy recommendations, CIITR researchers then developed a 10-step action plan the MPO can implement over the next four years as it improves the region's multimodal transportation system.

HOW RESIDENTS PREFER TO COMMUTE

Like most Texans, El Paso residents rely heavily on single-occupancy vehicles (SOVs) for commuting.

72%
Commute by SOV at least 4 days per week

13%
Walk at least once per week

>80%
Rely on SOVs at least one day per week

8%
Use public transportation at least once per week

8%
Telecommute at least once per week

Visualizing the El Paso Multimodal Plan Project

As part of the project to help the El Paso MPO with its multimodal planning project and to achieve a broader impact for the study, CIITR researchers developed two non-technical documents for other audiences. Both documents use photos and infographics to convey study findings in a more accessible, effective and visually appealing format.

One of the documents, *A Report on El Paso Resident Behaviors and Attitudes Toward Active Travel,* presents findings from the multimodal analysis in a visually compelling format aimed at edu-

cating policy makers, city managers and other practitioners regarding regional residents' attitudes toward alternative travel modes. The second document, a tri-fold brochure entitled Get Active, El Paso is designed to inform the public about the issues surrounding transportation, the importance of active travel, the goals of the MPO in formulating its multimodal plan, and how residents can incorporate active travel to become healthier.

Encouraging Teen Driving Safety in El Paso

El Paso schools had a strong showing in the statewide 2016 Teens in the Driver Seat (TDS) Summit, held in Grapevine in May 2017. TDS is a unique, student run, peer-to-peer education and outreach program that raises awareness regarding teen driving. Thirteen El Paso schools are active in TDS, and CIITR researchers help administer the program in El Paso.

El Dorado High School was awarded third place (tie) in the coveted 2016 Teens in the Driver Seat Cup, determined by various school activities and involvement in the program. Montwood and Parkland Middle Schools received recognition as "Outstanding Schools." Teacher Theresa Maya from El Dorado High School received a SponStar, for her sponsor activities. Three students from the Center for Career and Technology Education were appointed Teen Advisory Board Members: Maya Bohn, Ahmaris Lechuga, and Nik Petty.

U in the Driver Seat—a similar program aimed at college students to reduce drinking and driving during spring break—enjoys similar support in the region through The University of Texas at El Paso and all five El Paso Community College campuses.
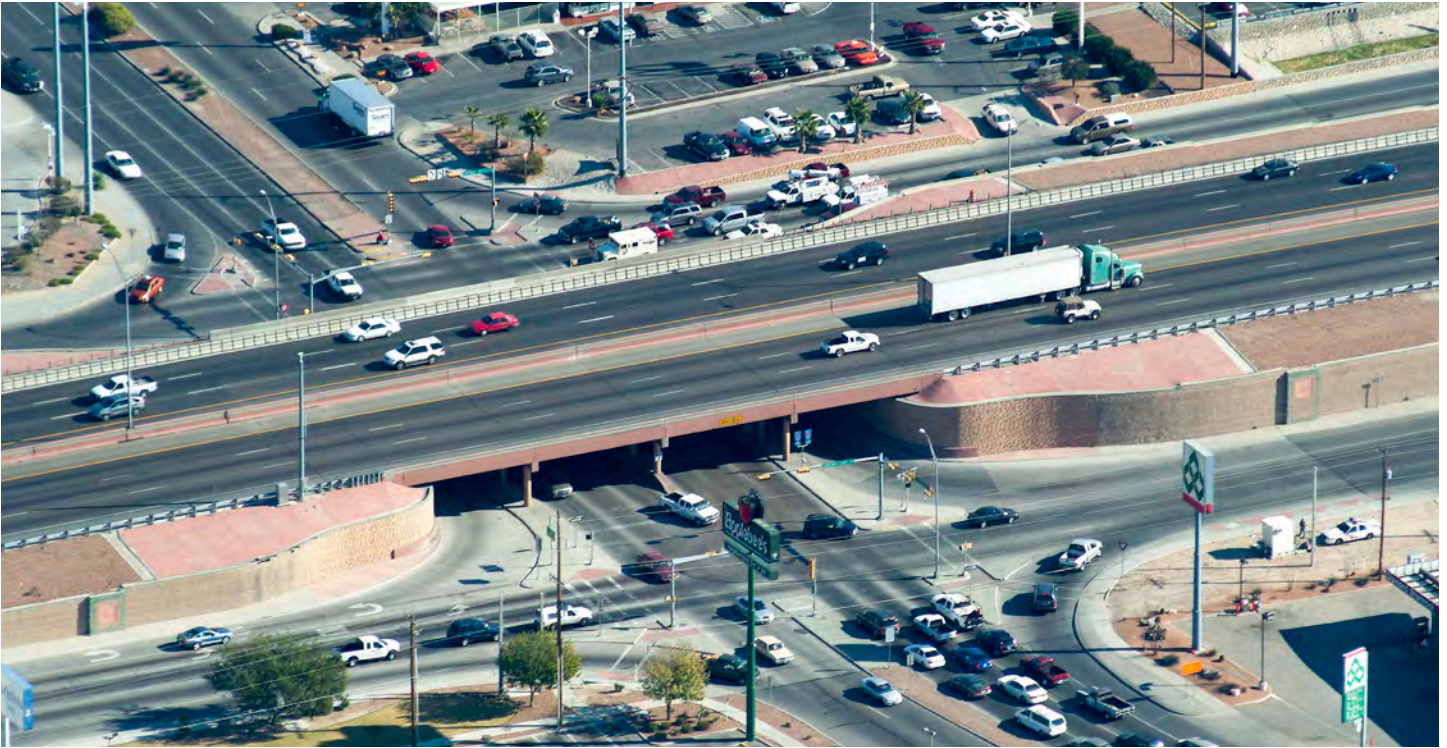
TRAFFIC OPERATIONS

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

Developing a Concept of Operations for ICM in El Paso

Rigorous Comparison, Testing Yields Recommendations for Transportation Simulation Modeling Software
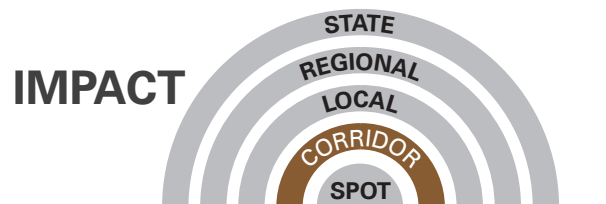
Developing a Concept of Operations for ICM in El Paso

Integrated Corridor Management (ICM) combines freeway, arterial, transit, and parking management systems into a single transportation management system. This approach provides enhanced traffic information, in real time, to enable more flexible trip departure times, routes, and/or modes when traffic conditions warrant.

Through a competitive selection process, the USDOT chose El Paso as one of 20 U.S. cities to advance ICM nationwide. CIITR researchers helped El Paso regional stakeholders develop the concept of operations (ConOps) for a 16-mile section of the I-10 corridor, model operational strategies, and measure the potential benefits of developing an ICM implementation plan. For example, under the proposed plan, motorists and shippers can use real-time information during an incident to avoid congestion and more easily find alternate routes or transportation modes, such as transit or rail.

A unique feature of the El Paso ICM will be the inclusion of the nearby international crossings, which will be monitored and will include an ICM strategy that addresses the full closure of one of the crossings. No other ICM site in the nation includes a direct connection to a port of entry (or international crossing).

COST

TIME
SHORT/MODERATE

IMPACT
STATE
REGIONAL
LOCAL
CORRIDOR
SPOT

WHO
STATE, MPO/REGION, TRANSIT AUTHORITY

HURDLES
OPERATIONS, COORDINATION, INSTITUTIONAL, FUNDING

Rigorous Comparison, Testing Yields Recommendations for Transportation Simulation Modeling Software Traffic Counts

Transportation simulation modeling is essential for departments of transportation and other planning agencies, but there are a lot of different software brands to choose from. A CIITR research team tested three popular, but different, simulation modeling platform packages. Though each package is different (e.g., network development, measures of effectiveness output), perhaps the most important difference relates to each package's ease of coding and traffic assignment theory.

The team tested three packages—Aimsun, TransModeler and DynusT—by importing a binational model of El Paso, Texas/Juarez, Chihuahua into all three packages to test their various tools and features, including:

- System requirements for small and large scale traffic assignment.

- Difficulty/ease of coding.

- Data requirements for network development.

- Origin and destination matrices.

- Expandability in terms of incident management, managed lanes, work zones, intelligent transportation systems.

- Visualization capabilities.

- Import/export features with other software platforms.

After a lengthy analysis, the CIITR team concluded that Aimsun and TransModeler offer advantages in the modeling of smaller Aimsun and TransModeler for smaller network models, especially when results are needed quickly. For larger regional networks where rerouting from congestion or network changes come into play, researchers concluded that DynusT would perform better.

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.

**Can Technology Reduce Pedestrian Crossing Times
at the U.S.-Mexico Border?**

**CIITR Study Shows Unique City-CBP Partnership
Helps Reduce Border Wait Times**

Can Technology Reduce Pedestrian Crossing Times at the U.S.-Mexico

Like motorists at all four international bridges in El Paso, pedestrians experience longer crossing times as more people are entering the United States from Mexico. Whether traveling on foot or by bicycle, the latest figures show that 550,000 pedestrians crossed the border in the first quarter of 2014. (At the Santa Fe Crossing, nearly 7 percent more pedestrians crossed in 2015 compared to the year before.) More pedestrians mean longer wait times as paperwork for each individual is processed through security checkpoints.

CIITR is working with the U.S. Customs and Border Protection (CBP) to study ways to decrease pedestrian crossing times without compromising security. Technology could play a big role in solving the problem. For example, researchers are evaluating a phone application that could be tied to information supplied by CBP (current processing times, the number of people waiting, and perhaps historical data showing the best times to cross) to help reduce wait times. This would apply for pedestrian traffic an informational approach already available to motorists. They are also examining a possible pedestrian pre-approval process (similar to current Trusted Traveler Programs) that would expedite travel for pre-approved, low-risk travelers through dedicated lanes and kiosks. Researchers met with CBP officials in November 2016 and plan further discussions in an effort to make travel for pedestrians safer, more efficient and faster—all without compromising border security.

CIITR Study Shows Unique City-CBP Partnership Helps Reduce Border Wait Times

One of the nation's first public-private partnerships (P3) with the U.S. Customs and Border Protection (CBP) was successful, CIITR have determined. The City of El Paso entered into an agreement with CBP in an effort to reduce border wait times (BWTs) at the Ysleta-Zaragoza, Paso Del Norte and Stanton Street crossings. As part of the agreement, the city increased its crossing tolls for both commercial and passenger vehicles by 50 cents in order to pay overtime for officers at primary inspection lanes during peak hours.

Researchers sought to determine the effectiveness of the PPP agreement: did the additional staffing facilitate the lawful movement of trade and people while reducing wait times? The project

- Documented the P3 contracting models.
- Examined the economic rationale of P3's at U.S. Ports of Entry (POEs).
- Assessed the overall benefits and costs.
- Compiled results from a pilot cost-benefit assessment.
- Summarized empirical findings from studies conducted by the City of El Paso, the El Paso Customs and Border Protection Bureau, and others.

Researchers determined that the P3 effort to enhance CBP staffing at very specific times and locations has had an impact on service and reduced BWT. At the Ysleta bridge facility, BWT decreased by one minute for commercial vehicles, and 24 minutes for passenger vehicles. At the Paso Del Norte crossing, pedestrians and passenger vehicles waited between 22 and 32 minutes less to cross the border. Researchers note that wait times decreased despite a significant increase in the number of crossings.

In assessing the agreement, CIITR researchers noted that the partnership between the city and CBP prompted a closer working relationship. Also, as a result of the project, the City of El Paso is sharing the information it learned with other POEs in the United States and Mexico.

INITIATIVES
International Research Initiatives

In a world economy, national borders must facilitate commerce while remaining secure. Partnering with agencies in both the United States and Mexico, CIITR researchers look for technologically innovative solutions that leverage international stakeholders' strengths while ensuring security, reducing wait times at checkpoints, and improving travel-time reliability.

IN THIS SECTION

Accurate Border Traffic Counts Are Just Around the Corner

Evaluating Ambulance Cross Border Operations to Save Lives

What's Moving Where? Tracking Trends to Improve International Trade

Proactive Mitigation Measures Prove Key to Avoiding Traffic Snarls During Special Events

Accurate Border Traffic Counts Are Just Around the Corner

After promising results from field tests in 2015 at the Texas A&M Rellis Campus, CIITR researchers installed traffic count devices (called the LeddarTech IS16 LED Scanner) in 2016 at one location on the U.S. side of the Ysleta/Zaragoza Port of Entry and five locations in Mexico. Researchers seek to find a device that would accurately count traffic at border crossings.

Having reliable count information is a must for researchers and government agencies who want to measure results year-to-year. A reliable counter would be invaluable for border research, especially involving border wait times, which can impact income from tourism, the bottom lines of companies depending on cross-border trade, and even how long international medical patients must wait before receiving needed care in the United States.

Over the years, the CIITR team discovered reliability and data retrieval issues with numerous other devices it tested. But, following testing, the LeddarTech scanner showed nearly a 100 percent accuracy rate in counting both commercial and passenger vehicles. Additionally, researchers feel confident in the device's durability. One scanner—in place for over a year—required no maintenance. Even after the exposure to rain and blowing sand, the detector kept accurate counts.

Following these convincing results, the CIITR team is confident in recommending these devices for use in future border research projects.

Evaluating Ambulance Cross Border Operations to Save Lives

Leading a team of public agencies that includes Texas Tech University, CIITR researchers are trying to expedite the cross-border transportation of patients needing emergency care in El Paso. Researchers learned that the El Paso Fire Department (EPFD) received 479 emergency calls in 2014 from the border crossings that connect El Paso and Ciudad Juárez, a number that has nearly tripled in the last few years.

Currently, Mexican ambulances carrying patients across the border must wait in line with other passenger vehicles. Once they arrive at U.S. Customs and Border Protection (CPB), the EPFD is called to send an ambulance to the border crossing. Once the patient is cleared to enter, the EPFD ambulance takes him or her to a local El Paso hospital. The entire process can take up to three hours, depending on the pickup location in Ciudad Juárez and the wait time at the border crossing. For heart attack and stroke patients, the delay can mean the difference between life and death. Researchers are looking at various options, including a pre-notification process for CBP before the patient arrives at the border, and are planning future meetings with all the entities to establish protocols to expedite cross-border operations.

Surface Trade Between the United States and Mexico
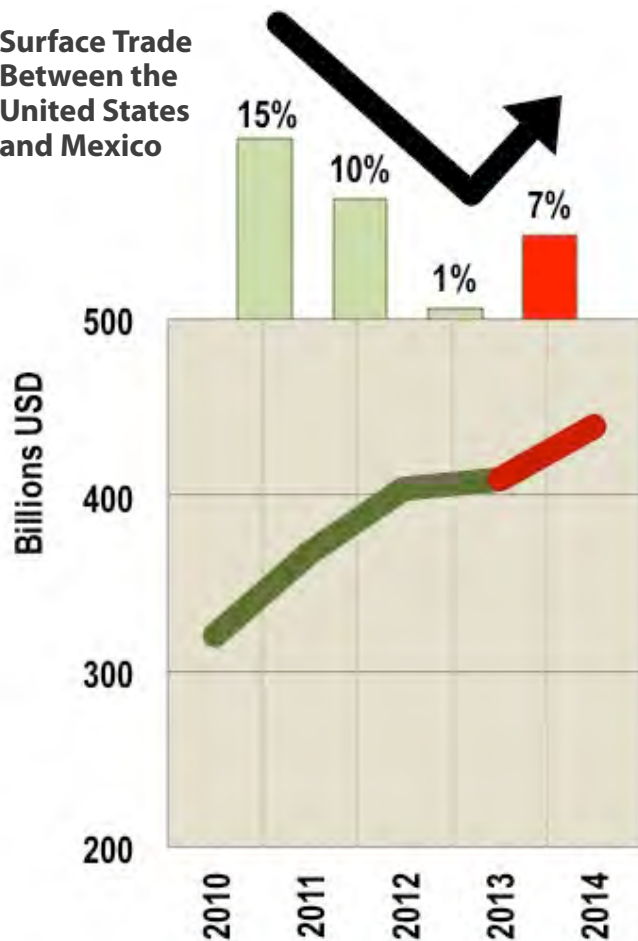
Using data from the U.S. Bureau of Transportation Statistics' Trans-Border Surface Freight Database, researchers have consistently found that 44 percent of all trade with Mexico is export and 56 percent is import, with import trade being between 25 and 30 percent higher than export. In 2014, truck transportation remained the most popular mode, accounting for 82 percent of cross-border surface trade, while shippers used rail to transport 18 percent of the total exported trade and 15 percent for import. Although Texas remains by far the number one trading state with Mexico, the value of trade with the Lone Star State declined 8 percent in 2015. However, Mexico trade values increased with California and Michigan.

Among the findings in the 2015 report (analyzing 2014 data):
- Manufactured goods remained the most popular commodity exported and imported.
- Imports and exports grew the most in Laredo, up 11 percent.
- Trade between Texas and Mexico decreased 1.4 percent compared to 2013, but Texas remains the number one trading partner with Mexico.
- The longest wait times during the week occurred at the World Trade Bridge in Laredo (more than 60 minutes), and the longest weekend days wait times occurred at Pharr (80 minutes on Saturday and 60 minutes on Sundays).
- The Columbia Bridge had the shortest wait times.

What's Moving Where? Tracking Trends to Improve International Trade

Using the latest data about cross-border freight activities, CIITR researchers discovered a seven percent gain in surface trade between the United States and Mexico in 2014 and a four percent gain in 2015 (to $455 billion, compared to $100 billion in 1995). The increase follows a 3-year decline in growth rates. The center has studied this issue since 2009 to determine, among other things, where goods are going, the specific activities at all 25 land ports of entry along the U.S.-Mexico border, which transportation modes are being used, and the proportion of export and import in total trade.

Among the findings in the 2016 report (analyzing 2015 data):
- Freight by trucks is 4–5 times higher than rail.
- Freight at Texas port of entries is more than the other three states combined.
- Manufactured goods are the highest-value commodity shipped across the border (both ways).
- Saturday has the longest border crossing wait times for commercial vehicles.

Proactive Mitigation Measures Prove Key to Avoiding Traffic Snarls During Special Events

CIITR researchers conducted a wide-ranging probe of vehicle and pedestrian congestion during the papal visit to Ciudad Juárez in April 2016. The results of the study could help other cities and transportation agencies prepare for the impact of major events on the local transportation system.

Anticipating an entire day of reduced mobility, proactive measures were taken by the City of El Paso, the U.S. Customs and Border Protection (CBP) and Sun Metro. Schools and some El Paso businesses and streets were closed, and CBP hired additional staff. To monitor the impact on congestion, researchers obtained traffic data before, during, and after the papal visit. They also installed pedestrian counters and video cameras at all ports of entry (POEs).

Despite concerns, interstate and other highway times were relatively normal, and pedestrian traffic (although significantly higher for much of the Pope's visit) proved manageable. Other border vehicle traffic was much less than anticipated. It was clear that tens of thousands of local residents stayed home to watch the event on television. Ridership with Sun Metro increased 30 percent, and school and road closures increased area mobility. Researchers point to increased CBP staff and restricted commercial traffic with congestion alleviation at the border and point to these proactive measures with the better-than-expected result regarding congestion. Their findings will be used by stakeholders to manage future and similar special events.

Researchers detailed their results and recommendations for similar events at the fall meeting of the Texas Institute of Transportation Engineering and for a lectern session of the Transportation Research Board Annual Meeting. The report has also been accepted for publication in Elseiver's International Journal of Transportation Science and Technology.

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

City of El Paso
City of Socorro
City of Horizon Town
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

Battelle
Mesilla Valley Transportation
Segura Consulting
Sotelo Trucking

>> BINATIONAL AND INTERNATIONAL

Municipality of Ciudad Juárez
Ciudad Juárez Instituto Municipal de Investigacion y Planeacion
State of Chihuahua
North American Development Bank

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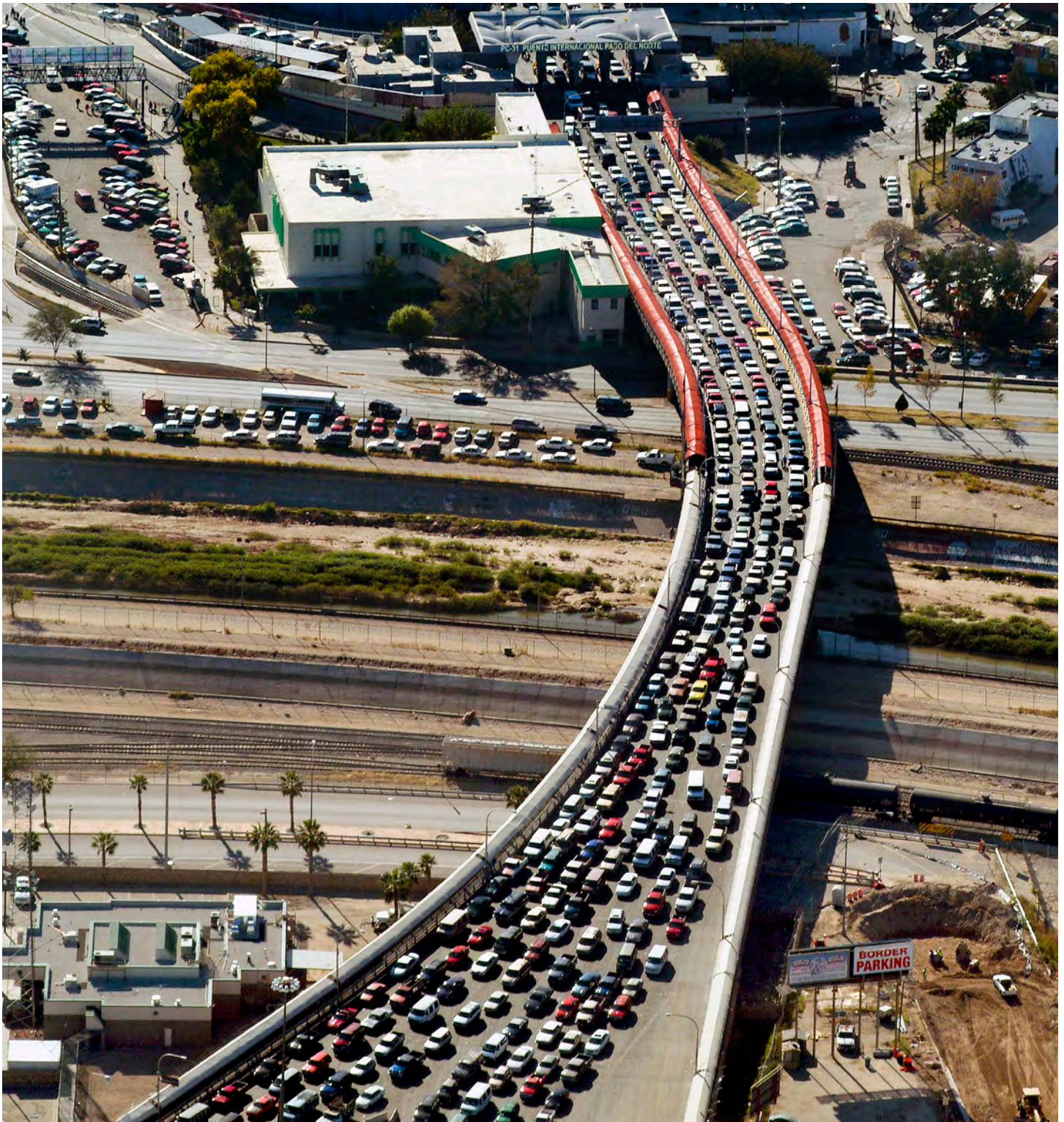TTI El Paso Office
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