



2014 ANNUAL REPORT



Center for International Intelligent
Transportation Research

El Paso, Texas



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A LETTER 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 his 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 began 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—eight 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.
Senior Research Scientist and
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

A Comprehensive Freight Transportation Plan for Ciudad Juarez

Creating a Regional Master Network for Paseo del Norte

Express Carpooling System

Improving Congestion with Improved Crash-Clearance Times

Integrate Travel Demand Model with Dynamic Traffic Assignment

Transportation Planning for a Better Paso del Norte

A Comprehensive Freight Transportation Plan for Ciudad Juarez

In an effort to improve the way freight is moved within the Mexican border city of Ciudad Juarez, CIITR researchers helped develop an urban freight regulatory plan designed to improve safety, congestion travel times, emissions, noise and premature deterioration of the city roads. The goal of this World Bank project was to optimize freight vehicle flows to harmonize with other transportation modes (e.g., passenger vehicles, bicycles and pedestrians).

The six-month project included an analysis of international best practices of urban freight management, a diagnosis of the existing road infrastructure, and meetings with Ciudad Juarez and federal authorities to explain details of the freight movement improvement plan. A major component of the project was to establish direct and permanent communication channels with World Bank and local stakeholders in order to maximize the probability of successfully implementing the plan. Researchers developed a three-day-long training course for city transportation officials that emphasized traffic simulation techniques to help with urban planning decisions.



For more information contact Rafael Aldrete at (915) 532-3759 or r-aldrete@ttil.tamu.edu.

Creating a Regional Master Network for Paseo del Norte



Researchers have made a lot of progress in developing a master transportation plan for the Paso del Norte Region, a massive undertaking—especially considering that data from three cities (El Paso, Las Cruces, and Ciudad Juarez) are involved in the process.

One of the biggest obstacles was the creation of software to develop a network-based model. The research team found and corrected numerous issues, including missing links, incorrect attributes and names, and a lack of a projection/coordinate system. The researchers were able to standardize interconnection attributes and consolidated transportation analysis zones from all three regions. By doing so, a regional origin-destination matrix can be created in the future.

Transportation planning authorities within the Paso del Norte region, geographic information system groups, and others interested in urban road-network analysis can now use the information. Additionally, the network is compatible with transportation planning software and the information can be imported into those systems.



For more information contact David Galicia at (915) 532-3759 or l-galicia@ttimail.tamu.edu.

Express Carpooling System



Mobility analysts, transportation planners and environmentalists all agree that the growing urban congestion problem could be alleviated with a carpooling program. However, numerous obstacles exist to implementing carpooling, including unpredictable school and work schedules and the security concerns of sharing a ride with strangers. Researchers continue to evaluate the feasibility of a flexible carpooling program for El Paso. If enacted in the El Paso region, a ridesharing program has the potential to help mitigate the current traffic congestion conditions during peak hours.

After conducting a literature review of the leading carpooling programs across the country, researchers determined that dynamic ridesharing programs (e.g. Uber, Sidecar, Lyft, and Carma) have become more popular and their user bases are increasing. In addition, researchers conducted a strengths, weaknesses, opportunities and threats (SWOT) analysis, which showed the positive and negative aspects of the implementation of a dynamic ridesharing system for El Paso. They also developed a survey, which was distributed among college students to determine their interest in ridesharing. About 40 percent of the respondents said they might try a ridesharing program, if it were available. Those that were not sure indicated that security concerns might prevent them from participating.



For more information contact
Alex Valdez at (915) 532-3759 or
g-valdez@ttit.tamu.edu.

Improving Congestion with Improved Crash-Clearance Times

Much of the congestion experienced by motorists in the El Paso region can be attributed to crashes and other events on area roadways. The quicker these incidents can be cleared, the faster mobility will improve.

In an effort to determine the performance of El Paso's traffic incident management, CIITR researchers studied various occurrences and recommended actions and strategies to improve the incident management team's overall performance. Among the researchers' recommendations:

- coordination and communication between the various local agencies,
- training of staff members,
- implementation of technology and
- improved data collection efforts.

The results of the study were summarized in a presentation for members of the traffic management team.

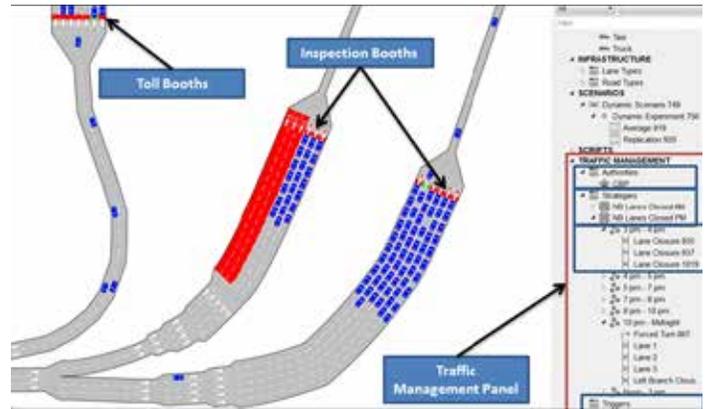


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Integrate Travel Demand Model with Dynamic Traffic Assignment

Demand models are essential in long-range planning, since they are the blueprint of the regional network. However, certain constraints exist within a traditional static model—most importantly, the static assignment. In addition, static trip-based models are not capacity constrained, so congested areas can sometimes have volume-to-capacity (v/c) ratios much greater than 1.

On the other side of the spectrum is simulation-based modeling at a mesoscopic level. These types of models use dynamic traffic assignment (DTA), where travelers' route choice behaviors are captured as vehicles traverse from origin to destination. However, DTA models only run assignments and do not update mode choice. With the gaps between traditional travel-demand models and simulation-based DTA models, there exists a strong need to integrate the two models by converting a trip-based model to a mesoscopic format to run an assignment. CIITR researchers integrated models to determine whether assignment results from a dynamic simulation-based model could replace static assignment results. Results from the dynamic model were compared to results from VALID9—a tool used to validate simulated traffic volumes to actual field counts. While traffic control was left at default values, simulation results showed a total of +13 percent in volume when compared to actual field counts. In addition to the validation results, several other reasons for switching to a dynamic assignment were apparent.



For more information contact Jeff Shelton at (915) 532-3759 or j-shelton@tti.tamu.edu.

Transportation Planning for a Better Paso del Norte



In an effort to combine the separate long-range travel plans of El Paso, Las Cruces and Ciudad Juarez into one regional plan, researchers are working with all three transportation planning authorities in the Paso del Norte Region. The goal is to create a focused, cohesive transportation plan that will benefit the region as a whole.

CIITR researchers examined the individual travel demand models (TDMs) produced by the El Paso and Las Cruces metropolitan planning organizations, and the Metropolitan Planning and Research Institute in Mexico. They're evaluating existing alternatives to select the most suitable, low-cost method to create a regional origin-destination matrix. The researchers determined that the most convenient and suitable alternative for the entire region can be achieved by using a combination of traffic counts, an integration of local TDMs, and computer-based iterative calibration tools.



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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

Assessing Capabilities of Decision Support Tools for Real-Time Simulation at POE

Identifying Reliable Detector Technologies for Border Traffic Counts

Improving Border Wait Times with More Staff, Partnerships and Shipper Program Memberships

Time Savings Benefit Assessment for Secure Border Trade Program (Phase II)

U.S.-Mexico Freight Traffic Trends



Assessing Capabilities of Decision Support Tools for Real-Time Simulation at POE

Transport modeling software can potentially alleviate common mobility problems (e.g., border delays and poor air quality) that exist along the land ports of entry (LPOEs) at the U.S.-Mexico border by empowering traffic operators to evaluate operational strategies and policies in real time.

To that end, CIITR researchers evaluated a decision-support tool called Aimsun, developed by Transport Simulation Systems. Researchers sought to

- assess Aimsun capabilities to manage and evaluate current operational strategies and policies at the Ysleta-Zaragoza LPOE,
- develop an intuitive interface that would allow performing basic operational evaluations of the LPOE in a web-based environment and
- explore the feasibility of implementing real-time simulation traffic models.

The research team was able to replicate the operational strategies and policies used at the LPOE after running a traffic simulation model numerous times. This suggests that the Aimsun software package would be helpful to traffic operators. The web-based interface developed by CIITR is user-friendly and capable of simulating and evaluating different scenarios in a short period of time.

In order to develop a real-time traffic model for Ysleta-Zaragoza, the team first proposes the creation of a pseudo model that can be tested by using timely, real-time data. This approach allows testing to occur in less time using fewer resources.



For more information contact David Salgado at (915) 532-3759 or d-salgado@tti.tamu.edu.



Assessment of JIT Supply Chain Security

With the ever-increasing traffic along the Texas-Mexico border, it's become much more difficult to predict border wait times and where bottlenecks may occur within the supply chain. Additional border traffic disrupts just-in-time (JIT) shipping plans and causes increased production costs. Part of the problem with border crossing data is that each entity has its own way of measuring crossing times and wait times. Having a reliable estimate of wait times will help shippers maintain a competitive edge and grow their business models.

CIITR researchers worked with the Federal Highway Administration and the Department of Homeland Security to develop a real-time Border Crossing Information System using radio frequency identification (RFID) data collection. The automated information system can be used to assist freight fluidity throughout the entire border corridor. Partnering with the Coalicion Empressarial Pro Libre Comercio, researchers determined that the public and private sectors must be able to share data in order to address bottlenecks and improve border congestion and, thereby, keep the just-in-time supply chain moving.



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Identifying Reliable Detector Technologies for Border



Numerous technologies exist, but which one is the most accurate and reliable for measuring the slow moving or stop-and-go traffic at the busy Texas/Mexico border crossings at El Paso? Researchers are continuing their evaluation of various products that include technologies such as video imaging, magnetometers, radar, and laser-scanning devices. The ideal traffic detector would be reliable, reasonably priced, easy to set up and operate, and would require only minimal modifications. This year, researchers evaluated a laser scanner and a micro-radar detector with promising results. Researchers expect to finish their evaluations in 2015 and make recommendations regarding the technology and product that performed the best.



For more information contact Dan Middleton at (979) 845-7196 or d-middleton@tamu.edu.

Improving Border Wait Times with More Staff, Partnerships and Shipper Program Memberships

Road improvements and a new bypass have been completed on the Mexican side of the border to reduce transit time to the Ysleta-Zaragoza Toll Bridge. These changes created a temporary fix for the current congestion and long border wait times (BWTs) at the Bridge of the Americas (BOTA) crossing. Research indicates that the projected business growth will soon overtake these short-term improvements at both BOTA and the Ysleta-Zaragoza crossings. It's estimated that the economic impact due to BWTs will more than double by 2017 as delays grow and projected infrastructure and operations remain unchanged.

Manufacturers have opened new plants and warehouses, and some have expanded their plants and warehouses as expected. Memberships in the trusted shipper programs on both sides of the border—Customs-Trade Partnership Against

Terrorism (CTPAT) and Nuevo Esquema De Empresas Certificadas (NEEC)—have not increased dramatically. However, new guidelines for NEEC certification may increase memberships in the future. On a positive note, the border community and government are working together to make improvements to BWT. The City of El Paso has joined with the Customs and Border Protection (CBP) through a public-private partnership (PPP) to fund additional CBP officers at some of the border ports of entry. This should provide some temporary relief to long BWTs. Should this PPP prove successful, new partnerships may form to expand trusted shipper programs, cross border growth, and overall improvement of BWTs. TTI is currently conducting a research project in El Paso/Juarez looking at the PPP and its impact upon reducing BWT.



For more information contact Bob Trotter at (713) 686-2971 or r-trotter@tti.tamu.edu.

Time Savings Benefit Assessment for Secure Border Trade Program (Phase II)



After analyzing global positioning system (GPS) data that recorded shipping travel times for three maquilas participating in the Secure Border Trade (SBT) project, CIITR researchers found that two of the maquilas experienced 1) shorter border crossing times and 2) reduced total travel times for its fleet, while the other maquila did not.

To compare these results against non-participating fleets during the same time period, GPS data from non-SBT commercial vehicles was analyzed. Researchers determined that these fleets either no change or a slight increase in crossing or total travel times. The findings confirm that the two maquilas in the SBT project received a benefit—perhaps regarding lower inspection rates—unlike the other maquila.

Because of the complexity of ports of entry (POEs), researchers could not determine if participation by the two lower-timed maquilas in the SBT demonstration played a role in receiving quicker inspections. The researchers learned that one of the maquilas experienced substantially shorter crossing and travel times. Researchers speculate that several reasons are possible for the difference: perhaps the maquila received preferential treatment at the POE, maybe it had better logistics, or perhaps its cargo was easier to process.



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U.S.-Mexico Freight Traffic Trends



In efforts to better understand the freight activities between the United States and Mexico, researchers examined data over a twenty-year period (1995–2014) at the 25 land ports of entry —identifying trends and patterns. Using data from the Trans-Border Surface Freight Database of the U.S. Bureau of Transportation, CIITR researchers classified freight by mode of transport, commodities and freight destinations.

Despite a recession and the global financial crisis, researchers learned that total yearly surface trade has quadrupled since 1995—from \$100 billion to \$400 billion in 2014. Of the goods shipped between the two countries over the last decade, the United States imported 56 percent while exporting only 44 percent. Researchers also learned that Mexico's trade with Texas in 2013 grew by only 0.5 percent, and actually declined by 3.5 percent with California. However, Mexico's trade with interior U.S. states like Michigan and Illinois continued to grow at the same rate as in previous years.



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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

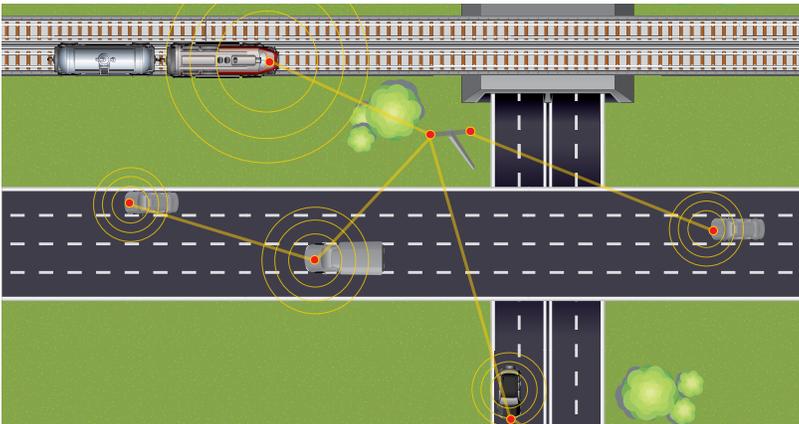
Applied Robotics for Installation and Base Operations (ARIBO) Roadmap

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Methodology to Estimate Road User Costs using a Time-Dependent Approach - Sunland Park CD Lanes Case Study

Teens in the Driver Seat – El Paso

Applied Robotics for Installation and Base Operations (ARIBO) Roadmap



CIITR researchers have developed a roadmap for applying vehicle automation to military base operations. The work involved collaboration with researchers from The University of Texas at Arlington, along with the U.S. Army's representative involved in the Applied Robotics for Installation and Base Operations (ARIBO) project. ARIBO is a coordinated effort to accelerate the adoption of automated technologies as initiated by the U.S. Army.

Primarily tasked with providing information on the infrastructure transportation side, TTI delivered two working documents to the ARIBO team. The first document included a current set of developed United States Department of Transportation (USDOT) research roadmaps in the area of Connected Vehicles (CV) and Automated Vehicles (AV) dating back to the initial IntelliDrive Research Program. The second working document was a brief literature review on the current direction of civilian AV. This effort may assist El Paso stakeholders in positioning the region for future military opportunities related to AV deployment.



For more information contact Christopher Poe at (972) 994-2206 or c-poe@tti.tamu.edu.

Exploration of Climate Change Impacts: Modeling Projections of Extreme Events

Climate change may have a dramatic impact on our future transportation system, including on the safety of travelers. Using historical records of daily rainfall, sea-level rise, and climate projections, researchers evaluated different emission scenarios to calculate the impact of extreme climate events over time. The purpose of the project was to evaluate what those events might be (e.g., dust storms, extreme temperatures, flooding and hail storms) and how they might impact the transportation infrastructure in the El Paso and Rockport regions of Texas.

Specifically, climate change impacts include decreased visibility, a decreased lifespan of pavements, buckling of roads and rail tracks, and electrical blackouts. As a result, there could be loss of life, injuries, and damage to personal and public property. This project can serve as a starting point for engineers and planners to develop future transportation projects by examining and building potential climate change precautions into their designs and procedures.



For more information contact Lorenzo Cornejo at (915) 532-3759 or l-cornejo@tti.tamu.edu.



Many transportation agencies are beginning to use incentive/disincentive clauses to motivate contractors to stay on or ahead of schedule. An important aspect in incentive/disincentive clauses is determining monetary values for various measures-of-effectiveness on a per-day basis. This monetary value is known as a road user cost. There are several different tools and methodologies in determining road user costs, including sketch planning tools, economic analysis tools, and simulation modeling. However, there is very little literature on using mesoscopic and microscopic simulation-based models to determine these monetary values.

The goal of this study was to use multi-resolution modeling techniques and develop a methodology to calculate user costs and address the impact of traffic diversion at a systemwide level. CIITR researchers used a simulation-based mesoscopic model to determine time-dependent routing and diversion of vehicles based upon each work zone construction sequence. Then, a sub-area of the project limits was extracted and

converted to a microscopic level to obtain various measures-of-effectiveness for automobiles and trucks. The multi-resolution modeling approach is an innovative way to capture the impact of driver behavior due to delays resulting from route shifting. Researchers then developed a deterministic model to calculate a final road-user cost per approach during each phase of construction. A case study analyzing the construction of a set of direct connectors in El Paso, Texas, was used to test the proposed methodology.



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Numerous El Paso schools and individual students were honored for their work promoting teen driver safety during the statewide Teens in the Driver Seat (TDS) Summit, held in San Antonio in May 2014.

Car crashes are the number one killer of teenagers in our nation.

TDS is a unique peer-to-peer safety program that educates teens about the dangers associated with teen driving. Since its founding in 2002 by the Texas A&M Transportation Institute, the program has developed a strong foothold in the El Paso region thanks to funding by the El Paso Metropolitan Planning Organization, the Texas Department of Transportation, and State Farm.

Once established in their school, students are selected to help spread the word among their peers with safety messages and program-oriented events and activities. The TDS program focuses all its efforts on the primary dangers and causes of teen crashes:

- driving at night,
- speeding and street racing,
- distractions like cell phones and teen passengers,
- not wearing a seat belt, and
- alcohol and drug use.

Three area schools were awarded the coveted TDS Cup during the summit. Ten El Paso students were honored for their work, or upcoming appointments, to the TDS Teen Advisory Board. Area teachers receiving the SponStar award for 2014 were: Sylvia Garcia of Silva High School, Amanda Oropeza of Montwood Middle School, and Laura Rizo of Desert View Middle School.



For more information contact Russell Henk at (210) 979-9411 or r-henk@tti.tamu.edu

REGIONAL 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.

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Binational Transportation Planning Tools for a Better Paso del Norte

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To that end, CIITR researchers evaluated a decision-support tool called Aimsun, developed by Transport Simulation Systems. Researchers sought to

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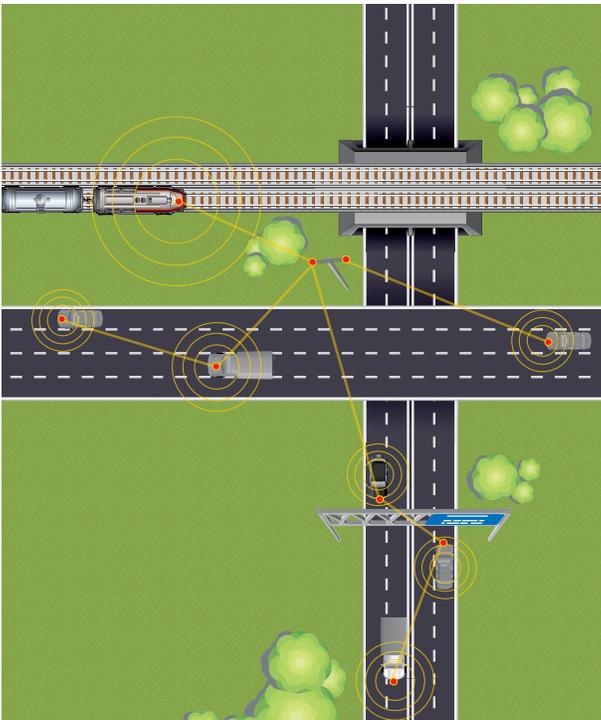
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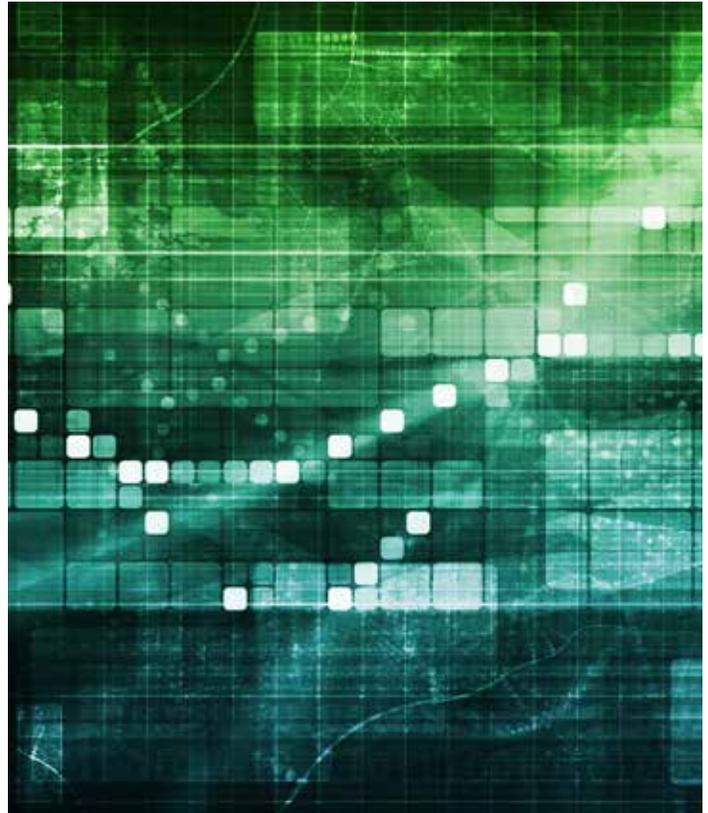
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Much of the congestion experienced by motorists in the El Paso region can be attributed to crashes and other events on area roadways. The quicker these incidents can be cleared, the faster mobility will improve.

In an effort to determine the performance of El Paso's traffic incident management, CIITR researchers studied various occurrences and recommended actions and strategies to improve the incident management team's overall performance. Among the researchers' recommendations:

- coordination and communication between the various local agencies,
- training of staff members,
- implementation of technology and
- improved data collection efforts.

The results of the study were summarized in a presentation for members of the traffic management team.

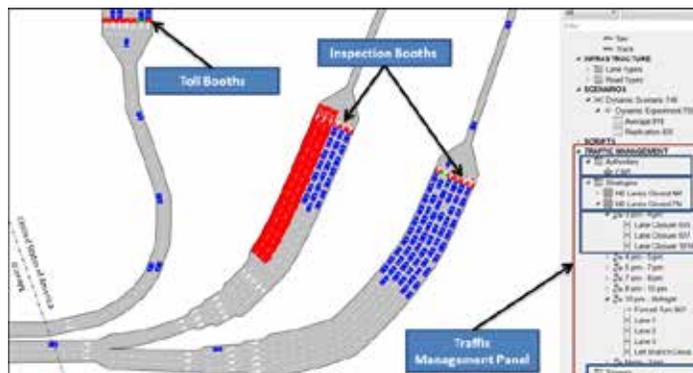


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Integrate Travel Demand Model with Dynamic Traffic Assignment

Demand models are essential in long-range planning, since they are the blueprint of the regional network. However, certain constraints exist within a traditional static model—most importantly, the static assignment. In addition, static trip-based models are not capacity constrained, so congested areas can sometimes have volume-to-capacity (v/c) ratios much greater than 1.

On the other side of the spectrum is simulation-based modeling at a mesoscopic level. These types of models use dynamic traffic assignment (DTA), where travelers' route choice behaviors are captured as vehicles traverse from origin to destination. However, DTA models only run assignments and do not update mode choice. With the gaps between traditional travel-demand models and simulation-based DTA models, there exists a strong need to integrate the two models by converting a trip-based model to a mesoscopic format to run an assignment. CIITR researchers integrated models to determine whether assignment results from a dynamic simulation-based model could replace static assignment results. Results from the dynamic model were compared to results from VALID9—a tool used to validate simulated traffic volumes to actual field counts. While traffic control was left at default values, simulation results showed a total of +13 percent in volume when compared to actual field counts. In addition to the validation results, several other reasons for switching to a dynamic assignment were apparent.



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Methodology to Estimate Road User Costs using a Time-Dependent Approach — Sunland Park CD Lanes Case Study



Many transportation agencies are beginning to use incentive/disincentive clauses to motivate contractors to stay on or ahead of schedule. An important aspect in incentive/disincentive clauses is determining monetary values for various measures-of-effectiveness on a per-day basis. This monetary value is known as a road user cost. There are several different tools and methodologies in determining road user costs, including sketch planning tools, economic analysis tools, and simulation modeling. However, there is very little literature on using mesoscopic and microscopic simulation-based models to determine these monetary values.

The goal of this study was to use multi-resolution modeling techniques to calculate user costs and address the impact of traffic diversion at a systemwide level. CIITR researchers used a simulation-based mesoscopic model to determine time-dependent routing and diversion of vehicles based upon each work zone construction sequence. Then, a sub-area of the project limits was extracted and converted to a microscopic level to obtain various measures-of-effectiveness for automobiles and trucks. The multi-resolution modeling approach is an innovative way to capture the impact of driver behavior due to delays resulting from route shifting. Researchers then developed a deterministic model to calculate a final road-user cost per approach during each phase of construction. A case study analyzing the construction of a set of direct connectors in El Paso, Texas, was used to test the proposed methodology.



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Numerous El Paso schools and individual students were honored for their work promoting teen driver safety during the statewide Teens in the Driver Seat (TDS) Summit, held in San Antonio in May 2014.

Car crashes are the number one killer of teenagers in our nation. TDS is a unique peer-to-peer safety program that educates teens about the dangers associated with teen driving. Since its founding in 2002 by the Texas A&M Transportation Institute, the program has developed a strong foothold in the El Paso region thanks to funding by the El Paso Metropolitan Planning Organization, the Texas Department of Transportation, and State Farm.

Once established in their school, students are selected to help spread the word among their peers with safety messages and program-oriented events and activities. The TDS program focuses all its efforts on the primary dangers and causes of teen crashes:

- driving at night,
- speeding and street racing,
- distractions like cell phones and teen passengers,
- not wearing a seat belt, and
- alcohol and drug use.

Three area schools were awarded the coveted TDS Cup during the summit. Ten El Paso students were honored for their work, or upcoming appointments, to the TDS Teen Advisory Board. Area teachers receiving the SponStar award for 2014 were: Sylvia Garcia of Silva High School, Amanda Oropeza of Montwood Middle School, and Laura Rizo of Desert View Middle School.



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In an effort to combine the separate long-range travel plans of El Paso, Las Cruces and Ciudad Juarez into one regional plan, researchers are working with all three transportation planning authorities in the Paso del Norte Region. The goal is to create a focused, cohesive transportation plan that will benefit the region as a whole.

CIITR researchers examined the individual travel demand models (TDMs) produced by the El Paso and Las Cruces metropolitan planning organizations, and the Metropolitan Planning and Research Institute in Mexico. They're evaluating existing alternatives to select the most suitable, low-cost method to create a regional origin-destination matrix. The researchers determined that the most convenient and suitable alternative for the entire region can be achieved by using a combination of traffic counts, an integration of local TDMs, and computer-based iterative calibration tools.



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RESEARCH INITIATIVES

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

Assessment of JIT Supply Chain Security

A Comprehensive Freight Transportation Plan for Ciudad Juarez

Time Savings Benefit Assessment for Secure Border Trade Program (Phase II)

U.S.-Mexico Freight Traffic Trends

Assessment of JIT Supply Chain Security

With the ever-increasing traffic along the Texas-Mexico border, it's become much more difficult to predict border wait times and where bottlenecks may occur within the supply chain. Additional border traffic disrupts just-in-time (JIT) shipping plans and causes increased production costs. Part of the problem with border crossing data is that each entity has its own way of measuring crossing times and wait times. Having a reliable estimate of wait times will help shippers maintain a competitive edge and grow their business models.

CIITR researchers worked with the Federal Highway Administration and the Department of Homeland Security to develop a real-time Border Crossing Information System using radio frequency identification (RFID) data collection. The automated information system can be used to assist freight fluidity throughout the entire border corridor. Partnering with the Coalicion Empresarial Pro Libre Comercio, researchers determined that the public and private sectors must be able to share data in order to address bottlenecks and improve border congestion and, thereby, keep the just-in-time supply chain moving.



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A Comprehensive Freight Transportation Plan for Ciudad Juarez



In an effort to improve the way freight is moved within the Mexican border city of Ciudad Juarez, CIITR researchers assisted Ciudad Juarez officials in developing an urban freight regulatory plan designed to improve safety, congestion travel times, emissions, noise and premature deterioration of the city roads. The goal of this World Bank project was to optimize freight vehicle flows to harmonize with other transportation modes (e.g., passenger vehicles, bicycles and pedestrians).

The six-month project included an analysis of international best practices of urban freight management, a diagnosis of the existing road infrastructure, and meetings with Ciudad Juarez and federal authorities to explain details of the freight movement improvement plan. A major component of the project was to establish direct and permanent communication channels with World Bank and local stakeholders in order to maximize the probability of successfully implementing the plan. Researchers developed a three-day-long training course for city transportation officials that emphasized traffic simulation techniques to help with urban planning decisions.



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After analyzing global positioning system (GPS) data that recorded shipping travel times for three maquilas participating in the Secure Border Trade (SBT) project, CIITR researchers found that two of the maquilas experienced 1) shorter border crossing times and 2) reduced total travel times for its fleet, while the other maquila did not.

To compare these results against non-participating fleets during the same time period, GPS data from non-SBT commercial vehicles was analyzed. Researchers determined that these fleets either no change or a slight increase in crossing or total travel times. The findings confirm that the two maquilas in the SBT project received a benefit—perhaps regarding lower inspection rates—unlike the other maquila.

Because of the complexity of ports of entry (POEs), researchers could not determine if participation by the two lower-timed maquilas in the SBT demonstration played a role in receiving quicker inspections. The researchers learned that one of the maquilas experienced substantially shorter crossing and travel times. Researchers speculate that several reasons are possible for the difference: perhaps the maquila received preferential treatment at the POE, maybe it had better logistics, or perhaps its cargo was easier to process.



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In efforts to better understand the freight activities between the United States and Mexico, researchers examined data over a twenty-year period (1995–2014) at the 25 land ports of entry —identifying trends and patterns. Using data from the Trans-Border Surface Freight Database of the U.S. Bureau of Transportation, CIITR researchers classified freight by mode of transport, commodities and freight destinations.

Despite a recession and the global financial crisis, researchers learned that total yearly surface trade has quadrupled since 1995—from \$100 billion to \$400 billion in 2014. Of the goods shipped between the two countries over the last decade, the United States imported 56 percent while exporting only 44 percent. Researchers also learned that Mexico’s trade with Texas in 2013 grew by only 0.5 percent, and actually declined by 3.5 percent with California. However, Mexico’s trade with interior U.S. states like Michigan and Illinois continued to grow at the same rate as in previous years.



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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 Instituto Municipal de Investigacion y Planeacion

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