You are now leaving the United States
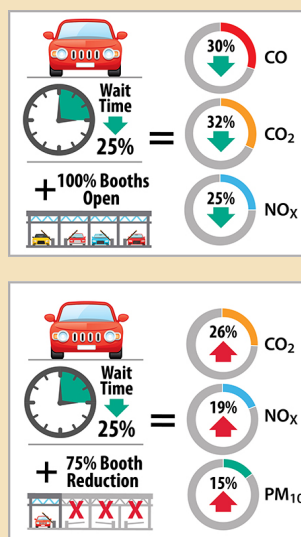Cordova Intl Bridge
AUTOS   AUTOS   AUTOS   TRUCKS

TTI-EL PASO RESEARCH AND IMPLEMENTATION PROGRAM

El Paso has grown by leaps and bounds over the past decade and is expected to nearly double its regional population to 1.5 million by 2070. The city's 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.

To support the city as it manages this growth, the El Paso Research and Implementation program at the Texas A&M Transportation Institute (TTI) assists local, state, federal and international agencies and organizations through the implementation and evaluation of advanced technologies and methodologies, including transportation finance, Intelligent Transportation Systems (ITS), border crossings, modeling and simulation, traffic management, safety, and various international studies. The program has developed a close working relationship with the El Paso Metropolitan Planning Organization (MPO) and also provides technology transfer for various agencies at the national and international levels.

## Urban Freight Regulatory Plan in Cuidad Juárez, Mexico

This project funded by the World Bank sought to organize and channelize freight vehicle flows in the urban area of Ciudad Juárez located at the U.S.-Mexico border. TTI developed a binational travel demand model and subsequent DTA model for El Paso and Juárez, including all POEs. Researchers analyzed different alternatives to improve freight flow through the urban area in Juárez using DTA and worked with local authorities and the private sector (e.g., carriers, the maquiladora industry) to obtain key input needed for the simulation-based model. TTI gathered various data from Mexico, including traffic counts for OD calibration, signal timings on major arterials, crash data, and wait time averages by U.S. Customs and Border Protection.

Extreme Events and the Cost of Critical Infrastructure Failure in the El Paso-Juárez Region

TTI researchers developed a simulation-based dynamic traffic assignment (DTA) model of the El Paso-Juárez border region to understand the potential travel effects and subsequent economic costs of an extreme event. Researchers simulated the closure of the Bridge-of-the-Americas (BOTA) and the IH 10/US 54 interchange to see what the economic cost to freight would be immediately after the disruption and the long-term effects after drivers have adapted to alternate routes. TTI developed a method to link the DTA modeling and cargo diversion methods to calculate first order direct costs. These costs were estimated both immediately following the disruption and through the adjustment phase to the new DTA long-term-run equilibrium (up to 1 year). Results indicate the total cumulative working year (annual) costs for truck trips by time-of-day were estimated at $29.3 million

Port of Entry Emissions Inventory for the El Paso Region

Researchers from TTI used TransModeler® software platform to develop a detailed, simulation-based microscopic model of the Ysleta-Zaragoza port of entry (POE) for commercial and passenger vehicles. The modeled area took into account both northbound and southbound flow of traffic for a 24-hour period, modeling 10 scenarios that included reduction in wait time, the number of booths available for inspections, and toll payment time, as well as a scenario adding capacity. Output from the simulation model provided input for an air-quality modeling system that estimates emissions for mobile sources for criteria air pollutants, greenhouse gases, and air toxins. The study shows how various scenarios (singular and combined) can affect emissions differently for passenger and commercial vehicles. These findings will assist the El Paso region in further refining targeted solutions to traffic congestion and air quality issues at specific POE locations along the border.

Wait Time ↓ 25%
+ 100% Booths Open
= 30% ↓ CO
32% ↓ CO_2
25% ↓ NO_X

Wait Time ↓ 25%
+ 75% Booth Reduction
= 26% ↑ CO_2
19% ↑ NO_X
15% ↑ PM_{10}

Travelers Response Architecture Using Novel Signaling for Network Efficiency in Transportation
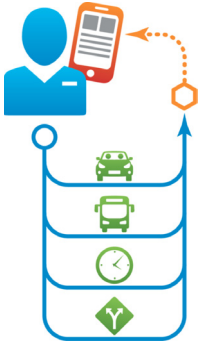
The Connected Traveler concept centers on the individual's ability and willingness to adjust travel patterns in a way that will increase overall transportation system efficiency. As the name suggests, travelers are connected to the larger transportation system and to each other to enable more informed choices, increased flexibility, and smarter transportation management. This transformative framework predicts ways for future travelers to use the transportation system most efficiently (in terms of both energy and convenience). Innovative strategies are used to trigger behavioral changes that modify or reduce travel demand at the individual, vehicle, and system level through the use of real-time wireless signals. The recommendation of the control strategies will balance different preferences and needs against a range of external factors to provide travel choices and incentives best suited to a particular person, market, time, destination, and energy-saving potential. At the vehicle level, open seats in both individual and public vehicles create opportunities for ridesharing, switching to public transit, and utilizing non-motorized modes, such as cycling and walking. At the system level, underutilized space and non-peak hours present opportunities to modify routes and departure times. A simulation-base DTA is used to validate various market penetration rates.

Road Safety Audits

TTI staff has conducted several road safety audits (RSAs) for various transportation agencies in Texas and abroad. The goal of an RSA is to help local governments understand the critical relationships between roads, roadside conditions, driver behavior and safety. RSAs attempt to identify low-cost transportation improvements that will reduce the severity and frequency of accidents. TTI staff recently conducted an RSA training workshop at the Abdulrehman bin Faisal University in Dammam, Saudi Arabia. The four-day workshop, funded by Saudi Aramco, helped the regional stakeholders and academics understand the basic RSA concepts and experience an audit as a hands-on training experience in both the classroom and the field.
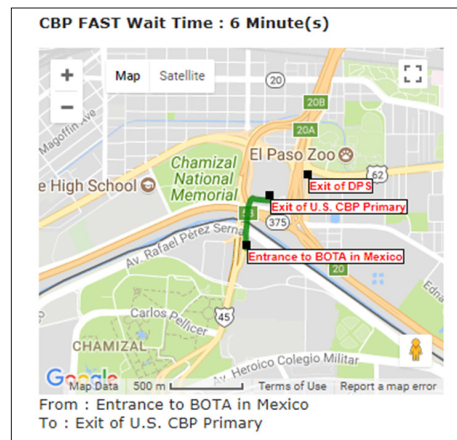
Border Crossing Information System

The Border Crossing Information System (BCIS) measures and disseminates real-time and historic wait and crossing time information captured at seven commercial and one passenger POE across the Texas–Mexico Border. BCIS captures real-time wait and crossing times for commercial vehicles entering the U.S. and wait time for passenger vehicles entering and exiting the U.S. All collected data are archived. BCIS enables the analysis of historic wait and crossing time (i.e., 10 minute and hourly averages, total daily and month delays), the comparison of historic wait and crossing times at different POEs, and the number of transponders in 10-minute, hourly, and daily intervals. BCIS can be accessed at http://bcis.tamu.edu.

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 developed 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 (TRZs). 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 used it to assist municipalities and counties throughout the state to assess their capacity to fund specific roadway projects via TRZs. Since 2009, TTI researchers have trained local agencies in use of TRZs. TTI recently extended the application of computation methodologies for TRZs to include considerations for multimodal transportation improvements involving newly developed or improved ports, rails, and transit systems. TTI's tool is considered classic in approach, innovative in application and robust in handling big data aspects of VC. Incorporating big data research into VC estimates allows agencies to devise innovative ways of investing in transportation improvements, simultaneously making the decision-making process for TRZs to be more reliable, robust, and accurate.

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