

The efficient movement of freight

is central to an effective transportation system and essential to a robust economy. Manufacturing, agriculture, retail and industry all depend upon reliable freight movement to function.

The Texas A&M Transportation Institute is a leader in multimodal freight research and an innovator in exploring new ways of moving freight across the nation and around the world.



Trucking, Freight Rail, Ports and Waterways, Air Cargo

- **Motor Carriers**
Truck congestion
chokepoints, truck emissions,
connected/automated
vehicles, oversize/overweight
trucks, heavy vehicle effects
on highways
- **Maritime**
Port operations, inland
waterway planning,
international freight movement
- **Border & Trade**
Border crossing performance
measures, freight intelligent
transportation systems,
NAFTA
- **Railroads**
Highway-rail grade crossings,
rail market research, rail
infrastructure and equipment
engineering, rail safety
- **Freight Systems & Planning**
Hazardous material
commodity flows, air cargo
landside accessibility, freight
policy, freight shuttle system

Learn more at
tti.tamu.edu



Texas A&M Transportation Institute's (TTI) Freight Shuttle System

TTI has developed a new freight transportation system: the Freight Shuttle System (FSS). The FSS's electrically powered motors will not add to existing pollution, will advance the United States' effort to achieve energy independence, and will allow more environmentally friendly energy choices.

2011 Waterborne Commerce



1.3 billion metric tons of foreign trade



805 million
metric tons of
domestic trade

2011 U.S. Water Transportation Statistical Snapshot, U.S. Department of Transportation, Maritime Administration, November 2013, p. 3.

U.S. Freight Stats



54 million tons of freight moved nationwide each day (\$46 billion in value)

Freight Analysis Framework, version 3.4, U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2012 figures.

40 tons/person
How much freight the U.S. needs to move annually

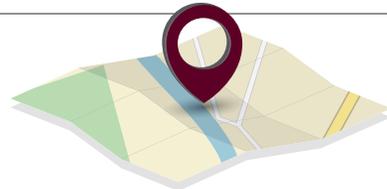


National Rail Plan, 2010 Progress Report, U.S. Department of Transportation, Federal Railroad Administration, p. 4.



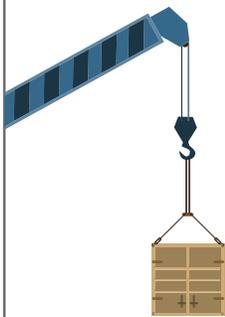
67% of tons moved by trucks in the U.S. (63% of freight by value)

Freight Analysis Framework, version 3.4, U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2014, 2012 figures.

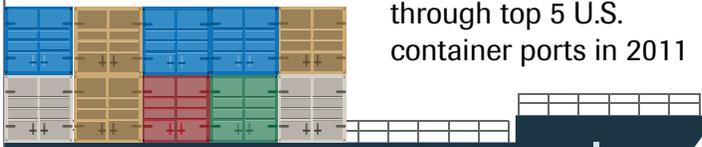


100 miles or less distance moved per shipment by 51% of total freight tons

Freight Analysis Framework, version 3.4, U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2012.



67% of U.S. foreign container tons moved through top 5 U.S. container ports in 2011



2011 U.S. Water Transportation Statistical Snapshot, U.S. Department of Transportation, Maritime Administration, November 2013, p. 5.

Representative Sponsors

Public Sector

- Texas Department of Transportation
- Texas Department of Public Safety
- Port Authorities
- Transportation Research Board
- U.S. Department of Energy
- U.S. Department of Transportation
- U.S. Environmental Protection Agency
- U.S. Federal Highway Administration
- Inter-American Development Bank
- National Cooperative Highway Research Program

Private Sector

- Association of American Railroads
- Transportation Technology Center Inc.
- Class I railroads: BNSF Railway, CSX
- National Waterways Foundation
- U.S. Soybean Export Council
- Private consultants

Ton-Miles Traveled per Gallon of Fuel



616
Inland Barge



478
Rail



150
Truck

A Modal Comparison of Domestic Freight Transportation Effects on the General Public: 2001-2009, Prepared for the National Waterways Foundation, Center for Ports and Waterways, Texas Transportation Institute, February 2012, Figure ES-4, p 5.



Representative Projects

<p>NAS (NCFRP 42)</p>	<p>Incorporating Surface Transportation Considerations into Navigation Project Budgeting</p>	<p>This project developed methodologies that (1) linked the performance of the U.S. maritime transportation system (MTS) with the performance of the U.S. freight transportation system and (2) could be used to identify MTS maintenance investment strategies that improved the efficiency of the overall freight transportation system. Researchers prepared methodologies that bridged the available waterborne commerce statistical data with equivalent land-side, multimodal transportation data to support system-level intermodal freight mobility, including the identification of appropriate related MTS maintenance investment strategies.</p>
<p>EPA</p>	<p>Truck Engine Idle Reduction Technology Demonstration Program</p>	<p>Extended truck idling wastes fuel and generates emissions of greenhouse gases and pollutants. This project produced prediction methodologies to assess the effectiveness of truck stop electrification (TSE) as a strategy to reduce these harmful effects. TTI research showed that a truck stop with TSE can reduce daily fuel consumption by 167 gallons, oxides of nitrogen emissions by 24.5 kg, and carbon dioxide emissions by 2.1 tons.</p>
<p>TxDOT</p>	<p>Texas 100 Congested Roadways and MAP-21 Reporting Assistance</p>	<p>Since 2009, TTI has led an effort to use traffic volume data and speed data (from INRIX in 2013) to generate mobility measures to produce a ranked list of the top congested bottleneck locations in Texas for both mixed vehicles and trucks. The list is used by TxDOT to program dollars to address the worst traffic locations across the state. TTI is also providing technical assistance to generate and report the MAP-21 performance measures, including freight performance measures at the statewide level for rural versus urban, NHS versus non-NHS, Interstate-only and by county.</p>





<p>Texas DPS (Division of Emergency Management)</p>	<p>Hazardous Materials Commodity Flow Studies and Emergency Planning</p>	<p>In a series of projects, TTI provided expert analysis for local emergency planning committees in a number of Texas counties. This included review of local emergency plans and analyses of hazardous-material commodity flows within each county, providing valuable information to inform the emergency plans of community leaders and first responders.</p>
<p>FHWA</p>	<p>Border Crossing and Wait Time Measurement System</p>	<p>TTI developed, tested, and implemented a system to consistently measure commercial vehicle crossing times at the U.S.-Mexico border. The system was originally piloted at the Pharr/Reynosa and El Paso/Ciudad Juarez ports of entry and is currently in operation at seven commercial international crossings in Texas. TTI sought input from key stakeholders to develop an information system to disseminate border-crossing information, seeking input from key stakeholders – carriers, shippers, and U.S. and Mexican federal and state agencies.</p>
<p>TxDOT (Gulf Coast Rail District)</p>	<p>Houston Freight Rail System Analysis</p>	<p>TTI contributed to the Houston Region Freight Study, an extensive inventory and operational modeling study that identified a series of infrastructure improvements to improve the safety and fluidity of the freight rail system in the greater Houston region. TTI continues to provide support services to the Gulf Coast Rail District to update the business case for grade crossing separation and improvement projects outlined in the original study.</p>
<p>FHWA</p>	<p>Secure Border Trade Demonstration – County of El Paso</p>	<p>The Secure Border Trade Demonstration Project is a three-year effort funded with Coordinated Border Infrastructure funds administered by FHWA and implemented by the County of El Paso. As part of this \$3.6 million project, TTI will assist the County of El Paso with project management, stakeholder facilitation and the implementation of a technology-monitoring system for the project. The project seeks to move vehicle and cargo monitoring away from the border by providing more information across the entire supply chain and software-enhanced analysis of data for customs and border security agencies.</p>

Research Centers

TTI is home to 10 state and national research centers, all approved by The Texas A&M University System Board of Regents. These centers help illustrate the depth and breadth of the Institute's capabilities. The products and recommendations generated by these centers enhance the economy and improve quality of life.

The following four centers specialize in freight transportation research.



Center for Railway Research

TTI's Center for Railway Research (CRR) studies, develops, and applies new and emerging technologies to solve rail industry problems. The center's researchers and industry experts conduct basic research to develop technologies to improve the safety, reliability and economics of rail transportation and perform technology scanning to identify emerging technology for the railroad industry. CRR researchers investigate a variety of rail issues, such as multimodal integration of railroads, optimization of warning signal performance, and enhanced safety in all facets of operation.

NAFTA Trade in 2013



\$300 billion
U.S. to Canada



\$332.1 billion
Canada to U.S.



\$226.7 billion
U.S. to Mexico



\$280.5 billion
Mexico to U.S.

NAFTA at 20: Overview and Trade Effects, *Congressional Research Service Report 7-5700, April 2014, Table A-1.*

**Established in 1950,
TTI has a long, successful
history of performing
groundbreaking research on
a wide range of significant
transportation issues.**



Center for Ports and Waterways

With 11 deepwater seaports and more than 1,000 miles of inland waterways, Texas' waterway system plays a vital role in the state's economy. To help preserve Texas' vital waterborne economic components and position industry to take advantage of opportunities for growth, TTI's Center for Ports and Waterways (CPW) provides valuable applied research at the local, regional and national level. CPW's proven track record of research, technology transfer and implementation is a valuable resource for the maritime industry. From local issues in water transportation to homeland security, TTI and CPW are uniquely qualified to help ensure the safety, efficiency and productivity of our nation's maritime interests.



Center for International Intelligent Transportation Research

As economies become more global, challenges faced by international urban centers like El Paso become more pressing. These challenges drive the innovation and discovery at the heart of the work of TTI's Center for International Intelligent Transportation Research (CIITR). 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 personal health.

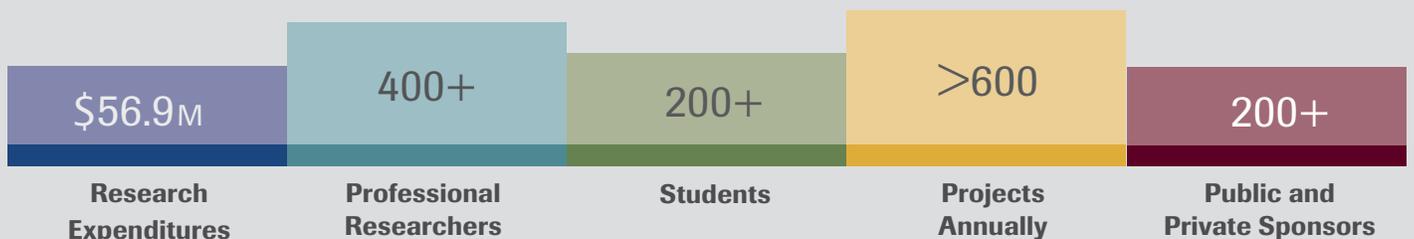


Transportation Policy Research Center

The Texas Legislature created the Transportation Policy Research Center at TTI to provide for a sustained, independent and objective capability in policy analysis to help decision makers address the state's current, near-term and long-range transportation challenges. Because the state has become increasingly dependent on the efficient movement of goods to enhance global competitiveness, PRC's work encompasses the public policy implications of freight movement across all modes.

TTI's research in this area aspires to help inform policy decisions and ensure an efficient multimodal and inter-modal freight transportation system. Initial work in this area focuses on issues related to oversize/overweight trucks, public use of rail right-of-way in urban areas, and the competitiveness of Texas' exports, including port trade.

TTI by the Numbers



Established in 1950, TTI has a long, successful history of performing groundbreaking research on a wide range of significant transportation issues. TTI employs approximately 400 professional researchers with significant expertise in all disciplines impacting transportation, such as technology, engineering, planning, economics, policy, landscape architecture, environmental sciences and the social sciences. Since the inception of TRB's Cooperative Research Program, TTI has been the largest participant in NCHRP, and some 80 TTI researchers lead or serve on TRB committees.

The Institute offers objective, credible guidance through its 10 state and national research centers and state-of-the-art facilities, including full-service safety proving grounds, an environmental and emissions testing facility, a sediment and erosion control laboratory, and numerous other facilities and laboratories. The Institute annually works on more than 600 transportation research projects totaling more than \$56 million. At any one time, TTI has research sponsors in about 30 states, and has conducted research for sponsors in all 50 states and more than 28 foreign countries.

Locations

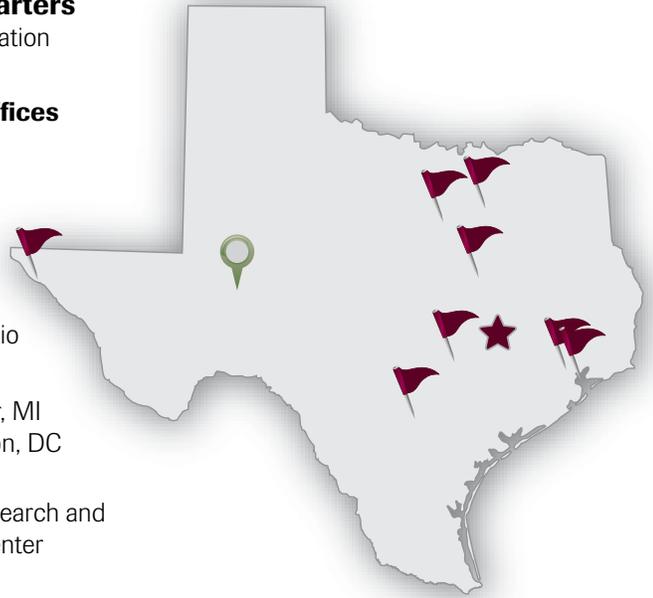
★ Headquarters
College Station

🚩 Urban Offices
Arlington
Austin
Dallas
El Paso
Galveston
Houston
San Antonio
Waco

Ann Arbor, MI
Washington, DC

📍 Pecos Research and Testing Center

📍 International
Mexico City, Mexico
Doha, Qatar



TTI's Mission

To identify and solve transportation problems through research, to transfer technology and knowledge, and to develop diverse human resources to meet the transportation challenges of tomorrow.

Contact



Allan Rutter
Research Scientist
Interdisciplinary Research Group
Texas A&M Transportation Institute
9441 LBJ Freeway, Suite 103
Dallas, TX 75243-3135
ph. (972) 994-2205
a-rutter@tti.tamu.edu
tti.tamu.edu

TTI1457.1054.1014

TTI has
conducted research in
25+ countries
&
all 50 states in the U.S.