Texas Freight Advisory Committee
November 5, 2020

Thank you for attending!

Meeting starts at 8:10 AM with Committee roll call shortly after.

Help make this is successful webinar:
• Ensure your phone and computer microphone are muted.
• Familiarize yourself with the chat box and participant list.
• If not speaking, periodically check your devices to ensure they are muted.

If you have unmuted your device and are trying to speak but no one is hearing you, touch *6 or send your message to the chat box. If you’re still having difficulty, text Kale Driemeier at 512-649-6825.
Meeting Overview and Introductions

Review of September 3, 2020 TxFAC Meeting and Ongoing Freight Planning Activities

Freight Network Technology and Operations Plan

Freight Transportation Technology Panel: Connecting Texas Freight

Project Updates: Freight Planning Tools, Economic Role of Freight in Texas, Impacts of the Panama Canal Expansion

Next Steps and Wrap Up
Planning for Freight and Energy Sector Transportation in the Permian Basin

- TxFAC and TX Freight Mobility Plan Recommendation
- State/National data sources do not reflect local activity

Economic Impact of the Permian Basin

- Larger than the economies of 12 states
- 2008-2019 GRP increased 78% (TX 46%)
- 2019 Freight related jobs: over 290,000
- 2019 State/Local taxes and royalties paid: over $4.5B

Freight Network Challenges, Conditions and Opportunities

- 2016-2018 Permian Basin truck-involved crashes increased over 120%
- Fracing (sand and water) accounts for over 105,000 daily truck trips in the PB
- Over 410 million tons of sand and water transported in the PB in 2018

Permian Basin Freight Plan Implementation

- Policy (13), Program (14), Project (954), and Operations (9) strategy recommendations
TxDOT Freight Planning and Studies

Rio Grande Valley Freight and Trade Transportation Plan (Dec 2020)
- Cross-Border Trade, Distribution, Warehousing

Freight Planning Tools (April 2021)
- Stakeholder Database and Engagement Module
- Freight Flow Forecasting and Scenario Planning
- Freight Data Collection/Management and Dashboards

Freight Infrastructure Design Considerations (April 2021)
- Developing Preliminary Minimal and Optimal Design Standards
- Working with Design Division to coordinate on the updated Design Manual

Economic Role of Freight in Texas (April 2021)
- Assessment of impacts (jobs, income, contribution to GSP/GDP, etc.)
- By mode, commodity, corridor, region, state
Truck Parking Study Implementation

- Underway in early 2021
- Develop strategies to address truck parking needs identified in the Truck Parking Study
- Corridor and region-based plans

I-10 Truck Parking Availability System (TPAS) (2023)

- USDOT ATCMTD grant award to design and install TPAS for 37 public facilities along I-10 from CA to TX
- Monitor truck parking, availability and provide real-time information to truck drivers
**WIM / Vehicle Classification Strategic Plan (Summer 2021)**
- Data uses (Planning, Maintenance, etc.)
- Needs Assessment
- Identification of Strategies
- Implementation Plan

**Texas Congestion Analysis Tool (Ongoing)**

**US 75**
Lyndon B Johnson / IH 635 to Woodall Rodgers Freeway / SS 366
TX100 ID: 8000112
Congestion Stats Year: 2019
- Truck:
  - Top 100 Rank: 11
  - Hours of Delay: 338,650
  - Delay Per Mile: 36,842
  - Congestion Cost: $17,478,803
- All Vehicles:
  - Top 100 Rank: 9
  - Hours of Delay: 8,665,806
  - Delay Per Mile: 725,202
  - Congestion Cost: $134,585,654

**Oversize / Overweight Report (April 2021)**

**Texas Freight Advisory Committee**
Other TxDOT Efforts of Interest

**TX-MX Border Transportation Master Plan (December 2020)**
- Texas border with Mexico extends for 1,255 miles, or 64 percent of the total U.S.-Mexico border
- Assess border crossings and multimodal corridor conditions, performance, challenges, needs
- Identify economic impact and sphere of influence
- Strategies (policies, programs, projects) to address regional freight transportation needs

**Ports to Plains Interstate 27 Feasibility Study (December 2020)**
- Legislatively mandated study
- Study upgrading corridor to interstate standards

**Impacts of the Panama Canal Expansion (February 2021)**
- Impacts on Texas Ports (LNG, Plastics, Containers, Ag, etc.)
- Impacts on the Texas Multimodal Network
What freight transportation technology strategy do we recommend?

Why and how did we get here?

Who did we interview and collaborate with?

What can you expect from the FNTOP?

What tasks are needed for implementation?
TxFAC Policy and Program Recommendations in the TFMP:

- **Freight-Based Technology Solutions and Innovation**: the state should develop and implement innovative transportation technologies, techniques, research and methods.

- **Safety, Security and Resiliency of the Freight Transportation System**: the state should identify and implement strategies that will improve safety, security and resiliency on the Texas Multimodal Freight Network.

- **Multimodal Connectivity**: the state should invest in strategies and solutions that link the different freight transportation modes.

- **Urban Freight Movement**: the state should continue to address freight transportation issues critical to the urban areas in Texas that support mobility and economic growth. The FAST Act placed particular emphasis on addressing congestion and freight bottlenecks which are primarily in the state’s largest urban areas.

- **Rural Connectivity**: the state should continue to address freight transportation issues critical to the rural areas in Texas that support economic development, including particular emphasis on infrastructure for transporting agricultural and energy sector equipment and products.

- **Texas as a Global Trade and Logistics Hub and Gateway**: the state should invest in strategic transportation solutions to ensure Texas is the leader in North American trade and a top international trade gateway and national logistics hub.

- **Economic Development and Economic Competitiveness**: the state should align investments in the transportation system with the state’s vision for economic growth and global competitiveness.

- **Freight Transportation Asset Preservation**: the state should continue to invest and pursue innovative strategies in asset preservation on the Texas Highway Freight Network.

- **International Border Crossings**: the state should invest in transportation strategies to improve freight mobility across international border crossings.

- **Rail Freight Transportation**: the state should continue to work with the private-sector rail industry and other stakeholders to identify strategies that expand rail capacity, improve rail fluidity and ease traffic congestion to accommodate projected growth in imports and exports.

- **Institutional Coordination and Collaboration**: the state should coordinate with international, national, state, regional and local agencies and private sector stakeholders.
Why a Freight Network Technology and Operations Plan?

- **Maximize use** of what we have
  - Existing technology and system capacity
- **Help meet TFMP goals**
  - Safety, economic competitiveness, asset preservation and utilization, mobility and reliability, and multimodal connectivity
- Ensure Texas is **prepared for** and a **leader** in new and emerging technologies

**PLAN PURPOSE**
Recommend appropriate technology, data-sharing, and operations-based strategies to address or capitalize on current and future freight safety and mobility challenges and opportunities on the Texas Multimodal Freight Network.
How Did We Get Here?

Plan Approach

- Develop Baseline Conditions and Needs Assessment
- Freight Network Technology Opportunities
- Freight Network Strategies and Recommendations and Conceptual Framework

Stakeholder Engagement

Implementation Plan

Freight Network Technology and Operations Plan, Executive Summary, Fact Sheets
### What Technical Analyses Supported This Effort?

<table>
<thead>
<tr>
<th>Technical Analyses</th>
<th>Concept of Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of the Practice Assessment</td>
<td><strong>Who</strong> – Who are the stakeholders involved with the system?</td>
</tr>
<tr>
<td>Inventory of Existing Conditions</td>
<td><strong>What</strong> – What are the elements and the high-level capabilities of the system?</td>
</tr>
<tr>
<td>User Needs Assessment</td>
<td><strong>Where</strong> – What is the geographic and physical extent of the system?</td>
</tr>
<tr>
<td>Strategy Identification and Conceptual Framework</td>
<td><strong>When</strong> – What is the sequence of activities that will be performed?</td>
</tr>
<tr>
<td><strong>6 Concepts of Operations</strong></td>
<td><strong>Why</strong> – What is the problem or opportunity addressed by the system?</td>
</tr>
<tr>
<td>Implementation Plan</td>
<td><strong>How</strong> – How will the system be developed, operated, or maintained?</td>
</tr>
<tr>
<td>Freight Network Technology and Operations Plan</td>
<td></td>
</tr>
</tbody>
</table>
Building on and Leveraging the Existing Texas ITS Program

Intelligent Transportation Systems (ITS) Coverage in Texas

Traffic Management Centers (TMCs)

ITS Coverage:
- TMC
- CCTV
- DMS
- Vehicle Detection
Who Did We Interview and Collaborate With?

Stakeholder Engagement

Interviewed and collaborated with 9 TxDOT Divisions

- Transportation Planning and Programming
- Information Technology
- Traffic Safety
- Travel
- Right-of-Way
- Rail
- Maintenance
- Maritime
- Strategy and Innovation

Regional outreach meetings including Houston, Dallas, Texas Mobility Summit, and Texas Port Authority Advisory Committee

59 interviews with private sector, state agencies, and local municipalities

Types of Stakeholders Interviewed

- City Government: 7%
- Law Enforcement: 2%
- OEMs/Startups: 12%
- Transportation Data Providers: 5%
- Industry Group: 12%
- Corporations with Internal Logistics Services: 5%
- Trucking Companies: 14%
- Border Crossing: 3%
- Metropolitan Planning Organization (MPO): 9%
- Research Institute: 4%
- Railroads: 4%
- Maritime Ports: 10%
- Federal/State Agency: 7%
Stakeholder Discussion Topic Areas

- Bar graph indicates **frequency of topic area** discussed during stakeholder interviews.
- Topic areas were used to **inform strategy development**.
## User Needs Identified

<table>
<thead>
<tr>
<th>Freight Technology Area</th>
<th># of User Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Management</td>
<td>14</td>
</tr>
<tr>
<td>Advanced Traveler Information Systems</td>
<td>19</td>
</tr>
<tr>
<td>Dynamic Route Guidance</td>
<td>4</td>
</tr>
<tr>
<td>Data Integration and Analytics</td>
<td>11</td>
</tr>
<tr>
<td>Enforcement and Inspection</td>
<td>5</td>
</tr>
<tr>
<td>Connected and Automated Freight Vehicles</td>
<td>9</td>
</tr>
<tr>
<td>Intermodal Terminal Operations</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total #</strong></td>
<td><strong>74</strong></td>
</tr>
</tbody>
</table>
Strategy Prioritization Process

- **Stakeholder Discussion Topics**: Over 50 unique topics
- **User Needs Development**: 74 User Needs across 7 freight technology areas
- **Strategy Formulation**: 12 FNTOP proposed strategies
- **Strategy Prioritization**: 2 proposed strategies not advanced
- **Conceptual Framework Development**: Covering 10 FNTOP recommended strategies
- **Concepts of Operations Development**: 6 FNTOP recommended strategies selected
<table>
<thead>
<tr>
<th>Safety Warning Detection System</th>
<th>Truck Parking Availability System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide Traffic Operations Center</td>
<td>Smart Work Zone Information System</td>
</tr>
<tr>
<td>Smart Freight Connector</td>
<td>Centralized Data Repository for Freight Applications</td>
</tr>
<tr>
<td>Blocked Rail Crossing Traffic Management System</td>
<td>Bi-National Traffic Operations Center</td>
</tr>
<tr>
<td>AV Infrastructure, Connected Signing, &amp; Data</td>
<td>Freight Integrated Corridor Management</td>
</tr>
<tr>
<td>High-Resolution Freight Traveler Information System</td>
<td>Fiber Optic Cable Expansion</td>
</tr>
</tbody>
</table>
## FNTOP Strategies Advancing to ConOps

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</tbody>
</table>
Mentimeter Polling and Discussion

- Provide real-time input to our discussion
- Polling is accessible via computer, smartphone, tablet
- Go to www.menti.com
- Enter code [provided during meeting]
- Webex chat function is also available if you have questions/comments

- Does the strategy add value to the Texas Multimodal Freight Network?
- Is the strategy likely to succeed in Texas?
- Can you prioritize the strategies?
- Does our final plan have the right content?
**OVERVIEW:** Install spot-treatment overheight, overweight, and/or overspeed detection equipment and notification systems at locations with a high-incidence of crashes or mission-critical infrastructure (bridges, etc.).

**NEEDS:** Need to provide real-time notifications of safety issues to prevent safety incidents and preserve infrastructure for future freight operations.

**CHALLENGES:** Funding to cover all sites needed is limited.
Go to www.menti.com and use the code 45 59 96 8

The code lets your audience join the presentation. It expires in 7 days.

Scales

Strongly disagree  |  Strongly agree

- Does the Safety Warning Detection System Strategy add value to the Texas Multimodal Freight Network?
- Is the Safety Warning Detection System Strategy likely to succeed in Texas?
Actionable Strategy: Statewide Traffic Operations Center

OVERVIEW: Implement a statewide TOC for overseeing statewide freight initiatives and large scale traffic management activities.

NEEDS: Need to improve statewide traffic operations, particularly along rural routes, by providing a consistent strategy and improved coverage.

CHALLENGES: Difficulties with upgrading the Advanced Traffic Management System.
Go to www.menti.com and use the code 4559968

Scales

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Strongly agree</th>
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</thead>
<tbody>
<tr>
<td>Does the Statewide Traffic Operations Center (TOC) Strategy add value to the Texas Multimodal Freight Network?</td>
<td>Is the Statewide Traffic Operations Center (TOC) Strategy likely to succeed in Texas?</td>
</tr>
</tbody>
</table>
Actionable Strategy: **Smart Freight Connector**

**OVERVIEW:** Deploy freight-specific ITS technology (truck priority signals, etc.) on critical freight routes to provide efficient operations and staging, such as on last-mile routes from interstate to ports.

**NEEDS:** Need to improve mobility, safety, and efficiency for trucks on last-mile connections to intermodal facilities.

**CHALLENGES:** TxDOT maintenance of ITS assets that are off the freeway network.
Go to www.menti.com and use the code 45 59 96 8

Scales

Strongly disagree

Does the Smart Freight Connector Strategy add value to the Texas Multimodal Freight Network?

Is the Smart Freight Connector Strategy likely to succeed in Texas?

Strongly agree
**Actionable Strategy:** Blocked Rail Crossing Traffic Management System

**OVERVIEW:** Install blocked rail crossing detection systems and advance notification equipment at high-profile routes with frequent rail activity.

**NEEDS:** Need to improve mobility near rail crossings by providing route options and advanced notification of delays.

**CHALLENGES:** Reluctance from railroad companies to share train location information.
Go to www.menti.com and use the code 45 59 96 8

Scales

- Strongly disagree
  - Does the Blocked Rail Crossing Traffic Management System Strategy add value to the Texas Multimodal Freight Network?
  - Is the Blocked Rail Crossing Traffic Management System Strategy likely to succeed in Texas?
- Strongly agree
Actionable Strategy: AV Infrastructure, Connected Signing and Data

OVERVIEW: Implement AV-specific infrastructure requirements for “smart” roadside signs and repository for digitized infrastructure data (“digital map”).

NEEDS: Need to offer better information on the roadway environment to improve efficiency and safety of automated freight vehicles.

CHALLENGES: Achieving a consolidated and consistent basemap of the roadway environment will require a strong public-private-partnership between TxDOT and its private sector partners.
Go to www.menti.com and use the code 45 59 96 8

Scales

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the AV Infrastructure, Connected Signing, &amp; Data Strategy add value to the Texas Multimodal Freight Network?</td>
<td></td>
</tr>
<tr>
<td>Is the AV Infrastructure, Connected Signing, &amp; Data Strategy likely to succeed in Texas?</td>
<td></td>
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</tbody>
</table>
**Actionable Strategy:** High-Resolution Freight Traveler Information System

**OVERVIEW:** Develop a statewide data collection program to provide high-resolution real-time traffic data for all freight network routes to provide for freight industry use in making informed routing decisions.

**NEEDS:** Need to improve the quality of traveler information to dramatically improve routing and freight efficiency.

**CHALLENGES:** Data processing power needed to generate predictive analytics for the entire statewide roadway system.
Go to www.menti.com and use the code 45 59 96 8

Scales

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the High-Resolution Freight Traveler Information System Strategy add value to the Texas Multimodal Freight Network?</td>
<td></td>
</tr>
<tr>
<td>Is the High-Resolution Freight Traveler Information System Strategy likely to succeed in Texas?</td>
<td></td>
</tr>
</tbody>
</table>
Priority for Deployment

1st: Safety Warning Detection System
2nd: Statewide Traffic Operations Center
3rd: Smart Freight Connector
4th: Blocked Rail Crossing Traffic Management System
5th: AV Infrastructure, Connected Signing, & Data
6th: High-Resolution Freight Traveler Information System

Go to www.menti.com and use the code 4559968
## What will be Included in the FNTOP?

### SECTION 1: The State of Freight Transportation Technology and Operations in Texas
- **Chapter 1:** Overview of the Texas FNTOP
- **Chapter 2:** The Importance of Freight Technology and Operations in Texas
- **Chapter 3:** Freight Technology Developments in Texas, the Nation, and the World

### SECTION 2: Texas Freight Transportation Challenges, Needs, Opportunities, and Strategies
- **Chapter 4:** Texas Freight Transportation Challenges, Needs, and Opportunities
- **Chapter 5:** Proposed Technology and Operational Strategies
- **Chapter 6:** Strategy Prioritization
- **Chapter 7:** Conceptual Framework

### SECTION 3: Taking Action to Address Freight Transportation Technology and Operations Needs in Texas
- **Chapter 8:** Strategies Selected for Concept of Operations Development
- **Chapter 9:** Implementation Recommendations
# Action Plan for Strategy Implementation

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Immediate Action Tasks (0-2 years)</th>
<th>Medium-Term Tasks (2-5 years)</th>
<th>Long-Term Tasks (5-7 years)</th>
<th>Ongoing O&amp;M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Warning Detection System</td>
<td>Yes; Expand system deployments</td>
<td></td>
<td>Adding new sites to existing system</td>
<td></td>
</tr>
<tr>
<td>Truck Parking Availability System</td>
<td>Yes; Monitor I-10 TPAS Implementation</td>
<td>Update</td>
<td>Adding new parking lots to existing system</td>
<td></td>
</tr>
<tr>
<td>Smart Work Zone Information</td>
<td>Yes; Coordinate with existing Smart Work Zone program</td>
<td></td>
<td>Adding new applications to existing program</td>
<td></td>
</tr>
<tr>
<td>Statewide TOC</td>
<td>No; Coordinate with regional partners to establish STOC vision</td>
<td></td>
<td>STOC Facility Implementation</td>
<td></td>
</tr>
<tr>
<td>Smart Freight Connector</td>
<td>No; Coordinate with key local stakeholders</td>
<td></td>
<td>Continue adding new corridors to deployed system</td>
<td></td>
</tr>
</tbody>
</table>

- **Concept of Operations**
- **System Requirements**
- **High-Level Design**
- **Detailed Design**
- **Deployment**
- **Facility Implementation/Incremental Strategy Expansion**
- **Completed**
- **Need to Do**
## Action Plan for Strategy Implementation

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<th>Long-Term Tasks (5-7 years)</th>
<th>Ongoing O&amp;M</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blocked Rail Crossing Traffic Management System</strong></td>
<td><img src="#" alt="Checkmark" /> No; Coordinate with existing local agency programs</td>
<td><img src="#" alt="Checkmark" /> No; Continue adding new sites to deployed system</td>
<td><img src="#" alt="Checkmark" /> Continue adding new corridors to deployed system</td>
<td><img src="#" alt="Checkmark" /> Continue adding new traffic data to deployed system</td>
</tr>
<tr>
<td><strong>AV Infrastructure, Connected Signing, and Data</strong></td>
<td><img src="#" alt="Checkmark" /> No; Continue collaborating with CAV industry</td>
<td><img src="#" alt="Checkmark" /> No; Continue adding new corridors to deployed system</td>
<td><img src="#" alt="Checkmark" /> Continue adding new corridors to deployed system</td>
<td><img src="#" alt="Checkmark" /> Continue adding new corridors to deployed system</td>
</tr>
<tr>
<td><strong>High-Resolution Freight Traveler Information System</strong></td>
<td><img src="#" alt="Checkmark" /> No; Coordinate internally between Divisions and regional partners</td>
<td><img src="#" alt="Checkmark" /> Continue adding new data services to deployed system</td>
<td><img src="#" alt="Checkmark" /> Continue adding new data services to deployed system</td>
<td><img src="#" alt="Checkmark" /> Continue adding new data services to deployed system</td>
</tr>
<tr>
<td><strong>Central Data Repository for Freight Applications</strong></td>
<td><img src="#" alt="Checkmark" /> No; Support TxDOT Information Technology Division planning and investment efforts</td>
<td><img src="#" alt="Checkmark" /> Coordinate with ongoing Border Master Plan Implementation effort</td>
<td><img src="#" alt="Checkmark" /> Bi-National TOC Implementation (Detailed Design, Deployment)</td>
<td><img src="#" alt="Checkmark" /> Bi-National TOC Implementation (Detailed Design, Deployment)</td>
</tr>
</tbody>
</table>

- **Concept of Operations**
- **System Requirements**
- **High-Level Design**
- **Detailed Design**
- **Deployment**
- **Facility Implementation/Incremental Strategy Expansion**
- **Ongoing O&M**
**FNTOP Key Recommendations**

Conduct an **FNTOP Implementation Planning Study** with the following supporting actions:

1. Continue **collaboration within the TxDOT Divisions** to support the implementation planning activities over the next two years.

2. Work with TxDOT Districts to facilitate **site opportunities for pilot deployment** and to develop **regional champions**.

3. Expand both **external public sector transportation agency** involvement and **private sector freight and technology** involvement.

4. Coordinate within TxDOT regarding **funding sources**.

5. Formalize an **FNTOP Working Group** that would act as a stakeholder advisory committee for this program and conduct regular meetings.
Discussion
Panel: Connecting Texas Freight

Michael Chacon, P.E.
Director
TxDOT – Traffic Safety Division

David Coronado, AICP, CNU-A
Director of International Bridges
City of El Paso

Rasheq Zarif
Managing Director
Deloitte Consulting, LLP

Robert Brown
Head of Public and Government Affairs
TuSimple
Freight Flow Forecasting and Scenario Planning Tool
Freight Flow Forecasting and Scenario Planning (FFSP) Module

Generate base year and future year (out to 2050) commodity flow profiles and routing by commodity, region (county or multi-county level), direction and mode under alternative futures.

- Account for impact of uncertain futures
- Develop robust strategies and investments
- Integrate freight into futures in statewide analysis model (SAM)
- Facilitate updating of commodity flows between data purchases
- Raise awareness of importance of freight
Forecasts Tailored to “Most Likely” Future

- Failure!
- Success!
- Failure!
- Unanticipated Future
- Most Likely Future
- Unanticipated Future
Freight Flow Forecasting with Scenarios
Approach Overview

- **TRANSEARCH Forecast**
  - Moodys forecast
  - BEA Make/use tables

- **Scenarios**
  - Markets
  - Policies
  - Technology

- **Alt. Forecasts**
  - Oil prices
  - Trade
  - High/low growth

- **Pre-determined alternative forecasts**
- **Parameters to allow for “what-if” analysis**
- **User generated scenarios**
TxFAC Input on Disruptors

- What disruptors should be considered?
- Please rate the disruptors on their probability of occurring and their potential impact
Discussion and Next Steps
Next 90 Days

1. Complete prototype
2. TxDOT beta test
3. Finalize tool based on beta results
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Project Manager  
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Sondra Johnson  
TxDOT  
Freight Planer  
(512) 621-8463  
Sondra.johnson@txdot.gov
The Economic Role of Freight in Texas

Overview and Findings to Date
Study Motivation

Analyze and document the economic role of freight and communicate and promote the findings to raise public awareness on the importance of safe and efficient freight transportation.

- Economic Impact of Freight – State, District, Texas Triangle and Corridor
- Economic Impact of Modes – Rail, Ports and Waterways, Trucking, Air Cargo, Pipelines, Warehousing and Distribution
- Economic Impact of Freight Congestion – Current and Future
- Economic Impact of Freight Investments
- Economic Impact of E-commerce in Texas Triangle
- Economic Impact of Cross Border Trade on Rural Counties
Data, Methodology, and Economic Analysis

COLLECT DATA, REVIEW MATERIALS, IDENTIFY BEST PRACTICES

DEVELOP AND VET METHODOLOGY

ECONOMIC IMPACT OF FREIGHT – DISTRICT, CORRIDOR, TEXAS TRIANGLE, STATE, MODES

ECONOMIC IMPACT E-COMMERCE AND FREIGHT INVESTMENT PLAN

VALUE AND VOLUME OF FREIGHT

DOCUMENTATION

DRAFT FINAL REPORT

FINAL REPORT

FACT SHEETS, EXECUTIVE SUMMARY

Work underway

Presenting today
Findings to Date
Statewide, District and Texas Triangle analysis
Modal analysis
## Study Geographies

<table>
<thead>
<tr>
<th>Task</th>
<th>State of Texas</th>
<th>TxDOT Districts</th>
<th>Texas Triangle</th>
<th>Key Freight Corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Importance of Freight for State Districts, Texas Triangle and the State of Texas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Economic Importance of Freight for Key Freight Corridors</td>
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<td></td>
<td>X</td>
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<tr>
<td>Economic Role of Freight by Mode</td>
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<tr>
<td>Class I and Shortline Railroads</td>
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<tr>
<td>Shortline Railroads Only</td>
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<tr>
<td>Maritime Ports and Waterways</td>
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<tr>
<td>Air Cargo</td>
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<td>X</td>
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<tr>
<td>Pipelines</td>
<td></td>
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<tr>
<td>Inland Ports, Warehouse and Distribution Facilities</td>
<td></td>
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</tr>
<tr>
<td>Trucking</td>
<td></td>
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<tr>
<td>Economic Costs of Congestion on Freight</td>
<td>X</td>
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<tr>
<td>Economic Benefits of Freight Infrastructure Investments</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Economic Impact of E-Commerce in the Texas Triangle</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Economic Impact of Border Freight</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Geographies Included in Economic Analysis

Counties in the Texas Triangle

TXDOT Districts

Selected Corridors

Prepared by Cambridge Systematics. Data for planning purposes only.
September 29, 2020

Prepared by Cambridge Systematics. Data for planning purposes only.
June 18, 2020

Prepared by Cambridge Systematics. Data for planning purposes only.
October 14, 2020
Direct Freight Transportation Impacts in Texas, 2018

- 3.3 billion tons freight valued at $2.9 trillion
- 103 tons and $70,000 in freight per capita
- 857 tons and $570,000 in freight per business
- 742 million tons valued at $910 billion in domestic trade
- 496 million tons of commodities valued at $617 billion in international trade
- 1 million direct freight transportation jobs
- $188.4 billion paid in freight transportation costs

<table>
<thead>
<tr>
<th>Mode</th>
<th>Truck ($ Billion)</th>
<th>Rail ($ Billion)</th>
<th>Air ($ Billion)</th>
<th>Water ($ Billion)</th>
<th>Total ($ Billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>$124.3</td>
<td>$18.9</td>
<td>$2.1</td>
<td>$43.2</td>
<td>$188.4</td>
</tr>
</tbody>
</table>

Source: Cambridge Systematics ad Quetica analysis of TRANSEARCH, U.S. Census Bureau, Bureau of Labor Statistics and third-party freight billing data
Economic Impact of the **Freight Transportation Sector** on the Texas Economy, 2018

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Employment Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation and Warehousing</td>
<td>44%</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>11%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>7%</td>
</tr>
<tr>
<td>Health Care and Social Assistance</td>
<td>6%</td>
</tr>
<tr>
<td>Accommodation and Food Services</td>
<td>5%</td>
</tr>
<tr>
<td>Other Services (except Public Administration)</td>
<td>5%</td>
</tr>
<tr>
<td>Administrative and Support and Waste Management and Remediation Services</td>
<td>6%</td>
</tr>
<tr>
<td>Finance and Insurance</td>
<td>4%</td>
</tr>
<tr>
<td>Real Estate and Rental and Leasing</td>
<td>3%</td>
</tr>
<tr>
<td>All other industries</td>
<td>6%</td>
</tr>
</tbody>
</table>

- **2.2 million full-time jobs**
- **$196.9 billion in GSP**
- **$43.1 billion in tax revenue**
- **$155.9 billion in wage income**

Source: CS analysis using 2018 IMPLAN model for Texas
Economic Impact of Freight Transportation Sector by District, 2018

2018 Freight Employment Impact (due to Freight Employment) by District

2018 Freight GDP Impact (due to Freight Employment) by District

2018 Personal Income Impact (due to Freight Employment) by District

Source: CS analysis using 2018 IMPLAN model for Texas
Economic Impact of Freight Transportation Sector in TX Triangle, 2018

805,000 direct freight sector jobs

$43 million in direct freight sector income

Economic Impact
1.8 million jobs
$171 million in GSP
$143 million in income
$27 million in tax revenue

Source: CS analysis using 2018 IMPLAN model for Texas
Freight Intensive Industries in 2018

- Business generating freight:

  - 12 million full-time jobs
  - $1.5 trillion in GSP
  - $253 billion in tax revenue
  - $807 billion in wage income

Source: CS analysis using 2018 IMPLAN model for Texas
Combined Economic Impact of Freight in Texas, 2018

- Statewide impact of freight transportation and handling and freight intensive industries

14.2 million full-time jobs

$1.7 trillion in GSP

$296 billion in tax revenue

$96.3 billion wage income

Source: CS analysis using 2018 IMPLAN model for Texas
Modal Economic Impacts

**Trucking**
- Industry profile and impact
- Intermediate input for other industries

**Rail**
- Industry profile and impact
- Benefit to highways
- Benefit for rail dependent industries

**Ports and Waterways**
- Industry profile and impact
- Summarize most recent studies

**Pipelines**
- Industry profile and impact
- Benefits to highways
- Intermediate input for oil and gas sectors

**Warehousing and distribution**
- Industry profile and impact
- Benefit for other industries

**Air Cargo**
- Industry profile and impact
- Summarize findings from TxDOT Aviation Division studies
Modal Employment Impact Summary – Enterprise Impacts, 2018

Source: Cambridge Systematics and WSP analysis using 2018 IMPLAN model for Texas

* Includes enterprise impacts only
Modal Intensive Industry Employment, 2018

Source: WSP analysis using 2018 IMPLAN model for Texas
## Modal Combined Economic Impact, 2018

<table>
<thead>
<tr>
<th>Mode</th>
<th>Employment (Thousands full-time jobs)</th>
<th>GSP ($ Billions)</th>
<th>Income ($ Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck</td>
<td>4,331</td>
<td>563</td>
<td>289</td>
</tr>
<tr>
<td>Rail</td>
<td>250</td>
<td>80</td>
<td>25</td>
</tr>
<tr>
<td>Maritime</td>
<td>383</td>
<td>153</td>
<td>42</td>
</tr>
<tr>
<td>Air cargo</td>
<td>146</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>Pipeline</td>
<td>549</td>
<td>180</td>
<td>70</td>
</tr>
<tr>
<td>Warehousing and Distribution*</td>
<td>173</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

* Includes only enterprise benefits

Source: Cambridge Systematics and WSP analysis using 2018 IMPLAN model for Texas
Discussion and Next Steps
## Milestones and Schedule

<table>
<thead>
<tr>
<th>Milestones</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology Framework</td>
<td>June 2020</td>
</tr>
<tr>
<td>Economic Impact of Freight Transportation</td>
<td>August 2020</td>
</tr>
<tr>
<td>Economic Impact of Freight Modes</td>
<td>October 2020</td>
</tr>
<tr>
<td>Economic Impact of Freight Congestion</td>
<td>November 2020</td>
</tr>
<tr>
<td>Economic Impact of Freight Investments</td>
<td>November 2020</td>
</tr>
<tr>
<td>Economic Impact of E-Commerce</td>
<td>November 2020</td>
</tr>
<tr>
<td>Economic Impact of Border Trade on Rural Communities</td>
<td>January 2021</td>
</tr>
<tr>
<td>Final Report</td>
<td>February 2021</td>
</tr>
</tbody>
</table>
Thank you!

Contact us for more information about the Economic Role of Freight in Texas

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(512) 460-1727

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Paula Dowell, Ph.D.
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(404) 861-5834
Project Objective

- Document the impact of the three-year operation of the expanded Panama Canal on Texas ports, industries, and the landside transportation infrastructure, including roads, bridges, and other facilities on the Texas multimodal freight network. Identify additional improvements to increase exports and imports through Texas ports.
Trade with Pacific Rim Countries via Texas Deep Draft Ports Through the Panama Canal

Labeled countries are in the top 25 Texas trading partners
- Panama Canal
- Texas deep draft ports
Background – TxDOT Panama Canal Stakeholder Working Group (PCSWG)

- TxDOT formed PCSWG in 2012
- Six information-gathering meetings with stakeholders
- Findings, recommendations, and actions to increase exports and imports through Texas ports and expand state’s position as global gateway for nation
- Texas Freight Advisory Committee (TxFAC) established in 2013
Project Activities

- Conduct stakeholder interviews
- Review data from the Panama Canal Authority, Department of Energy, ports and other sources
- Review national, state, and regional reports on the impacts of Panama Canal expansion
- Coordinate with other freight and port-related projects
Panama Canal — Total Transits

- FY16: 13,114
- FY17: 13,548
- FY18: 13,795
- FY19: 13,785
Texas Benefits from the Expanded Canal

- Examples of increased exports and imports to Pacific Rim countries
  - Liquified Natural Gas (LNG)
  - Liquid Petroleum Gas (LPG)
  - Containers
  - Plastic resins
  - Roll-on/Roll-off (RoRo)
  - Agricultural, processed foods and beverages
Texas LNG Exports

- Deep draft ports
- Operating LNG export terminals
- Approved LNG terminals under construction
- Approved LNG terminals awaiting construction
Texas LNG Exports Through the Panama Canal

2
Operating LNG export terminals in Texas

3
FERC approved LNG export terminals in Texas under construction*

6
FERC approved LNG export terminals in Texas awaiting construction*

10
Laden LNG vessels through the Panama Canal neopanamax locks from Texas (Atlantic to Pacific)**

FY16
** Federal Energy Regulatory Commission (FERC), March 2020

72
FY17

142
FY18

156
FY19

** Panama Canal Authority, FY 2019

*** Operates through the Sabine Neches Navigation District

* Additional terminal in Louisiana***

*** Additional terminal in Louisiana***
Texas LPG Exports Through the Panama Canal

Gulf-Origin-to-Pacific Laden LPG Vessels

- 80% of total laden Atlantic to Pacific LPG vessels
- 2012-2018 — Compound annual growth rate of 30%
Container Imports and Exports Through the Panama Canal

- **Port of Houston**
  - Tradelanes served by Panama Canal major growth engine
  - 5% annual growth in containers through the Panama Canal 2016-2019
  - Larger vessels in regular rotation

- **Port of Freeport**
  - 58% increase in export containers since canal expanded
Plastic Resins — Exports

- Eight new polyethylene plants on the Texas Gulf Coast
- Port Houston — 42% of U.S. resin exports
- Port Houston and Port of Freeport — increase in exports and adds balance to imports/exports
Roll-on/Roll-Off Imports and Exports

Port Freeport

- 97% increase in RoRo vessels
- 305 RoRo vessels first 3 years of expanded canal
- Automotive vehicles, high and heavy equipment, containers and breakbulk cargo
Agricultural Products, Processed Foods, and Beverages

- Houston, Corpus Christi, Galveston, Freeport
- Imports and exports
- Containers and dry bulk
- Wheat, sorghum, soybeans, cotton, and processed foods and beverages
Future Influences on Exports and Imports through the Panama Canal

- E-commerce
- Freight distribution centers and patterns
- Completion of port deepening and widening projects
- Global economy
Individuals Interviewed

- Larry Kelley, Jr., Port of Port Arthur
- Matthew Kaufman, Sabine-Neches Navigation District
- Jordan Frisby and Bruce Mann, Port Houston
- Mike Wilson, Jason Miura, and Jennifer Barrera, Port Freeport
- Sean Strawbridge and Jeff Pollack, Port of Corpus Christi
- Steve Tyndal, Port of Brownsville
- Adam Jack, Director, TxDOT Beaumont District
- James Koch, Director, TxDOT Houston District
- Paula Sales Evans, TxDOT Corpus Christi District
- Tyson Moeller, Union Pacific Railroad
- Rafael Mercado, Kansas City Southern Railroad
- Megan Shea, Travis Thowe, and Brandon Unterbrink, BNSF Railway
- Judge Ed Emmitt, Rice University
- Chad Burke, Economic Alliance (Houston)
- Brant Wilbourn, Texas Farm Bureau
- Steelee Fischbacher, Texas Wheat Producers Association
- Mike Steenhoek, Soy Transportation Coalition
- Jack Todd, Trinity Industries, Inc.
- Len Waterworth, Texas A&M University Galveston
- John Esparza, Texas Trucking Association
- Bill Diehl, Greater Houston Port Bureau
- Will Connelland and Don Dovie, Gulf Intermodal Services
- Bob Dickinson, Beaumont-Port Arthur MPO
Discussion