Texas Freight Advisory Committee

Meeting starts at 8:00 AM

Help make this a successful meeting:
• Ensure your microphone, phone and computer are muted when not speaking.
• For virtual attendees, familiarize yourself with the chat box and raise hand feature.
• If not speaking, periodically check your devices to ensure they are muted.
• Non-members should use chat feature if you wish to comment.

If you have unmuted your device and are trying to speak but no one is hearing you, dial *6 or send your message to the chat box. If you’re still having difficulty, text Tyler Graham at 512-354-9278.

Sign in using this code
Point your phone camera at code and open browser when prompted
How this hybrid meeting works:

*TxFAC members* wishing to provide input during the meeting either:

1. Raise your hand, wait to be called upon and state your name, organization and question/comment.

2. Virtual participants can also use the chat option to submit your question or comment, and the moderator will call upon you.

### Meeting Tips

- Mute your line/mic if you are not speaking.
- Speak loudly and clearly.
- Try to limit your input to 2 minutes.
- Conserve bandwidth by turning off your camera.
### Safety Minute - Sharing the Road with Large Trucks

<table>
<thead>
<tr>
<th>Drive defensively</th>
<th>• Remain alert at all times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep a safe distance</td>
<td>• Keep at least a <strong>four-second following distance</strong> between you and the trailer</td>
</tr>
</tbody>
</table>
| Avoid blind spots | • Right side of a truck is the largest blind spot for a truck driver  
| | • Behind the trailer and certain zones along the driver’s side |
| Pass quickly | • Drive closer to the shoulder rather than the truck  
| | • Speed up instead of lingering |
| Don’t cut a large truck off | • Make sure you can see the entire front end of the truck before merging in front of it - they need more distance and time to stop |
| Dim the bright lights | • Lower your bright lights when you are one block (or closer) behind a semi |
| Always signal | • Minimum of three seconds or more before upcoming changes |
## Today’s Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:45 - 8:00 a.m.</td>
<td>Registration</td>
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<tr>
<td>8:00 - 8:15 a.m.</td>
<td>Welcome and Introductions</td>
<td>Judge Ed Emmett, Rice University’s Baker Institute for Public Policy, Texas Freight Advisory Committee (TFAC) Chair</td>
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<tr>
<td></td>
<td></td>
<td>Laura Ryan, Texas Freight Advisory Committee (TFAC) Chair</td>
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<tr>
<td></td>
<td></td>
<td>Alvin New, Texas Freight Advisory Committee (TFAC) Chair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caroline Mays, AICP, TxDOT Director, Freight, Trade, and Connectivity Section, TxDOT</td>
</tr>
<tr>
<td>8:15 - 8:30 a.m.</td>
<td>Overview of Today’s Meeting Recap of November 10, 2021 TxFAC Meeting Overview of Ongoing Freight Planning Activities</td>
<td>Sherry Pifer, TxDOT</td>
</tr>
<tr>
<td>8:30 - 10:00 a.m.</td>
<td>Texas Multimodal Freight Network (TMFN) Critical Urban Freight Corridors (CUFC) Critical Rural Freight Corridors (CRFC)</td>
<td>Kale Driemeier, TxDOT</td>
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<tr>
<td></td>
<td></td>
<td>Paula Dowell, Cambridge Systematics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lizzie Welch, Cambridge Systematics</td>
</tr>
<tr>
<td>10:00 - 10:15 a.m.</td>
<td>Break</td>
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<tr>
<td>10:15 - 10:30 a.m.</td>
<td>Supply Chains Overview</td>
<td>Sherry Pifer, TxDOT</td>
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<td></td>
<td></td>
<td>Paula Dowell, Cambridge Systematics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adam Danczyk, Cambridge Systematics</td>
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<td></td>
<td></td>
<td>Joe Bryan, WSP</td>
</tr>
<tr>
<td>10:30 - 11:15 a.m.</td>
<td>Resiliency Case Studies</td>
<td>Sherry Pifer, TxDOT</td>
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<td></td>
<td></td>
<td>Paula Dowell, Cambridge Systematics</td>
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<td></td>
<td></td>
<td>Janna Rosenthal, Atkins</td>
</tr>
<tr>
<td>11:15 - 11:45 a.m.</td>
<td>Senate Bill 1308</td>
<td>Aisa Showery, TxDOT</td>
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<td></td>
<td>Mike Williamson, Cambridge Systematics</td>
</tr>
<tr>
<td>11:45 - 12:00 p.m.</td>
<td>Wrap Up Discussion</td>
<td>Caroline Mays, AICP, TxDOT</td>
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<tr>
<td></td>
<td></td>
<td>Judge Ed Emmett</td>
</tr>
<tr>
<td>Noon</td>
<td>Adjourn</td>
<td></td>
</tr>
</tbody>
</table>
Texas Delivers 2050 Branding

- Reflects plan forecast year as opposed to year completed
- Depicts forward movement of the actionable recommendations and strategies
- Includes multimodal components
- Retains the Texas Freight Mobility Plan (TFMP) name recognition
Updating the Texas Multimodal Freight Network

Critical Freight Corridors
Multimodal Components

Designated highway freight network

Select air cargo airports

Select ports and the GIWW

Commercial international border crossings

All freight railroads and pipelines

TMFN

Texas Highway Freight Network
- Railroad
- Cargo Airport
- Maritime Port
- Gulf Intracoastal Waterway (M-69)
- Rail International Bridge
- Commercial Vehicle International Bridge
Freight Highway Network Terminology

**Texas Highway Freight Network (THFN)**
- Designated by TxDOT – Based on stakeholder input
- No mileage limitation
- No direct funding eligibility implications

**National Highway Freight Network (NHFN)**
- Designated by FHWA
- Includes Primary Highway Freight System (PHFS)
- Includes non-PHFS Interstates*
- Includes DOT/MPO designated Critical Urban/Rural Freight Corridors
- Directly affects funding eligibility
Draft Final THFN

2018 THFN Mileage: 21,861
Additional 2023 Draft THFN Mileage: 1,709
Total Draft 2023 Mileage: 23,570

- From stakeholder feedback: SH36, SH115, SH18, SH17, SH207, SH176, FM1450, SH63, US377, SH20, +12 others
- Remove passenger terminal access road at DFW airport
TxFAC Input on Draft TMFN during November Meeting

- Confirmed the approach matched the 2018 TFMP
  - Updated data (2019 or later)
  - Stakeholder input
- Confirmed corridors of interest are on the THFN
  - US 83, FM 1472, I-2, West Military
- Emerging corridors to add as they open:
  - SH 99 / Grand Parkway in Houston
  - 365 Tollway Project in the Rio Grande Valley

Any additional input on the draft final network?
What are Critical Freight Corridors?

CRFCs and CUFCs are important freight corridors that provide critical connectivity to the NHFN. By designating these important corridors, States can strategically direct resources toward improved system performance and efficient movement of freight on the NHFN.

Federal Highway Administration
Designating Critical Rural Freight Corridors

- Designated by TxDOT
- Limited to 745.55 miles and outside of urbanized areas
  - No additional mileage from Infrastructure Investment and Jobs Act (IIJA)
- Meets one or more of seven criteria

- Principal arterial with trucks at least 25 percent of traffic
- Provides access to energy exploration or production
- Connects PHFS and Interstate System to major facilities
- Provides access to grain, agriculture, mining, forestry, or intermodal
- Connects to international port of entry
- Provides access to significant air, rail, water, or other freight facilities
- Determined by the state to be vital to efficient freight movement
CRFC Candidate Identification Process

Identified THFN corridors to be scored
- Primary arterials
- Outside urbanized areas

Scored by adding up number of Federal criteria met
- Scored each segment

Designate 745 miles
- Corridors that met most criteria
- Corridors with UTP project in next 5 years
2018 Texas Freight Mobility Plan: Critical Rural Freight Corridors

<table>
<thead>
<tr>
<th>Description</th>
<th>Miles</th>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 87 / SH 35 from US 59 to FM 1593</td>
<td>30.28</td>
<td>YKM</td>
</tr>
<tr>
<td>SH 6/ US 281 from I-20 to SH 220</td>
<td>61.66</td>
<td>FTW/BWD</td>
</tr>
<tr>
<td>US 84 from SS 331 to I-20</td>
<td>108.55</td>
<td>LUB/ABL</td>
</tr>
<tr>
<td>US 87 from I-20 to Grape Creek Rd</td>
<td>80.41</td>
<td>SJT/ABL</td>
</tr>
<tr>
<td>US 79 from CR 132 to I-45</td>
<td>116.01</td>
<td>BRY/AUS</td>
</tr>
<tr>
<td>US 290 from SL 212 to Becker Rd</td>
<td>111.87</td>
<td>AUS/BRY/HOU</td>
</tr>
<tr>
<td>US 83 from Bravo Blvd to Patricio Perez Rd</td>
<td>34.83</td>
<td>PHR</td>
</tr>
<tr>
<td>US 277/US 83 from US 32 to FM 3034</td>
<td>94.19</td>
<td>ABL/WFS</td>
</tr>
<tr>
<td>US 69 from US 84 to US 59</td>
<td>42.34</td>
<td>LFK/TYL</td>
</tr>
<tr>
<td>US 75 from FM 1417 to CR 203</td>
<td>18.48</td>
<td>PAR/DAL</td>
</tr>
<tr>
<td>US 380 from US 287 to I-35</td>
<td>24.46</td>
<td>DAL/FTW</td>
</tr>
<tr>
<td>US 259 from I-20 to US 79</td>
<td>21.52</td>
<td>TYL</td>
</tr>
</tbody>
</table>
**Updated Critical Rural Corridor Scoring**

- Approximately 8,600 miles meet definition for scoring
  - On THFN
  - Off PHFS
  - Rural arterial

<table>
<thead>
<tr>
<th>Number of Criteria</th>
<th>Miles</th>
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<tbody>
<tr>
<td>No Federal Criteria</td>
<td>188</td>
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<tr>
<td>One Federal Criterion</td>
<td>1,422</td>
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<tr>
<td>Two Federal Criteria</td>
<td>3,319</td>
</tr>
<tr>
<td>Three Federal Criteria</td>
<td>2,719</td>
</tr>
<tr>
<td>Four to Five Federal Criteria</td>
<td>999</td>
</tr>
</tbody>
</table>

![Map of Texas with critical rural corridors highlighted]
Comparison to 2018 Analysis of Criteria

2018

2022

Number of Federal Criteria

<table>
<thead>
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<th>Number of Federal Criteria</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Texas Freight Advisory Committee

February 2, 2022
Candidate Critical Rural Freight Corridors

- Approximately 3,200 miles of candidates identified for TxFAC consideration
  - 3+ criteria met
  - Connect to logical termini

- About 50 segments throughout state on U.S., state, and F.M. highways

- Link to web map to review candidates [TMFN and Critical Freight Corridors](arcgis.com)
Designating Critical Urban Freight Corridors

- Led by MPOs when population exceeds 500k
- Led by TxDOT in smaller urbanized areas (above 50k)
- Limited to 372.78 miles (no change)
- In 2018 TxDOT chose to begin with:
  - 288 miles in large urban areas
  - 84 miles in small urban areas
- Meets one or more of four criteria
- MPOs currently working on designation

**Connects intermodal facility to PHFS, Interstate, or intermodal facility**

**Provides an alternative route along the PHFS**

**Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land**

**Determined to be important to freight movement by MPO or state**
Next Steps

- Integrate TxFAC input on TMFN
- Finalize DOT Designated Critical Freight Corridors
- Obtain MPO designated CUFCs
- FHWA certification
Industry Clusters and Supply Chains
Selected Industries for Supply Chain Analysis

- **Petroleum**
  - Oil and gas production
  - Petrochemical manufacturing
  - Rubbers and plastics

- **Agriculture**
  - Cotton
  - Wheat
  - Cattle
  - Food processing

- **Advanced Manufacturing**
  - Computers, electronics, and electrical components
  - Transportation equipment

- **Construction**
  - Lumber and wood products
  - Structural steel
  - Cement and concrete

- **Warehousing and Distribution**
  - General retail
  - Cold storage - grocery
  - E-commerce
Documenting the Role of the TMFN in Supporting Key Industry Supply Chains

- Estimation of structural flows for supply chains
  - Examine sourcing, production, distribution, reverse logistics
    - Commodity flows
    - Modal usage upstream and downstream
  - Generate outputs
    - Graphical depiction of supply chain structures
    - Supply chain flows on the TMFN
- Stakeholder vetting and validation
  - TxFAC
  - Supply Chain Working Group
- Finalization of supply chain diagrams and TMFN flows
Example: Cotton

Diagram of the cotton supply chain.
TxFAC Input on Graphical Depictions of Supply Chains

- Diagrams are meant to capture general flows and will not fully capture the nuances of any supply chain of any specific industry
- Focus is on adequately capturing major commodity flows and modal usage
- Diagrams capture current supply chain structural flows
- Trends and their implications on supply chains will be discussed in needs assessment
- Initial diagrams have been vetted with individual TxFAC members within each industry and modal representation (rail and port)
- Revised diagrams to be vetted by Supply Chain Working Group
- Draft final will be sent to TxFAC for input week of February 17

Requested TxFAC Input
Have we missed any keys moves/steps for Texas?
Are the modal depictions correct?
TMFN
Resiliency Case Studies
Understanding Freight Resiliency

Individual, community, and national resilience is the ability to: prepare and plan for, absorb, respond to, recover from, and adapt to adverse events - NAS

The ability of the transport network to withstand the impacts of disruptions, to operate in the face of such disruption and to recover promptly from its effects - City REDI

The ability for the system to absorb the consequences of disruptions, to reduce the impacts of disruptions and maintain mobility - TxDOT, 2011

Core Components:
Absorb/withstand
Operate/maintain
Recover/adapt

A system’s ability to continue to function at an acceptable level of efficiency in the face of disruptive or unexpected conditions.
Purpose: To assess the ability for the TMFN to absorb the consequences of disruptions, to reduce the impacts of disruptions and maintain freight mobility

- Criteria for selecting case studies
  - Potential impact on TMFN
  - Geographic coverage
  - Data availability
  - TxFAC input on disruptions
Selected Case Studies

- Statewide - COVID-19
- Statewide - Winter Storm 2021
- Gulf Coast - Hurricane Harvey
- Border Region - Farmers’ protest
- Texas Triangle - 2011 drought and wildfires
- Energy Regions - Pipeline cyber attack
Statewide: Winter Storm, 2021

- Extreme cold temperatures created periods of freezing rain beginning February 7, 2021
- Produced dangerous roadway conditions halting transit for goods
- Many terminals and warehouses were closed
  - Texas long-haul deliveries dropped 36% week over week
  - National truck load spot prices went from $2.48 per mile, to $2.68 per mile in two weeks
- Generated an energy crisis due to power outages

How were freight movements for your businesses/organizations impacted? What were notable multimodal impacts?
Border Region: Farmers’ Protest

- Mexican farmers shut down the Presidio Bridge from June 7th - 10th 2020
- Farmers were protesting the diversion of water from the Conchos River in Chihuahua to fulfill Mexico’s obligation to the United States under an international water treaty
- The blockade prevented all passenger and vehicular traffic for three days
- Freight traffic forced to reroute

How were freight movements for your businesses/organizations impacted? What must we include in case study with regards to freight movement?
Texas Triangle: 2011 Drought and Wildfires

- Dry fall and winter started in October 2010
- By April wildfires had begun in the western portion of Texas
- June 2011 was the hottest June on record between 1895 and 2011
- Numerous factors contributing to worst wildfire season in state history
- $32.4 million expended by the Texas Department of Transportation primarily related to pavement maintenance directly attributable to the drought

How were freight movements for your businesses/organizations impacted? What must we include in case study with regards to freight movement?
Multiple days of Colonial Pipeline shutdown
- Spike in gasoline prices
- Panic buying resulting in localized fuel shortages
- Impacts from the east coast used to inform Texas case study

How might a Texas disruption differ from Colonial Pipeline example? What are most significant impacts likely to be?
Statewide- COVID-19

- Initial disruption - delivery of medical protective equipment and supplies
- Continuity of regular shipments of medicines and medical supplies remains critical
- As the effects of the virus continue into a second year, gaps in delivery of goods and services are impacting all CRITICAL supply chains

How were freight movements for your businesses/organizations impacted? What are long-term consequences?
Gulf Coast: Hurricane Harvey

- Over 60 inches of rain, resulting in more than $125 billion damages
- 10% of ALL U.S. trucking was impacted by flooded roads and damaged infrastructure
- Over 30,000 people were displaced for more than a week, and more than 17,000 had to be rescued
- Workers (drivers, operators, labor, administrators) unable to get to Ports, due to extensive flooding of major State and Interstate arterials

How were freight movements for your businesses/organizations impacted? What must we include in case study with regards to freight movement?
Next Steps

- Complete event overview and data collection
- Conduct analysis for performance measures
- Conduct stakeholder interviews
- Document findings
- Develop TMFN resiliency risk indices
TMFP Wrap-up
Texas delivers 2050 Schedule

**ACCESSING CRITICAL SUPPLY CHAINS, UNDERSTANDING THE TEXAS MULTIMODAL FREIGHT NETWORK**
- Freight and Economic Profiles; Supply Chain Analysis, Network Designation; Trends, Disruptors & Opportunities

**ASSESSING CURRENT & FUTURE FREIGHT NEEDS**
- Commodity Flow Forecasts and Scenarios; Needs Assessment

**DEVELOPING STRATEGIES**
- Policy, Program, and Project Strategies

**STAKEHOLDER OUTREACH**
- STAKEHOLDER WORKSHOPS #1
  - Goals, Freight Profiles, Freight System

- STAKEHOLDER WORKSHOPS #2
  - Forecasts, Needs, Strategies

- TxFAC Meetings

**DRAFT FINAL PLAN**
Thank you!

Contact info for Texas Delivers 2050

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(512) 460-1727

Paula Dowell, Ph.D.  
Cambridge Systematics  
PDowell@CamSys.com  
(404) 861-5834
STATE OF TEXAS

Senate Bill 1308 Study
What Is Senate Bill 1308

Texas Senate Bill 1308 calls for the Texas Department of Transportation and the Texas Department of Public Safety (DPS), in consultation with the Texas A&M Transportation Institute (TTI) and the appropriate federal agencies, to jointly conduct a study on:

1. The potential benefits of using automated driving systems (ADS), connected driving systems (CDS), and other emerging technologies to alleviate motor vehicle traffic congestion at ports of entry between Texas and Mexico; and
2. The overall impact of using automated driving systems, connected driving systems, and other emerging technologies on the transportation industry workforce and the broader Texas economy, including the effects on driver and public safety.

Texas Senate Bill 1308 requires the results of the study be submitted to the Governor, the Lieutenant Governor, and the Texas legislature not later than January 1, 2023.
Texas Senate Bill 1308 calls for the Texas Department of Transportation and the Texas Department of Public Safety (DPS), in consultation with the Texas A&M Transportation Institute (TTI) and the appropriate federal agencies, to jointly conduct the study.

**Study Lead Agencies**

- **Co-Lead Agency**
  - Managing consultant team
  - Ensuring intent of legislation is met
  - Ensuring high quality study delivered on time
  - Ensuring effective stakeholder engagement
  - Providing key input and material as a study stakeholder

- **Co-Lead Agency**
  - Providing input to project direction
  - Participating in Working Group
  - Helping ensure intent of legislation is met
  - Helping ensure high quality study delivered on time
  - Providing key input and material as a study stakeholder

- **Supporting Organization**
  - Providing consultation to project team
  - Participating in Working Group
  - Providing key input and material as a study stakeholder
Common Definitions are Important

- **Automated driving systems (ADS)** as defined in Texas transportation code § 545.451: hardware and software that, when installed on a motor vehicle and engaged are collectively capable of performing without any intervention or supervision by a human operator.

- **Connected Driving Systems (CDS)** hardware and software that, when installed on a motor vehicle, enables vehicles to receive and share mobility and safety information between vehicles, people, other roadway users, and transportation management systems.

- **Other Emerging Technologies** are defined as transportation-related applications that will potentially have direct interaction with ADS/CDS and the ability to shape ADS/CDS impacts.
Study Approach – Where are We Today?

**ADS/CDS and Border Crossings**
- Literature and State of the Practice Review
- Inventory of Existing and Planned ADS/CDS
- Development of Use Cases

**ADS/CDS and Workforce**
- Literature and State of the Practice Review
- Inventory of Existing Technology Impacts
- Development of Use Cases

**ADS/CDS and Safety**
- Literature and State of the Practice Review
- Inventory of Safety Opportunities
- Development of Use Cases

**Scenario Development & Impact Assessment**
- Using Tools including Travel Demand Modeling, Economic Impact Modeling, Trend Analysis, Related Research

**ADS/CDS and Border Crossings**
- Document Impacts & Benefits, Opportunities, Challenges

**ADS/CDS and Workforce**
- Document Impacts & Benefits, Opportunities, Challenges

**ADS/CDS and Safety**
- Document Impacts & Benefits, Opportunities, Challenges

**Stakeholder Outreach & Engagement**

**Draft and Final Report**

February 2, 2022
Input from Our Working Group – Benefits of ADS/CDS on Border Crossings

What areas have the greatest need for ADS/CDS technology?

Which ADS/CDS and other emerging technologies have the greatest promise to address border crossing concerns and needs?

Potential Barriers to ADS/CDS Adoption at Border Crossings:
- Regulations
- Funding & infrastructure
- Coordination with Mexico
- Harmonization of technology
- Lack of education
- Concerns of reliability
- Communication
- Adequate access to power
- Federal regulations
- Convincing users to adopt technology
Input from Our Working Group – Impacts of ADS/CDS on Workforce

Potential Workforce Opportunities by Adoption of ADS/CDS
- Higher wages
- New skilled labor categories
- Hardware/software developers
- New jobs that don’t exist today
- Telecommunications
- Attorneys & liability coverage
- Teachers/trainers
- Field technicians
- Remote teleoperators
- Safety & security

Potential Workforce Challenges for ADS/CDS Deployment
- Lack of resources
- Training & retraining workforce
- Trust
- Fear of job loss
- Lack of certifications
- Lack of government acceptance
- System reliability
- Safety & privacy concerns
- Cybersecurity & hacking
- Bi-national harmonization

How are transportation jobs like? What is the impact of ADS/CDS technology deployment in the next ten years?

Probability of Occurring

Impact on Jobs

1. Higher wages
2. New skilled labor categories
3. Hardware/software developers
4. New jobs that don’t exist today
5. Telecommunications
6. Attorneys & liability coverage
7. Teachers/trainers
8. Field technicians
9. Remote teleoperators
10. Safety & security
Potential Public Safety Challenges for ADS/CDS Deployment

- Liability
- Public perception
- Rushing case studies and trial
- Public education and awareness of benefits
- Ability to reach full population
- Hackers
- Electronic interference
Answering the Legislative Intent of SB 1308

1. **Stakeholder Engagement**
   - Define Use Cases: Identify what ADS/CDS applications have potential impacts on border congestion, workforce, and public safety

2. **Baseline Assessment**
   - Establish Scenarios: Provide a vision for which use cases will be active and to what extent

3. **Model Scenarios**
   - Use available tools to assess benefits/impacts to range of scenarios

4. **Measure Results**
   - Generate defensible and comprehensive benefits and impacts per SB 1308
## ADS/CDS Use Cases to Alleviate Congestion at Border Crossings

- Driverless Truck ADS/CDS Operation in AV-Only Lanes w/ Full Preclearance
- Driverless Truck ADS/CDS Operation in Expedited Processing Lanes
- Passenger Vehicles ADS/CDS Operation in AV-Only Lanes w/ Full Preclearance
- Platooning Trucks in Expedited Processing Lanes
- ADS Operation in Expedited Processing Lanes
- ADS Operation on Border Crossing Approach/Exit
- ADS Operation in Standard Lanes
- Cross-Border Transit Using ADS
- Advanced Border Crossing Data-Sharing for CDS-Equipped Vehicles

**Abbreviations:**

- ADS: Automated Driving System
- CDS: Connected Driving System
- AV: Automated Vehicle
- CMV: Commercial Vehicle
- POE: Port of Entry
- POV: Passenger Vehicle
### ADS/CDS Use Cases for Statewide Impacts to Workforce & Public Safety

<table>
<thead>
<tr>
<th>Use Case</th>
</tr>
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<tbody>
<tr>
<td>CMV ADS Operation for Long-Haul in Mixed Traffic</td>
</tr>
<tr>
<td>CMV Platooning Supported by ADS/CDS Operation</td>
</tr>
<tr>
<td>CMV ADS Operation for Long-Haul in AV-Only Lanes</td>
</tr>
<tr>
<td>CMV ADS Operation for Short-Haul Delivery</td>
</tr>
<tr>
<td>POV ADS Operation</td>
</tr>
<tr>
<td>Taxi/Rideshare w/ADS (Driverless)</td>
</tr>
<tr>
<td>ADS-equipped Transit on Dedicated ROW</td>
</tr>
<tr>
<td>ADS-equipped Transit in Mixed Traffic</td>
</tr>
<tr>
<td>Enhanced Data-Sharing for CDS-Equipped Vehicles</td>
</tr>
</tbody>
</table>

**Abbreviations**
- **ADS**: Automated Driving System
- **CDS**: Connected Driving System
- **AV**: Automated Vehicle
- **CMV**: Commercial Vehicle
- **POE**: Port of Entry
- **POV**: Passenger Vehicle
### Border Crossing Scenarios – Baseline & Low, Medium, High

<table>
<thead>
<tr>
<th>Crossing Type</th>
<th>2019 (in millions)</th>
<th>2050 (in millions)</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossings (All)</td>
<td>37.4</td>
<td>56.8</td>
<td>52%</td>
</tr>
<tr>
<td>POV</td>
<td>32.8</td>
<td>44.5</td>
<td>36%</td>
</tr>
<tr>
<td>CMV</td>
<td>4.6</td>
<td>12.3</td>
<td>167%</td>
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</table>

**Baseline**
- Provides a strong baseline for future demand for border crossings, anticipated delays, and associated economic impacts.

**ADS/CDS-Focused Scenarios**
- Provide a range of potential new benefits when factoring in significant ADS/CDS usage.
- Will generate estimates in reduced motor vehicle congestion at border crossings and associated economic impacts.

**Border Transportation Master Plan**
- Provides a strong baseline for future demand for border crossings, anticipated delays, and associated economic impacts.
Border Crossing Scenario Framework

**LOW**

**Conservative estimate** of ADS/CDS capabilities, changes to border infrastructure and operations, and usage at and near border crossings; assumes modest capacity to serve driverless truck crossings

- **ADS/CDS Capabilities**
  - Advancement in capabilities but lack of widespread trust, driver preferred by all but select carriers

- **Infrastructure + System Readiness**
  - Improved data exchanges
  - Allows for driverless CMV in expedited processing lanes

- **ADS/CDS Usage**
  - Significant CDS penetration (85%)
  - ADS use at border for POV fleet (15%)
  - ADS use at border for CMV fleet (33%)
  - Fully driverless CMV crossings (17%)*
  *Half of approx. current FAST Lane usage

**MEDIUM**

**Best estimate** of ADS/CDS capabilities for border crossing, reasonable updates to border crossing infrastructure and operations, and usage; expanded capacity to serve driverless truck crossings

- **ADS/CDS Capabilities**
  - Readily supports trusted, driverless CMV border crossing

- **Infrastructure + System Readiness**
  - Expanded capacity for driverless CMV in expedited processing lanes

- **ADS/CDS Usage**
  - Full CDS penetration (100%)
  - ADS use at border for POV fleet (25%)
  - ADS use at border for CMV fleet (66%)
  - Fully driverless CMV crossings (33%)*
  *Approx. current FAST Lane usage

**HIGH**

**Optimistic estimate** of ADS/CDS capabilities, advancements to infrastructure and border operations to accommodate ADS/CDS, and high usage; assumes regulatory and operational environment rewards adoption and use of ADS/CDS at the border

- **ADS/CDS Capabilities**
  - Trust and efficiency levels creating widespread demand for driverless CMV border crossing

- **Infrastructure + System Readiness**
  - Provides dedicated right-of-way for driverless CMV
  - Safe and secure full preclearance in place

- **ADS/CDS Usage**
  - Full CDS penetration (100%)
  - ADS use at border for POV fleet (50%)
  - ADS use at border for CMV fleet (90%)
  - Fully driverless CMV crossings (66%)*
  *Twice approx. current FAST Lane usage
Discussion on Border Crossing Scenario Framework

- What is your reaction to these three levers?

- What is your reaction to the usage assumptions for low, medium and high?

Levers
- ADS/CDS Capabilities
- Infrastructure and System Readiness
- ADS/CDS Usage

ADS/CDS Usage
- Significant CDS penetration - 85% / 100% / 100%
- ADS use at border for POV fleet - 15% / 25% / 50%
- ADS use at border for CMV fleet - 33% / 66% / 90%
- Fully driverless CMV crossings - 17% / 33% / 66%
Focus on evaluating **change in employment needs** and the resulting potential retraining needs and disparate impacts

**Key Factors:**

- **Net Affect on Employment**
  - How will net projected demand for drivers increase or decrease in the context of ADS and CDS technology?

- **Employment by Sector**
  - How will demand for employment change across different transportation sectors?

- **Employment by Demographics**
  - Identify disparate impacts across geography and sociodemographic groups in order to target workforce development needs
## Transportation Workforce Scenario Framework

### Conservative estimate of capabilities, penetration rate, and infrastructure; Assumes incremental advancement in technology with highly specific applications

- **ADS/CDS Capabilities**
  - Limited to controlled/dedicated operating environments (e.g., A/V only lanes, parking facilities)
  - Limited operation in mixed traffic

- **Infrastructure + System Readiness**
  - Highly focused on specific operating environments (e.g., Long-Haul freight or High Capacity transit)

- **ADS/CDS Usage**
  - Fleet vehicles only (CMVs at 20%)
  - No personal ownership (POVs at 0%)

### Best estimate of capabilities, penetration rate, and infrastructure; reasonable advancement/implementation; examples of use across public, private, and commercial sectors

- **ADS/CDS Capabilities**
  - Private, public and commercial use in most environments with dedicated facilities
  - Some operation in mixed traffic

- **Infrastructure + System Readiness**
  - Supportive infrastructure common in commercial environments

- **ADS/CDS Usage**
  - Common in fleets and commercial settings (CMVs at 40%)
  - Personal ownership rare (POVs at 25%)

### Optimistic estimate of capabilities, penetration rate, and infrastructure; assumes a high degree advancement and implementation, with use prevalent across public, private, and commercial sectors

- **ADS/CDS Capabilities**
  - Driverless operation in most common environments
  - Operation in mixed traffic common; few dedicated facilities required

- **Infrastructure + System Readiness**
  - Widespread supportive infrastructure across public and private settings

- **ADS/CDS Usage**
  - Very common in commercial settings (CMVs at 60%)
  - Personal ownership somewhat common (POVs at 40%)
Discussion on Workforce Scenario Framework

- What is your reaction to these three levers?

- What is your reaction to the usage assumptions for low, medium and high?

**Levers**
- ADS/CDS Capabilities
- Infrastructure and System Readiness
- ADS/CDS Usage

**LOW - ADS/CDS Usage**
- Fleet vehicles only (CMVs at 20%)
- No personal ownership (POVs at 0%)

**MEDIUM - ADS/CDS Usage**
- Common in fleets and commercial settings (CMVs at 40%)
- Personal ownership rare (POVs at 25%)

**HIGH ADS/CDS Usage**
- Very common in commercial settings (CMVs at 60%)
- Personal ownership somewhat common (POVs at 40%)
Focus on potential change in rate of crashes, fatalities, injuries, and property losses.

Key Factors:

- **Crashes by Type**
  - Key multiplier for estimated reductions based on manner of collision, vehicle crash types, and behavioral safety factors

- **Crashes by Severity**
  - Key multiplier for economic impacts based on fatal, serious injury, and PDO crashes

- **ADS/CDS use rate**
  - Separate rates for CMVs, POVs, and mixed/dedicated facility contexts
### Public Safety Scenario Framework

**Conservative estimate** of capabilities, penetration rate, and infrastructure; Assumes incremental advancement in technology with highly specific applications

- **ADS/CDS Capabilities**
  - Limited to controlled/dedicated operating environments (e.g., A/V only lanes, parking facilities)
  - Limited operation in mixed traffic

- **Infrastructure + System Readiness**
  - Highly focused on specific operating environments (e.g., Long-Haul freight or High Capacity transit)

- **ADS/CDS Usage**
  - Fleet vehicles only (CMVs at 20%)
  - No personal ownership (POVs at 0%)

**Best estimate** of capabilities, penetration rate, and infrastructure; reasonable advancement/implementation; examples of use across public, private, and commercial sectors

- **ADS/CDS Capabilities**
  - Private, public and commercial use in most environments with dedicated facilities
  - Some operation in mixed traffic

- **Infrastructure + System Readiness**
  - Supportive infrastructure common in commercial environments

- **ADS/CDS Usage**
  - Common in fleets and commercial settings (CMVs at 40%)
  - Personal ownership rare (POVs at 25%)

**Optimistic estimate** of capabilities, penetration rate, and infrastructure; Assumes a high degree advancement and implementation, with use prevalent across public, private, and commercial sectors

- **ADS/CDS Capabilities**
  - Driverless operation in most common environments
  - Operation in mixed traffic common; few dedicated facilities required

- **Infrastructure + System Readiness**
  - Widespread supportive infrastructure across public and private settings

- **ADS/CDS Usage**
  - Very common in commercial settings (CMVs at 60%)
  - Personal ownership somewhat common (POVs at 40%)
Discussion on Public Safety Scenario Framework

- What is your reaction to these three levers?

- What is your reaction to the usage assumptions for low, medium and high?

**Levers**
- ADS/CDS Capabilities
- Infrastructure and System Readiness
- ADS/CDS Usage

**LOW - ADS/CDS Usage**
- Fleet vehicles only (CMVs at 20%)
- No personal ownership (POVs at 0%)

**MEDIUM - ADS/CDS Usage**
- Common in fleets and commercial settings (CMVs at 40%)
- Personal ownership rare (POVs at 25%)

**HIGH ADS/CDS Usage**
- Very common in commercial settings (CMVs at 60%)
- Personal ownership somewhat common (POVs at 40%)
Study Timeline

**BASELINE ASSESSMENT & OUTREACH**
- Literature Review & State of the Practice; Needs Assessment; Inventory of Current & Planned ADS/CDS Deployments; and Assessment of Current Impacts

**BENEFITS & IMPACT ANALYSIS**
- Develop Use Cases; Develop & Analyze Scenarios; Assess Impacts & Benefits of ADS/CDS on Border Congestion & Delay, Workforce and Public Safety

**DRAFT REPORT DEVELOPMENT & OUTREACH**
- Develop Draft Report (6/30.2022); Develop Final Report (9/30.2022); Develop One-Page Fact Sheets (9/30/2022)

**FINALIZATION**
- Pursue Final Approval for Agency Leadership; Deliver Final Study Report to Governor, Lt. Governor and Texas Legislature by January 1, 2023

**STAKEHOLDER INTERVIEWS**
- Border Trade Advisory Committee (BTA C) Meetings
- Bi-national Regional Steering Committee (BNRSC) Meetings

**STAKEHOLDER OUTREACH**
- Connected and Automated Vehicles Task Force (CAVIF) Meetings
- Stakeholder Engagement Meetings
- Working Group Meetings
- Texas Freight Advisory Committee (TxFAC) Meetings
Thank you!

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Thank you!

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