TEXAS-MEXICO BORDER
WAIT TIME MEASUREMENT

Texas Freight Advisory Committee
Agenda

- Rationale and value proposition for border wait time measurement systems
- About Border Crossing Information System
- Completed and on-going deployments at various ports of entry
- Capabilities to provide expected and archived wait and crossing times
- Capabilities to monitor wait times related performance of ports of entry
- Issues and challenges
Rationale for Deploying Measurement Systems

- Consistent, Continuous, and Reliable Data
- "Remove Guess Work and Anecdotes"
- Technology Based Solution

Border Crossing Information System

US-MX Stakeholders (USDOT, SCT, TxDOT, US CBP, DPS, Private Stakeholders)

INFORMED and BETTER DECISIONS
Value Proposition for Border Crossing Information System

- Eliminates guess work and anecdotes about wait and crossing times

- Can help agencies
  - Identify specific trends and look for answers
    - Why did one port improve, while the other did not?
    - What happened in March? Shipping cycle? Weather?
  - Test and evaluate solutions
    - Will more staffing at CBP, Mexican Customs, States help?
Border Crossing Information System is a Decision Tool

- Sensors at the ports
  - 150-300 transponders from trucks every hour per port

- Current/historic wait and crossing times
  - 4,000 to 10,000 truck wait time samples per month per port

- Users (e.g., USCBP, planners, decision makers, private sector)
  - DECISION TOOL
Measurement systems are deployed at 6 ports.
RFID Based Wait Time Measurement System

- RFID Reader and Antenna
- U.S. CBP
- U.S. Aduana
- MX Aduana

Wait Time

Crossing Time

Processing Time
RFID Based Wait Time Measurement System

RFID readers on both Sides of the border to Identify transponders on trucks
- Testing at ten ports
- Installed at 1 port.
Real Time Commercial Vehicle Wait Time Estimates

http://bcis.tamu.edu
BCIS Information Example: Truck Wait Time Comparison

Bridge of the Americas

Zaragoza-Ysleta International Bridge
Texas-Mexico Border  Wait Time Measurement

BCIS Information Example: Truck Wait and Crossing Times

Truck Wait Time (in Minutes) at Zaragoza-Ysleta International Bridge

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tue</th>
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Truck Crossing Time (in Minutes) at Zaragoza-Ysleta International Bridge

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Year by Year Comparison of US Bound Truck Wait Time Trends

Percentage of Days (In Seven Months) Trucks Experienced Low/Medium/High Wait Times

<table>
<thead>
<tr>
<th>Location</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>Bridge of the Americas</td>
<td>90%</td>
<td>80%</td>
</tr>
<tr>
<td>Colombia Solidarity</td>
<td>60%</td>
<td>50%</td>
</tr>
<tr>
<td>Pharr-Reynosa</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>World Trade</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Zaragoza-Ysleta</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Legend: 
- Green: 0 - 30 Min
- Yellow: 31 - 60 Min
- Red: > 60 Min
Issues and Challenges

- Having right contacts at the local level is crucial
- Staff rotation at border agencies can have positive and negative impacts
- Bi-weekly conference call has been extremely helpful
- Useful life of the equipment is unknown
- Cellular communication can be unreliable at ports
- Lane configuration/construction can impact data availability (e.g., Colombia Solidarity and Veteran’s Memorial Bridges)
- Algorithms went through several modifications – going back to modify archived data is tedious
- Need for in-person ground truth testing (GPS testing proved to be unreliable)
- Distance an obstacle when there are problems, rapid response
- Perseverance – expect the unexpected
Contact Information

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- Juan Carlos Villa, j-villa@tamu.edu
- Rajat Rajbhandari, Ph.D., raja@tamu.edu
- Swapnil Samant, s-samant@tamu.edu
Commercial Motor Vehicles
DPS Activity by Year
Images of Crashes
Rider 42 & Texas Mobility Needs
(An Overview and Some Freight Aspects)

Tim Lomax
t-lomax@tamu.edu
Texas A&M Transportation Institute

Texas Freight Advisory Committee
December 2013
Mobility Investment Priorities

Accomplishments & On-Going Work

- Intensive examination of 25 most congested corridors
- $302 million in right-of-way, design, planning, feasibility analyses
- Improved public engagement practices
- Economic benefits and possible funding scenarios
- 80+ traffic and demand management strategies, funding options, public engagement ideas
  - “Bang for the buck” & “outside the box”
- Computer simulation model of the future of IH 35 in Austin

[link](http://mobility.tamu.edu/mip)
Mobility Investment Priorities

*The Take-Aways*

- Agencies must involve their stakeholders
- Go meet the public where they are
- Innovative designs and operating ideas are needed
- Multiple funding sources will be needed
- Technology can play a role
- Public-private partnerships - leading construction practice to the future
- Incentivize the market and encourage creativity

[ mobility.tamu.edu/mip ]
Don’t We Do This Already?

- Complemented planning and project development activities; did not replace or supersede existing planning processes
- Big change - no fiscal constraint on project costs – get past the chicken-or-egg question
- Assist the agencies in prioritizing and targeting additional mobility improvement funds
- Each region developed its own set of projects, programs and plans
- Reflect the public interests and the best congestion reduction practices
The “Chicken-or-Egg” Issue

Nationally – Revenue increases have a few things in common

- Agencies perceived as doing a good job with funds they have
- Develop a plan with public input
- Involve businesses and travelers
- Talk about benefits
- Project delivery includes: transparency, accountability, reliability
Why Did Rider 42 Focus on The Top 50?

- Same pattern as truck congestion
- Significant delay focused on worst sections
- Mismatch between planning efforts and problem size
- 4 metro regions
The Top 10 – In a League of Their Own

Annual Person-Hours of Delay per Mile

Top 10 Cost - $249M (27%)

Cost of 11-50 : $441M (47%)

Cost of 51-100 : $239M (26%)
Freight Congestion
A Key Element of the 21st Century Economy

• Texas truck delay
  – 25 million truck hours
  – $2.1 billion

In addition...
• Inventory costs
• Just-in-time operations
• Fleet productivity
• Distribution centers
• Ports & intermodal terminals
Why Did Rider 42 Focus on The Top 50?

- “Bad problems” are stable
- 41 of top 50 in 2010 still in top 50 in 2013
- 22 of top 25 in 2010 still in top 25 in 2013
#4: Expand IH 35 study to include express lanes, traffic management & travel options

#39: Design Loop 1 South tolled express lanes

#39: Loop 1 North express lanes preliminary engineering

#4: IH 35 environmental study

#4: IH 35 traffic management & travel options study

All Congested Corridors
- Integrated system operations study

#xx: Congested Section Addressed by Project
- Proposition 12 Funds
- Study Funded by Others

12/2/2013

Austin Recommendations
#12, #17 & #29: Horseshoe Project (contribute to ROW & engineering)

#12, #16, #17 & #29: First phase of Trinity Parkway (ROW & engineering)

#xx: Congested Section Addressed by Project

: Proposition 12 Funds

: Study Funded by Others

Dallas/Fort Worth Recommendations
#15: Study HOV operation & access improvements; bottleneck removal

#9: Begin feasibility & design study of operations components

#16: Consider environmental study

#12, #16, #17 & #29: First phase of Trinity Parkway (ROW & engineering)

#12, #17 & #29: Horseshoe Project (contribute to ROW & engineering)

#12: Consider purchase ROW & engineering

#17: Consider engineering & construction

#xx: Congested Section Addressed by Project

: Proposition 12 Funds

: Study Funded by Others
Dallas/Fort Worth Recommendations

Fort Worth Sub-Region

#8, #21: Monitor North Tarrant Express Master Development Agreement

#xx: Congested Section Addressed by Project

: Proposition 12 Funds

: Study Funded by Others

12/2/2013

Study Funded by Others
# Houston Recommendations

1. Supplement IH 45 EIS; add operations & parallel route study
2. Purchase ROW to widen freeway & interchange
3. Monitor Hardy Toll Road extension
4. Appraise ROW to grade separate interchange
5. Purchase ROW to widen freeway & interchange
6. Purchase ROW, adjust utilities & design 3 direct connectors
7. Purchase ROW, adjust utilities & design direct connector
8. Appraise ROW to grade separate interchange
9. Purchase ROW, adjust utilities & design 2 direct connectors
10. Purchase ROW, adjust utilities & design direct connector

All Congested Corridors:
- Active traffic management
- Travel options
- Monitor METRO’s HOV to HOT conversion

#xx: Congested Section Addressed by Project
- : Proposition 12 Funds
- : Study Funded by Others

12/2/2013
San Antonio Recommendations

#23: Monitor EIS; widen to freeway/tollway with managed lanes

#38: Design northbound direct connectors

#38: Monitor EIS; widen to freeway/tollway with managed lanes

All Congested Corridors
- Traffic management & traveler information
- Travel options
- Parking management

#38: Alternative operation options

#50: Monitor before/after study

#48, #49: Study expanded capacity & operations

#48: Design mainlane/ramp improvements & NEPA*

#48: Study expanded capacity & operations

#48, #49: Design direct connectors & NEPA*

#48: Design direct connectors & NEPA*

#48, #49: Study expanded capacity & operations

*NEPA: Design and environmental analysis with emphasis on public engagement.
### Most Congested 10 for Trucks

<table>
<thead>
<tr>
<th></th>
<th>Truck / Rank</th>
<th>All Veh. / Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Houston</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IH 10W (IH 610 to IH 45)</td>
<td>92</td>
<td>370</td>
</tr>
<tr>
<td>IH 10W (SL 8 to IH 610)</td>
<td>70</td>
<td>329</td>
</tr>
<tr>
<td>US 59S (IH 10 to SH 288)</td>
<td>49</td>
<td>743</td>
</tr>
<tr>
<td>US 59S (SH 288 to IH 610W)</td>
<td>47</td>
<td>731</td>
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<tr>
<td><strong>Dallas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IH 635 (IH 35E to US 75)</td>
<td>64</td>
<td>675</td>
</tr>
<tr>
<td>IH 345 (US 75 to IH 30)</td>
<td>60</td>
<td>376</td>
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<tr>
<td><strong>Fort Worth</strong></td>
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</tr>
<tr>
<td>IH 35W (IH 30 to SH 183)</td>
<td>63</td>
<td>685</td>
</tr>
<tr>
<td>IH 35W (SH 183 to US 81)</td>
<td>39</td>
<td>403</td>
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<tr>
<td><strong>Austin</strong></td>
<td></td>
<td></td>
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<tr>
<td>IH 35 (SH 71 to US 183)</td>
<td>75</td>
<td>789</td>
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<tr>
<td><strong>San Antonio</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IH 35 (SL 1604 to FM 3009)</td>
<td>33</td>
<td>212</td>
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</table>

*Previously addressed
Studied in Rider 42*
## Mobility Investment Priorities
### 30-Year Benefits & Costs

<table>
<thead>
<tr>
<th>Project</th>
<th>Benefits (B)</th>
<th>Costs (B)</th>
<th>B/C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>IH 35 Austin</td>
<td>$7.1B</td>
<td>$1.8B</td>
<td>3.9</td>
</tr>
<tr>
<td>Loop 1 Austin</td>
<td>$1.1B</td>
<td>$0.3B</td>
<td>4.1</td>
</tr>
<tr>
<td>IH 45N Hous</td>
<td>$11.4B</td>
<td>$2.2B</td>
<td>5.3</td>
</tr>
<tr>
<td>IH 35 SA</td>
<td>$7.1B</td>
<td>$2.2B</td>
<td>3.3</td>
</tr>
<tr>
<td>US 290 Hous</td>
<td>$6.4B</td>
<td>$0.9B</td>
<td>7.2</td>
</tr>
</tbody>
</table>
Mobility Investment Priorities

Paying for the Projects

For 4 unfunded projects at the same time (ballpark estimate)
  – 16 cents/gallon or $75 per vehicle

One idea – a blended financing approach

• State issues a bond (backed by state - lower interest rate)
• State & local agencies agree to repayment schedule
  – Just an Example!
  – State pays half project cost and makes bond payments
  – Locals pay half project cost and all financing cost

• Use allocation of funds from Nov 2014 election – if passed
• Managed lane revenue
• Tax increment financing
• Other existing or new local funding sources

mobility.tamu.edu/mip
Strategy Summaries

• Over 60 congestion management topics
  – Traffic Management
  – Travel Options
  – Additional Capacity
  – Construction Improvements

• 25 Financing and public engagement topics also available

• Includes description, target market, implementation issues, and success stories

• Developed by experts in each field

• mobility.tamu.edu/mip/strategies.php

AGGRESSIVE INCIDENT CLEARANCE

Description
Several techniques and policies can be used to aggressively reduce the duration and effect that stalled vehicles or crashes have on traffic while increasing safety for everyone. Successful programs encompass:

- Detection—quickly finding and verifying incidents as they occur (via cameras, sensors, phone tips, media, and information sharing);
- Response—quickly dispatching resources and tow trucks; and
- Clearance—aggressively removing vehicles from lanes and managing congested traffic until free flow is restored.

Quickly clearing stalls and crashes also reduces secondary collisions—typically rear-end crashes during unexpected stop-and-go traffic.

Target Market
- Freeways sensitive to traffic incidents
- Local streets and freeways with high levels of congestion

Incident clearance works best in corridors that have a high risk of congestion due to crashes or mechanical problems and that are monitored by roving patrols of tow trucks or by sensors providing instant data to operators.

How Will This Help?
- Improve travel-time reliability and decrease delay that accounts for 1/4th of all traffic congestion.
- Increase response time through better coordination and information management.
- Increase safety for emergency management personnel, those involved in the incident, and other drivers.

Success Story
SafeClear, Houston, Texas
With an approximately $5 million program cost for 250 freeway miles, the program offers a 10:1 benefit/cost ratio for crash and congestion reduction. Private tow trucks must respond within six minutes. In order to meet response targets, 60 to 90 tow trucks patrol the freeways during rush hours.

Implementation Issues
Public and private agencies must willingly share information and invest resources, especially across jurisdictional boundaries. This requires considerable planning, organization, and a favorable policy environment that encourages interaction and constant communication between all possible stakeholders. When incidents do occur, sharing information rapidly to all users (including drivers via dynamic message signs or other electronic means) and aggressively clearing traffic lanes will maximize this strategy's effectiveness.

For more information, please refer to: http://mobility.tamu.edu/mip/strategies.php
Congestion Reduction Strategies: Active Traffic Management

• Improve system efficiency and safety by actions such as:
  – Rapidly clearing collisions and stalled vehicles.
  – Improving signal coordination so drivers experience green lights as they move in the peak travel direction.

• Several of will benefit from collaboration with businesses, commuters and neighborhoods.

• Real-time monitoring by Traffic Management Centers
• Traveler information and rerouting systems
• Merge control & Queue warning
• Variable speed limits
Congestion Reduction Strategies: Travel Options

Reduce single occupant vehicle trips by:

- Encourage ridesharing or vanpooling

Private companies play the key role in offering employee options, such as:

- Flexible work hours
- Compressed work weeks
- Telecommuting

Shipping companies may also participate by choosing overnight goods transport - meet deadlines, reduce congestion
Using road space more efficiently to reduce congestion and improve safety involve:

• Re-work existing space to provide peak-direction lanes, turn lanes or medians that channel traffic.
• New intersection designs that reduce the number of conflict points.
• Grade separations
• Approaches that take advantage of public transit or freight moving capabilities.
Congestion Reduction Strategies: Additional Capacity

- Improve reliability & provide travel options
- Limited opportunities – but significant projects
  - HOT/HOV lanes or managed lanes
  - Toll roads
  - Wider freeways and streets
  - Transit projects
  - Freight rail; Intermodal centers; Truck routes
  - Freight shuttle
- Support economic development, population and job growth
Congestion Reduction Strategies: Construction Improvements

- Methods for reducing the effect of construction projects
  - Using design techniques that require less new construction
  - Doing the construction in ways that reduce the time or the amount of road closures
  - Accommodating construction techniques that also mean less maintenance over the pavement life
Public Engagement: An Underappreciated Element

(..if getting public approval is 90% of the project, shouldn’t we spend more than 1% of the budget?)

Inform
- Provide information to assist understanding

Consult
- Obtain feedback on alternatives

Involve
- Work directly with the public to ensure understanding and support

Collaborate
- Partner in decision-making

Empower
- Decision-making in the hands of the voting public

*Adapted from IAP2 Spectrum

mobility.tamu.edu/mip
Rider 42 Continuing Activities

- Monitor progress of funded studies
- Assist with implementation of travel option and traffic management strategies
- Improve public engagement practices
- Increase transportation funding knowledge
- Expand list of congestion and safety improvement techniques

[ mobility.tamu.edu/mip ]
Legislative Direction

• “Serve as an independent resource to the Legislature providing analysis of the state’s transportation policies and the economic impact of those policies” (Rider language)

• Work under direction of Senate and House Transportation Committee chairs
  – Tasks identified and prioritized each biennium

• Provide on-call support to Legislature

• Provide institutional memory for committees
Initial Topic List

**Finance**
- Ellis
  - VMT fees
- Toll road assessment

**Freight**
- Prozzi
  - OS/OW trucks
  - Truck use of SH 130
  - Urban rail ROW
  - Panama Canal

**Congestion**
- Lomax
  - Continuation of Mobility Investment Strategies (Rider 42)
  - Demand management

**Public Engagement**
- Geiselbrecht
  - Assessing public perceptions
  - Outreach

**Technology**
- Poe
  - Connected and automated vehicles
  - Traveler information

**Transportation Data**
- Bricka
  - Economic, finance, demographic & network data
  - Demand: passenger and freight
Finance

• Analysis of funding alternatives
• Innovations in infrastructure finance across all modes
• Economic impacts of policy options

Activities:
• VMT fees
• Leveraging toll revenues for roadway financing
• Revenue projection modeling
• Alternative fuel vehicle forecast
• Impediments to private investment
Inform policies toward a sustainable multi-modal freight system in Texas

Activities:
- Oversize/overweight
- Truck use of toll facilities
- Urban rail ROW
- Impact of transportation on exports
- Energy development impacts
Congestion

• Support of policy formation
• Insight provider, thought leader for new ideas
• Activities
  – Upgrade congestion reduction strategy resources
  – Linking data on congestion, economic value of freight movement, crashes, bridge and pavement quality
  – New thinking on future of demand management
Public Engagement

Activities

• Identify Outreach Methods in Successful Funding Initiatives

• Longitudinal Survey Study of Attitudes and Behavior

• Development of Public Education Materials
Technology

• What inventions/innovations will drive change in how transportation services are delivered?
• What are the plausible scenarios as to how technology will affect future transportation?

Activities:
• Automated and connected vehicles
• New approaches to transportation management and traveler information
• Vehicle telematics to support road use fees
• Next generation traffic signal operations
Transportation Data

• Key to evidence-based policy making
• Provide deeper understanding of the complexity of the policy challenges

Activities:
• Integrated modeling tools
• Transportation data inventory
Policy Research Process

1. Prepare project list
2. Engage stakeholders
3. Conduct research
4. Report findings
5. Obtain legislative feedback
6. Assist Legislature with solutions