The TPIMS Journey

Project concept
- Focus on key Midwest freight corridors
- Collect real-time parking data
- Monitor 139 public and private sites
- Aggregate and analyze data
- Share parking availability data through multiple channels
- Measure impact on parking, truck-related safety

Goals and success measures
Create and distribute truck parking information that:
- Enhances highway safety and efficiency
- Provides sustainable and scalable solution
- Offers a secure solution for user privacy and data
- Promotes greater TPIMS use

Why is TPIMS needed now?

Regulation impacts
- Hours-of-service rule (July 1, 2013)
- Electronic logging device (ELD) rule (April 1, 2018)
Unsafe choices often made

Driver safety and fatigue

How often have you found yourself fatigued and left with an unsafe feeling because you were not able to find a safe place to park your vehicle?

Increasing truck volume

What is the solution?

Create a system that:
- Collects usage data from public and private parking sites
- Aggregates the data based on a common format and set of criteria
- Shares the data in a useful, convenient format with users

Seamless system challenge

Core TPIMS concepts

- Data Collection
  - Entrance and exit or individual space counts
- Data Aggregation
  - Integrated with ATMS or separate
  - Local or cloud
- Information Dissemination
  - Types of signs
  - Types of apps
  - Types of websites
Facility type

Public sites
- Owned, maintained and operated by state agencies
- Rest areas, weigh stations
- Direct access

Private sites
- Owned and operated by private truck stop operators
- Indirect access

<table>
<thead>
<tr>
<th>State</th>
<th>No. of Sites</th>
<th>Public</th>
<th>Private</th>
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<tbody>
<tr>
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<td>X</td>
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<tr>
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<td>8</td>
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<tr>
<td>Minnesota</td>
<td>7</td>
<td>X</td>
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<td>Ohio</td>
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</tr>
<tr>
<td>Wisconsin</td>
<td>10</td>
<td>X</td>
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</tr>
</tbody>
</table>

Data collection technology

**Entrance and Exit Counts**
- In-pavement magnetometers
- Video cameras
- Laser technology
- Radar

**Space Occupancy Counts**
- Infrared/magnetometers
- Microwave/magnetometers
- Video cameras

Data collection methodology

<table>
<thead>
<tr>
<th>State</th>
<th>In/Out Counts</th>
<th>Occupancy</th>
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<tr>
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<td>X</td>
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<tr>
<td>Wisconsin</td>
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Data collection technology

<table>
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<th>State</th>
<th>Technology</th>
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<tr>
<td>Indiana</td>
<td>Magnetometers</td>
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<tr>
<td>Iowa</td>
<td>Magnetometers and Video</td>
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<tr>
<td>Kansas</td>
<td>Video</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Side-Fire Radar</td>
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<tr>
<td>Michigan</td>
<td>Video</td>
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<td>Minnesota</td>
<td>Magnetometers</td>
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<td>Ohio</td>
<td>Magnetometers/IR puck</td>
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<tr>
<td>Wisconsin</td>
<td>Magnetometers</td>
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Takeaways
• Currently no “silver bullet” technology
• With in/out counting technology, manual resets will be required
• Do not let less than 100% accuracy stop you from implementing

Dynamic messaging signs
• Dedicated truck parking signs
• Two or three locations per sign
• Hybrid static/dynamic message signs

Data communication

Data sharing – data warehouse

Public Data Feed
Dynamic Public Feed - example
JSON format

Dynamic Public Feed - live URL
https://transport.metrohm.com/TPMS/dynamic
**State traveler information - Michigan**

**Iowa deployment**

<table>
<thead>
<tr>
<th>Iowa TPIMS Sites</th>
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<td>139</td>
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<tr>
<td>952</td>
<td>1</td>
<td>1</td>
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</tr>
</tbody>
</table>

**Dynamic messaging signs**

- Moratorium on new signs in ROW
- Expensive
  - Ability to deploy more sites
- Rely on Technology to make data publicly available
  - Smartphone apps, in-cab navigation, 511
- Iowa State effectiveness assessment

**Types of sites**

- Public Rest Areas
- Truck Weigh Stations
- Private Truck Stops
- Prairie Meadows Racetrack and Casino
- Kum&Go Stores
- Casey’s General Stores
- Kwik Star
- Taylor Quick Pick
- McDonalds

**Technology solution**

- In-ground Magnetometer Puck

- Entrance/Exit Counting
- Camera with Built In Video Analytics
Technology solution

- System Validation with Fish Eye and Pan/Tilt/Zoom Cameras

Contracting approach

- Hire contractor to provide truck parking availability data
- Contractor deployed their own equipment
- Contractor operates/monitors/resets the system
- Contractor provides data feed
- DOT obtains data for 511 through data feed

Deployment schedule/process

- Developed high level system requirement with 8-state group
- Developed detail functional requirements for RFP
- Worked with DOT purchasing to develop full RFP
- Evaluated proposals
- Selected contractor
- Rolled RFP requirements into a contract
- Phase 1 Construction – Public rest areas
- Phase 2 Construction – Private truck stops

Construction schedule

- All sites fully constructed by mid-October 2018

Self evaluation process

- Contractor individually evaluates all sites are in working order.
- 24-hours of verified data.
- Done remotely with cameras.

Burn in period

- Entire System Evaluation
- 60 Day Review Period Nov- Dec 2018
- 30 Days Documentation
- Require 7 Consecutive Days of Data
System operation

- Go Live = January 4, 2019
- Runs for 3 years per Grant Requirements

Information dissemination

511 traveler website

511 map

511 traveler website

Traveler Information Integration: Privately Owned Truck Stops (no pictures due to privacy considerations)
The MAASTO TPIMS Project

**Grant performance measures**

- Parking Utilization and Demand Cycles
- ATRI baseline and post-implementation truck parking surveys
- ATRI analysis of truck Global Positioning System (GPS) location data
- Available truck parking studies or data
- Corridor Safety
  - Change in Hours-of-Service violations
- Reliability
  - System downtime
  - User complaints
- Accuracy

**Contractor monitoring**

- Evaluating frequency and magnitude of rests
- Graphing availability over time
  - High baseline of trucks parked
  - Lots that do not fill
- Visual verification of data feed
- Utilizing static images from 511

**Outreach**

- Billboards
- TrucksParkHere.com Website

**Marketing efforts targeting drivers**

- Truck Freight Conferences
- Mid-America Trucking Show
- Truckers Jamboree
- Great American Trucking Show
- Sirius XM – Road Dog Radio interview
- TrucksParkHere.com

**Third-party vendor outreach**

- Marketing efforts targeting application developers and in-cab navigation systems
  - Truck Freight Conferences
  - National Private Truck Council
  - Institute for Trade and Transportation Studies
  - Great American Trucking Show
  - National Association of Small Trucking Companies
  - One-on-one conference calls
  - Third-party Vendor Forum – November 2019
Measuring success

Parking Utilization
- Are drivers utilizing TPIMS to inform their parking decisions?
- Have driver-perceived parking shortages declined?

Safety and Security
- Are truck parking facilities more safe and secure?
- Is there a reduction in illegal or informal parking?
- Is there a reduction in fatigue-related crashes?

System Reliability
- Is there a decline in the average time spent looking for parking?
- Is the system meeting its performance requirements for accuracy?

The TPIMS vision

Freight network users will experience:

Regional Consistency for Trucking Industry
- Seamless regional look and feel for trucking industry users
- Flexibility for state-specific concepts

Safety, Productivity & Economic Competitiveness
- Safer for truck drivers and general public roadway users
- Drivers & carriers more efficient and profitable
- New economic opportunities attracted to regional corridors

National Model for Deployment
- Consistent concepts, messaging and technologies
- Expand pilot project to other NHS corridors and states

TPIMS questions?

www.TrucksParkHere.com

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