



MAASTO Regional Truck Parking Information Management System (TPIMS)





ATRI

Trucking industry's NFP research organization

- Safety
- Mobility
- Economic Analysis
- Technology
- Environment

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2017 Top Industry Issues

1. Driver Shortage (7)
2. ELD Mandate (1)
3. Hours-of-Service (2)
4. Truck Parking (4)
5. Driver Retention (8)
6. CSA (6)
7. Cumulative Economic Impact of Regulations (3)
8. Driver Distraction (10)
9. Transportation Infrastructure/Congestion/ Funding (9)
10. Driver Health and Wellness (12)

CRITICAL ISSUES IN THE TRUCKING INDUSTRY – 2017



Presented to the
American Trucking Associations

Prepared by
The American Transportation Research Institute
October 2017



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Top Issues Drivers vs. Carriers

Commercial Drivers

1. ELD Mandate
2. Truck Parking
3. Hours-of-Service
4. Cumulative Economic Impact of Trucking Regulations
5. Driver Distraction
6. CSA
7. Driver Health/Wellness
8. Driver Retention
9. Transportation Infrastructure Congestion/Funding
10. Autonomous Vehicles

Motor Carrier Execs

1. Driver Shortage
2. ELD Mandate
3. Driver Retention
4. CSA
5. HOS
6. Cumulative Economic Impact of Trucking Regulations
7. Transportation Infrastructure Congestion/Funding
8. Driver Distraction
9. Truck Parking
10. Tort Reform





Travel Diaries and Surveys

Truck Parking Diaries

- 14 days of parking activity
- 148 diaries completed in 2016
- 2,035 days of truck parking activity
- 4,763 unique stops

Truck Driver Survey

- Jason's Law: 8,150
- Kansas DOT: 1,300
- MAASTO: 2,659
- North Carolina DOT: 777



Ease of Finding Parking

It is easy to find truck parking in the 10 MAASTO states in comparison to truck parking in other regions.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.9%	13.2%	33.1%	35.5%	16.3%

It is easy to find truck parking in the 10 MAASTO states for the required Hours of Service 10-hour break.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3.3%	6.9%	20.9%	47.8%	21.1%



No Vacancy



Google earth
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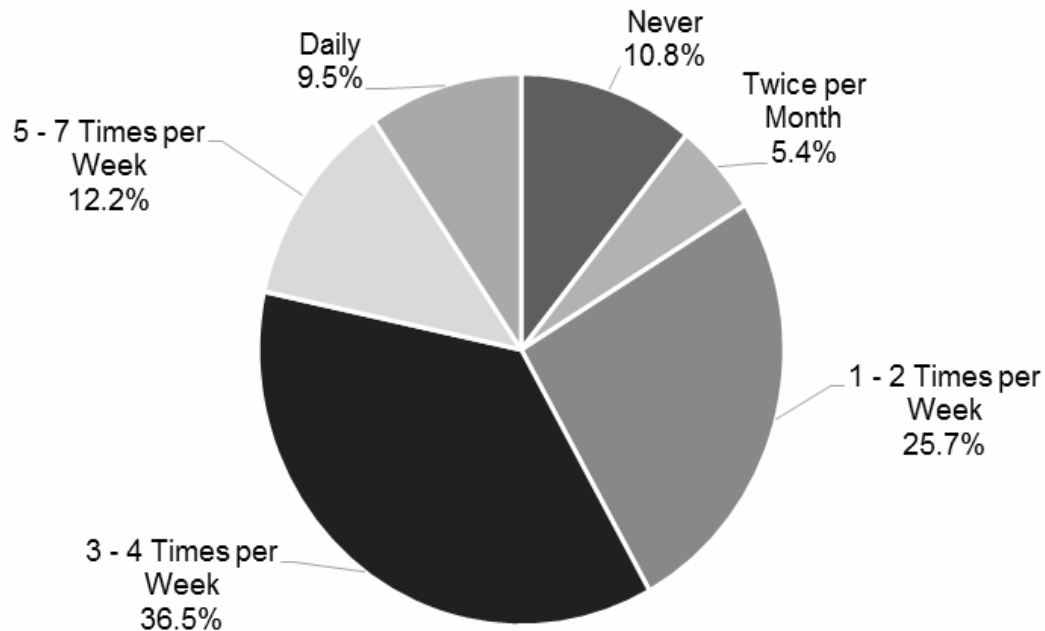
No Vacancy

Cumberland County, PA Rest Area: I-81 Northbound
January, 2017



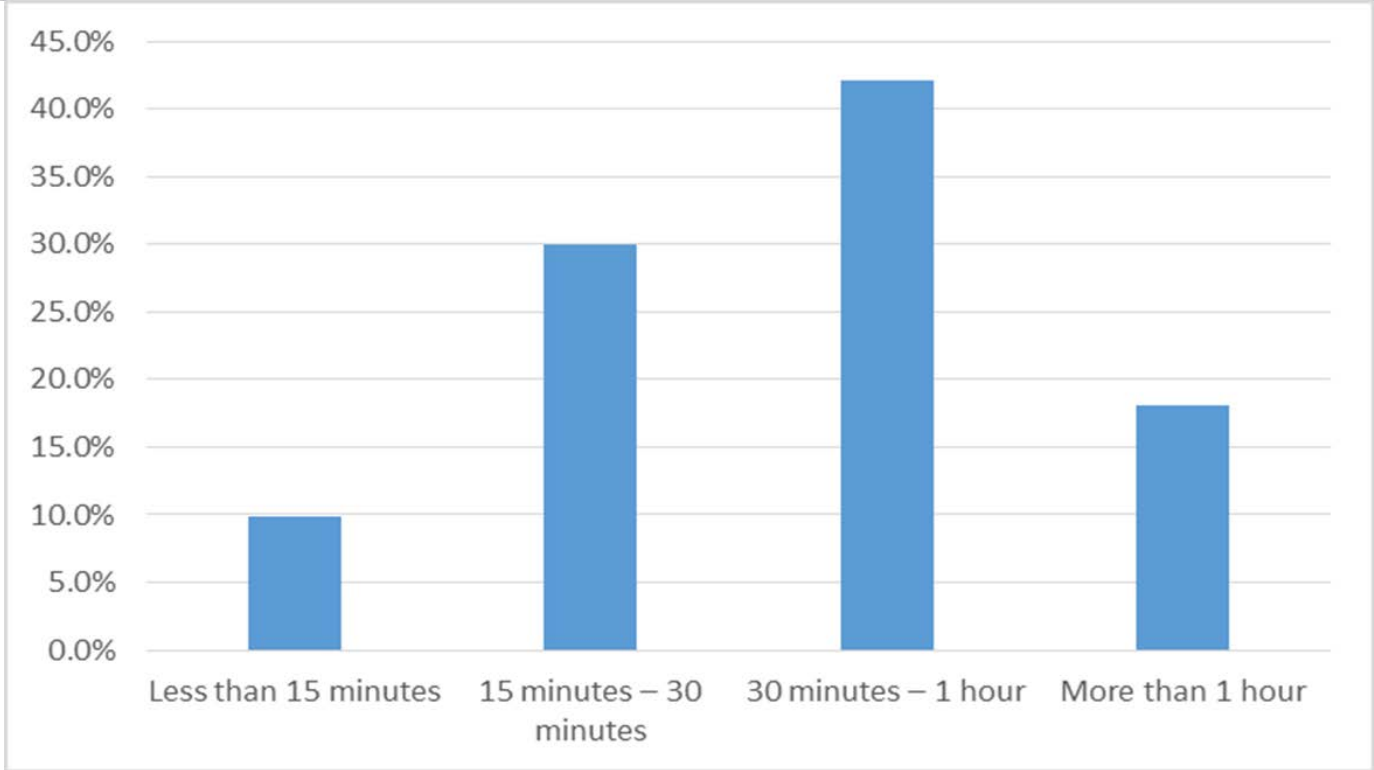


Frequency of Unauthorized/Undesignated Parking





MAASTO Search Times





Safer, *faster* parking

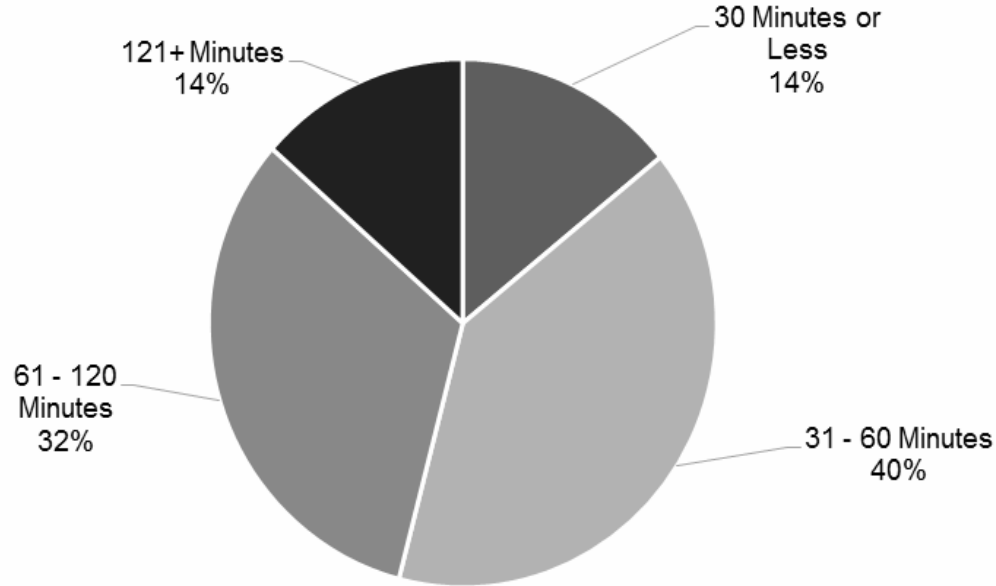


Source: Survey data presented by Desiree Wood, Andrew Warcaba Associates and Hope Rivenburg

The MAASTO TPIMS Project



Average Remaining Drive Time



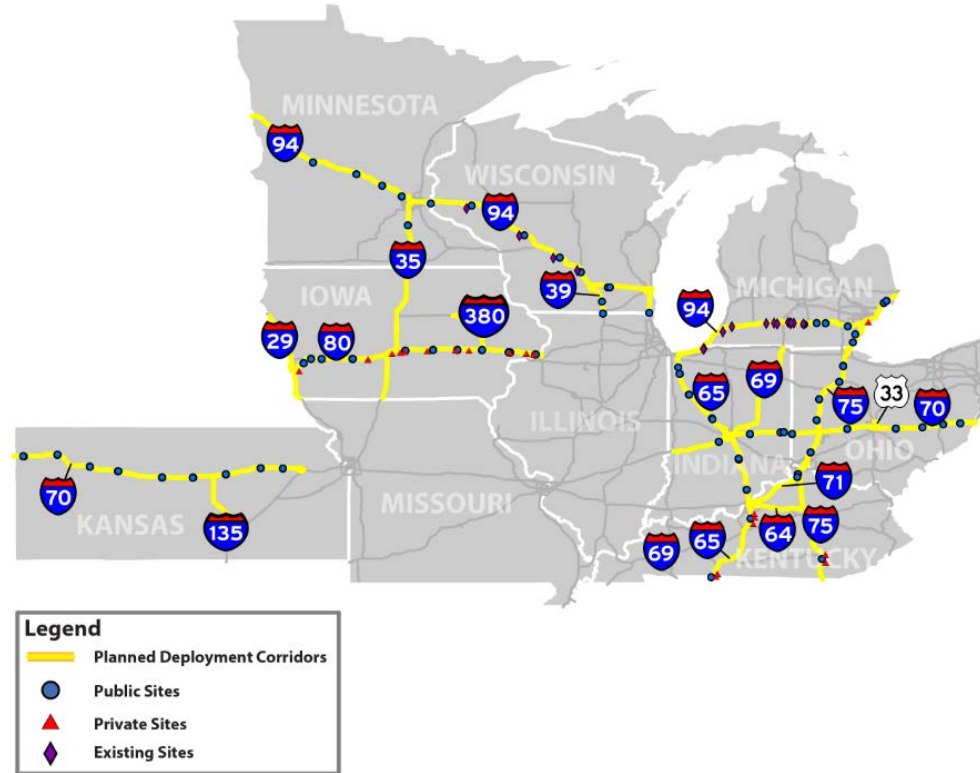
Average = 56 minutes/day Opportunity Cost = \$4,600 annually
ELDs: nearly 2x as likely to spend 30+ minutes looking for parking





TPIMS at a glance

- 139 public and private sites
- \$31.2 million in federal funding
- Collect, aggregate and communicate real-time parking availability
- Measure impact on truck parking and safety
- System launch: January 2019





How does TPIMS help?

- Give parking information to drivers in route
- Rely initially on dynamic messaging signs
- Locate signs at routing decision points
- Provide drivers with multiple parking options
- Make system seamless for users





Seamless system challenge

Functions	Type	Iowa	Ohio	Michigan	Kentucky	Wisconsin	Indiana	Kansas	Minnesota
Procurement	Public	DBOM	DBOM	DBB	DBB	DBB	DBB	DBB	DBB
	Private		N/A	DBOM		N/A	N/A	N/A	N/A
Data Collection Method	Public	Functional Requirements	Functional Requirements	In/Out	In/Out	In/Out	In/Out	Space-by-Space	Space-by-Space
	Private		N/A			N/A	N/A		
Data Collection Technology ⁵	Public	Functional Requirements	Functional Requirements ^{1,2}	Video	Magnetometer	Magnetometer	Magnetometer	Video ²	Magnetometer
	Private		N/A	Video		N/A	N/A	N/A	N/A
Operations & Maintenance	Public	Third Party	Third Party	Internal ³	Third Party ⁴	Third Party	Internal	Third Party	Internal
	Private		N/A	Third Party		N/A	N/A	N/A	N/A
	Sign Operations	N/A	Internal	Internal	Internal	Internal	Internal	Internal	Internal
Data Analytics & Sharing	Processing	Third Party	Third Party	In-House ATMS ⁷	In-House ATMS	Third Party	In-House ATMS	In-House ⁸	In-House ATMS
	Software	Not Developed	Not Developed	Current	Not Developed	Current	Not Developed	Not Developed	Needs Additional Development
	Sharing Format	XML Data Feed	XML Data Feed	XML Data Feed	XML Data Feed	XML Data Feed	XML Data Feed	XML Data Feed	XML Data Feed
Information Dissemination	Signs	No Signs	DTPS	DTPS	DTPS	DTPS	DTPS	DTPS	Full-Matrix Color DMS
	Website	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵
	Mobile Website/ Mobile App	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵	State and Third Party ⁵



Key TPIMS decisions

- Public vs. Private Sites
- Data Collection
 - Entrance and exit or individual space counts
- Data Aggregation
 - Integrated with ATMS or separate
 - Local or cloud
- Data Communication





Public vs. private sites

Public sites

- Owned, maintained and operated by state agencies
- Rest areas, weigh stations
- Direct access
- Limited parking slots, simpler designs
- Greater control over data collection and distribution

Private sites

- Owned, maintained and operated by private sector
- Truck stops
- Indirect access, often with multiple driveways and mixed truck-car traffic
- Greatest number of parking slots
- 3 states participating: KY, IA and MI

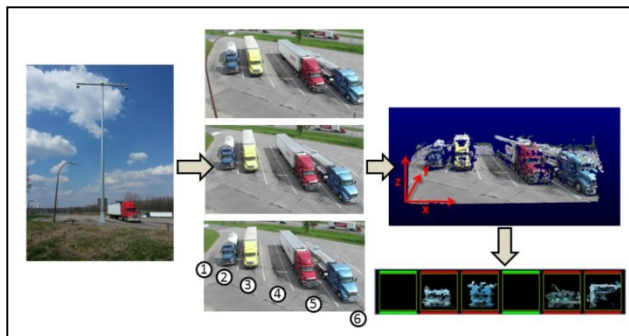




Data collection

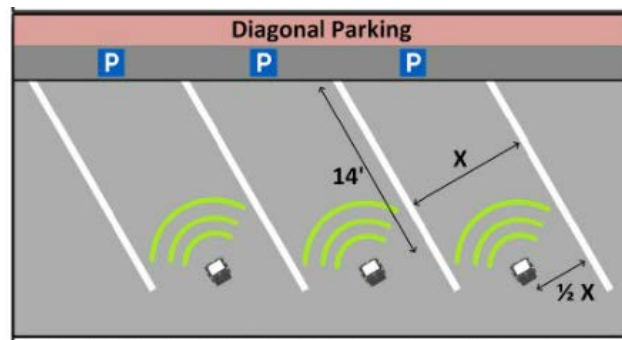
Entrance and Exit Counts

- In-pavement magnetometer
- Video cameras
- Laser technology
- Radar



Space Occupancy Counts

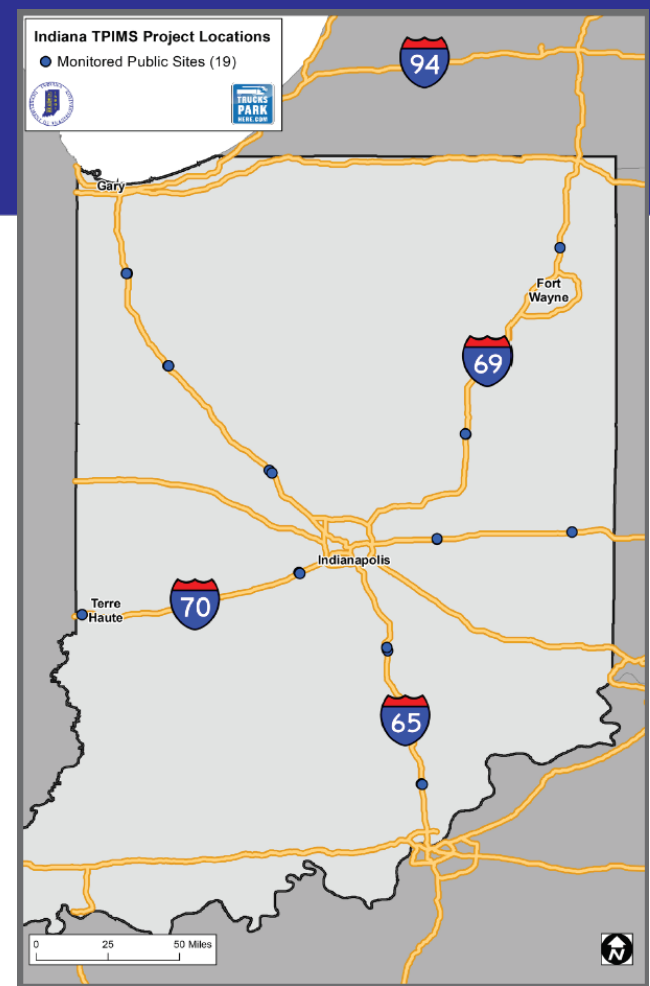
- Infrared/magnetometers
- Microwave/magnetometers
- Video cameras





Indiana TPIMS

- 10 Sites on I-65
- 3 Sites on I-69
- 6 Sites on I-70
- Technology: In/Out

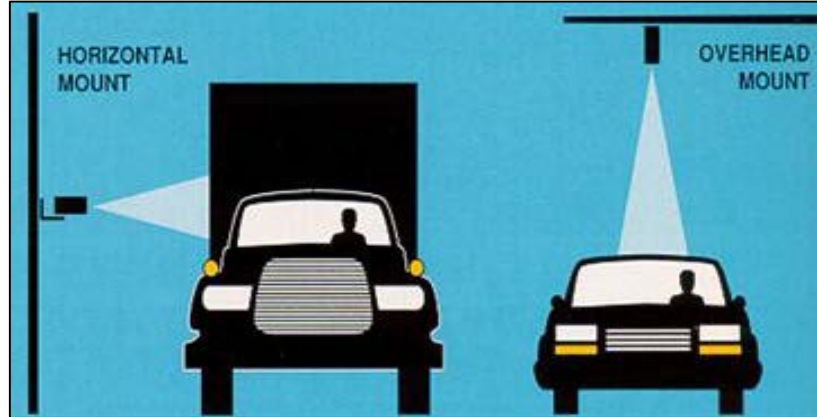




How the Indiana TPIMS works

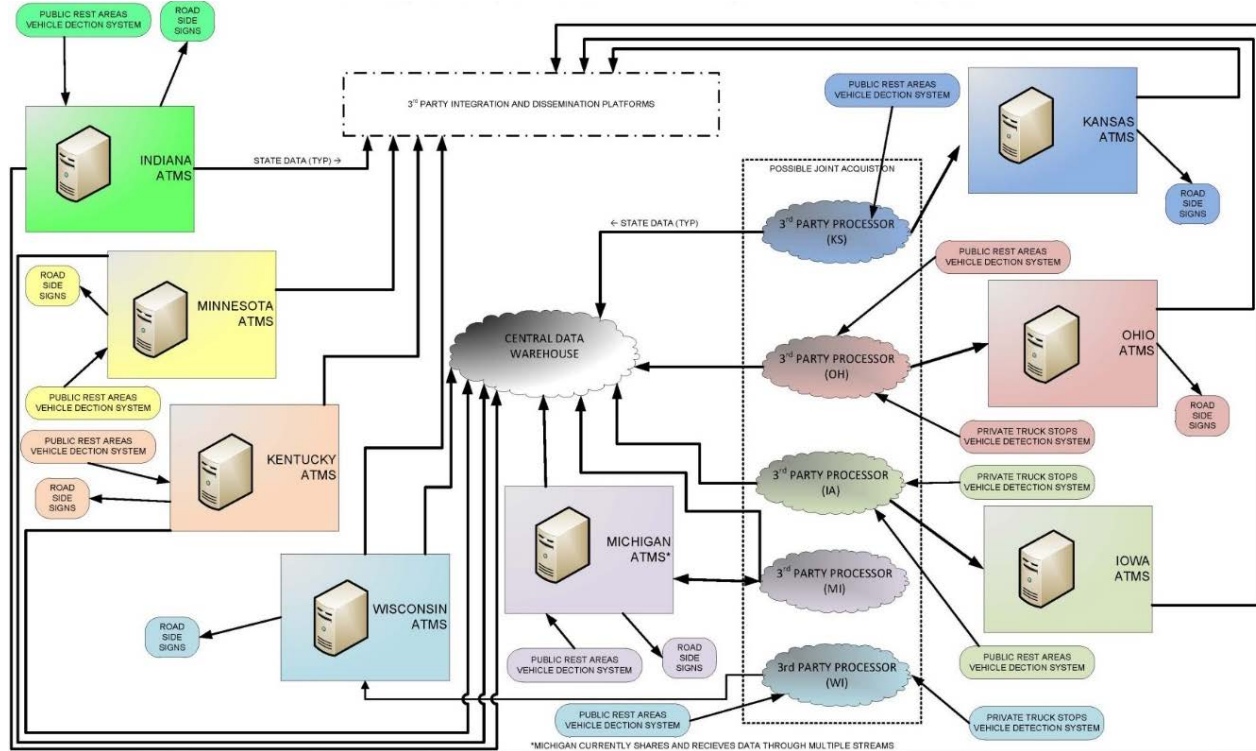
Entrance and Exit Counts

- In-pavement magnetometer
- Video cameras





Data aggregation





Public Data Feed

Element	Type	Description
siteId	string	Unique fixed-length identifier including state, route number, route type, reference post, side of road and unique location number or name abbreviation. See more detailed description in appendix.
timeStamp	string	Provides the date and time that the site record was last updated. See more detailed data and time representation description in appendix.
timeStampStatic	String	Provides the date and time that the site static record was last updated. See more detailed data and time representation description in appendix.
reportedAvailable	string	Number of available spots shared through the data feed. The number is capped at the total number of parking spots at the site and "Low" is reported if the low threshold is reached.
		Optional. Reports whether the site is emptying, steady or filling. Accepted values: "CLEARING" / "STEADY" / "FILLING" / null . See more detailed description in appendix.
		Will report open unless the parking site is closed to parking for maintenance or another situation. Possible values: true / false / null
		This flag will report that the site is operating normally. Possible reasons for a "false" value include periods where the site is under construction while open to traffic, IT maintenance windows, or equipment failures. Possible values: true / false / null

Dynamic Public Feed - example

JSON format

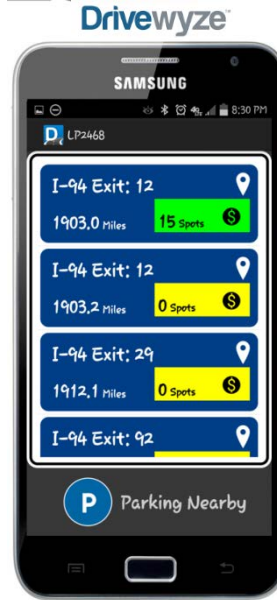
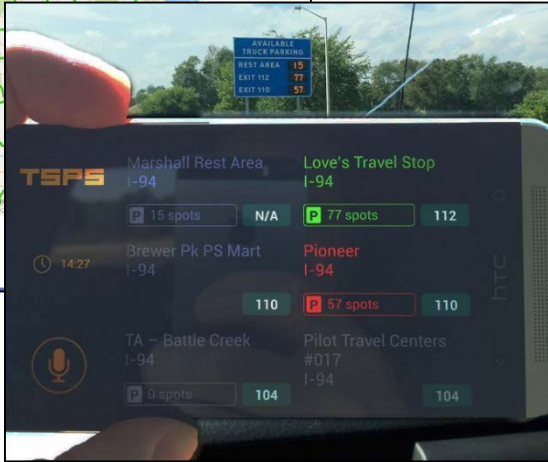
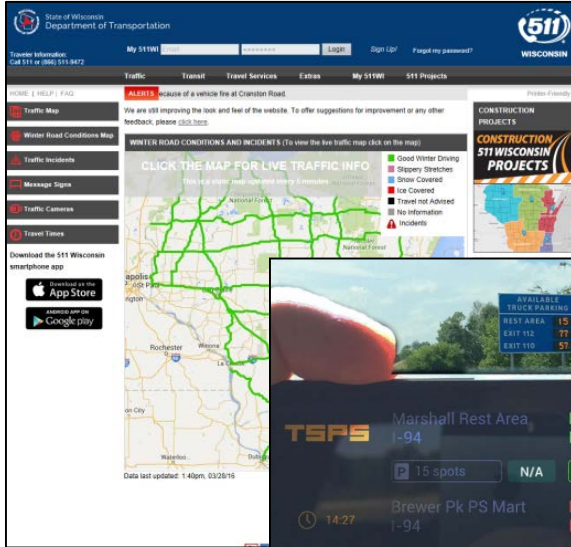
```
[{"siteId":"WI00094IS0012400ERSTARE53","timeStamp":"2016-08-15T20:35:15Z","timeStampStatic":"2015-05-03T12:24:19Z","reportedAvailable":"25","trend":"FILLING","open":true,"trustData":"true"}]
```

Dynamic Public Feed - live URL

<https://transportal.cee.wisc.edu/TPIMS/dynamic>



Data communication



Interactive Voice Response System



Performance measures

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?





TPIMS questions?

TPIMS Project

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