



I-10 Truck Parking Availability System (TPAS) & MAASTO Truck Parking Information Management System (TPIMS)

FHWA Roundtable for I-81



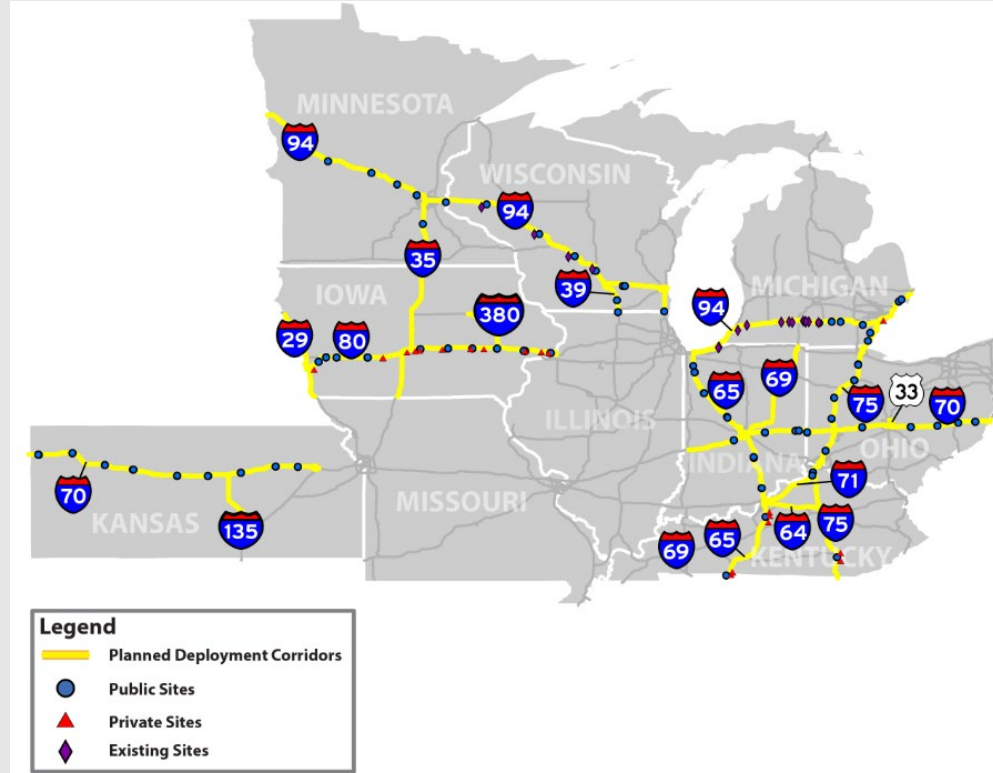
I-10 TPAS Overview

- Provides real-time truck parking availability information
- Deployed at 37 rest areas along the corridor
- ATCMTD Grant
- Project website: www.i10connects.org



MAASTO TPIMS At a Glance

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



TPIMS/TPAS Objectives

- Reduce fatigued driving
- Reduce travel time searching for truck parking
- Reduce parking along highway shoulders and ramps
- Improve commercial vehicle safety
- Create a system that can be expanded



How does TPIMS/TPAS 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



Stakeholder Outreach

- Trucking Industry Stakeholder Workshops
- Trucking Industry Stakeholder Interviews
- Electronic Surveys
- Third Party Application Developer Truck Parking Data Feed Awareness and Educational Outreach
- Freight Advisory Committee Outreach
- I-10 Corridor Coalition website www.i10connects.com

I-10 CONNECTS
I-10 CORRIDOR COALITION

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HOME ABOUT TRUCK PARKING PARTICIPATE RESOURCES

I-10 CONNECTS
TPAS
TRUCK PARKING AVAILABILITY SYSTEM

OVERVIEW OF TPAS

Truck Parking Availability System

In April 2020, the I-10 Corridor Coalition was awarded a \$6.85 million U.S. Department of Transportation (USDOT) Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant to implement a Truck Parking Availability System (I-10 TPAS) along the I-10 corridor. In addition to the grant, the Coalition states are receiving the Funds 5:1, allowing the Coalition to leverage \$33.7 million for the TPAS project.

The I-10 TPAS is a technology system that will detect, monitor and provide real-time truck parking availability information to truck drivers, dispatchers and other interested stakeholders through roadside dynamic message signs, smartphone and in-cab applications and online via websites and traveler information sites. Using this information, truck drivers and dispatchers can make informed parking decisions which will improve traffic efficiency and mobility and reduce emissions along the I-10 corridor. The system will monitor and report on available truck parking spaces at 37 public rest areas in California, Arizona, New Mexico and Texas, providing approximately 350 truck parking spaces.

The project is planned to be deployed over a four-year period and will "go live" with the launch of the TPAS in 2023, followed by ongoing operations and maintenance of the system.

TPAS Technology at a Glance

1 Vehicle detection systems measure available parking in lots across each state
2 Parking data goes to states and 40-party providers
3 Data is delivered to drivers
4 Information is disseminated to drivers via dynamic message signs, smartphone and in-cab applications, and websites and traveler information sites.

INFORMATION DISSEMINATION

Dynamic Parking Availability Signs (DPAS) will be placed upstream from the parking areas. These signs will provide drivers with real-time advanced warning ahead of the parking site to allow drivers to consider alternate plans if a location is full.

Smartphone and web-based services may also be used to provide data to drivers and dispatchers. The Coalition will work with application developers to integrate the feed into existing applications.

Project Benefits

The I-10 Freight Corridor Study estimated the economic impact of freight moving along the I-10 Corridor at \$1.98 trillion annually. The I-10 Corridor Coalition TPAS project can help support the economic productivity of this critical commerce route by:

- Improving mobility and safety along the freight corridor;
- Reducing infrastructure damage and diesel emissions; and
- Saving commercial truck drivers thousands of dollars a year in lost earnings and productivity.

The implementation of TPAS may also serve as the foundation for future technology implementation along the Corridor including integration of weather or other data systems, a multi-parking reservation system, and automated and connected vehicle and infrastructure technology.

State	Miles	Stops
California	345 Miles	6 Stops
Arizona	392 Miles	6 Stops
New Mexico	164 Miles	5 Stops
Texas	881 Miles	18 Stops
Total	1,882 Miles	37 Stops

Truck Industry Feedback

- Aware of TPAS and use similar systems throughout the country
- System accuracy and reliability is important
- More information is always helpful and preferred
- Dynamic parking availability signs and smartphone and online applications are preferred
- 5 minutes is considered reliable for “real-time” information
- Additional parking capacity is a priority

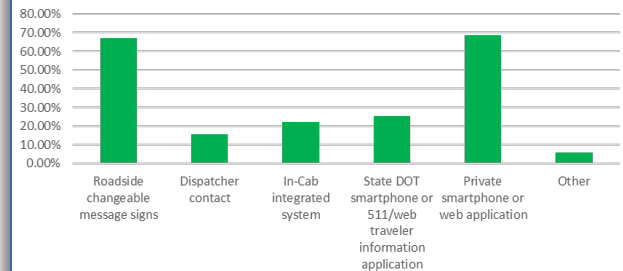


DRIVERS

I-10 Corridor Coalition seeks truck driver input

The coalition seeks to understand the challenges truck drivers face when they are attempting to park at locations along the I-10 corridor in California, Arizona, New Mexico, and Texas.

Preferred method for receiving real-time truck parking availability information:



How TPIMS/TPAS Works

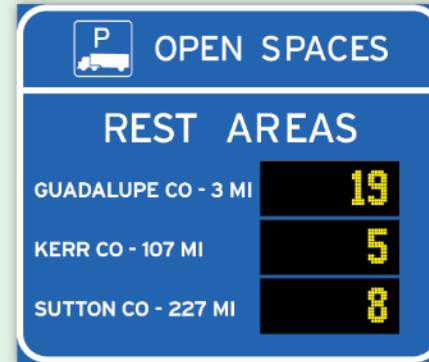
1 Vehicle detection systems measure available truck parking in rest areas and/or travel information centers across each state



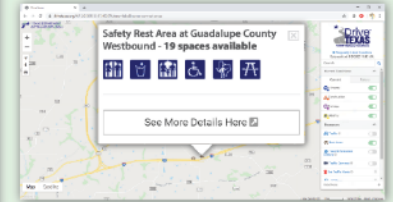
2 Parking data goes to states and 3rd party processors



3 Data is delivered to drivers
Dynamic Parking Availability Signs



State Traveler Information Website



* Examples are for illustrative purposes only

Key Deployment Decisions

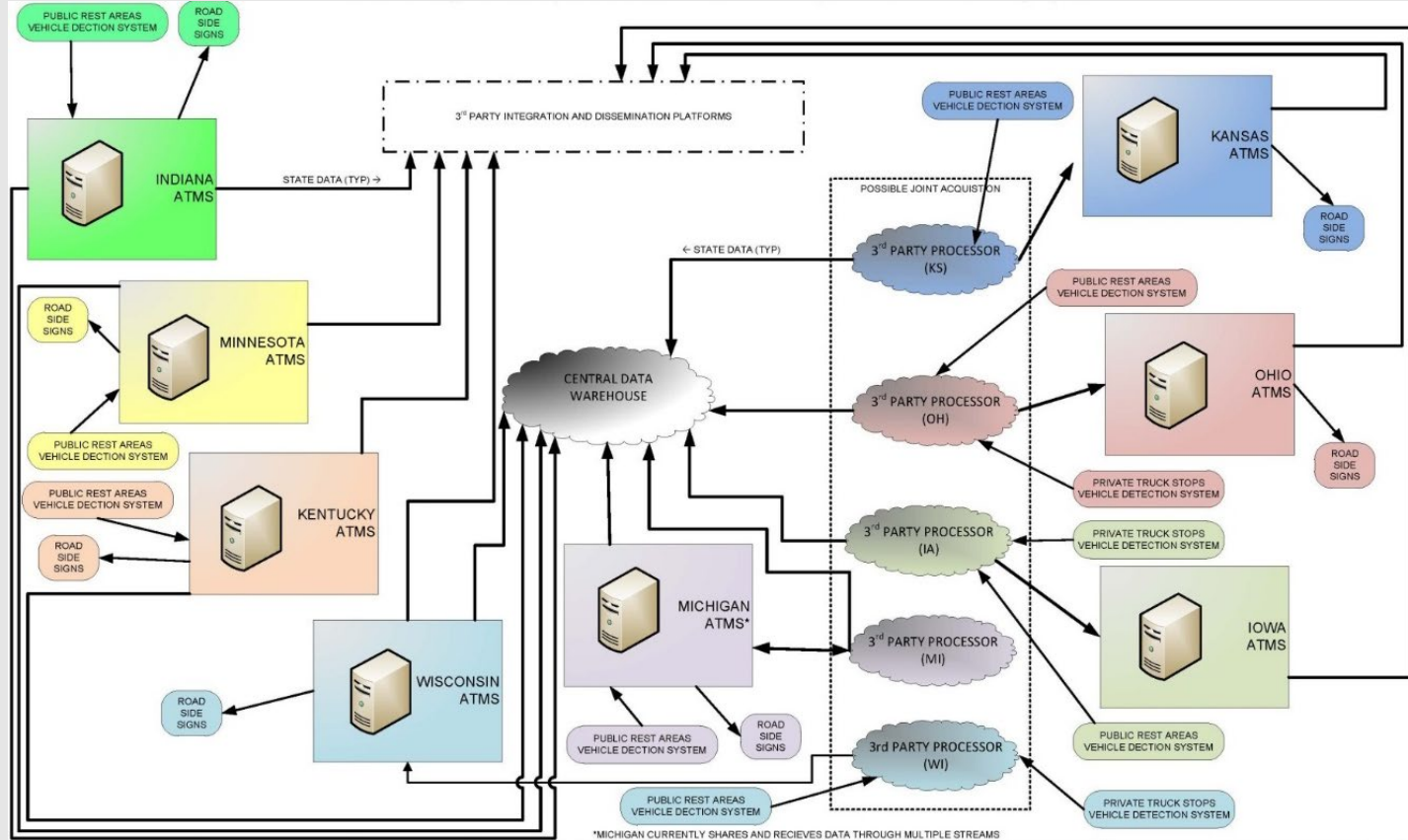
- Public vs. Private Sites
- Data Collection
 - Entrance and exit or individual space counts
- Data Aggregation
 - Integrated with ATMS or separate
 - Local or cloud
- Data Communication



Seamless System – tracking core functions

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	
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	
	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

Data Aggregation – System of Systems



*MICHIGAN CURRENTLY SHARES AND RECIEVES DATA THROUGH MULTIPLE STREAMS

Public Data Feed

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>

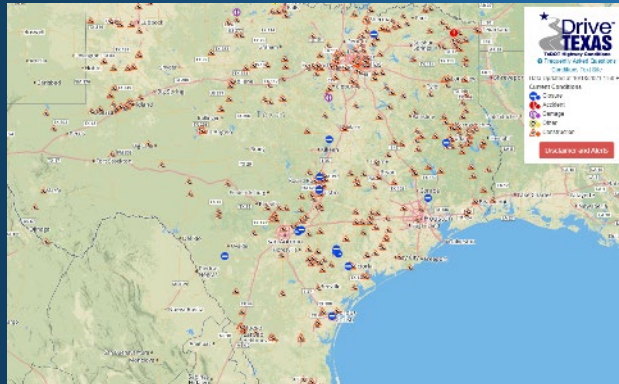
<https://trucksparkhere.com/developer-info/>

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.
trend	string	Optional. Reports whether the site is emptying, steady or filling. Accepted values: "CLEARING" / "STEADY" / "FILLING" / null . See more detailed description in appendix.
open	boolean	Will report open unless the parking site is closed to parking for maintenance or another situation. Possible values: true / false / null
trustData	boolean	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

How the Information is Shared



Truck Parking Signs



Integrated into State Travel Sites

Data Feed for 3rd-party Applications



Data Feed for In-cab Integration



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?



Corridor/Region Project Lessons Learned

LESSON 1

FOCUS ON OUTCOMES

Focusing on outcomes – safety, ease of use, consistent regional access to parking information – was critical for success. Agreed-to goals enabled the Partnership to reframe discussions about technological solutions in terms of end-user benefits rather than agency custom. It removed potential conflicts about how each state delivered those benefits since each one could achieve the goal in its own way, reflecting its operational, regulatory and statutory preferences and constraints.

LESSON 2

LINK GOALS AND PERFORMANCE

The ability to rule particular technology in or out of consideration based on agreed-to goals and performance measures reduces opportunities for delay. It shifts the focus from “how we do it” to “will it help achieve the end results.” In the process, partner agencies can better accept differing agency approaches if they see they don’t affect the ultimate delivery of services and results. Finally, it is simpler to address late-breaking project questions or changes by analyzing them in light of whether they improve or degrade results under agreed-upon performance measures.

Corridor/Region Project Lessons Learned continued...

LESSON 3

COMMUNICATE EARLY AND OFTEN

Team members may differ regarding the manner of system design and testing. But common standards for testing and communication increase the likelihood of success. Early in design, for example, it became clear that moving parking facility utilities could require more coordination than expected. Sharing this enabled agency partners to adapt construction and testing approaches, eliminating potential delay. As each state was completing final design and installation prior to testing, monthly project team meetings coupled with individual WebEx conference calls combined to make sure that work was proceeding on schedule and that partner agencies could benefit from each other's experiences.

LESSON 4

DEFINE ROLES CLEARLY

Federal grants require a lead applicant - for MAASTO TPIMS, KDOT administers the TIGER grant; for I-10 TPAS TxDOT administers the ATCMTD grant. The lead agency also manages the group's activities in support of monthly and milestone progress; and facilitates group and stakeholder meetings designed to ensure that the system meets partner and end-user needs and expectations. This frees up each state to focus on only its own implementation plan, schedule and budget.

OTHER SUCCESS FACTORS

TO CONSIDER

- Verify proposed sign locations to preclude field issues.
- Locate signs to maximize truck driver decision making.
- Market new system internally and externally to maximize acceptance and use.
- Coordinate with other current and proposed truck parking system to ensure consistent regional and national protocols for information distribution.