



The future of truck parking

TIGER PROPOSAL 2015

Regional Truck Parking Information and Management System (TPIMS)

CONTACT INFORMATION

Chris Herrick, Director of Planning and Development
Kansas Department of Transportation
Dwight D. Eisenhower State Office Building
700 S.W. Harrison Street
Topeka, KS 66603-3745

Phone number: (785) 296-3090
E-mail: cherrick@ksdot.org

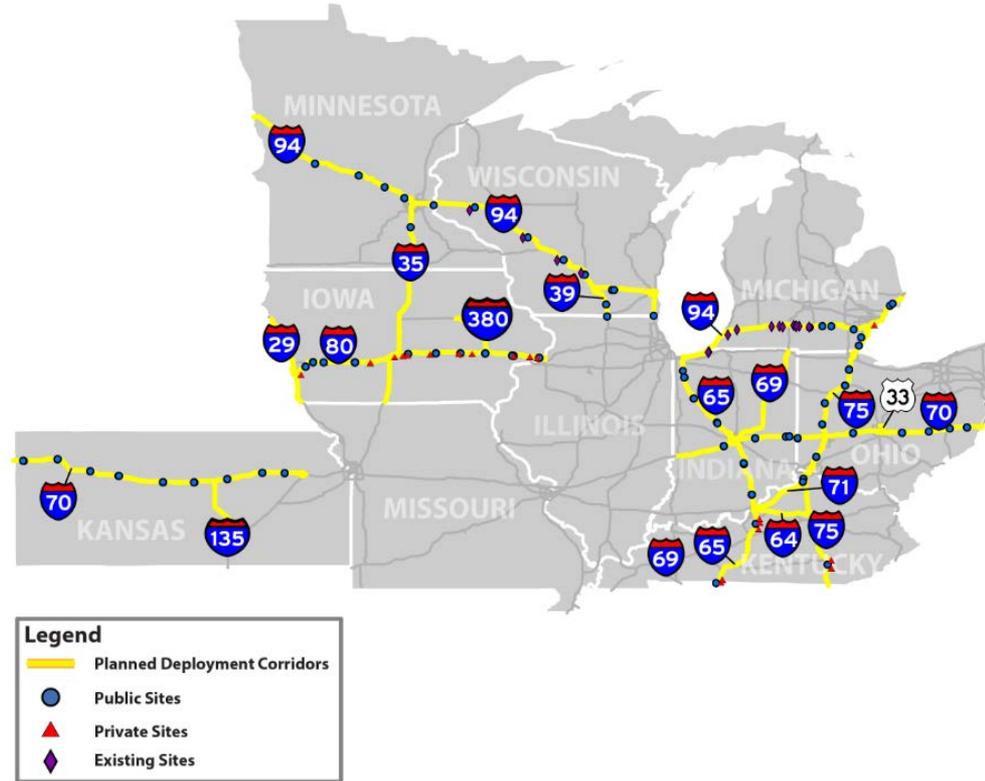
Grant Request: \$36.6 million
Grant Type: Rural Application





TPIMS at a glance

- Focus on key Midwest freight corridors
- Monitor 139 public and private sites
- Collect real-time parking availability
- Aggregate and analyze data
- Communicate parking availability to drivers
- Measure impact on truck parking utilization, efficiency and safety





How does TPIMS help?

- Give parking information to drivers in route
- Rely initially on dynamic messaging signs for information
- Locate signs at routing decision points
- Provide drivers with multiple parking options and their parking availability
- Make system seamless across state borders 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	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





Phase 1 – completed

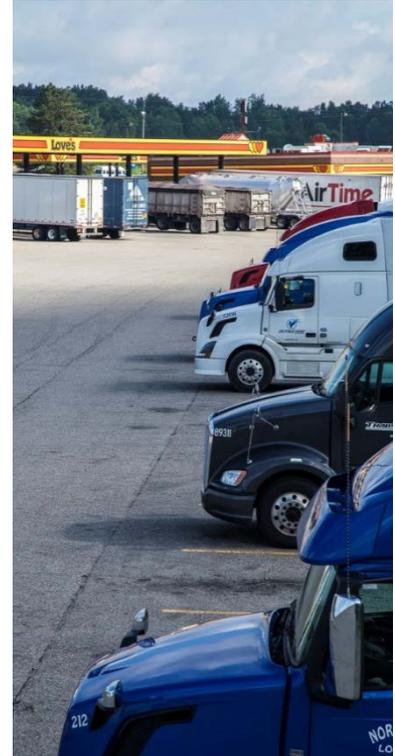
- ✓ TIGER grant application and award
- ✓ Partnership governance and protocols
- ✓ Proof of concept
- ✓ Conceptual design (30%) plans
- ✓ Online map & geodatabase
- ✓ System architecture
- ✓ TPIMS marketing and communication





Phase 2 – underway

- Construction
- Software integration
- Grant reporting
- System testing
- Vendor/developer and trucking industry outreach
- Performance measures data collection and analysis





Measuring success

Parking Utilization

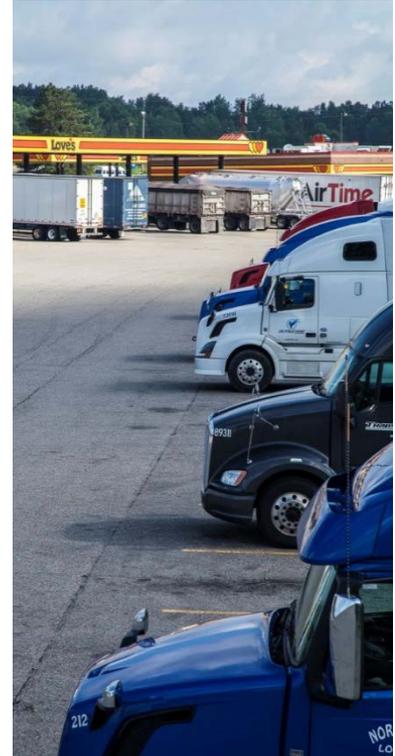
- Drivers are using TPIMS to inform their parking decisions
- Driver perceptions of shortages decline

Safety and Security

- Illegal or informal parking rates decrease
- Fatigue-related crashes decline

System Reliability

- Average time spent looking for parking decreases
- System performance requirements are met (accuracy)





Benefit Cost Analysis

Benefit Factors for Analysis

- Safety
(Injury, PDO)
- Travel Time
(Parking Space Search Time, Travel Time)
- Environmental Benefits
(GHG, NO_x, VOC, PM)



Benefit Cost Analysis

Safety Factors for Analysis

Injury Crash Analysis:

Avg annual value of fatalities and injuries
× *Assumed reduction in value of fatalities and injuries*

PDO Analysis:

$$\frac{\text{Total Value of PDO crashes}}{\text{\# of years of data}} \times \text{Total value of PDO crashes}$$



Benefit Cost Analysis

Travel Time Benefit Factors

Per Parking Space:

*Travel time saving per parking space
× (# of parking spaces × utilization rate)*

Travel Time Per Day:

Savings per day × days per year × hourly rate



Benefit Cost Analysis

Environmental Benefit Factors

<u>Emission</u>	<u>Conversion</u>	<u>Savings per day (metric tons)</u>
CO ₂	22.38 lbs/gallon*	163.63
VOC	0.447 grams/mile (@ 6 miles/gallon)**	0.04
NOx	8.61 grams/mile (@ 6 miles/gallon)**	0.83
PM	0.20 grams/mile (@ 6 miles/gallon)**	0.02

*<http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11>

**<http://www.epa.gov/otaq/consumer/420f08027.pdf>



Benefit Cost Analysis

Deployment Capital and O&M Costs

Cost Summary by State		
State	Total Deployment Costs	Annual Maintenance Costs
Indiana	\$ 6,085,800	\$ 235,775
Iowa	\$ 4,980,864	\$ 423,336
Kansas	\$ 4,868,640	\$ 188,620
Kentucky	\$ 4,077,383	\$ 478,922
Michigan	\$ 4,020,089	\$ 662,556
Minnesota	\$ 1,775,000	\$ 68,289
Ohio	\$ 7,855,873	\$ 1,064,566
Wisconsin	\$ 3,000,000	\$ 82,521
Total	\$ 36,663,649	\$ 3,204,586



Benefit Cost Analysis

Benefit Cost Analysis

	Undiscounted	3% NPV (2013\$)	7% NPV (2013\$)
Safety Benefit	\$ 107,139,265	\$ 72,734,574	\$ 45,677,214
Travel Time Benefits	\$ 206,344,580	\$ 140,082,959	\$ 86,550,788
Environmental Benefit	\$ 89,574,770	\$ 60,446,668	\$ 46,927,508
Total Benefits	\$ 403,058,614	\$ 273,264,201	\$ 179,155,509
Deployment Costs	\$ 36,663,649	\$ 33,063,805	\$ 28,949,491
Maintenance Costs	\$ 57,682,548	\$ 39,159,458	\$ 24,592,087
Total Cost	\$ 94,346,197	\$ 72,223,263	\$ 53,541,577
Benefit-Cost Ratio	4.27	3.78	3.35

TIGER Benefit-Cost Analysis (BCA) Resource Guide (2015)



Economic Competitiveness

Time *is* Money

- Wasted fuel and lost working hours ~\$7 billion
- Damaged or stolen goods ~\$35B
- Saving 15 minutes daily to find parking can yield within the project corridors ~\$10M



The bottom line ...

- Greater driver access to safe, convenient parking
- Improved safety for all drivers in freight corridors
- More efficient freight movement





TPIMS questions?

www.TrucksParkHere.com

info@TrucksParkHere.com

BCA: www.maasto.net/TIGERgrant.html

TPIMS Project Manager

Davonna C. Moore

MAASTO TPIMS Project Manager

Assistant Bureau Chief-Transportation Planning

Kansas Department of Transportation

(785) 296-0346

davonna.moore@ks.gov

