

SmartPark Pilot in TN

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Presentation Outline

- Motivation
- SmartPark in TN
- SmartPark Technology
- Data Gathering and Validation
- Survey Responses
- Evaluation of Other Technologies
- Conclusion



Motivation (1)



- Truck parking is a major problem
- Lack of available truck parking
 - forces truck drivers to remain on highways or park illegally



Source: <http://www.charlotteobserver.com/>



Source: <http://www.linkedin.com/>

Motivation (2)

- In 2007, FMCSA initiated “SmartPark” program
 - Designed to match supply/demand of truck parking
- The initiative relies on
 - truck parking detector technologies integrated with real time information system



SmartPark in TN



- Two locations on I-75 (MM 45, and 23)



MM45



MM23



Two Phases of Pilot

- Phase I
 - Implemented detection technology at MM45
 - Tested accuracy of technology
- Phase II
 - Implemented detection technology at MM23
 - Distribute parking availability information to drivers



Phase I - Site Selection

- Criteria

- Recent reconstruction
- Single points of ingress and egress
- Separated truck and car parking
- Ample lighting for nighttime
- Downstream of another site meeting criteria for Phase II



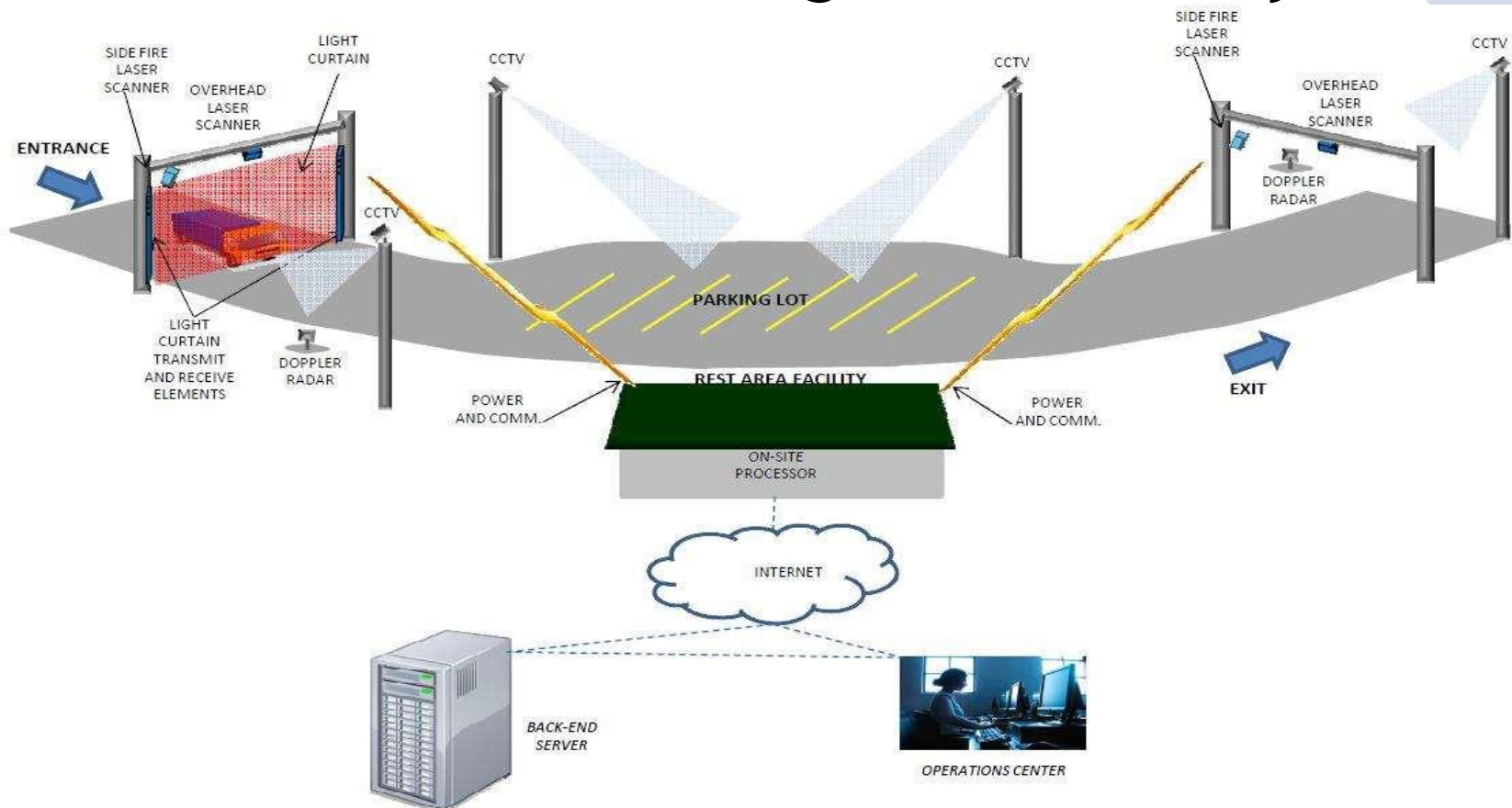
Phase II - Site Selection

- Criteria
 - Upstream of Phase I site
 - Within 35 miles of Phase I site
 - Controlled ingress and egress points



Detection Technology

- Source: Gannett Fleming FMCSA Study



Technology Components

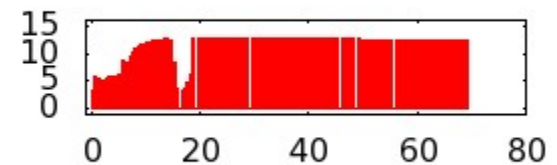


- Gantry Structures
- Detectors
- On-site Processor
- Off-Site Server
- 7 CCTV Cameras
- Website and Data
 - Archive

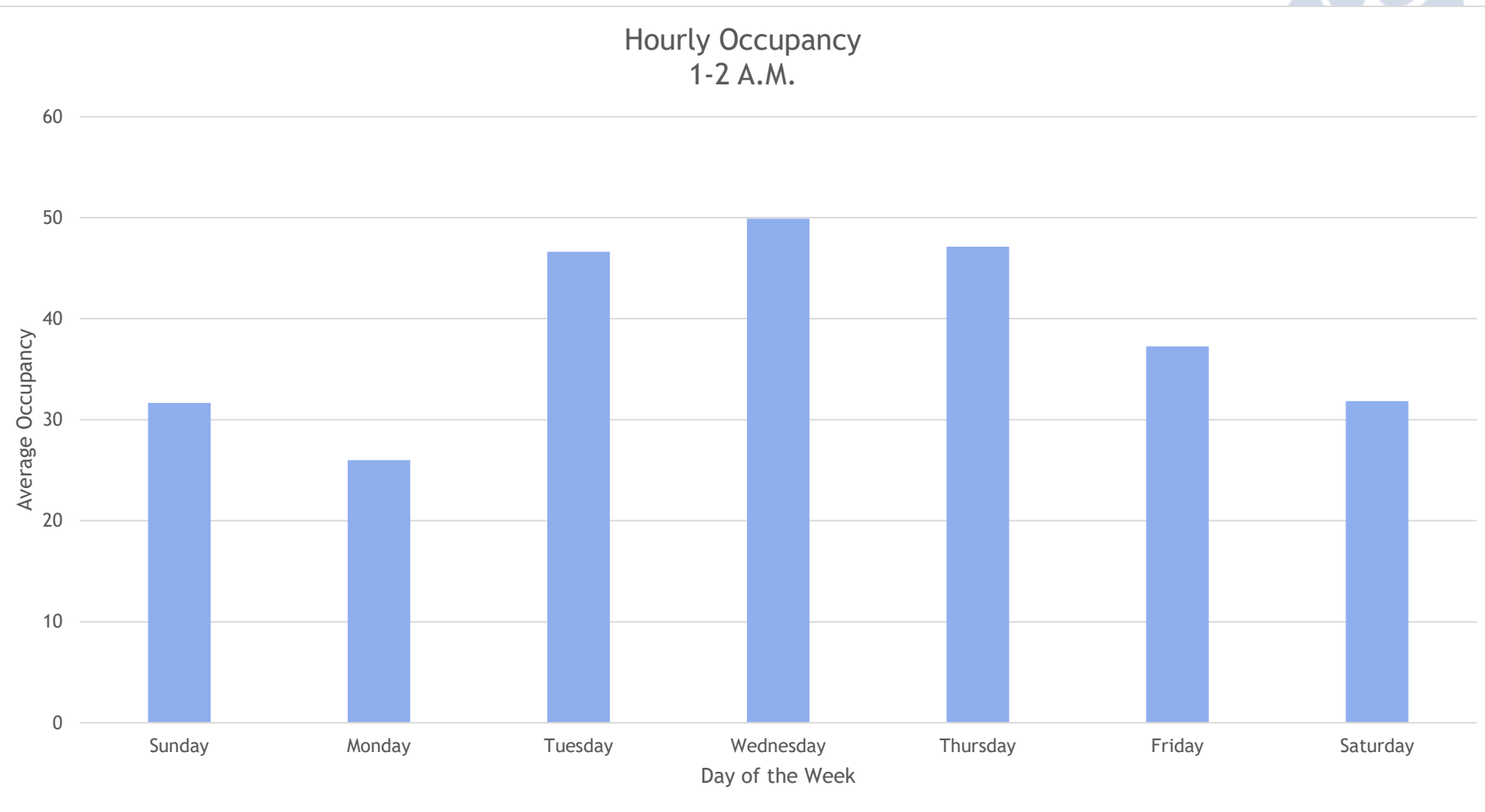


Source: FMCSA SmartPark Technology Demonstration Project

Detection Technology Visualization



Phase I - Lot Occupancy



Phase I - Analysis

- Detection Accuracy
 - Overhead - Overhead 97.76%
 - Light Curtain - Overhead 93.46%
 - Side - Side 97.75%
- Side - Side was chosen for Phase II location



Phase II - Parking Information



- Dynamic Message Signs (DMS)

- Available : more than 4 spaces
- Limited: 2-4 spaces
- Full: 1

- Where?

- Website
- SmartParkUSA App



...simplifying truck parking to enhance safety

Home Register Check Availability Login Help

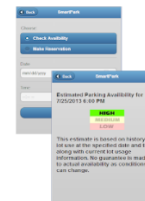
SmartPark helps truckers find parking designated for them. SmartPark allows truckers to locate parking on their route, make sure a spot will be available at the time they need to park, and even reserve a spot in advance. SmartPark will be expanded in the future to cover corridors frequented by trucks. Use of the site requires minimal registration.

SmartPark is also mobile! Download the mobile app for your smartphone today (iOS or Android systems at this time)

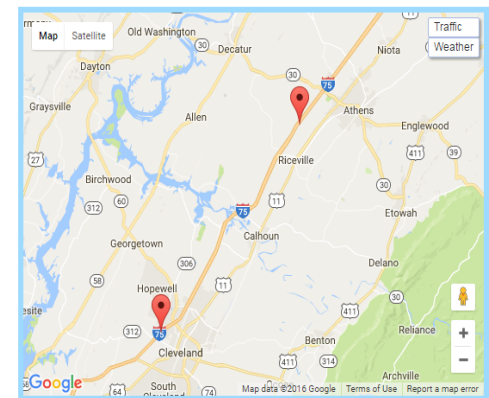
SmartPark is sponsored by the Federal Motor Carrier Safety Administration, a division of the USDOT. SmartPark is intended to reduce driver fatigue, help drivers adhere to their hours of service, and enhance truckers' driving experience by increasing the accessibility of truck parking.

Go Mobile!
Download the
SmartParkUSA App
for iOS and
Android!

Or, call our
interactive voice
response system at
1-844-SMARTPK



Click on marker for current parking, or use table below.
[Click here for a project overview and answers to frequently asked questions](#)



Parking Area
Tennessee I-75 NB at MM 23
Tennessee I-75 NB at MM 45

Current Availability
Available
Available



Validation-1



Aug 30 2016 9:23AM	Egress	625533	SCANNER	LEFT	6	0	0	0	0	0	
Aug 30 2016 9:25AM	Egress	625534	SCANNER	LEFT	6	0	0	0	0	0	
Aug 30 2016 9:26AM	Ingress	590331	SCANNER	RIGHT	6	1	0	1	0	0	

Simultaneous ingress/egress only one is captured

Validation-2



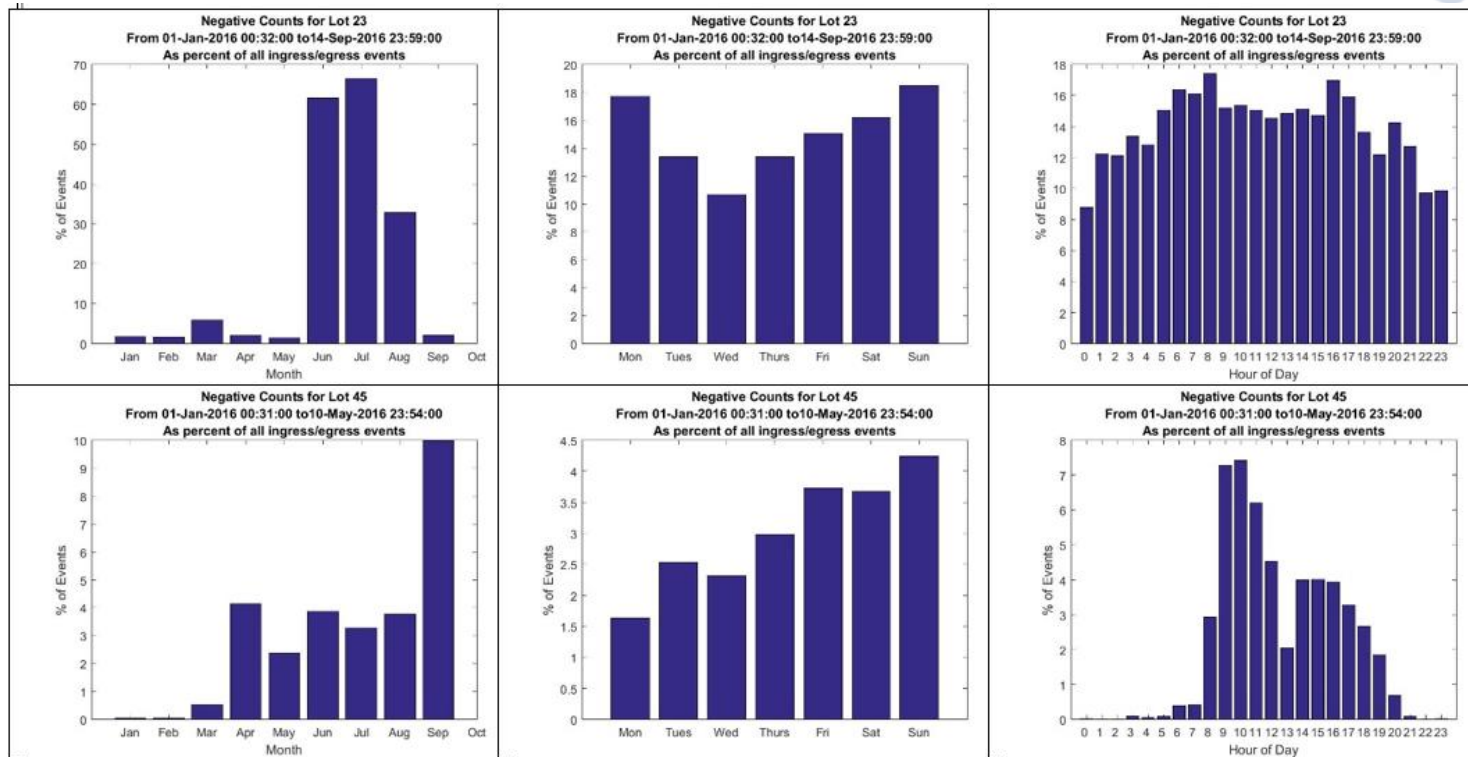
Discrepancy between lot cameras and lot count

Date	Time	Lot MM	Count from Data	Estimation from Still Images
8/30/16	9:11 AM	45	0	8
8/30/16	4:09 PM	23	2	2
9/1/16	9:06 AM	45	5	14
9/1/16	11:52 AM	23	2	3
9/7/16	9:41 AM	45	0	14
9/7/16	2:40 PM	23	0	2



Validation-3

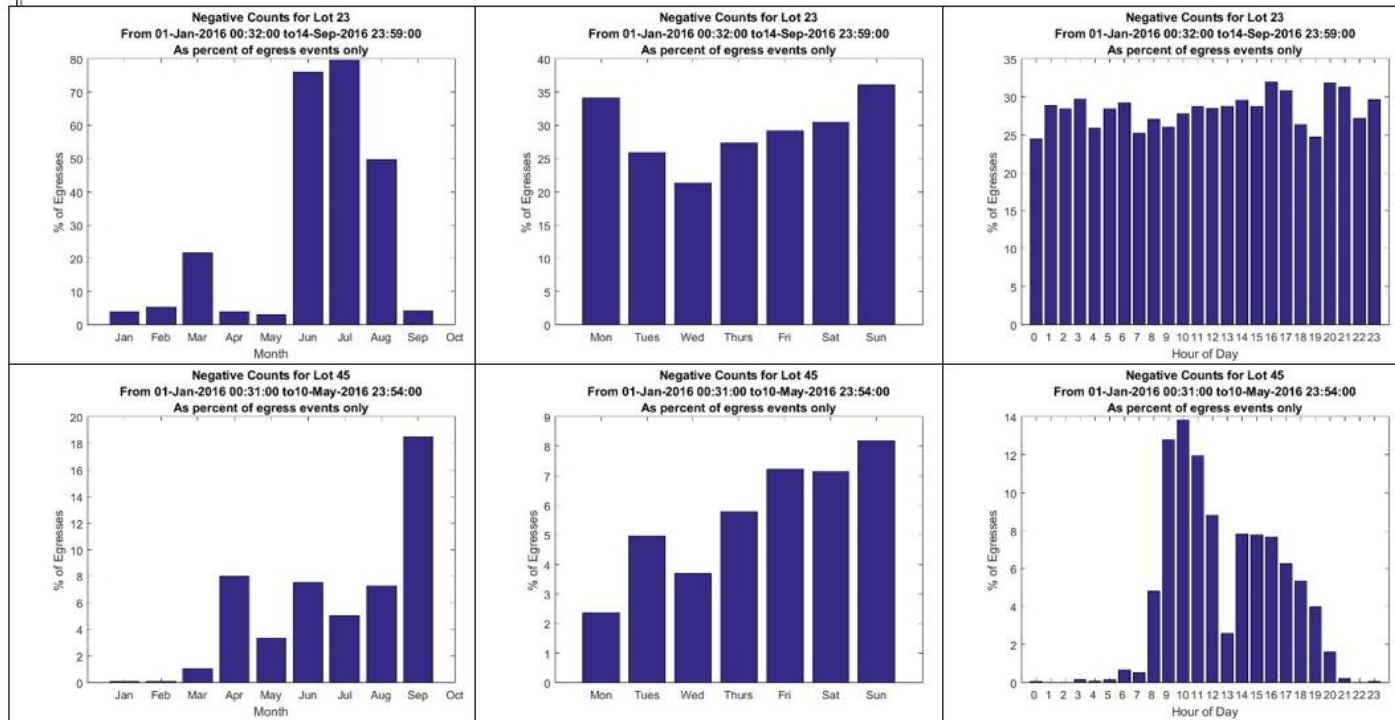
01/01/16 through 09/14/16



$$\% \text{ error} = \frac{\text{number of egresses from empty lot}}{\text{total number of events}}$$

Validation-4

01/01/16 through 09/14/16



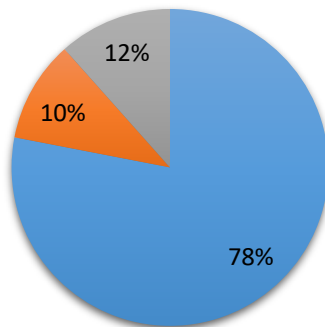
$$\% \text{ error} = \frac{\text{number of egresses from empty lot}}{\text{total number egresses}}$$

Phase II - Trucker Surveys

- Collected over 150 responses on September 12th and 13th
- Results
 - Most drivers experience difficulty parking between 6 PM and 6 AM
 - Drivers think the parking information is accurate “most of the times”

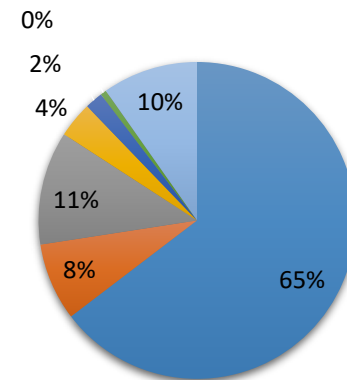
Survey Results (1)

1. Employer Type



■ Employee Driver ■ Owner-Operator ■ Independent Contractor

2. Truck Operation Type

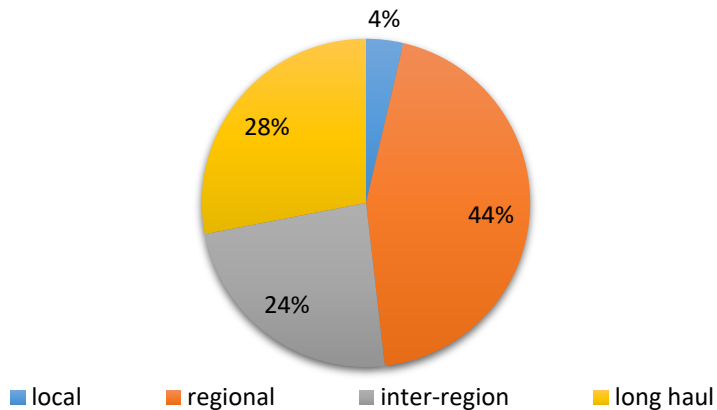


■ truckload ■ LTL ■ flat ■ tank ■ express ■ intermodal ■ other

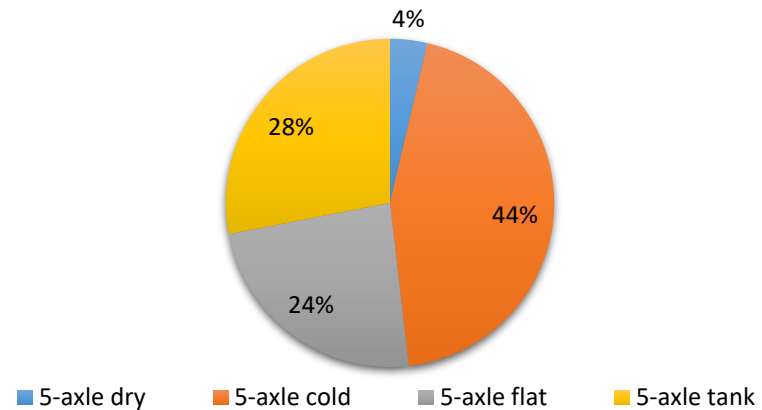
Survey Results (2)



3. What is your average length of haul?



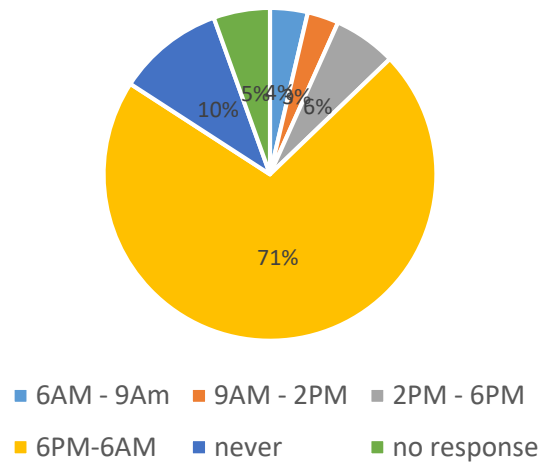
4. Primary vehicle configuration



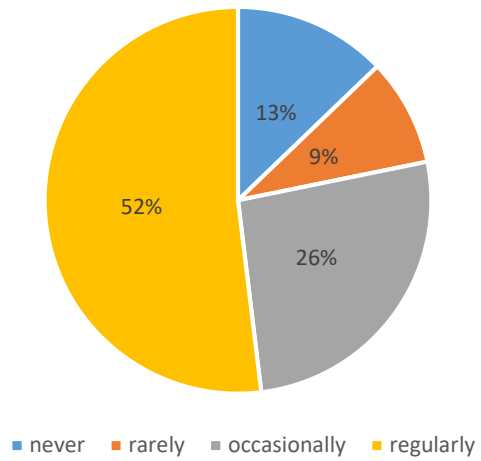
Survey Results (3)



10: What Time is it Hardest to Park Safely?



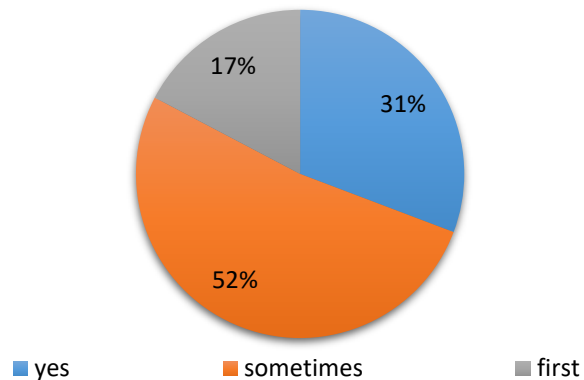
9: How Often is it Hard to Find Safe Parking?



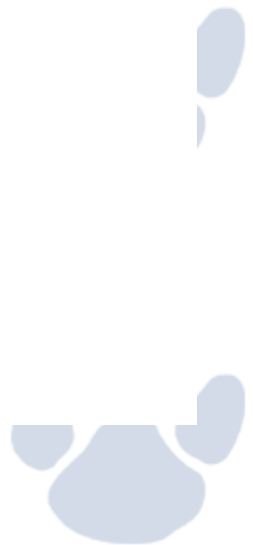
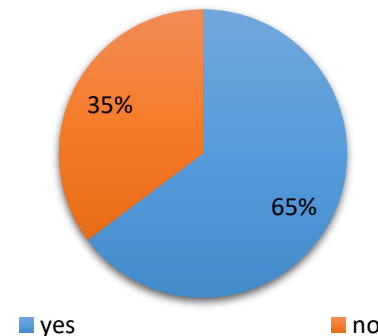
Survey Results (4)



11. Do you stop frequently here?



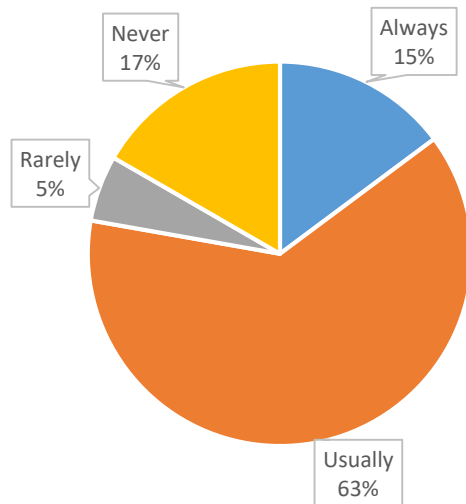
12. Did you know about SmartPark Technology Here



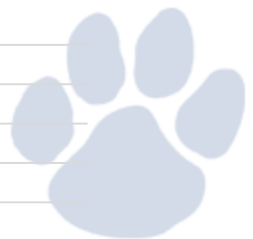
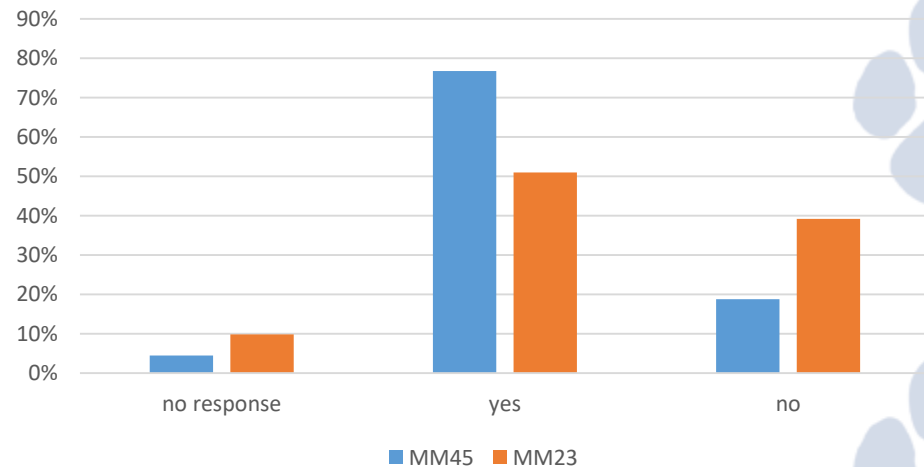
Survey Results (5)



19: How Often is the SmartPark App Accurate?

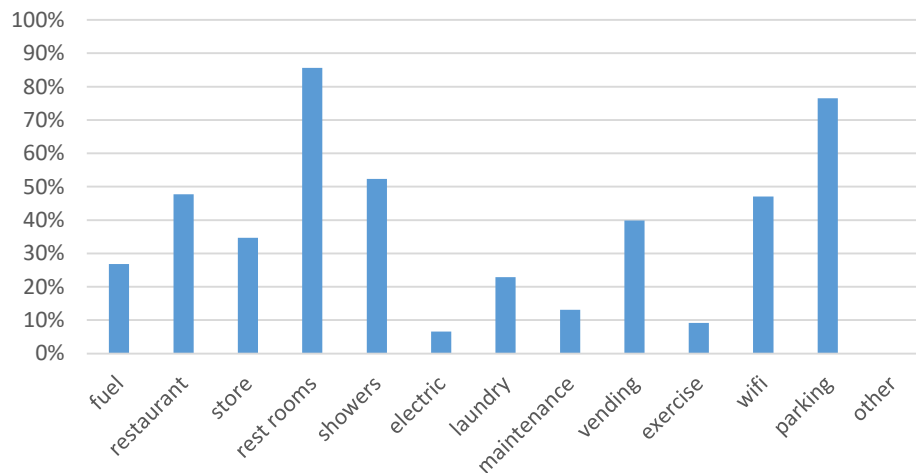


23: Do You Feel Safer Here?

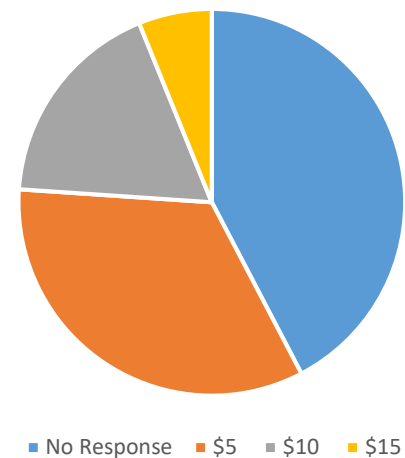


Survey Results (6)

Question 25: Desired Amenities



26a: Pay for Full Amenities?

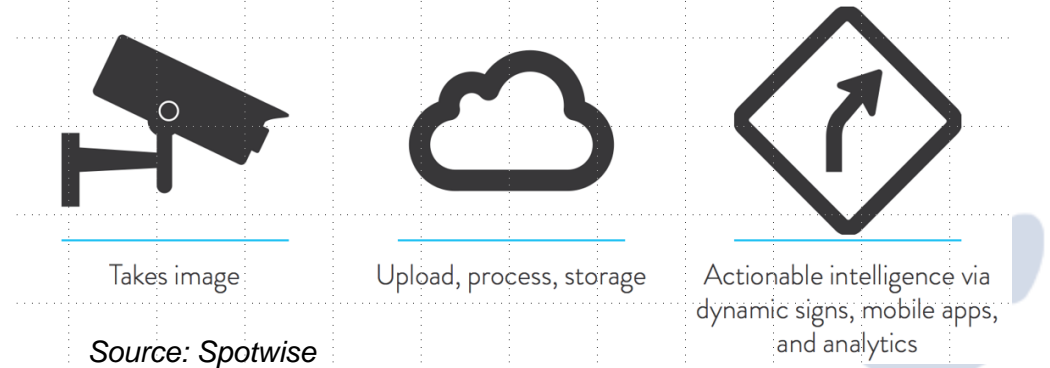


Other Technologies

- Evaluation of other detection technologies

- Image processing

- Spotwise



- Internet of Things (IoT)

- TSPS

- More....



Source: TSPS

Conclusion

- There is a need for real time truck parking information
- Number of technologies is growing
- Accuracy of detection is a critical component
- Life cycle cost is a factor for wider adoption

Acknowledgement



- This project is sponsored by Tennessee Department of Transportation
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Q&A

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