FMCSA's SmartPark – Phase 2

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Outline

- Background
- Scope
- Summary of Phase 1
- Phase 2
- Contact Information

Background

Introduction to FMCSA

- FMCSA's mission is . . .*to reduce the number of crashes, injuries, and fatalities involving large trucks and buses*
- FMCSA is 1 of 10 Operating Administrations within the U.S. Department of Transportation (DOT)
- FMCSA is 1 of 3 DOT agencies focused on improving highway safety
- FMCSA and FHWA are the 2 DOT agencies involved with truck parking

Scope

- FMCSA's SmartPark Research Program
  - Responds to National Transportation Safety Board's (NTSB) Recommendation H-00-19 to provide a guide for truckers for parking availability
  - Is a research and technology demonstration effort in conjunction with the State of Tennessee
  - Is not intended to compete with
    - Other ITS truck parking projects funded under SAFETEA-LU § 1305
    - Private sector efforts
- FMCSA's CVISN Grants
  - States may apply for an Expanded CVISN Grant to deploy any reasonable ITS technology for truck parking
    - States are not restricted to deploying the same technology as in FMCSA's SmartPark Research Program

Program Goals

- To demonstrate an Intelligent Transportation Systems (ITS) technology for
  - Determining truck parking space availability in real time and
  - Disseminating information on truck parking availability to truckers on the road in real time

Program Objectives

- Identify a *commercially-available* or *near-term* technology to accurately and reliably determine truck parking space availability in real time
- Demonstrate the concept of linking two truck parking areas so that if one is full, truckers can be diverted to an area that is unfilled
- Demonstrate technology to disseminate truck parking space availability to truckers on the road in real time
- Demonstrate a truck parking reservation system
- Develop a business plan for deploying the technologies
- Deploy SmartPark technologies

Program Phases

- FMCSA's SmartPark Program divided into two major phases
  - **Phase I** – Identify a technology for accurately and reliably counting truck parking space availability in real time
  - **Phase II** – Demonstrate real-time dissemination of truck parking space availability information based on the technology from Phase 1

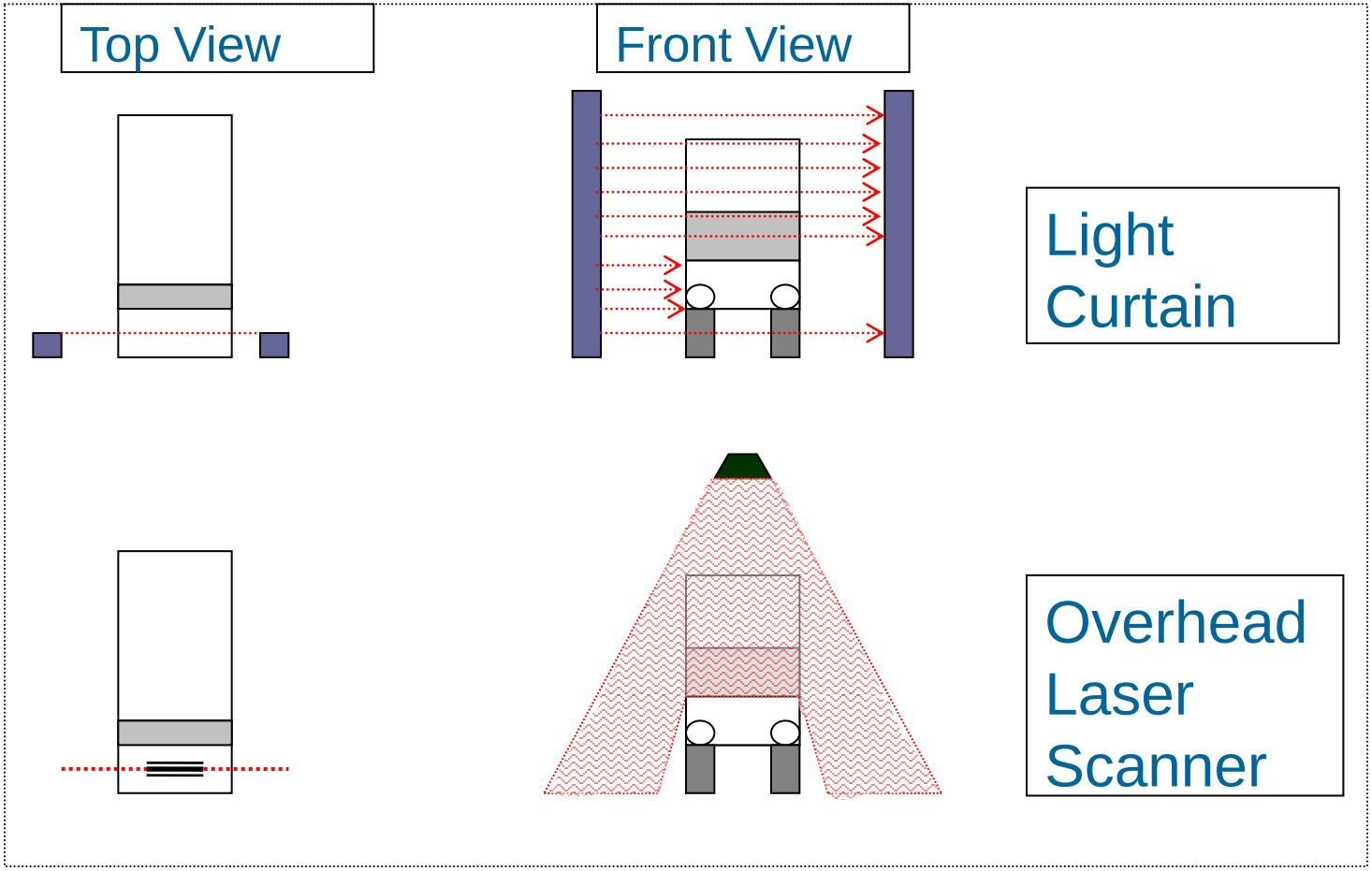
Summary of Phase 1

Conclusion of Phase 1

- In 2013, FMCSA
  - Successfully concluded Phase 1 with Doppler radar combined with *side laser scanner* identified as the technology for determining truck parking space availability for Phase 2
  - Doppler radar combined with *light curtain* failed
  - Published final report on SmartPark Phase 1
    (see references slide)
  - Exercised the option in the Gannett-Fleming contract to continue into SmartPark Phase 2 using Doppler radar combined with *side laser scanner*

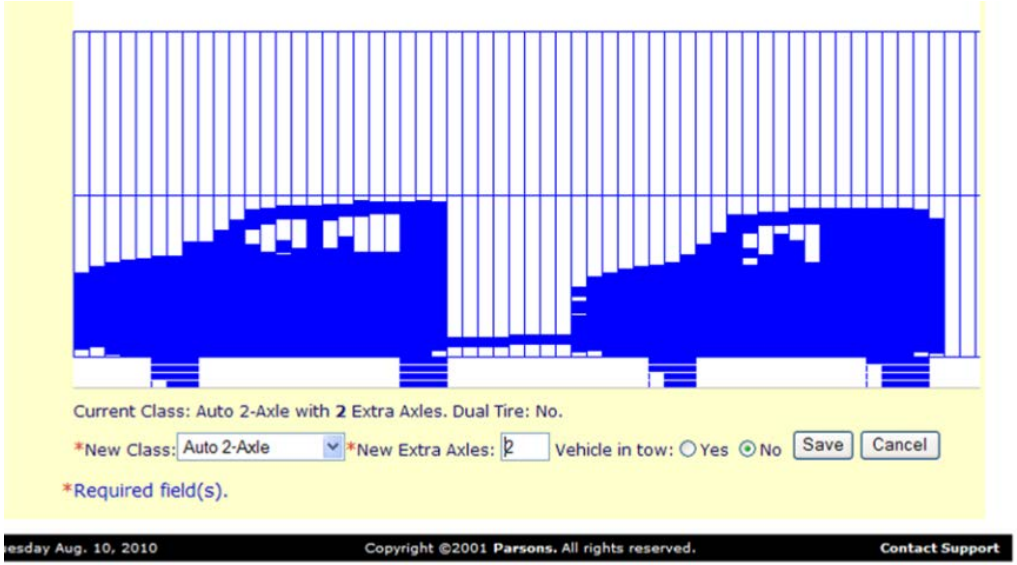
Doppler Radar Combined with Light Curtain or Laser

- Principle of Operation



Doppler Radar Combined with Laser

- Principle of Operation
  - Software analyzes the profile to distinguish between a combination vehicle or discrete vehicles following closely behind each other
  - Detecting a tow bar hitch, or other connection is critical



- Tested for FMCSA 2012-2013
  - Mile Marker 45 (public) on I-75 north near Athens, TN

Comparison of Technology Performance

Technology	Location	Sample Size (n)	Vehicle Detection Error Rate	Vehicle Classi-fication Error Rate	Pass/ Fail
Video Imaging	Charlton, MA	701	3.6%	6.1%	(>5%) Fail
Magnetometry	Wrentham & Attleboro, MA	3297	4.0%	13%	(>5%) Fail
Doppler Radar & Light Curtain (in) Overhead Scanner (out)	Athens, TN	8150	0.66%	12.96%	(>5%) Fail
Doppler Radar & Overhead Scanner (both in & out)	Athens, TN	29,094	0.15%	2.36%	<5% Pass
Doppler Radar & Side Scanner (both in & out)	Athens, TN	37,703	0.18%	3.74%	<5% Pass

Phase 2

Phase 2 – Major Tasks

- Link two truck parking areas in order to demonstrate the concept of whether truckers can be diverted from an area that is full to an area that is unfilled
- Demonstrate real-time dissemination of truck parking space availability information based on using
- Demonstrate a truck parking reservation system
- Forecast future truck parking availability from past use
- Develop a business plan for deploying SmartPark

Linking Two Truck Parking Areas

Test Site No. 1 at Mile Marker 45 on I-75 north near Athens, TN (site used for Phase I)

Test Site No. 2 at Mile Marker 23 on I-75 north near Cleveland, TN (site under re-construction by TDOT for Phase 2)

Real-Time Truck Parking Information

- Demonstrate real-time dissemination of truck parking space availability information using
  - Dynamic Message Signs
  - Interactive Voice Recognition
  - Smartphone app
  - SmartPark Research Project Web site

Dynamic Message Signs (DMS)

- DMS with Type “A” insets are installed
  - 5200’ upstream of and
  - 400' before the entrance to each truck parking area
- Type “A” insets display “Available” (> 4 spaces), “Limited” (2-4). “Full” (≤1)

Mock-up of DMSs with Type “A” Insets

Dynamic Message Signs (actual)

DMS 5200 ft. upstream of Mile Marker 23 Truck Parking Area on I-75 NB

DMS 400 ft. upstream of Mile Marker 45 Truck Parking Area on I-75 NB

Truck Parking Reservations

- First-come, first-served for rest areas at
  - Mile Marker 23 (five reserved spaces) limited to ≤ 11 hrs.
  - Mile Marker 45 (five reserved spaces) limited to ≤ 2 hrs.
- Booked, changed, or cancelled using
  - Interactive Voice Recognition
  - Smartphone app
  - SmartPark Research Project Web site

Same methods as for obtaining information on truck parking availability

Reserved Truck Parking Spaces

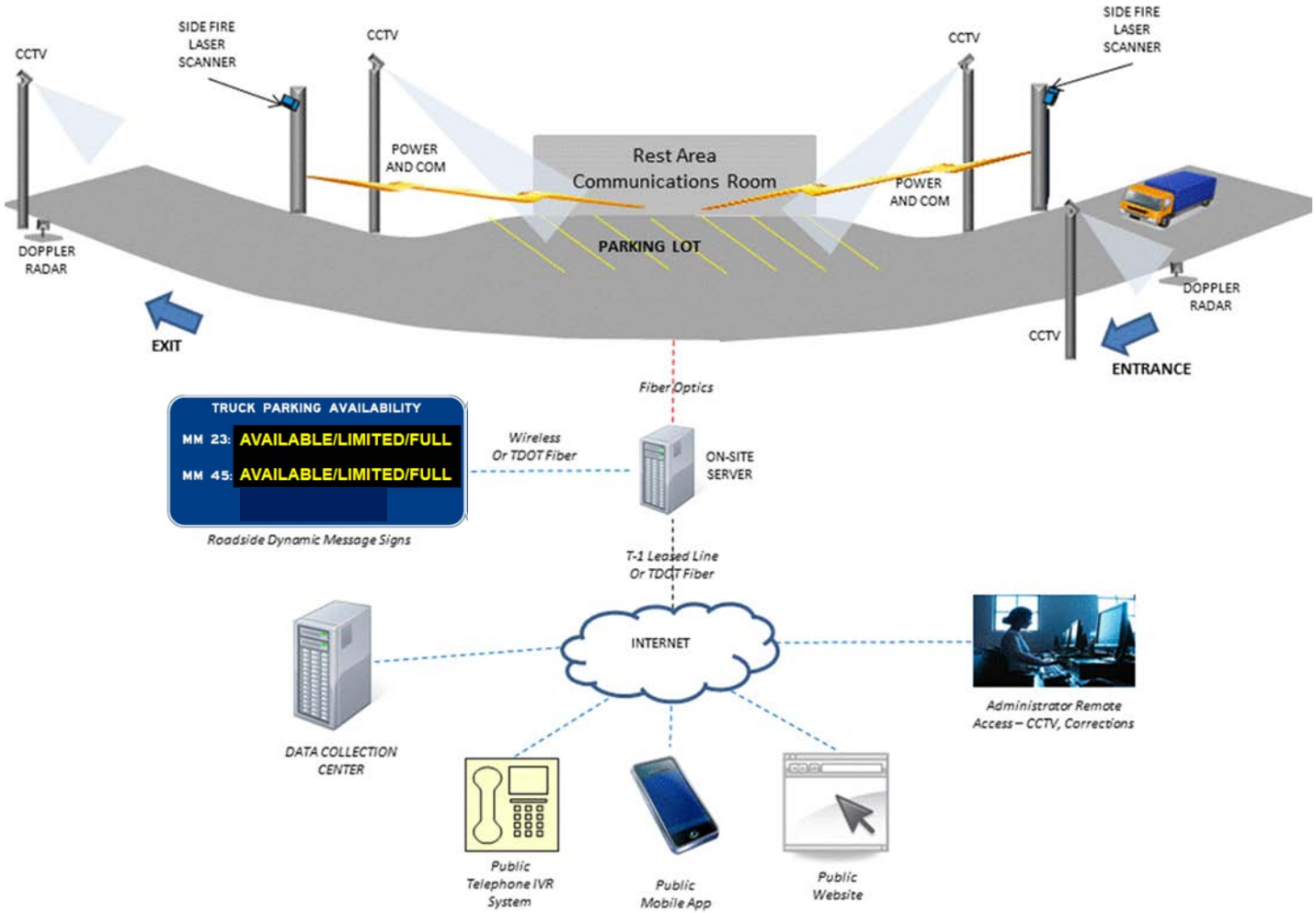
Reserved Spaces in Truck Parking Area at Mile Marker 23

A Reserved Truck Parking Space Sign at Mile Marker 45

Forecasting Future Truck Parking Availability

- Predicated on historical usage of truck parking: the longer the record of usage, the higher the accuracy of forecast
- Forecast is made for week of year, day of the week, time of day, and rest area (either Mile Marker 23 or 45)
- Forecast may be obtained by same methods for obtaining information on truck parking availability:
  - Interactive voice recognition
  - Smartphone app
  - SmartPark Research Project Web site

Summary of SmartPark Technology



Contact Information

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References

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