



# SmartPark Technology Demonstration Project

## BACKGROUND

The Federal Motor Carrier Safety Administration (FMCSA) has a Smart Roadside Initiative project called SmartPark to demonstrate a technology to provide parking availability information to truckers in real time on the road. Phase I of SmartPark was to demonstrate a technology capable of counting truck parking space occupancy and determining space availability in a truck stop rest area.

In 2000, the National Transportation Safety Board (NTSB) recommended that FMCSA create a guide to inform truck drivers about locations and availability of parking. In 2002, the Federal Highway Administration (FHWA) completed a congressionally-mandated study on the adequacy of truck parking facilities. The study urged the development of “Intelligent Transportation Systems deployments to provide commercial motor vehicle drivers with real-time information on the location and availability of parking spaces.”



Figure 1. Nighttime view of a truck parking lot collected from a camera used during the Phase I research.

## PHASE I

In 2005, FMCSA initiated its truck parking program—SmartPark—and issued a white paper

entitled “Intelligent Transportation Systems (ITS) and Truck Parking” (available at <http://www.fmcsa.dot.gov/facts-research/research-technology/report/intelligent-transportation-truckparking.htm>).

Between 2007 and 2009, FMCSA awarded two contracts for Phase I (i.e., conduct field operational tests of two separate technologies) for demonstrating the feasibility of determining truck parking space occupancy. These two technologies included video imaging (with trip-line algorithm) and magnetometry (with threshold algorithm). After these two technologies were determined to be unfeasible, FMCSA decided to repeat Phase I, but with a different technology. This technology is Doppler radar combined with laser scanning.

## Performance Requirements

In August 2011, FMCSA awarded a contract to repeat Phase I of the project using this combined Doppler radar-laser scanning technology. The field operational test on this technology was conducted at the Tennessee Department of Transportation’s truck parking rest area at mile marker 45 on I-75 northbound near Athens, TN.

Three performance requirements were specified for the success of this technology in Phase I:

- The technology shall achieve a parking count accuracy of 95 percent or better.
- The ingress and egress detectors shall agree on vehicle classification at least 95 percent of the time.
- The technology shall be available and functioning at least 95 percent of the time.

The field operational test for this technology commenced in the beginning of October 2012; data collection began in November 2012 and ended in April 2013.

### **Preliminary Test Results**

An independent verification of the field operational test was conducted and used the parking counts from videos onsite and from detection sensors deployed by the technology vendor for its own verification. The results were based on a sample size of 1,340, and it was verified that the technology achieved an accuracy of 99.9 percent (only 1 error out of 1,340), exceeding the performance requirement of 95 percent. The ingress and egress detectors agreed 99 percent of the time on vehicle classification, exceeding the performance requirement of 95 percent. There was no downtime during the data collection period.

Thus, the availability of the technology exceeded 99.5 percent during the period of analysis.

### **PHASE II**

Because preliminary results from Phase I were successful, FMCSA proceeded to Phase II in June of 2013. Phase II has seven tasks, of which the two main tasks are to: (a) demonstrate how truck parking availability information can be

disseminated; and (b) demonstrate how two adjacent truck parking areas can be networked to divert trucks from a filled parking area to an unfilled area. Task (c) is the conversion of temporary equipment to permanent installation so that the State agency can continue using the technology. Other tasks include:

- Task (d), which adds the capability for recording historical use for purposes of forecasting parking availability.
- Task (e), which serves to maximize use of the truck parking area by assigning single-unit trucks or bobtails to park one behind the other in one parking lane according to chronological order of departure.
- Task (f), which adds the capability for reserving a truck parking space.
- Task (g), which includes compilation of a business plan for sustaining the operation and maintenance of truck parking technology. Phase II is scheduled to be completed by November 2014.

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