Florida's Accelerated Innovation Deployment (AID) Demonstration Project - Commercial Vehicle Parking System

I. Project Abstract

The goal of this project is to provide reliable real-time information about commercial vehicle parking availability to dispatchers and commercial vehicle drivers to allow for educated decisions to be made about parking at rest areas and weigh stations. This project will be the initial deployment for a statewide commercial vehicle parking system. The project focuses on the operations of the highway transportation, with the goal of allowing commercial vehicle operators to be more efficient and curve hours-of-service (HOS) violations and also to eliminate illegal and unsafe practices, to include parking on the shoulder of the highway or on an off-ramp. The AID grant will allow Florida to begin developing the state's commercial vehicle parking system which will allow for future expansion of innovative technology and will result in improved highway safety and efficiency for commercial carriers. The request for funding will enable for Florida to plan and deploy the initial commercial vehicle parking system for the state.

II. Project Description

Construction of additional parking spaces is capital intensive and doesn't maximize the use of existing parking infrastructure. Nationally, approximately 80 – 85% of the truck parking capacity is privately owned. To capitalize on the existing parking capacity and maximize the transportation dollar, Florida has developed a project concept that involves the deployment of a truck parking availability system on limited access facilities throughout the state. This statewide option focuses on addressing the overcrowding of public parking facilities by including both public rest areas and weigh stations. In the future, this option can be expanded to include private parking facilities.

Michigan and Minnesota have both implemented the Truck Smart Parking Services (TSPS) which uses video detection and distributes the information through dynamic message signs (DMS), smartphone application, state web site or in-cab messaging currently, Michigan has equipment deployed at five public rest areas and ten private truck stops. Minnesota has equipment deployed at three public rest areas and one private truck stop.

In an effort to be proactive, the Florida Department of Transportation (Department) initiated a research project with Florida International University (FIU) to determine the supply and demand characteristics for commercial truck parking in Florida. The research assessed technology that could be used to improve parking management and deployed one test location for a smart parking system. After reviewing on-going research by the Federal Motor Carrier Safety Administration (FMCSA), the research team chose to utilize wireless ground sensors which combined magnetic induction and infrared sensing to accurately determine vehicle presence. A closed-circuit

television (CCTV) camera was also installed at each location so that manual verification could be done. This test deployment was on Interstate10 at the Leon County Rest Areas west of Tallahassee.

The Department also deployed a second test deployment in the Jacksonville area on Interstate 95 utilizing Wavetronix® SmartSensor HD classifiers to count commercial vehicles as they enter and exit the rest area to determine the number of available truck parking spaces. CCTV cameras were also installed to periodically manually verify available parking spaces. Also installed at this test location was a static sign with a mini dynamic message sign (DMS) inlay one mile prior to the rest area to notify commercial vehicles of the availability of commercial vehicle parking spaces.

The Department's proposed truck parking system will be utilized to identify truck parking availability at the Department's maintained rest areas and weigh station on limited access facilities. This will be accomplished by utilizing the two previously mentioned and tested technologies in Florida.

At the Department's limited access rest areas, technology utilizing wireless presence detection will be will be installed (three detectors per commercial vehicle parking space). These detectors, once a vehicle is detected, will then transmit vehicle presence to the data collector via a relay node. The information will be sent to the Department's Traffic Management Center (TMC) software, SunGuide®, for processing and posting to FL511 and to signage in advance of the facility.

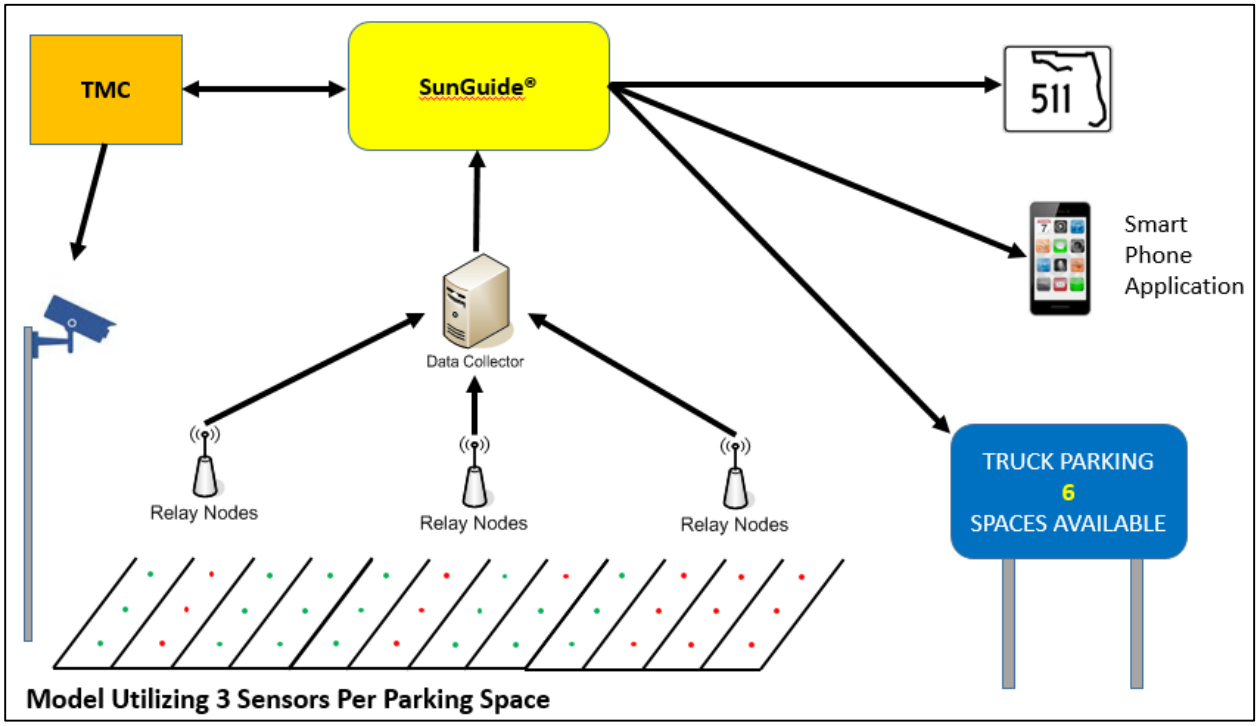

Figure 1 - Presence Detection System

At the Department's weigh stations vehicle classification equipment will be utilized to count vehicles entering and exiting the commercial vehicle parking area. This information will then be sent to a data collector which will then send the information to the Department's TMC software, SunGuide®, for processing and posting to FL511 and to signage in advance of the facility.

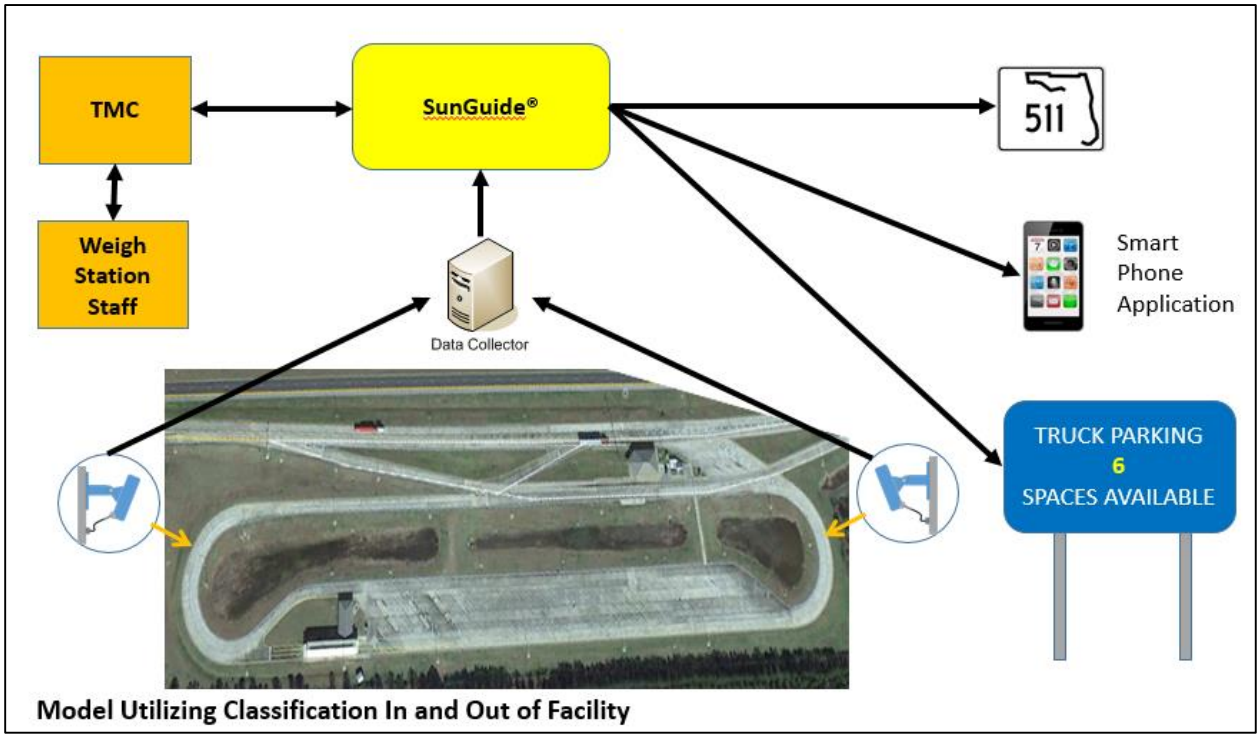

Figure 2 - Classification Detection System

Both systems will monitored and validated at preset intervals to insure all the information is correct and current. The Department's rest areas will utilize CCTV feeds for verification of parking occupancy and the Department's Weight Inspectors will verify information at the Departments weigh stations.

What will be innovative and different about this system is the Department is looking at this project to be the start of a statewide system. The initial phase of the system will cover the entire Interstate 95 and Interstate 4 limited access rest areas and weigh stations, not just a portion of a corridor. Second phase will make the data available to private industry for use with electronic on board equipment to allow the commercial industry the ability to use the information provided via existing systems within the vehicle. And finally, the data will be archived and utilized to provide carriers with a predictability model. For example if a vehicle is estimating traveling for another two hours on the interstate, the system will allow him to look for rest areas and weigh stations in advance and the system will provide the carrier with the probability of parking availability before arrival, so a decision can be made in advance to park at an alternate location if availability probability is low.

III. Innovation Performance

The Department will use the initial research that was performed in 2011 as a baseline for monitoring the benefits of the system. This initial research identified rest areas and weigh stations as low, medium and high issue areas. Also, it will be determined if additional interviews and data collection is needed to establish a solid baseline. The parking trend information will be monitored, via the SunGuide® System.

Also a comparison of data from the Crash Analysis Reporting System (CAR) and the Florida Integrated Report Exchange System (FIRES) will be utilized to compare commercial vehicle crashes related to fatigue pre and post deployment. Presently the CAR system has the following information regarding commercial vehicle crashes involving fatigue:

CAR System Data			
	Crashes	**Fatalities**	**Injuries**
2012	49	2	18
2013	92	1	51
2014	45	3	94
Total	***186***	***3***	***94***

The project will span a two year period, and will adhere to the following timeline for planning, procurement, deployment, and monitoring:

Project Phase	Duration
Planning/Scope Development	*3 months*
Procurement	*2 months*
Deployment/Software Development	*12 months*
Monitoring	*7 months*

IV. Applicant Information and Coordination with Other Entities

The Florida Department of Transportation, as the applicant for this AID Demonstration project, identifies the following official point of contact for the project:

Paul L. Clark, Statewide Commercial Vehicle Operations and Traffic Incident Management Programs Manager, 605 Suwannee St, MS 90, Tallahassee, FL 32399-0450

Phone: 850-410-5607

Email: paul.clark@dot.state.fl.us

V. Funding Request

The Department is requesting $1,000,000 in AID Demonstration funding to execute the project work outlined in the previous sections. These funds will allow Florida to begin development and deployment of the state's commercial vehicle parking system. This amount was determined by the research truck parking system deployments and initial estimates for software enhancements to process the data in the Department's SunGuide® software. Costing estimates are as follows:

Estimated Commercial Vehicle Parking System Cost:

Item	Qty	Cost	Subtotal
Software Development	1	$125,000	$125,000
Weigh Station Commercial Vehicle Parking System (per site)(I-95/I-4 Corridors)	8	$40,000	$320,000
Rest Area Commercial Vehicle Parking System (per site) (I-95/I-4 Corridors)	17	$55,000	$935,000
		Estimated Cost:	**$1,380,000**

Note: The above cost estimate is a general estimated cost and will vary depending on selected vendor and technology deployed. This estimated cost includes the installation of network such as data collectors, relay nodes, test and commission all on-site hardware.

VI. Eligibility and Selection Criteria

- The Department is an eligible entity for funding through this application.
- As of the date of submission, the Department has not received any AID funding.
- The project detailed herein is eligible under Title 23 USC in that it "carries out research, development, and technology transfer activities" by making grants available to a State agency, namely the Department.
- The project detailed herein is ready to initiate within six (6) months of application submission date for AID Demonstration funding.
- The innovation does align with the TIDP goals.
- The innovation has been proven in real-world application under the Memphis Cross-Town Improvement Project and has benefits documented with the FHWA (see Section II above).
- The innovation detailed herein is not currently used by the Department.
- The innovation is a significant improvement from Department's conventional practice.
- The FDOT is fully willing to: (A) Participate in monitoring and assessment activities regarding the effectiveness of the innovation(s) and subsequent technology transfer and information dissemination activities associated with the project; (B) accept FHWA oversight of the project; and (C) conduct a before and after customer satisfaction determination for construction projects

Additional Attachments ☐ No ☐ Yes (PDF files identified by Applicant and Project Title)