AASHTO Innovation Initiative

[Proposed] Nomination of Innovation Ready for Implementation

Sponsor

Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation. If selected, the sponsoring DOT will be asked to promote the innovation to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative.

1. Sponsoring DOT (State): Florida

2. Name and Title: Marie Tucker, Commercial Vehicle Operations Manager

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Innovation Description (10 points)

The term "innovation" may include processes, products, techniques, procedures, and practices.

3. Name of the innovation:

Truck Parking Availability System (TPAS)

4. Please describe the innovation.

TPAS provides real-time information on the availability of commercial vehicle (truck) parking at all public locations (rest areas, welcome centers, weigh stations) along Florida's Interstate Highway System. The

innovation leverages technology to actively monitor truck parking spots and display the availability information to commercial vehicle operators through roadside dynamic message signs as well as through the Florida 511 on-line website and mobile application, as well as through third party data feeds.

5. What is the existing baseline practice that the innovation intends to replace/improve?

Prior to the deployment, there was no information on truck parking availability provided to commercial vehicle operators. Drivers had to exit the interstate to verify if parking was available. A 2013 survey found that eighty-three percent (83%) of commercial vehicle drivers took longer than 30 minutes to find parking. Due to this, lost productivity and impacts to mobility and safety occurred due to trucks entering and exiting the highway network.

6. What problems associated with the baseline practice does the innovation propose to solve?

The innovation solves the problem of lack of available information on truck parking availability, resulting in reduced productivity leading to economic, safety, environmental and mobility impacts.

7. Briefly describe the history of its development.

A research project began in 2011 to understand the issue of truck parking shortage. The study determined that a technology solution could be used to improve parking management. As part of the research, a test project was deployed to review rest area parking data and to test the technology and determine the feasibility of providing real-time parking availability information. The project tested in-pavement wireless detection sensors (WDS) at the I-10 rest area in Leon County, west of Tallahassee, and utilized closed circuit television (CCTV) cameras for verification of the availability data. A second test project deployment in a rest area in St. Johns County on I-95 south of Jacksonville tested the use of microwave vehicle detection sensors (MVDS) to count the vehicles as they entered and exited the rest area. An embedded dynamic message sign (DMS) approximately one mile ahead of the rest area notified commercial vehicle operators of the availability of parking spaces. In 2016 the FDOT tested the performance of available technology through a research project with the University of Florida (UF) at two rest areas in Columbia County to further define the parameters of the new WDS deployment. The study resulted in the establishment of a Developmental Specification outlining the requirements of the WDS. In 2017, the full deployment of the TPAS system was contracted as a series of design-build projects. The initial phase of TPAS deployment, at 68 facilities statewide, is scheduled for completion by the end of calendar year 2020. An additional four sites are being deployed in conjunction with planned or on-going facilities improvements, with two additional sites planned for future deployment.

8. What resources—such as technical specifications, training materials, and user guides—have you developed to assist with the deployment effort? If appropriate, please attach or provide weblinks to reports, videos, photographs, diagrams, or other images illustrating the appearance or functionality of the innovation (if electronic, please provide a separate file). Please list your attachments or weblinks here.

System engineering documents, including Concept of Operations, Requirements Traceability Verification Matrix, Project System Engineering Management Plan and ConOps Companion Software Architecture and System Requirements were developed. Vehicle Detection System specifications were developed. Regional Transportation Management Center (RTMC) standard operating procedures were developed. Documents can be found at: http://www.floridatruckinginfo.com/Docspubs.htm

Attach photographs, diagrams, or other images here. If images are of larger resolution size, please provide as separate files.

State of Development (40 points)

Innovations must be successfully deployed in at least one State DOT. The AII selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

9. How ready is this innovation for implementation in an operational environment? Please select from the following options. Please describe.

☐ Prototype is fully functional and yet to be piloted

☐ Prototype has been piloted successfully in an operational environment

☒ Technology has been deployed multiple times in an operational environment

☒ Technology is ready for full-scale implementation

The project has been deployed statewide. The final projects are estimated to complete by the end of calendar year 2020. Similar deployments have occurred in Michigan, and are being deployed in Arizona, California, Indiana, Iowa, Kansas, Kentucky, Minnesota, New Mexico, Ohio, Texas and Wisconsin

10. What additional development is necessary to enable implementation of the innovation for routine use?

Systems engineering documents for other locations. Environmental documentation.

11. Are other organizations using, currently developing, or have they shown interest in this innovation or of similar technology?? ☒ Yes ☐ No

If so, please list organization names and contacts. Please identify the source of this information.

Organization	Name	Phone	Email
Kansas Department of Transportation	Cory Davis	785-296-7984	Cory.Davis@ks.gov
Texas Department of Transportation	Caroline Mays	512-936-0904	Caroline.mays@txdot.gov
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.

Potential Payoff (30 points)

Payoff is defined as the combination of broad applicability and significant benefit or advantage over baseline practice.

12. How does the innovation meet customer or stakeholder needs in your State DOT or other organizations that have used it?

The need for truck parking is a nationally recognized problem that is addressed in the National Freight Strategic Plan. In response to the requirements of MAP-21 Section 1401 (Jason's Law), this innovation will provide information through the Truck Parking Availability System (TPAS) to commercial vehicle drivers on parking availability. Expanding this effort nationally will lead to increased interstate efficiency in goods movements, environmental benefits, enhancing mobility, increasing safety and supporting economic prosperity.

13. Identify the top three benefit types your DOT has realized from using this innovation. Describe the type and scale of benefits of using this innovation over baseline practice. Provide additional information, if available, using quantitative metrics, to describe the benefits.

Benefit Types	Please describe:
Improved Safety	By providing information on available parking at a safe parking location, trucks are less likely to park on ramps or the roadside when they cannot find parking.
Improved Safety and environmental impact	By providing information on available parking, trucks do not have to exit and enter the interstate system to look for parking, reducing conflict points and environmental benefit by reduced fuel use.
Improved Customer Service	Drivers can maximize their travel time and reduce the time spent looking for parking, which enhances economic prosperity, improves production of commercial vehicle drivers' hours of operation and environmental benefit by reduced fuel use.

Provide any additional description, if necessary:

Click or tap here to enter text.

14 How broadly might this innovation be deployed for other applications. in the transportation industry (including other disciplines of a DOT, other transportation modes, and private industry)?

This innovation can be deployed to other applications such as: 1) intermodal connectivity – TPAS can be used as staging for pickup and delivery connections at ports, intermodal logistics centers and other freight transfer locations; 2) Traveler Information Systems – TPAS information is being disseminated through FL511 and a third party data feed is available for ingestion by other information providers; 3) Freight Signal Priority – in conjunction with item 1, TPAS can be used for an integrated freight operations network, allowing for arterial routing and signal connectivity to improve mobility and reduce congestion; 4) Planning – incorporation of additional parameters, such as truck size and weight, increased travel demand modeling and other traffic analysis can occur; 5) Traffic – by incorporating TPAS data with other traffic data obtained through roadside devices such as weigh in motion and vehicle classification, robust data sets can be developed to support analytics; 6) Emergency Response – leveraging TPAS, evacuations and response efforts can be streamlined by managing available locations.

Market Readiness (20 points)

The AII selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

15. What specific actions would another organization need to take along each of the following dimensions to adopt this innovation?

Check boxes that apply	Dimensions	Please describe:
☒	Gaining executive leadership support	Develop business case, including benefits analysis and funding scenarios to support investment.
☒	Communicating benefits	Develop outreach program for internal agency, partner agencies and industry.
☐	Overcoming funding constraints	Click or tap here to enter text.
☒	Acquiring in-house capabilities	Develop standard operating procedures, maintenance procedures.
☐	Addressing legal issues (if applicable) (e.g., liability and intellectual property)	Click or tap here to enter text.
☒	Resolving conflicts with existing national/state regulations and standards	Integrate standard signage and communication protocols, review and/or update ITS architecture.
☐	Other challenges	Click or tap here to enter text.

16. Please provide details of cost, effort, and length of time expended to deploy the innovation in your organization.

Cost: $18,000,000 for full statewide deployment (71 sites). This equates to approximately $250,000 per site, depending on the number of parking stalls, configuration, availability of communication infrastructure, etc.

Level of Effort: Medium: while the project is similar to a traditional ITS deployment, the system is composed of new technology. Designers/consultants have not worked with the layout of the various components, such as the meshing of the network to define the parking spaces (using embedded sensor

technology) that requires input from the vendors/manufacturers. The lack of specifications within each agency will require effort to define the product. There is also limited experience with the integration of the system within the existing ITS system. This will require additional coordination between the transportation management center (TMC), network management system, the operators and the detection system vendor. Finally, the contractor and construction inspection industry have limited experience with the system, which increases the level of effort. Finally, there is also additional outreach, beyond a traditional ITS project, required to engage the freight industry.

Time: The deployment process took approximately five years from initial concept development, parking technology research and pilot project, procurement to construction, integration and final testing. With the system functional, and technology solutions in place through the other activities listed above, the timeline for future deployments could be reduced to approximately two to three years, including concept development, environmental documentation and construction and integration, depending on the delivery method.

17. To what extent might implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.

This innovation will likely require: contract support for the construction of the infrastructure (ITS devices, communication, power, signs, poles, foundations) and consultants for the design, integration, testing and operations of the Regional Transportation Management Center. Vendor support is required for system integration, testing and interoperability.