



Research Problem Statement

ODOT Research Section
555 13th Street NE; Ste 2
Salem OR 97301-5192

Phone (503) 986-2700
Fax (503) 986-2844

I. TITLE

17-015 Performance measures and policy evaluation framework to analyze Oregon's readiness for connected vehicle technologies: A freight industry perspective

II. PROBLEM

Much of the attention focused on connected vehicle technologies has been centered on and around the passenger vehicle market. However, there is a good argument to be made that these connected vehicle technologies will first affect industry and commerce—and that means the freight transportation industry. There were approximately 800,000 heavy or tractor-trailer truckers on U.S. highways at the end of 2012. Heavy trucks are a vital part of the U.S. economy and they carry close to 70% of our nation's freight and are the backbone of a \$642B transportation business. The trucking industry is essential to U.S. Economic health.

From a trucking industry perspective, connected vehicles would provide real time road information about congestion, traffic accidents, or weather conditions through messages. This would allow truckers to re-route their connected vehicles to avoid congestion and thus save fuel and time. The technology would also increase the real time accuracy for estimating arrival times of heavy trucks that would provide truckers with additional information on route planning (this would include truck parking decisions). As an industry facing current driver shortages any opportunity to operate more safely and efficiently is always welcomed. Companies such as UPS, FedEx, Wal-Mart and Amazon, who move high volumes of freight, would likely be some of the first to adopt and shift to the new technologies.

As the technology continues to rapidly evolve, what is not clearly understood is what role states play in the facilitation and implementation of the technology from a policy and law viewpoint—for example, what legislation, if any, would be needed to help advance funding for connected vehicle infrastructure and operation in the state? And which investments will allow the state to more effectively and efficiently utilize the existing transportation infrastructure to facilitate the technology and movement of freight transportation? For example, freight connected vehicles will have sensors to detect or warn pedestrians and/or cyclists and avoid common right turn crashes. Connected vehicles will be able to reduce fuel consumption and emissions in signalized arterials by reducing the number of stops and the deceleration/acceleration cycles. The prioritization of infrastructure deployment will depend on the performance measures (e.g. mobility, safety or emissions) that are being pursued. In addition, would current legislation and policy promote public-private partnerships in financing new transportation projects related to connected technologies.

With this in mind, the goal of this research is to evaluate the readiness of the State of Oregon to quickly adapt to the evolving connected technologies that are going to impact operations and funding. The proposed research is highly relevant to two existing active studies SPR 783 "Truck Parking: An Emerging Safety Hazard to Highway Users" and "Potential for Freight Mode Shifting in Oregon." The research supports the RAC priority of "efficient transportation system that supports economic opportunity and livable communities for Oregonians"

III. PROPOSED RESEARCH, DEVELOPMENT, OR TECHNICAL TRANSFER ACTIVITY

The proposed research activity will involve:

1. Conducting a detailed literature review of what other states are doing to prepare for the early adopters (freight industry) of connected vehicles technologies and what Oregon is doing to prepare (consist of reviewing current legislative policies and law)
2. Develop performance measures that ODOT can utilize to evaluate and prioritize connected vehicle investments.
3. Conducting a freight industry survey to understand adoption of connected technologies and their perceptions of what the states roles are in facilitating connected technologies.

4. Conducting an ODOT survey to compile and understand how different ODOT units may evaluate or perceived the benefits/costs associated to connected vehicle developments.
5. Identifying and analyzing the specific issues and challenges Oregon will face from the early adopters of the connected technologies. This would consist of investigating data (existing and needs), funding constraints, infrastructure design implications (for both current and future), mobility and safety, and workforce and innovation.
6. Quantification of potential benefits of freight connected vehicles regarding mobility, safety, fuel consumption, and emissions. Although there are still many uncertainties regarding the deployment of connected vehicles it is possible to construct scenarios to estimate potential savings given current technological forecasts.

IV. POTENTIAL BENEFITS

The project will significantly enhance and promote the opportunity to cultivate more effective communications between planning agencies and the private sector (including shippers, carriers, and supporting services). ODOT will have a basic framework to start evaluating freight related connected vehicle proposals or idea. In addition, this project will provide ODOT with a set of recommendations and guidelines on Oregon’s readiness for early adopters of connected technologies. Moreover, the proposed research helps address freight issue 6 and freight issue 10 in the Oregon Freight Plan (ODOT, 2011).

V. IMPLEMENTATION

The results of this research will be implemented by ODOT’s Freight Planning Unit and TPAU and the ITS unit under the Maintenance and Operations branch of ODOT.

VI. LIST OF REFERENCES (optional)

- Cambridge Systematics (2014). State DOT CEO Leadership Forum: A Focus on Transportation Futures. Retrieved from: [http://stsmo.transportation.org/Documents/FR1_NCHRP%202024\(100\)_CEOs%20at%20ITS%20WC_FINAL.pdf](http://stsmo.transportation.org/Documents/FR1_NCHRP%202024(100)_CEOs%20at%20ITS%20WC_FINAL.pdf)
- King, J., (2014). How Transportation Technologies will change everything. Government Technology: URL: <http://www.govtech.com/transportation/How-Transportation-Technologies-Will-Change-Everything-.html>

VII. CONTACT INFORMATION

Your name: Sal Hernandez, M. Figliozzi, Avi Unnikrishnan
 David Porter
 Affiliation: Oregon State Univ, Portland State University
 Telephone: 5417371757, 5037252872
 Email: sal.hernandez@oregonstate.edu,
david.porter@oregonstate.edu
uavinash @pdx.edu
mafiglio@pdx.edu

Person Responsible for Implementation: _____
 Affiliation: _____
 Telephone: _____
 Email: _____