



Photo Source: USDOT

SMART ROADSIDE



INTRODUCTION

Smart Roadside is a system envisioned to be deployed at strategic points along commercial vehicle routes to improve the safety, mobility, and efficiency of truck movement and operations on the roadway. Private- and public-sector motor carrier systems will continue to operate as intended and the information collected can be shared where authorized to serve multiple stakeholders and uses. The objective is to apply advanced technologies to create more efficient and streamlined processes and to share data in real time or near-real time to maximize its utility.

THE TRANSPORTATION PROBLEM

Increasing truck travel demand has resulted in too many legally loaded commercial motor vehicles queued up at inspection stations causing unnecessary delays in the U.S. supply chain. Levels of enforcement are not keeping pace with this increase in trucks traveling—resources are being strained to deliver effective enforcement programs to ensure all users of the highway are safe. The Smart Roadside program will allow screening of trucks and drivers using wireless communication between the vehicle and the infrastructure while they travel at highway speeds.

RESEARCH OVERVIEW

The Smart Roadside program is a joint modal initiative between the Federal Highway Administration (FHWA) and Federal Motor Carrier Safety Administration (FMCSA). It is a component of the vehicle-to-infrastructure element of the U.S. Department of Transportation (DOT) connected vehicle research initiative and encompasses technology and information-sharing research efforts with commercial vehicle roadside elements that are crucial to the missions of the DOT. The research goals of the Smart Roadside program are to foster the development of a prototype application that will:

- Enhance roadside enforcement operations through improved screening and automation of inspection/compliance checks
- Provide enhanced road condition and traffic information to support commercial vehicle route planning and improved access to intermodal ports, urban pick-up, and delivery locations
- Identify key components (e.g., motor carrier, commercial vehicle, commercial driver, cargo) and communicate with commercial vehicles in real time at highway speeds



Photo Source: USDOT

Capabilities

Desired capabilities of the Smart Roadside program:

- Collect and share real-time traffic, weather, special event, and truck parking information with drivers
- Collect and share vehicle sensor data from the roadside with private-sector maintenance systems
- Establish unique vehicle identifiers, which can be used for “at highway-speed” compliance verifications by enforcement agencies
- Share routing clearance information with drivers
- Make vehicle size and weight measurements available to enforcement personnel at the roadside
- Share origin/destination information to determine routing information
- Construction and time restriction information shared with drivers
- Share real-time driver/carrier/truck information with enforcement agencies for inspection decisions
- Share roadside inspection results (violation and non-violation) with federal enforcement agencies
- Share emissions data with carriers and agencies to calculate carbon footprint.



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- Ensure that the necessary standards, protocols, and architecture are developed to support both interoperable operations across the country and appropriate data privacy requirements. The vision for the Smart Roadside program is one in which commercial vehicles, motor carriers, enforcement resources, highway facilities, intermodal facilities, toll facilities, and other modes on the transportation system collect data for their own purposes and share the data seamlessly with relevant parties to improve motor carrier safety, security, operational efficiency, and freight mobility. This vision will be achieved through the application of interoperable technologies and information sharing between in-vehicle, on-the-road, and freight facility systems.

KEY ACTIVITIES

In support of the Smart Roadside initiative, FMCSA and FHWA will:

- Fund selected tests, demonstrations, and deployments
- Coordinate with state and industry representatives to identify promising applications of Smart Roadside infrastructure;
- Coordinate the development of the necessary architecture and standards
- Develop appropriate guiding principles
- Document the business case for Smart Roadside
- Develop and implement a deployment strategy
- Maintain a Smart Roadside roadmap and projects database to facilitate coordination among FMCSA, FHWA, and other related programs and projects
- Facilitate stakeholder collaboration
- Seek collaboration with the Department of Homeland Security (DHS) and the Environmental Protection Agency (EPA).

Whenever possible, the Smart Roadside program will leverage stakeholders' current technology investments to augment existing programs and support new activities.

FOCUS AREAS

The primary focus areas of Smart Roadside safety research are in various stages of operation and deployment:

- **Electronic Screening (E-Screening):** This is a key component of the information collection systems and communications networks that support commercial vehicle operation, referred to as the Commercial Vehicle Information Systems and Networks (CVISN). E-Screening involves automatic identification and safety assessment of a commercial vehicle in motion. With E-Screening, safe and legal vehicles are allowed to continue on their route. Enforcement resources can be used to target unsafe vehicles and carriers. Currently, E-Screening occurs at fixed stations and on-demand verification sites.

- **Virtual Weigh Stations/Electronic Permitting:** This was the focus of an enforcement technologies study conducted in 2008 and 2009. The focus of the study was to develop the foundation for roadside technologies that can be used to improve truck size and weight enforcement. Outcomes of this study included the development of a concept of operations for virtual weigh stations, which led to the development of the recently completed Virtual Weigh Station/Electronic Permitting Architecture. The virtual weigh station concept will further increase the number of electronic screenings and may provide a more enhanced safety and credentials assessment, depending on the configuration.
- **Wireless Roadside Inspection Program:** Research is being done to increase the number and frequency of roadside safety inspections and to obtain data about the commercial vehicle and its driver. The program is examining technologies that can transmit safety data directly from the vehicle to the roadside and from a carrier system to a government system. The safety data being considered for transmission include basic identification data (for the driver, vehicle, and carrier); the driver's hours of service record; and sensor data that provides information on weight, tire status, and brake status. Enforcement systems and staff will use this data set to support E-Screening and inspections at various locations including staffed roadside sites, virtual weigh stations, and on-demand verification sites.
- **Truck Parking:** Research and ITS-based project deployments will provide commercial vehicle parking information so that commercial drivers can make advanced route planning decisions based on hour-of-service constraints, parking location and availability, travel conditions, and loading/unloading considerations. In addition, environment and smart freight mobility applications are being investigated for inclusion in the initial Smart Roadside research.

OUTCOME

The current commercial vehicle environment consists of numerous federal, state, regional, and private-sector programs that use a combination of manual, semiautomatic, and advanced technologies to support safety, mobility, and security. The effectiveness of these programs will be greatly improved by the Smart Roadside concept as relevant and appropriate data is shared among the current systems and integrated in a collaborative fashion.

The outcome of the Smart Roadside research program will be clear evidence, which can be disseminated to stakeholders, of how technology and information sharing help to improve commercial vehicle operations on the road. When Smart Roadside is realized, commercial vehicles will be screened electronically, with roadside equipment and on-board sensors providing most of the information that manual inspections currently capture.

For more information about this initiative, please contact:

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