



Commercial Motor Vehicle Roadside Technology Corridor (CMVRTC)

Center for Transportation Analysis (CTA) Research Areas

Aviation Safety
Air Traffic Management Analysis
Data, Statistical Analysis
Geo-Spatial Information Tools
Defense Transportation
Energy Policy Analysis
Environmental Policy Analysis
Highway Safety
Intelligent Transportation Systems
Logistics Management
Supply Chain Management
Modeling and Simulation
Transportation Operations
Planning and Systems Analysis
Transportation Security

Center for Transportation Analysis
Oak Ridge National Laboratory
2360 Cherahala Boulevard
Knoxville, TN 37932
865.946.1349
(Fax) 865.946.1314

Website: cta.ornl.gov

Oak Ridge National Laboratory is managed by UT-Battelle, LLC, for the U.S. Department of Energy under Contract number DE-AC05-00OR22725



The primary mission of the Federal Motor Carrier Safety Administration (FMCSA) is to reduce crashes, injuries, and fatalities involving large trucks and buses. To improve commercial vehicle safety, the FMCSA's research and technology activities have been focused on promoting and facilitating the uses of information systems and advanced technologies. Unfortunately, the tight profit margins of the commercial vehicle industry often hinder their adoption of new and promising technologies. When the benefits of these technologies are fully demonstrated through open and independent testing, the industry will be in a better position to make investment decisions regarding these technologies.

FMCSA's Office of Research and Technology (R&T) is pursuing a strategic initiative to accelerate FMCSA's mission and R&T's goal of expediting the deployment of safety technologies by developing and using a Commercial Motor Vehicle Roadside Technology Corridor (CMVRTC) to test and evaluate new safety technologies and procedures. Because of the large number of trucks that utilize the 70-mile East Tennessee I-40/I-75 corridor and its close proximity to the Oak Ridge National Laboratory (ORNL), the National Transportation Research Center (NTRC), and the University of Tennessee, this corridor was chosen as FMCSA's CMVRTC.

On August 7, 2007, FMCSA debuted the CMVRTC at the Greene County Inspection Station on the South-bound lane of I-81, at mile marker 21. This debut involved an overview of existing technologies related to inspections, and more advanced technologies. These technologies included existing technologies such as:

Query Central – A secure intranet web application developed and maintained by FMCSA that provides Federal and State Safety Enforcement personnel with a single location

where they can enter one query and obtain targeted safety data on CMV carriers, vehicles, and drivers from multiple sources.

Aspen – A software application developed and maintained by the FMCSA used by roadside inspectors to document the results of a roadside inspection. Results are summarized in a report which is provided to CMV drivers as well as to the State and FMCSA.

Inspection Selection System (ISS) – A software program developed and maintained by FMCSA to help identify which vehicles and drivers to inspect based on prior carrier safety history.

Performance Registration Information Systems Management Program (PRISM) – Pilot program mandated by Congress to improve motor carrier safety. The International Registration Plan (IRP) commercial vehicle registration process of the states serves as the framework for the PRISM program by establishing accountability that no vehicle is plated without first identifying the motor carrier responsible for the safety of the vehicle during the registration year.

Driver Information Resource (DIR) – A data resource of comprehensive historical driver inspection and crash safety data. DIR was developed and maintained by FMCSA. Investigative inquiries can be made which include the most recent trucking company employer, and information can be assembled regardless of name variations and misspellings. DIR contains data on 3.6 million drives and 10.5 million MCMIS crash and inspection records.

Commercial Vehicle Information Systems and Networks (CVISN) Electronic Screening Program via the PrePass™ System – An Intelligent transportation system for participating trucks in which a transponder (affixed to the windshield) transmits a message identifying the company operating the truck as well as vehicle weight to a roadside reader hanging over the lane. If the company has a good record in terms of safety performance, registration status, fuel tax payments, and other credentials, then a green light located on the transponder flashes a green light telling the driver to proceed past the scales without stopping. This system is estimated to have saved 120 million gallons of fuel and \$1.2 billion in operating costs for participating carriers.

Some of the more advanced technologies that were demonstrated, and some of which will be further tested and evaluated in CY-2008 and beyond are:

Wireless Roadside Inspection (WRI) Program for Trucks and Motorcoaches – FMCSA’s WRI program involves the capability of assessing truck and bus drivers and vehicles 50 times more often than is possible using today’s approaches. A WRI is a process where public sector entities (people and systems) examine the condition of the vehicle and driver by assessing data collected by on-board systems. The data used in the assessment is termed the “Safety Data Message Set” (SDMS). The SDMS is delivered using wireless communications in real-time from the CMV to a network of fixed and mobile roadside readers. The WRI can be used in conjunction with a mobile enforcement vehicle and assists an officer in determining which vehicle should be pulled over for closer inspection.

Smart Infrared Inspection System – The Smart Infrared Inspection System (SIRIS) is a prototype system that can scan both sides of every vehicle that passes the infrared cameras located on both sides of the in-station travel lane. The SIRIS’s analysis is based on actual temperature detected, rather than an artificially scaled image. The SIRIS has the potential to identify brake problems, as suggested by either cold or overly hot brakes relative to others on same

vehicle; wheel bearing issues where the loss of lubrication causes friction, generating excessive heat that indicates imminent failure; and tire issues since under-inflated tires are hotter than properly inflated ones.

Commercial Vehicle Inspection System (ComVIS) – ComVIS puts the power of Aspen, ISS, and key elements of Query Central directly into the hands of the inspector through the use of a rugged personal data assistant (PDA) designed to meet DoD standards for shock, environmental conditions, and vibration. It eliminates the use of handwritten notes which can slow down the inspection process and introduce transcription errors.

Performance-Based Brake Tester (PBBT) – A valuable in-ground roller dynamometer that can quickly determine whether or not a vehicle produces sufficient braking force and detect inadequacies that a visual inspection cannot. The PBBT test can be done in as little as ten minutes as compared to 45 minutes in traditional Class-1 inspections.

FMCSA’s CMVRTC is a permanently designated research corridor that is being utilized to test and evaluate new and emerging technologies to enhance inspection efficiencies, improve heavy truck safety, and truck-based vehicle-infrastructure integration (VII).

Commercial Motor Vehicle Roadside Technology Corridor

A series of fixed and mobile state-of-the-art facilities for testing and evaluating CMV enforcement technologies in a real-world setting

"The goal of this long-term collaborative effort among FMCSA, TDOS, TDOT, ORNL and UT is to develop and promote advanced truck and bus safety inspection and enforcement technologies to save lives."

Benefits

- Provide Quantitative Assessments of Technology Benefits and Costs
- Support Technology Deployment Decisions
- Expedite Technology Testing Process
- Flexibility to Address Multiple Technology Types
- Test-bed for Truck and Bus Vehicle Infrastructure Integration (VII) safety applications

Field Operational Testing
VII Test-bed for Truck and Bus Safety

Greene County Inspection Station

INTERSTATE 81

Bench-top testing
Hardware-in-the-loop testing
Driving simulator testing
Test course testing

INTERSTATE 40

TDOT Region 1 Headquarters

Active testing of infrastructure-based technologies at Inspection Stations

INTERSTATE 75

Knox County Inspection Stations

OAK RIDGE National Laboratory

NTRC
National Transportation Research Center

Knoxville

UT
The University of Tennessee

FMCSA
Federal Motor Carrier Safety Administration

STATE OF TENNESSEE

TDOT

For more information regarding this research please contact Gary Capps at (865) 946-1285 or email cappsgj@ornl.gov.