U.S. Department of Transportation

Federal Highway Administration

Research, Development and Technology Turner Fairbank Highway
Research Center
6300 Georgetown Pike
McLean, VA 22101-2296

ERRATA

Preventing Fuel Tax Evasion: Developing a Real-Time Fuel Tax Evasion Detection Solution (fact sheet)

Publication No. FHWA-HRT-12-020

Because of a proofing error, recipients of the above referenced publication are asked to make the following pen-and-ink change to their copies of the Exploratory Advanced Research (EAR) Program fact sheet.

Location	Change
Page 2, first column, technical contact's phone number	**Change** the phone number for Michael Dougherty from "202-366-9238" **to** "202-366-9234"

We apologize for any inconveniences this may have caused you.

Preventing Fuel Tax Evasion

Developing a Real-Time Fuel Tax Evasion Detection Solution

Exploratory Advanced Research . . . Next Generation Transportation Solutions

Motor fuel and other highway use taxes provide the primary source of funding for the Nation's highway transportation system. However, loss of revenue due to evasion has been estimated to be from \$1 billion annually to as much as 25 percent of total revenues.[1] "Supply Chain-Based Solution to Prevent Fuel Tax Evasion" is a Federal Highway Administration (FHWA) Exploratory Advanced Research (EAR) Program study, in partnership with the U.S. Department of Energy's Oak Ridge National Laboratory (ORNL), aimed at reducing or eliminating fuel tax evasion schemes.

Detecting Evasion

Ensuring that all fuel and highway use taxes are collected, remitted, and credited to the Highway Trust Fund at the Federal level, and for the various State transportation funds, is a priority for FHWA, the Internal Revenue Service, and State departments of revenue, taxation, and transportation. Existing approaches to identifying and preventing fuel tax evasion are time consuming and mostly reactive, primarily conducted through fuel tax enforcement and audits, electronic registration and data reporting, and processing and analyzing fuel tax data.

"This ORNL study aims to proactively monitor and determine, in near real time, the 'legitimacy' of every loading, offloading, and movement of petroleum products, and provide enforcement

staff with intelligence on a potential diversion of fuel while it is happening or even before it takes place," explains Michael Dougherty at FHWA. "The development of a Fuel Tax Evasion Detection System has the potential to reduce or eliminate a number of fuel tax evasion schemes, resulting in millions of dollars of additional revenue in the Highway Trust Fund."

A Proactive Approach

This research integrates multiple innovative measures to create the Fuel Tax Evasion Detection System. Instead of relying on a single solution to prevent fuel tax evasion, entirely new in-line sensors are being developed, and other advances in sensor technology are being integrated to combine wireless communications, vehicle tracking, and information analysis.

Although several sensors are currently available that can accurately measure the fuel level in a tank, there is no low-cost, noninvasive, and intrinsically safe level sensor on the market. Almost all current detection systems require penetrating the tank or locating the sensor inside the tank. This study aims to locate the sensor on the outside of the tank, and ORNL is developing an ultrasonic level system as a noninvasive method to achieve this. An optical-based detector is also under development to detect the fuel markers that identify taxable fuel. This detector will use commercially available optical components, integrated with commercial electronic and optoelectronic signal condition and readouts, to automatically identify the quantity of taxable fuel in a tank.

"Unlike previous reactive solutions, this study's approach will see an integrated sensor, communications, and power management platform installed on a tank truck," says Dougherty. "The sensor units will be able to identify the open or closed status of the tank truck valve, the volume of fuel that is being loaded or unloaded, and the amount of fuel marker in the fuel." He continues, "Combined with GPS tracking, this system will allow for real-time notification of any suspicious variation in standard delivery processes."

---

[1] *Economic Indicators of Federal Motor Fuel Excise Tax Collections,* Prepared by Pacific Northwest National Laboratory and Oak Ridge National Laboratory for the U.S. Internal Revenue Service, Weimar, M.R. *et al,* 2002.

Preventing Fuel Tax Evasion
Developing a Real-Time Fuel Tax Evasion Detection Solution

Enabling Enforcement

Several deliverables are anticipated from this study, primarily the architecture for a system that will result in a decrease in fuel tax evasion through the integrated sensor, communication, and data acquisition platform. The inline sensors will be developed to authenticate the presence and concentration of fuel markers in fuel, and the data platform will communicate that information to law enforcement personnel, enabling them to investigate potential fuel diversion activities.

According to FHWA data on motor fuel tax evasion, enforcement activities directly contribute hundreds of millions of dollars to the HTF and state transportation funds, with a yield estimated at $10 to $20 per dollar spent on these programs.[2] Through its innovations and developments, this research has the potential to ensure substantial resources intended for building and maintaining transportation infrastructure are not diverted illegally.

Learn More

For more information on this EAR Program project, contact Michael Dougherty, FHWA Office of Highway Policy Information, at ~~202-366-9238~~ 202-366-9234 (michael.dougherty@dot.gov).

---

[2] *Motor Fuel Tax Evasion Summary,* Office of Transportation Policy Studies, Federal Highway Administration, Washington, DC, 1998 (http://www.fhwa.dot.gov/policy/summ.htm).

EXPLORATORY ADVANCED **RESEARCH**

What Is the Exploratory Advanced Research Program?

FHWA's Exploratory Advanced Research (EAR) Program focuses on long-term, high-risk research with a high payoff potential. The program addresses underlying gaps faced by applied highway research programs, anticipates emerging issues with national implications, and reflects broad transportation industry goals and objectives.

To learn more about the EAR Program, visit the Exploratory Advanced Research Web site at www.fhwa.dot.gov/advancedresearch. The site features information on research solicitations, updates on ongoing research, links to published materials, summaries of past EAR Program events, and details on upcoming events. For additional information, contact David Kuehn at FHWA, 202-493-3414 (email: david.kuehn@dot.gov), or Terry Halkyard at FHWA, 202-493-3467 (email: terry.halkyard@dot.gov).