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Evaluating Truck Drivers' Speed and Seat-Belt Use Before and After the Implementation of a Non- Video Onboard Monitoring System

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Overview

- ❑ What is FAST DASH?
- ❑ Previous technology assessments
- ❑ Current assessment of a non-video OBMS
- ❑ How vendors can participate in future evaluations



What is FAST DASH?

- ❑ A program co-developed by VTTI and FMCSA
- ❑ FMCSA's Advanced System Testing utilizing Data Acquisition System on the Highways (FAST DASH)
- ❑ Purpose is to perform quick-turnaround, independent evaluations of promising safety technologies for trucks and buses
- ❑ Evaluations last approximately 18 months and involve a field-operational-test with in situ trucks/buses and drivers

Previous Assessments

- There have been 3 prior assessments and one is currently underway
- Blind-spot detection system (E1)
- On-Board Monitoring System (E2)
- Novel-mirror technology (E3)
- Fatigue-detection (E4)

Problem Scope: Focus for E2

- ❑ Large Truck Crash Causation Study (LTCCS) involved an in-depth analysis of severe truck crashes in the US
- ❑ Driver error were assigned to 87% of these crashes
- ❑ FMCSA's Motor Carrier Management System (MCMIS) for 2013 found failure to use seatbelt was among the top 5 violation categories
- ❑ How can we reduce driver errors and improve seatbelt usage?

Technology Selected for FAST DASH E2

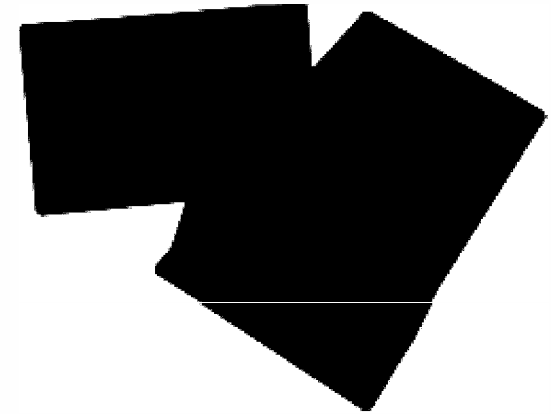
- ❑ Developed by inthinc™ Technology Solutions, the system monitors driving habits, including speeding and seat-belt usage, through various sensors and data from the vehicle's CAN bus (J1939 or J1708).
- ❑ When the system detects an aberrant behavior (e.g., speeding, aggressive driving), real-time feedback is presented to the driver
- ❑ If the driver fails to correct, a violation is transmitted to the company



OnBoard Monitoring System (OBMS) : waySmart™ by inthinc®

Key driver monitoring features

- In-cab coaching (verbal alerts)
- Safety belt use alerts
- Speeding, aggressive driving alerts
- Driver/fleet scoring
- Fuel usage monitoring



Elements

- Real-time in cab safety belt and speeding alerts include 15-sec grace period for drivers to correct before being reported as violations.
- Severe violations reported to fleet managers immediately as well as regularly scheduled score cards with driver safety and efficiency performance.

Field Testing

- ❑ Instrument 20 commercial vehicles with OBMS and research data acquisition systems (DASs)
- ❑ Compare driver performance before and after intervention
 - Evaluated safety measures by determining safety-critical event (SCE) rates before intervention in comparison to after
 - Also evaluated safety measures based on seatbelt and speeding rate trends from baseline to intervention
- ❑ Evaluate OBMS violation and feedback accuracy based on sample
- ❑ Evaluate driver acceptance of OBMS
- ❑ 2 months baseline and 4 months intervention

Fleet and Drivers

Fleet Selection

- Important factors were considered:
 1. Number of trucks and drivers available
 2. The proximity of the fleet's terminal to both teams' headquarters
- 20 class 8 tractors were instrumented
 - 53 ft box-van trailers
- Vehicles equipped with PeopleNet™ electronic log systems
- Vehicles equipped with electronic roll and stability control systems
- Vehicles had speed limiters set at 65 MPH manual control; 68 MPH cruise control
- Drivers paid \$50/week plus a \$100 bonus for completing participation



Data Acquisition System (DAS)

- VTTI's DAS captures three general groups of measures:
 1. DAS measures
 - e.g. accelerometer, gyro, video
 2. Vehicle network measures
 - e.g. J1939
 3. Add-on measures
 - e.g. OBMS audible alerts and violations
- 1,450,459 mi of on-road data over 11 months

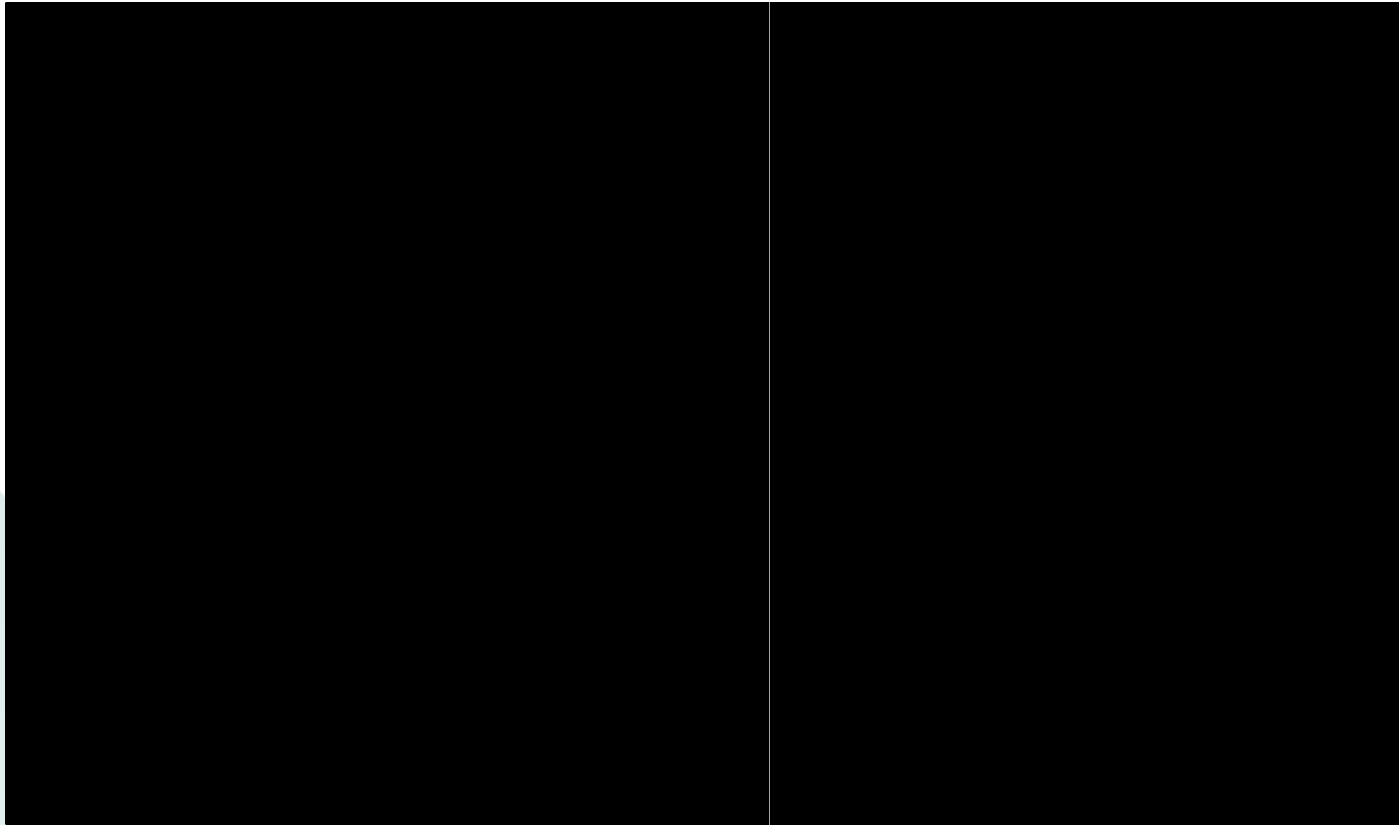


OBMS Settings

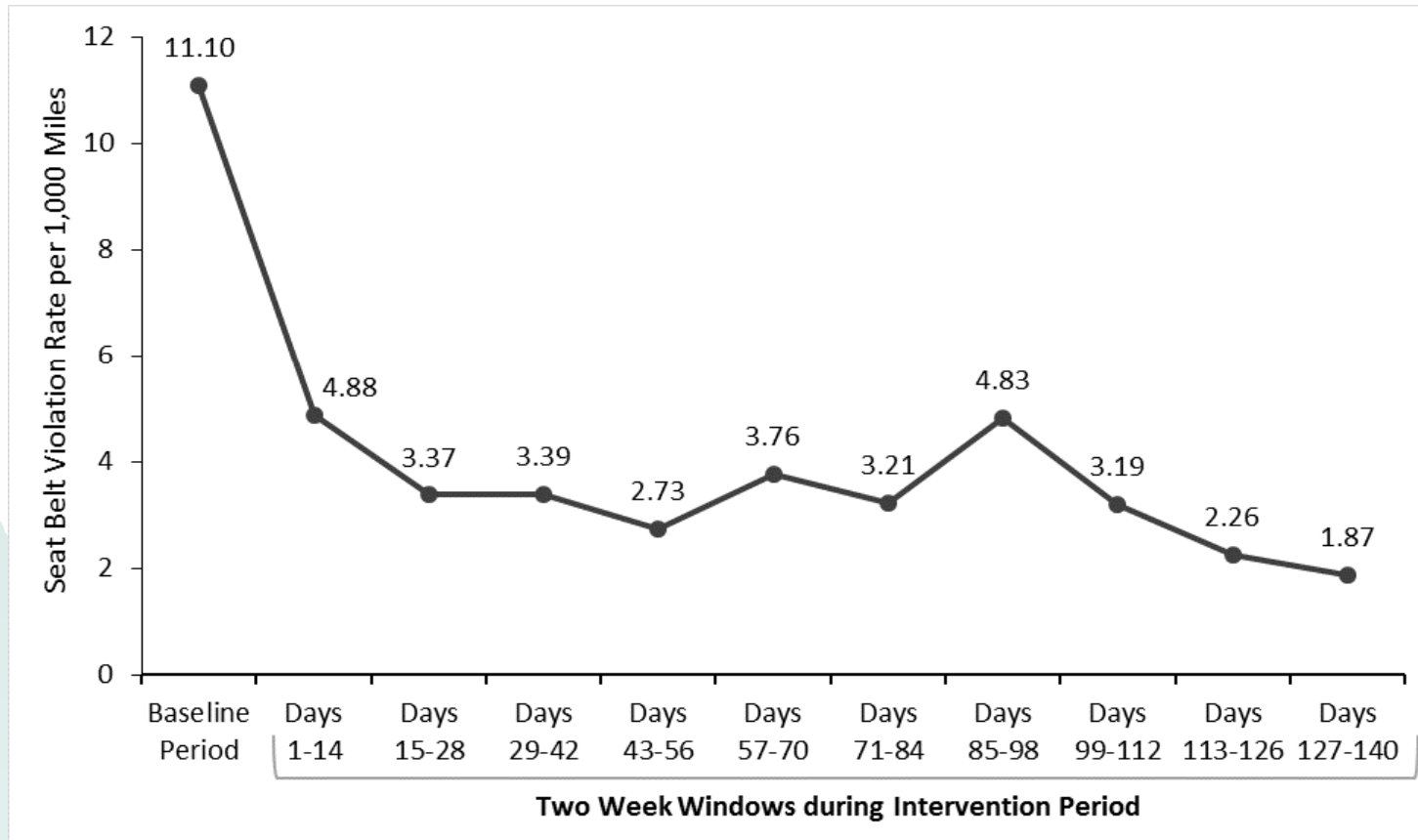
☐ Acceptable OBMS Vehicle Performance Criteria

- Speeding
 - Vehicle speed < 5 mph (8.0 km/h) above the posted speed limit
 - Posted speed limit identified by the OBMS proprietary Speed-by-Street™ technology
- Seatbelt
 - Vehicle speed < 5 mph (8.0 km/h), OR
 - Vehicle speed ≥ 5 mph (8.0 km/h) AND seatbelt buckled
- Aggressive Driving
 - Hard Brake
 - Hard Turn
 - Hard Bump
 - Hard Acceleration
- Audible Alerts Setting (not adjustable)
 - 85 dB at 1 meter

Results: Speeding



Results: Seatbelt



Summary

- ❑ OBMS speed monitoring correctly identified 86 percent of the time
- ❑ The rate of speeding violations was significantly reduced (37%) from baseline to the first two-week intervention period.
 - Effect lost after ninth two-week window
- ❑ The OBMS seatbelt monitoring correctly identified 100 percent of the time
- ❑ The rate of seatbelt violations was significantly reduced (56%) from baseline to the first two-week intervention window.
 - Effect remained across intervention

FAST DASH Program

FMCSA

- Provide funding
- Project selection
- Project and program oversight

VTTI

- Project solicitation
- Project selection recommendation
- Participating fleet selection
- DAS installation
- Experiment, data collection, analysis, reporting, closure

Technology Vendor

- Technology to support the experiment
- Staff to assist with installation, and maintenance
- Technology decommissioning

Fleet

- Provide access to vehicles and drivers as necessary



FAST DASH: Interested Vendors

<https://www.vtti.vt.edu/research/ctbs/fast-dash.html>

Questions?



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