FMCSA’s Advanced System Testing Utilizing a Data Acquisition System on Highways (FAST-DASH) Program

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Overview

- FMCSA’s Onboard Safety System Research Area
  - Priorities
  - Research Decision Factors
  - Examples

- FAST-DASH Program
  - Objectives
  - Structure
  - Timeline
  - Use of Naturalistic Driving
Onboard Safety System Research Area

- Promising vehicular technologies, their premise, potentials and deployment of proven onboard safety systems (OBSS)
  - In-service focused
  - Critical Factors of importance
    - Safety benefits
    - Unintended consequences
    - Reliability.
  - Agency Authority, Reach, Impact, Enforcement
  - Total cost of ownership,
    - Purchase price
    - Installation cost
    - Maintenance cost
    - Operational cost impact.

An OBSS is a Commercial Motor Vehicle technology that provides a consistent and measurable net safety benefit to the driver, motor carrier and highway transportation.
Onboard Safety System Research Decision Factors

- Safety benefits aimed by the technology
- Avoid crashes
- Reduce severity of crashes
- What Literature exists on this OBSS type?
- Will research yield meaningful results?
- Safety Premise
- Research History
- Research Fitness
- Agency Mission
- Agency Authority
- OBSS Technology Evaluated
- 49 U.S.C. §31108. Motor carrier research and technology program
- How will/can the results be used?
Onboard Safety System Categories

- By pre-crash scenarios
  - Running red light, road edge departure/maneuver, changing lanes/same direction, drifting/same direction, etc

- By conflict zone
  - Front, rear, side, blind-spot, etc

- By conflict type
  - Rollover, fatigue, loss of control, blind-spot, etc

- By action type
  - Training, coaching, warning, intervention, etc

- By vehicular platform
  - Tractor based, trailer based, floating device, etc.
Examples of Onboard Safety Systems

Backup Object Detection

DSRC based V2V, V2I

Fatigue Monitoring

LDW

AOBRD EOBR

Currently Available Technology

In advanced stages of development

In early stages of development

Texting, cell phone use detection

Texting, cell phone use detection

Driver Monitoring

BSP LCW

ABS ATC DTC RSC ESC

Brake-stroke monitoring

FCW ACC CMBS

TPMS

TRSC
FAST-DASH Program Objectives

- 5-year cooperative agreement between FMCSA and VTTI
- A Technology Transfer Program
- Independent & Quick Turnaround testing and reporting
- Targets to test Marketed or near market-ready technologies
- Research plan / Experimental Design includes:
  - Static functionality testing on Smart Road
  - 6-month Naturalistic Driving FOT with 20 DASs on Fleet Vehicles
  - Conflict based safety effectiveness assessment
  - Analysis of participating Fleet’s accident risks from their records.
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 their vehicles and drivers as necessary

Diagram showing the flow of the FAST-DASH Program.
First Project under FAST-DASH Program

- First Project underway
  - Blind spot object detection and warning system
  - Data collection finished
  - Analysis and reporting planned for the rest of CY12.
  - Final Report anticipated in early CY13

- Primary Decision Factors
  - Pre-crash scenario study\(^1\) by Volpe Center shows that in heavy trucks the leading pre-crash scenario was Changing lanes / same direction (13%)
  - There are no documented results with robust BSW systems in the literature

\(^1\)Frequency of Target Crashes for IntelliDrive Safety Systems, DOT HS 811 381, October 2010, NHTSA.
Naturalistic Driving Data Supports Evaluation Studies

- ~20 Vehicles at participating fleet instrumented with SHRP2 DAS, collects data from:
  - Multiple cameras, forward radar
  - Vehicle databus
  - Onboard safety system being tested.

- 6 month data collection
  - ~2 month baseline, ~4 month with system enabled
  - 2k-8k miles/per month per vehicle data acquisition.

- Assessment of safety benefits
  - Critical events relevant to the technology.
For Additional Information, please contact

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VTTI’s FAST-DASH site: