



U.S. Department of Transportation  
Federal Motor Carrier Safety Administration  
Office of Analysis, Research, and Technology

# Silent Danger Zone for Highway Users

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# Agenda

- Introduction to FMCSA
- The CMV Industry
- Fatigue Problem and Concern
- FMCSA's Fatigue Research
  - Driver Restart Study – recently released
  - Flexible Sleeper berth
  - Driver Commuting
  - Research on Obstructive Sleep Apnea
  - Naturalistic Driving Research
  - Crash Risk by CMV Driver Schedules
  - Small Business Innovative Research Program
  - FMCSA's Technology Evaluation Program
  - North American Fatigue Mgmt Program
- Fatigue Challenge



# Who Are We?

- Established in 2000, FMCSA became one of 11 separate operating administrations within USDOT.
- FMCSA is headquartered in Washington, DC, with more than 1,100 employees:
  - 25 percent at Headquarters
  - 75 percent in Field Offices
- Field staff include safety inspectors, investigators, and auditors.





# Our Mission

- To prevent large truck and bus crashes, fatalities, and injuries through:
  - Regulation
  - Enforcement
  - Education
  - Research
  - Technology



# A Snapshot of the CMV Industry

## FMCSA

If you are traveling on a U.S. highway, chances are you will see a large truck or a bus. Large trucks and buses are integral to the U.S. economy and travel billions of miles each year to deliver freight and transport passengers. So just how large is the commercial motor vehicle industry?



**6.0 MILLION**  
CMV DRIVERS (AS OF 2015)



**295.1 BILLION**  
VEHICLE MILES TRAVELED IN 2014  
(LARGE TRUCKS AND BUSES)



**13,728**  
SAFETY INSPECTORS  
STATE: 13,195 FEDERAL: 533



IN 2015: **3.38 MILLION**  
ROADSIDE  
INSPECTIONS



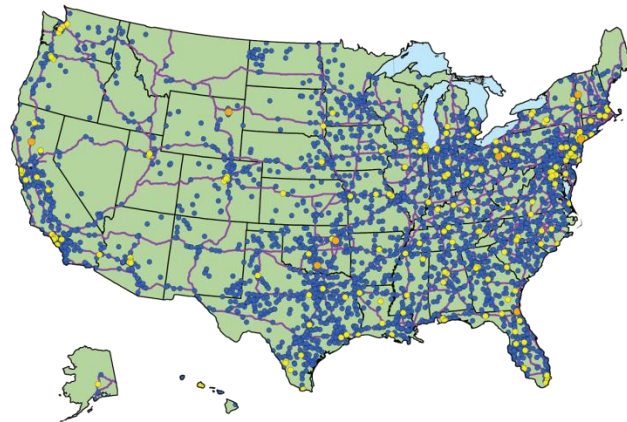
**10.9 MILLION**  
LARGE TRUCKS REGISTERED  
(AS OF 2014)



**872,000**  
BUSES REGISTERED  
(AS OF 2014)



**551,000**  
REGULATED CARRIERS  
OPERATING IN THE U.S. (AS OF 2015)



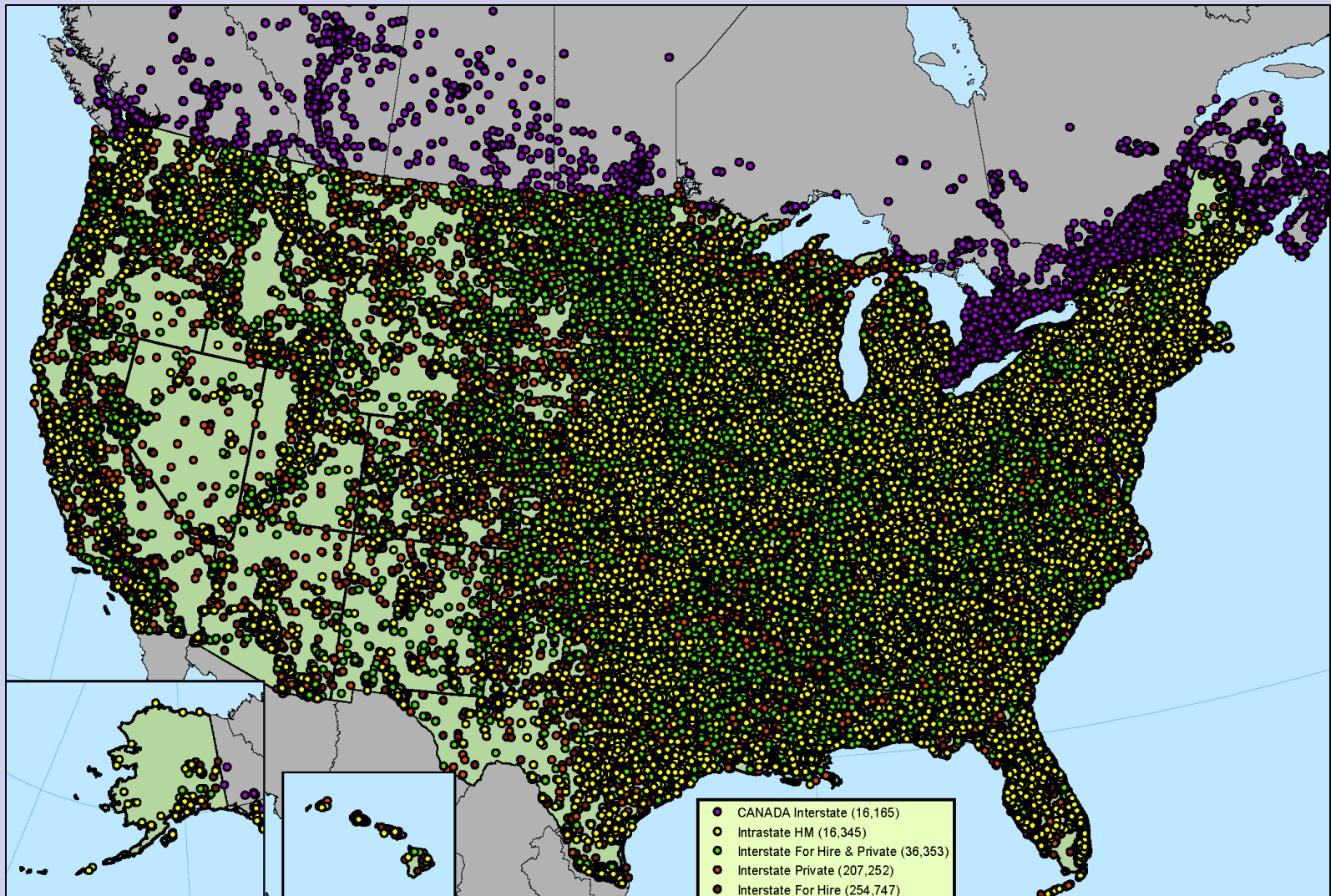
IN 2015, IN THE U.S.  
**4,337**  
FATALITIES  
IN LARGE  
TRUCK AND  
BUS CRASHES

Note: Numbers are rounded.

Sources: FMCSA Pocket Guide to Large Truck and Bus Statistics, 2016; Large Truck and Bus Crash Facts, 2015 (Early Release Version)

# FMCSA-Regulated Motor Carriers

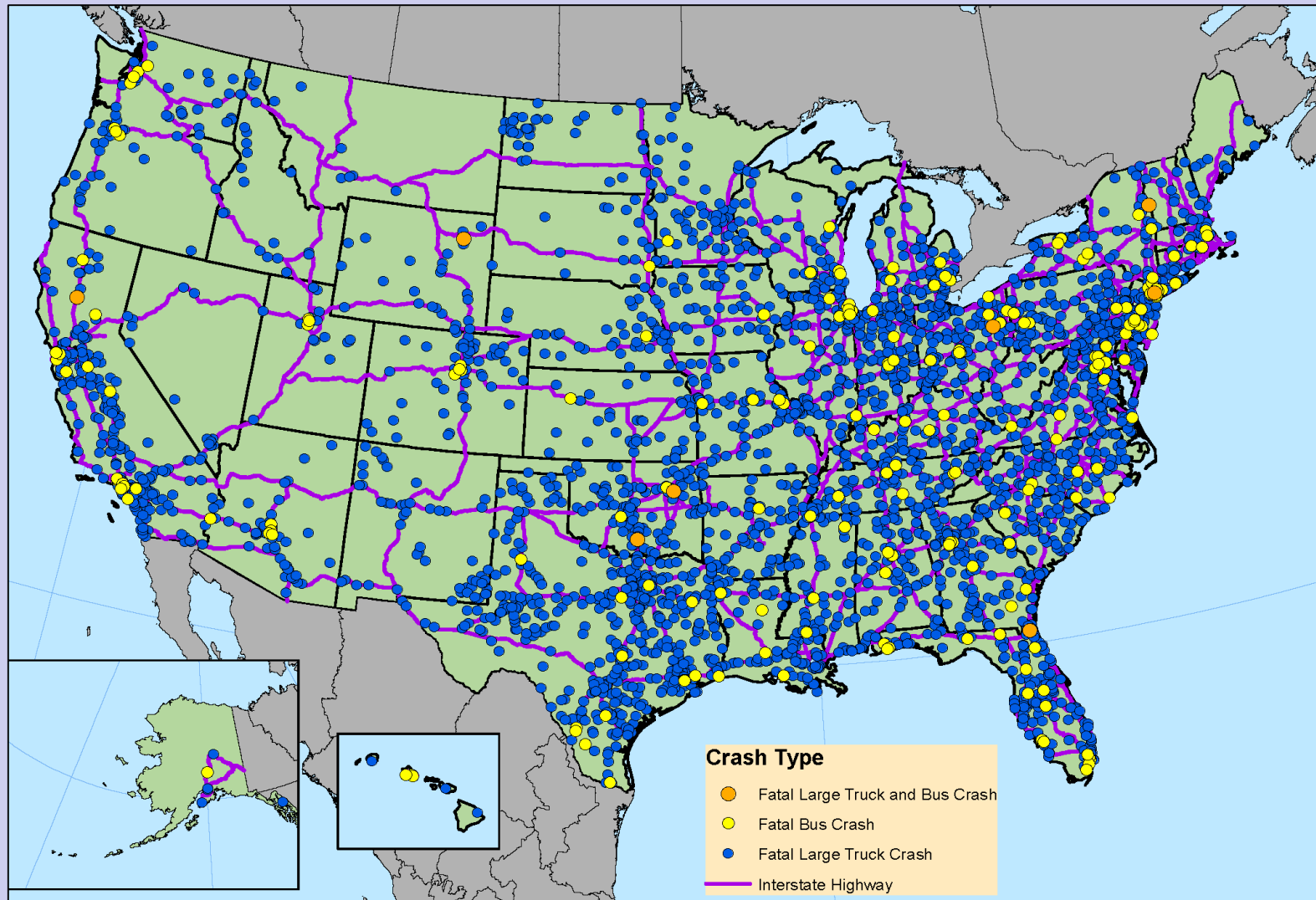
## Carriers by Headquarters (Domicile) Location, 2016



Source: FMCSA, Motor Carrier Management Information System (MCMIS), as of February 2016.

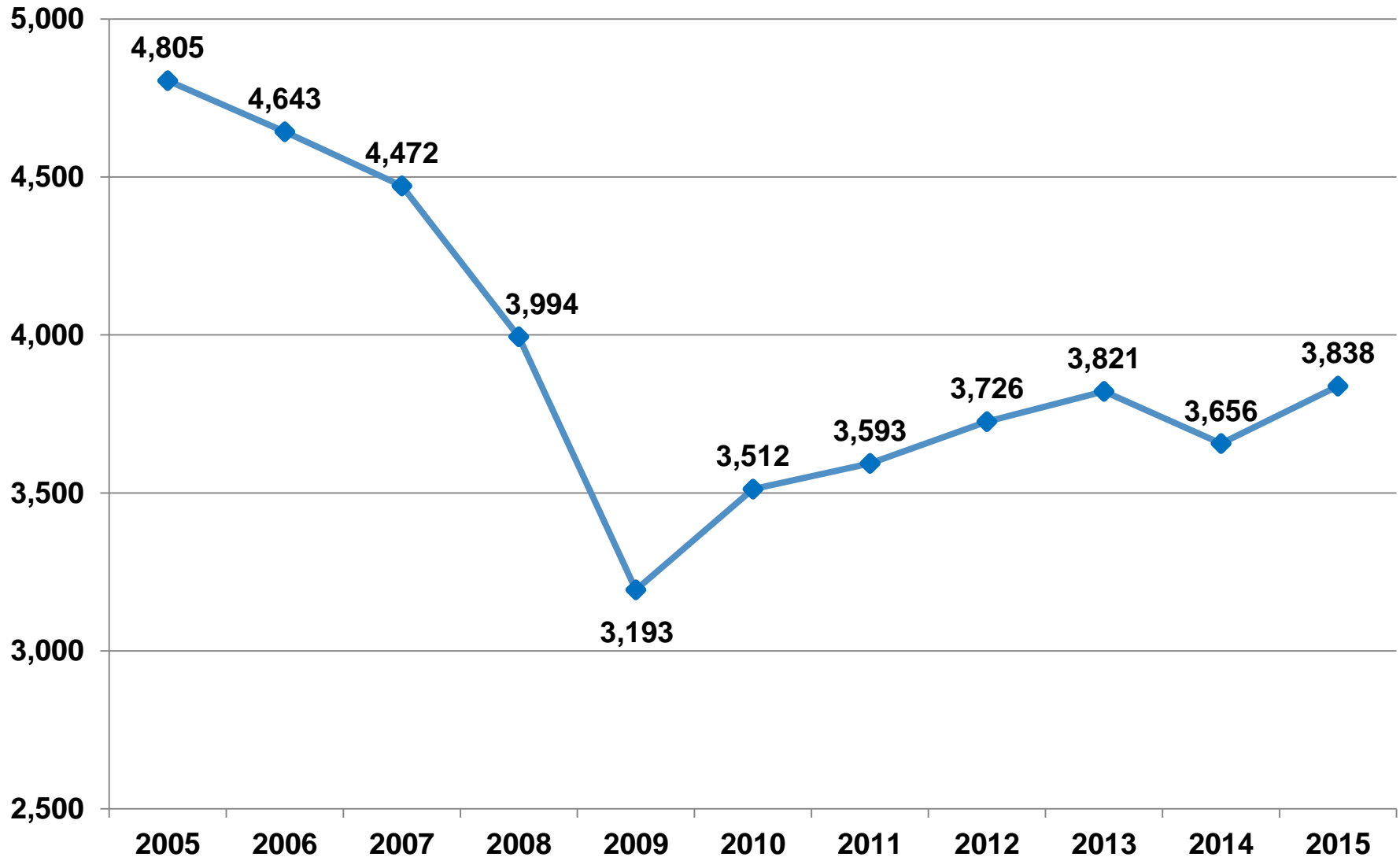


# Locations of Large Truck and Bus Fatal Crashes, 2014



Source: FMCSA, Motor Carrier Management Information System (MCMIS), as of December 2015.

# Fatal Crashes Involving Large Trucks or Buses, 2005–15



Source: National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS)



# FATIGUE RESEARCH

# Driver Restart Study – Recently Released

- Congress directed USDOT to initiate a naturalistic study of the operational, safety, health, and fatigue impacts of the two restart provisions related to truck drivers' hours of service (HOS).
- Data collected included:
  - Electronic logging device data for HOS and driver use of provisions.
  - Psychomotor Vigilance Test (PVT)
  - Actigraphy data.
  - Onboard monitoring system for safety-critical events.
- The 235 drivers participated and 181 driver finished 5 months of data collection; they provided a total of:
  - Drove 140,671 hours.
  - 26,964 days of data: 17,628 duty days; 9,336 restart days.
  - 3,287 restarts for data analyses:
  - Completed more than 79,000 PVT-B performance test.
- Report: <https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/RRR-15-011-CMV%20Driver%20Restart%20Study-Final-Report-508C.pdf>

# Flexible Sleeper Berth Pilot Program

**Goal:** To conduct a pilot study to demonstrate how HOS regulatory flexibility could be used to improve driver rest and alertness.

- Previous research found that when consolidated nighttime sleep is not possible, split sleep is preferable to consolidated daytime sleep.

## Study Design

- Study is a naturalistic driving study where participants drive their normal revenue-producing routes.
- Within-subject and between-subject research design.
- Study will compare multiple metrics, such as:
  - Driving behaviors (e.g., safety-critical events).
  - Driver alertness (rated via Psychomotor Vigilance Tasks and the Karolinska Sleepiness Scale).
  - Sleep/wake patterns (measured using actigraphy devices).
  - Roadside violations, crashes, and incidents.
  - Driver opinions regarding regulatory flexibility.



# Driver Commuting Survey

- **Goal:** Conduct a study of the effects of excessive commuting on safety and CMV driver fatigue.
- **Method.**
  - Survey CMV drivers (property and passenger) to better understand the commuting practices of CMV drivers by: type of vehicle and type of operation, company versus owner operator, length of trip, and driver work experience and demographics.
  - The study will also examine the impact of excessive commuting on safety.
- **Status:** Information Collection Request has been developed and the Agency is work on obtaining OMB approval.





# Research on Obstructive Sleep Apnea

- **Goal:** Collect data necessary to support a rulemaking on OSA in CMV drivers.
- **Background:** OSA is a respiratory disorder characterized by a reduction or cessation of breathing during sleep.
- **Summary:**
  - The first phase of this study is to conduct a thorough literature review to respond to questions in the FMCSA ANPRM on CMV drivers with OSA.
  - The rulemaking team will determine if a second phase of this research is warranted based on the perceived gaps in the research literature, data available and the responses receive from the general public.



# Naturalistic Driving Research

- Provides in-vehicle, real-time objective data identifying driver performance and crash precursors.
- Truck cab is equipped with four video cameras providing views of driver's face, forward view, and two side mirror views.
- Provides understanding of precursors to crashes and driver factors such as issues of performance, inattention, distraction, and fatigue.



Research used for:

- Rulemaking Support
- Safety System Development and Testing
- Driver Training and Outreach
- Factors that Lead to SCEs
- Driver Monitoring and Feedback

# Crash Risk by CMV Driver Schedules

## ■ Crash Risks by CMV Driver Schedules:

- To collect electronic logging device (ELD) and crash data from property-carrying and passenger-carrying CMV carriers to assess risks posed by alternative schedules as they relate to various aspects of hours-of-service (HOS) provisions.
- The study will analyze:
  - Relative crash risk by hour of driving.
  - Relative crash risk by hour of driving per week.
  - Relative crash risk of driving breaks.
  - Relative crash risk as a function of recovery periods.
  - How each of the HOS provisions is being used.



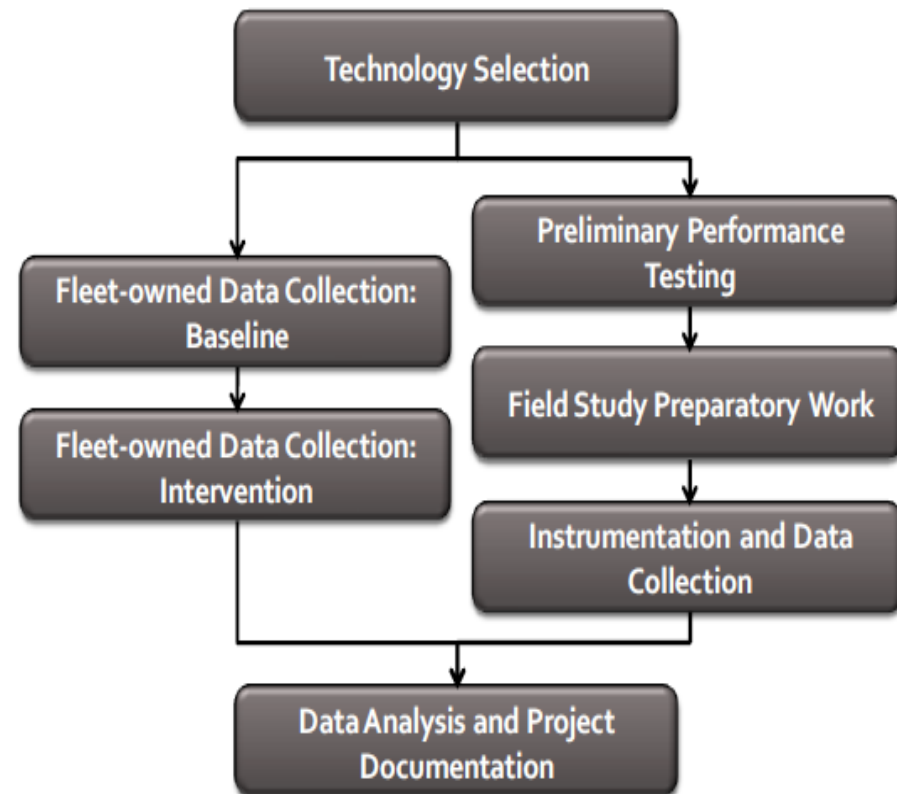
# Small Business Innovation Research Program

- **Driver Fatigue and Distraction Monitoring and Warning System**
  - Phase II Project: To provide innovative, practical, fast, and reliable detection of driver fatigue and distraction under a wide variety of operating conditions.
- **Advanced Fatigue Modeling for Individual Differences**
  - Phase III Project: The goal of this project is to develop technology that uses existing streams of trucking data to evaluate driver fatigue and provide actionable feedback in near real-time.
- **Technologies Enabling the Assessment of Sleepiness**
  - Phase I Project: Produce reliable and practical technologies to monitor and assess sleepiness.



# FMCSA's Technology Evaluation Program

- FMCSA's **A**dvanced **S**ystem **T**esting utilizing a **D**ata **A**cquisition **S**ystem on the **H**ighways
- “FAST DASH II”
- Perform quick-turnaround independent evaluations of promising safety technologies aimed at CMV operations
- Determine efficacy of the safety system using the following high-level metrics:
  - Crash reduction effectiveness
  - Unintended consequences
  - User acceptance

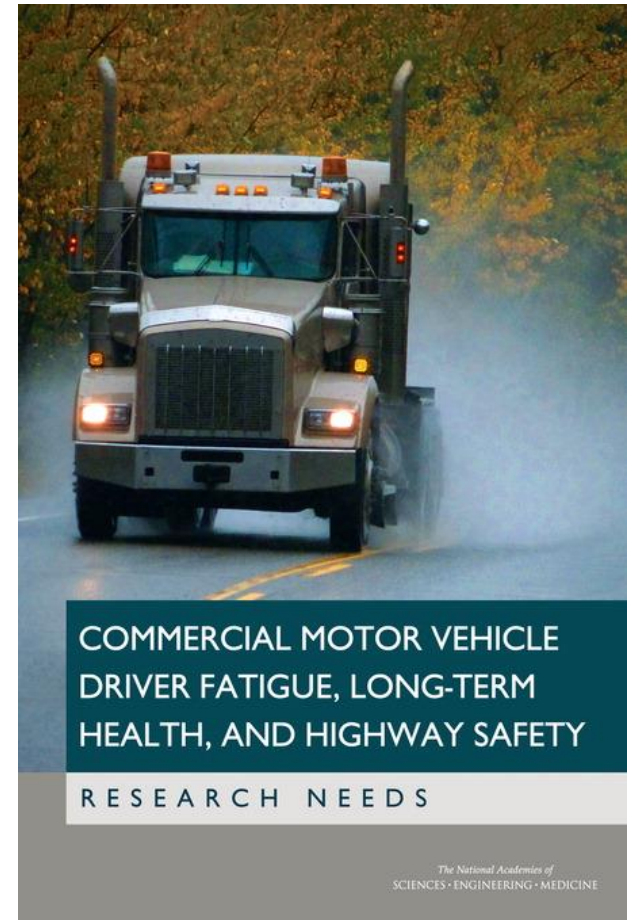


# North American Fatigue Management Program

- FMCSA & Transport Canada worked together to develop a NAFMP.
- The project involves four phases:
  - Phase 1, researchers identified fatigue management requirements and developed a comprehensive approach designed specifically for drivers, dispatchers, and company managers.
  - Phase 2 involved development of educational and training materials as well as the development and assessment of procedures for field testing the FMP.
  - Phase 3, a field operational test was conducted (protocol development and field testing of the effectiveness) on a comprehensive FMP compared to current industry practices.
  - Phase 4, development of recommended practice guidelines, manuals, and other training materials.
  - Next Phase: Evaluating the Effectiveness of the NAFMP.

# Fatigue Challenge

- ✓ Read *CMV Driver Fatigue Long-Term Health and Highway Safety*. Many of their recommendations go beyond motor carrier research and are applicable to all fatigue research.
- ✓ Driver fatigue affects all modes of transportation and all users of our transportation system.
- ✓ If we are going to have an impact at fighting driver fatigue we must all work together.
- ✓ I want to challenge you to ask important questions at this conference—the questions that we need to answer in order to improve fatigue research and protect the lives of all our roadway users.



# Thank You

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