SAFETY PROGRAM BRIEF

Updating Safety Research in SHRP 2

DECEMBER 2010

The central goal of Safety research in the second Strategic Highway Research Program (SHRP 2) is to address the role of driving performance and behavior in traffic safety. This includes developing an understanding of how the driver interacts with and adapts to the vehicle, traffic environment, roadway characteristics, traffic control devices, and the environment. It also includes assessing the changes in collision risk associated with each of these factors and interactions. This information will support the development of new and improved countermeasures with greater effectiveness in reducing crashes. To achieve this goal, SHRP 2 is conducting a naturalistic driving study (NDS), which will continuously collect a vast array of data from 3,100 volunteer drivers located in six sites throughout the United States over a two-year period. The SHRP 2 NDS began in fall 2010.

The resulting data of the SHRP 2 NDS, expected to exceed 1 petabyte in size—about the size of a million 1-gigabyte USB flash drives—will provide a wealth of information regarding driving behavior, lane departures, and intersection activities. This data is expected to be useful to transportation safety researchers and others for at least 20 years. It is important to note that all privacy protections promised regarding participants and their data will continue even after the study ends, including the use of secure data facilities, data sharing agreements, and institutional review board (IRB) approvals where appropriate.

SHRP 2 will analyze the data to quantify the contribution of relevant driving, roadway, vehicle, and environmental factors to selected research questions and to assess the countermeasure implications of the findings. The knowledge gleaned from the SHRP 2 analyses, as well as those performed by other researchers, will support public policy, rulemaking, infrastructure improvements, and other—as yet unknown—activities, targeted at reducing fatalities on our nation's roadways.

Most Safety projects are complete or active. The most recent request for proposals for a project in the Safety research plan was released in December 2010. This document provides a brief update on the status of projects in the SHRP 2 Safety program. The Safety research plan and complete project descriptions are available on the SHRP 2 Safety page: www.TRB.org/SHRP2/Safety.

Safety Projects

Project S01: Development of Analysis Methods Using Recent Data

Four contractors worked independently to identify and develop analytic methods for the SHRP 2 NDS and demonstrate these methods by using data from similar field studies to examine road departure and intersection safety issues. These analytic methods will be applied to the large data sets that are being produced in the field study of the NDS. The S01 project series is complete. The final reports, currently in publication, will be available on the SHRP 2 website.

The SHRP 2 naturalistic driving study will help drivers contend with complex traffic environments.

Project S02: Integrate Methods and Develop Analysis Plan

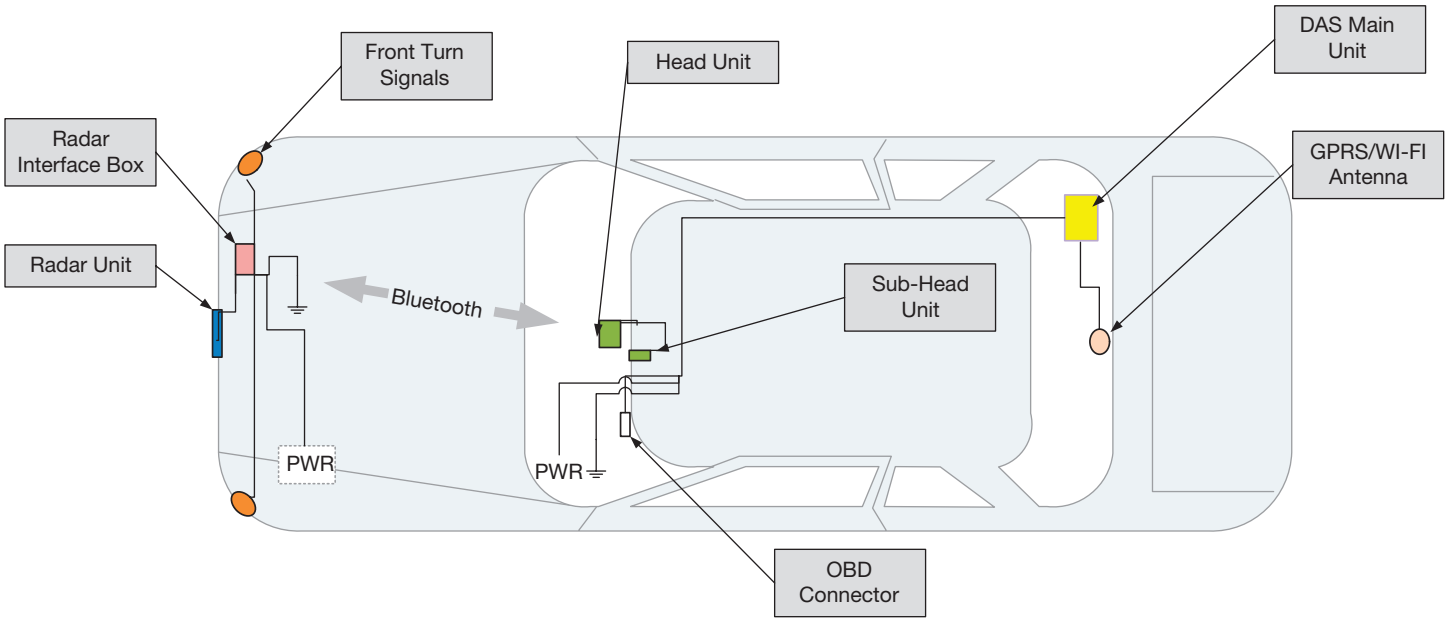
The objective of this project was to integrate the results of the S01 projects and produce an analysis plan for the in-vehicle field studies. The Project S02 research team developed a recommended list of essential elements to be covered in the SHRP 2 analysis project work plans. Recommendations are based on a detailed review of the analytical methods used by project S01 (Development of Analysis Methods Using Recent Data) and S05 (Design of the In-Vehicle Driving Behavior and Crash Risk Study) research teams, and on the project S02 team's expertise in this area. The project is complete. The final report, currently in publication, will be available on the SHRP 2 website.

Project S03: Roadway Measurement System Evaluation

The objective of this project was to develop, organize, and conduct an evaluation of automated data collection services (rodeo). The rodeo was part of a prequalification stage for project S04B (Mobile Data Collection), which will provide roadway data on selected roads within each naturalistic driving study site; these data will be in a GIS and linkable with the SHRP 2 NDS data. Ten commercial data collection vendors participated in the rodeo evaluation. Participants were evaluated for accuracy and precision in collecting roadway data at highway speed, and under "real world" conditions likely to be encountered during the S04B project. The project is complete. The project final report, currently in publication, will be available on the SHRP 2 website.

Project S04A: Roadway Information Database Development and Technical Coordination and Quality Assurance of the Mobile Data Collection Project (S04B)

Project S04 will produce a database of roadway characteristics that can be linked to the naturalistic driving database to support safety analysis. Project S04 consists of two projects: Project S04A (Roadway Information Database Development and Technical Coordination and Quality Assurance of the Mobile Data Collection) and Project S04B (Mobile Data Collection). Project S04A is focused on issues of data integration, quality control and assurance, storage, retrieval, analysis, reporting and representation, and maintenance. An early task of the project was to determine the types of data and analysis that database users will require. SHRP 2 conducted a webinar in September 2010 that helped the project team make their determination. A recording of the webinar is available on the SHRP 2 website. This project is active.



Cars in the SHRP 2 naturalistic driving study are equipped with these data-collecting components.

Project S04B: Mobile Data Collection

The objective of this project is to collect roadway characteristics throughout the NDS data collection period for selected roads in the six study areas. This work will be coordinated by the Project S04A contractor and support the production of a roadway database. Work on this project is expected to start by the second quarter of 2011.

Project S05: Design of the In-Vehicle Driving Behavior and Crash Risk Study

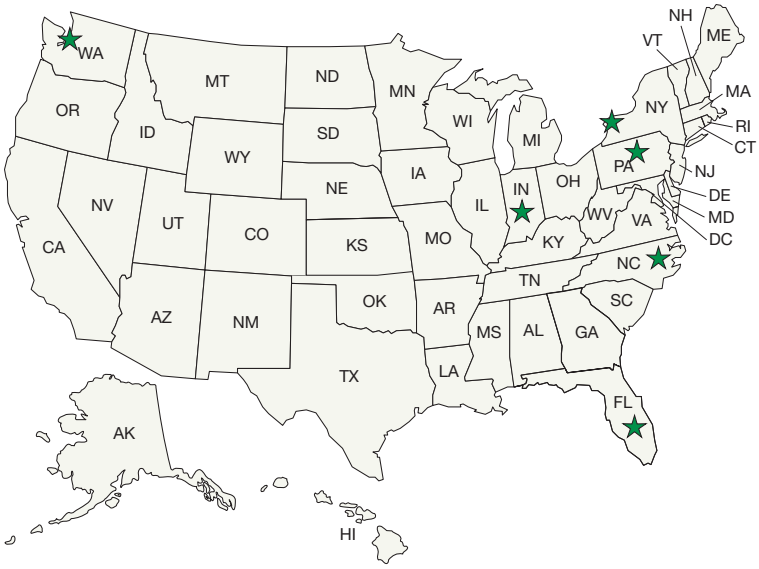
The objective of this project was to design the SHRP 2 NDS, which is now under way. The research team identified several categories of data to be collected including driver assessments, time series data and video from the onboard data acquisition system (DAS), participant demographics, vehicle inventory, and crash investigations. The team also determined that six sites should serve as data collection sites to provide as wide a range of geography, weather, state laws, road types, and road usage as feasible. Quality, management, and security protocols are being applied in the NDS. The project is complete. A project brief is available on the SHRP 2 website. The project final report, currently in publication, will also be available on the SHRP 2 website.

Project S06: Technical Coordination and Quality Control

The objective of Project S06 is to provide overall technical coordination and quality control for the six sites that are carrying out data collection for the in-vehicle driving behavior field study. The overall goal is to ensure that the correct data are collected and stored securely while maintaining all human subject protections. The researcher's responsibilities include overseeing procedures for protection of human subjects; coordinating study protocols, consent forms, and IRB applications; training Project S07's driver assessment and DAS installation staff; making Project S07 site visits; overseeing subject recruitment and adherence to the sampling plan; managing the response to all system health check and collision notification messages; monitoring hard drive removal and data upload to the S06 server; maintaining the data collection schedule; and processing, storing, and providing access to the study data for the S08 analysis projects. This project is active.

Project S07: In-Vehicle Driving Behavior Field Study

The objective of Project S07 is to carry out data collection for the in-vehicle driving behavior field study over a two year period. The field study is being conducted in six sites: Erie County, New York; Seattle Washington; Central Pennsylvania; Central Indiana; Tampa Bay, Florida; and Durham, North Carolina. A total of 3,100 participants are expected to be included in the field study, which began in fall 2010. A website for participants in the field study can be found at www.shrp2nds.us.



Data collection sites for the SHRP 2 naturalistic driving study.

Project S08: Analysis of the Naturalistic Driving Study Data

The objective of project S08 is to conduct analyses of the SHRP 2 NDS data to obtain new information and insights on critical safety issues. The results of these analyses should demonstrate the use of the unique NDS data, lead to real-world applications and safety benefits, and be broadly applicable to a substantial number of drivers, roadways, and/or vehicles in the United States. An RFP for this project was released in December 2010. Multiple awards are anticipated. The results of each award should lead to real applications

Roadway data collection equipment.

for improving one or more of the three fundamental driving components: driving behavior, vehicle design and operation, and roadway infrastructure design and operations.

Project S09: Site-Based Video System

This project developed a site-based video system that can capture vehicle trajectories in a robust and reliable way, with sufficient accuracy and fault-free operation to support a wide range of future safety improvement projects. The system complements the in-vehicle data collection system developed in SHRP 2 project S05 (Design of the In-Vehicle Driving Behavior and Crash Risk Study). While the site-based system cannot directly record individual driving behaviors, it does have access to the full range of traffic interactions and the potential to fill an important gap in the vehicle-based study. Also, broad classes of driving behavior can be inferred from the vehicle trajectories, for example, the effects of distraction or impairment are seen in terms of reaction delays or path-following errors. The project is complete. The final report will be available on the SHRP 2 website.