



Office of Safety Research and Development

Federal Highway Administration Safety Research & Development

Presented to the

Research & Technology Coordinating Committee

May 2019

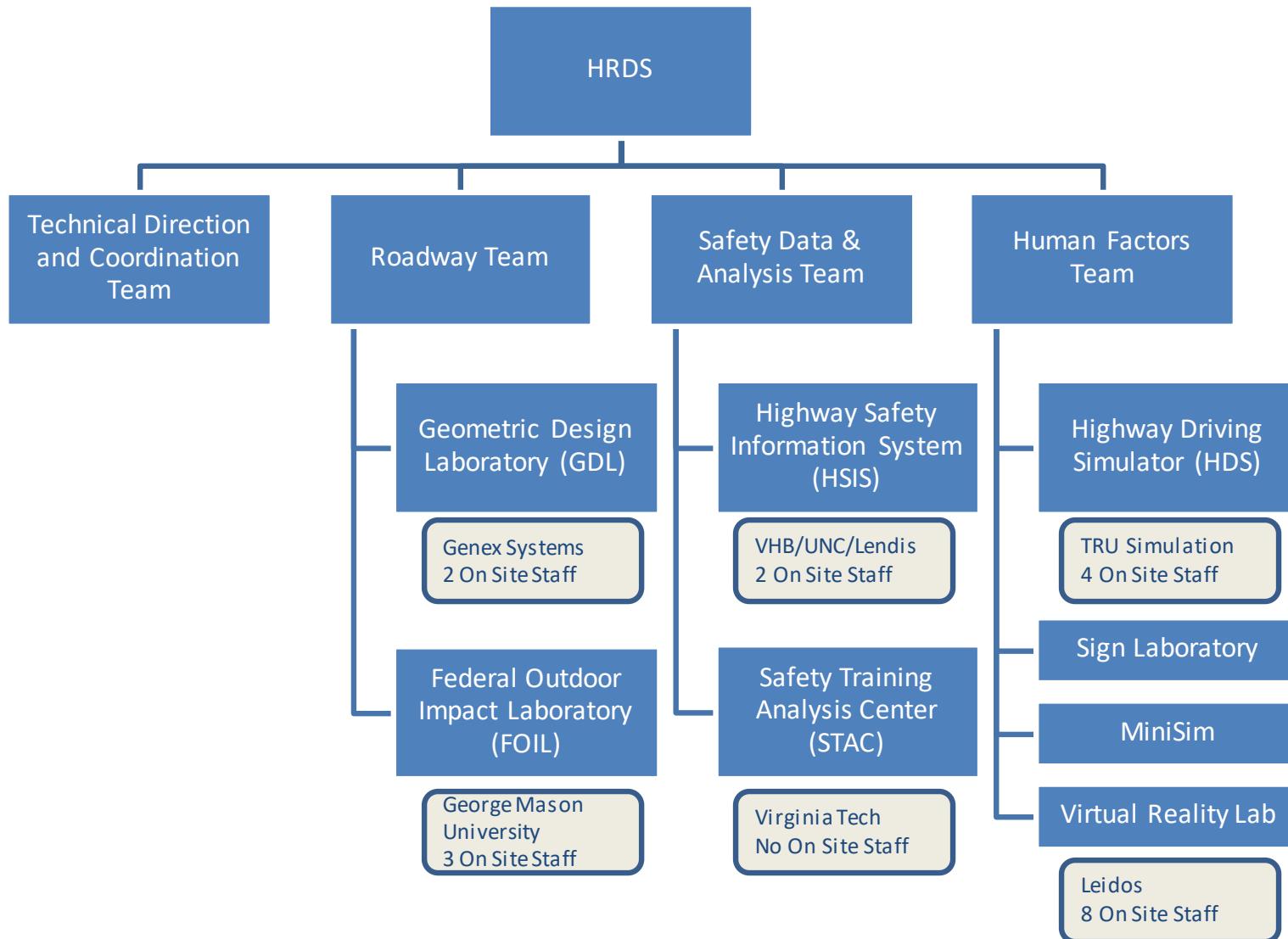
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Director, Safety Research & Development**



Safety R&D Teams

- Technical Direction & Coordination
- SHRP2 Safety Implementation
- Roadway Safety
 - Providing information to prevent and reduce the severity of roadway departure crashes.
- Safety Data & Analysis
 - Supporting systematic, knowledge-based approaches to reducing highway injuries and fatalities.
- Human Factors
 - Understanding road user behavior to improve safety.

Team Structure and Labs



Safety Program Roadmaps

- Roadway Departure
 - Funding Split: 19% HSA; 81% HRDS
- Data and Analysis
 - Funding Split: 32% HSA; 68% HRDS
- Intersections
 - Funding Split: 43% HSA; 57% HRDS
- Ped/Bike
 - Funding Split: 73% HSA; 27% HRDS
- Human Factors CPP
- Local and Rural Roads CPP
- HSIP CPP
- PCB CPP

Roadway Safety

Roadway Safety Research

Examinations of speed management, intersections and roadway design in order to keep vehicles on the road.



Roadway Departure Research

Laboratory, simulation and field study tasked to minimize the consequences when a vehicle leaves the road.

Intelligent Transportation Systems

Development of technologies and protocols for vehicles and infrastructure to securely communicate information.



FOIL Future Contract

- **Mutually beneficial no-cost contract/agreement**
 - Mimic Federal Railroad Administration's (FRA) Transportation Technology Center (TTC)
 - RFI
 - Two responses, one proposal (GMU) and one non-interest
 - One interested party did not respond in time but would be interested
 - FRA contract review
 - RFP for FOIL contract to start in 2020

FOIL Testing

- Current FOIL Testing Projects:
 - Future Materials Hardware Feasibility (Polyester Polymer Concrete)
 - Development of an FE Tree Model
 - Rumble Strip Full Scale Testing
 - NCHRP 15-53 - Roadside Barrier Designs Near Bridge Ends with Restricted Rights of Way
 - NCHRP 03-119 - Application of MASH Test Criteria to Breakaway Sign and Luminaire Supports and Crashworthy Work-Zone Traffic Control Devices
 - NCHRP 22-29B - Continuation of Super Elevated Full Scale Test
 - DOS Security Perimeter Barrier Development

FOIL Tests per Year					
	2018	2017	2016	2015	2014
Full Scale Crash Tests	10	13	33	11	3
Pendulum Tests	154	37	60	45	37



Safety Data & Analysis



Research

Capturing consistent, high-quality data allows researchers to identify key safety questions, then develop and deploy effective safety improvements.

Safer Road Designs

Safety-focused data and effective tools allow practitioners to evaluate and compare the safety of roadway design alternatives.



Better Safety Investments

Quality data and cutting edge analysis help safety professionals decide how best to allocate resources to achieve the greatest safety improvements.

Highway Safety Information System (HSIS)

- Consists of data from 7 states
 - Crash
 - Roadway
 - Traffic
- Provides quality data to road safety researchers (often in support of other national research programs, such as NCHRP)
- Conducts research to support FHWA's focus areas
- Supports development and use of data collection and analytical tools for the study of highway safety

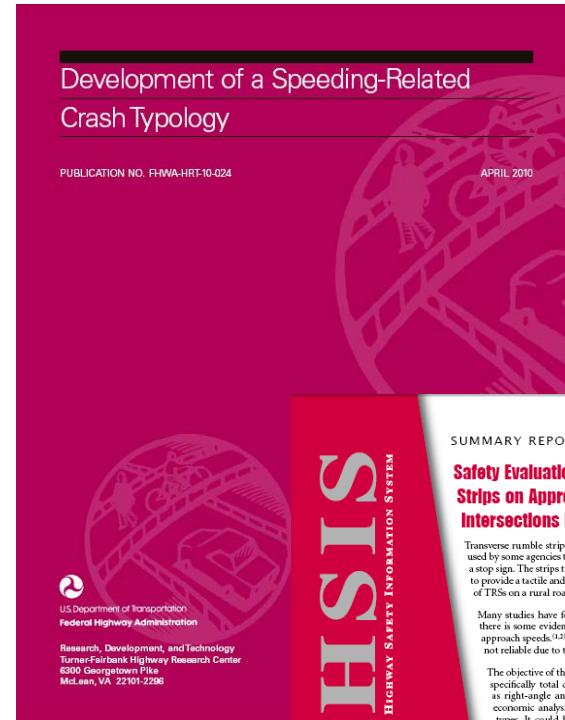


HSIS
Highway Safety Information System



HSIS Products

- Data
 - > 50 NCHRP Studies
- HSIS Summaries
- FHWA Research Reports
- Journal Articles (TRR, AAP, ITE, ...)
- Tools
 - FHWA Pedestrian and Bicycle GIS Safety Analysis Tools
 - FHWA GIS Safety Analysis Tools
 - Pedestrian and Bicycle Crash Analysis Tool (PBCAT)
- www.hsisinfo.org



The image shows the front cover of a report titled 'Development of a Speeding-Related Crash Typology'. The cover is red with a circular graphic of a road and a car. Text on the cover includes 'PUBLICATION NO. FHWA-HRT-10-024', 'APRIL 2010', and 'U.S. Department of Transportation Federal Highway Administration Research, Development, and Technology Turner-Fairbank Highway Research Center 6300 Georgetown Pike McLean, VA 22101-2296'.

SUMMARY REPORT

Safety Evaluation of Transverse Rumble Strips on Approaches to Stop-Controlled Intersections In Rural Areas

Transverse rumble strips (TRSs) (also called in-lane rumble strips) have been used by some agencies to warn drivers in rural areas that they are approaching a stop sign. The strips typically consist of grooves crossing the roadway surface to provide a tactile and audible warning for drivers. Figure 1 shows an example of TRSs on a rural road in Minnesota.

Many studies have focused on the effect of TRSs on driver behavior, and there is some evidence that TRSs are effective in reducing the intersection approach speeds.^{1,2} However, the results from these crash-based studies are not reliable due to the lack of rigor in the accident evaluation designs.³

The objective of this effort was to examine the impact of TRSs on crashes, specifically total crashes, injury crashes, and property crash types, such as right-angle and run stop sign crashes. The effort also included an economic analysis to investigate the tradeoffs between different crash types. It could be hypothesized that the major effect of TRSs would be to reduce instances of drivers failing to stop at an intersection because they are unaware of the intersection (or stop sign) presence (i.e., reduce run stop sign crashes). However, by increasing the driver's awareness of the upcoming intersection, the TRSs might also affect crashes where the driver stops at the sign but then pulls out into the path of an oncoming vehicle (i.e., reducing right-angle crashes). Thus, analysis of both is warranted.

Figure 1. TRSs on a rural road in Minnesota.



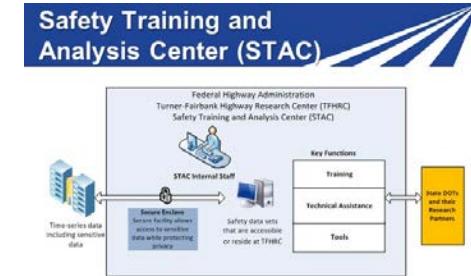
Source: Minnesota Department of Transportation (MDOT)

HSIS HIGHWAY SAFETY INFORMATION SYSTEM

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

Safety Training and Analysis Center (STAC)

- A Secure Enclave:
 - Established at TFHRC
 - To access PII in SHRP2/NDS data
 - Remotely access NDS data from VTTI
- Tools Available
 - Data analysis tools (Python, SAS, R)
 - Roadway Information Database (RID)
 - Video Analytics Tools
- <https://highways.dot.gov/data-sets/safety-training-and-analysis-center/about-stac>



STAC Goals and Supporting Actions

- Expand understanding of the SHRP 2 Safety Data
 - Informational material for a variety of audiences
- Expand access to these data, incl. PII
 - Pilot test secure data access
 - Enclave at TFHRC
- Expand usability of these data
 - Data analysis tools and reduced data set development
 - EAR tools, Dynamic-segmentation tool for non-GIS proficient users
- Expand user base
 - Research opportunities – Fellowships, Sabbaticals
 - BAA, IAP, Pooled Fund
 - Naturalistic Study Data Pooled Fund Study (6 States)



Ongoing SHRP2 FHWA Activities

- SHRP2 Implementation Assistance Programs
 - Speed (WA, MI)
 - Weather (WY)
 - Pedestrians (FL)
 - Lighting (WA)
 - Work Zones (MN)
- Broad Agency Announcement Recipients
 - Safety Enforcement (NY)
 - Elderly Drivers (FL, IA)
 - Work Zones (MI, MO)
 - Rural (IA)
 - Speed-Safety Relationships (MO, OH, UT)

Human Factors



Laboratory Experiments

Conducting studies to assess comprehension of signing and alternative designs.



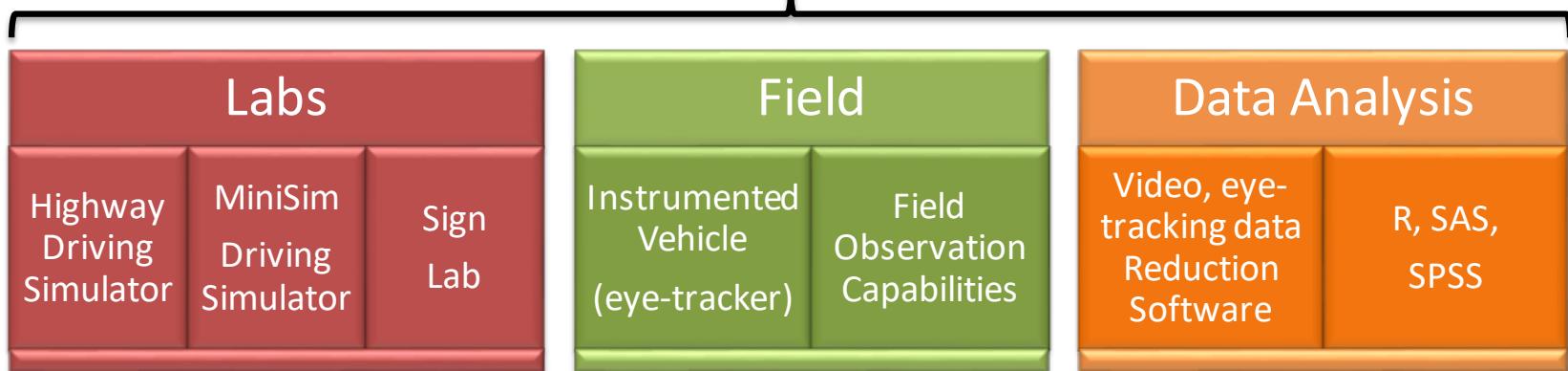
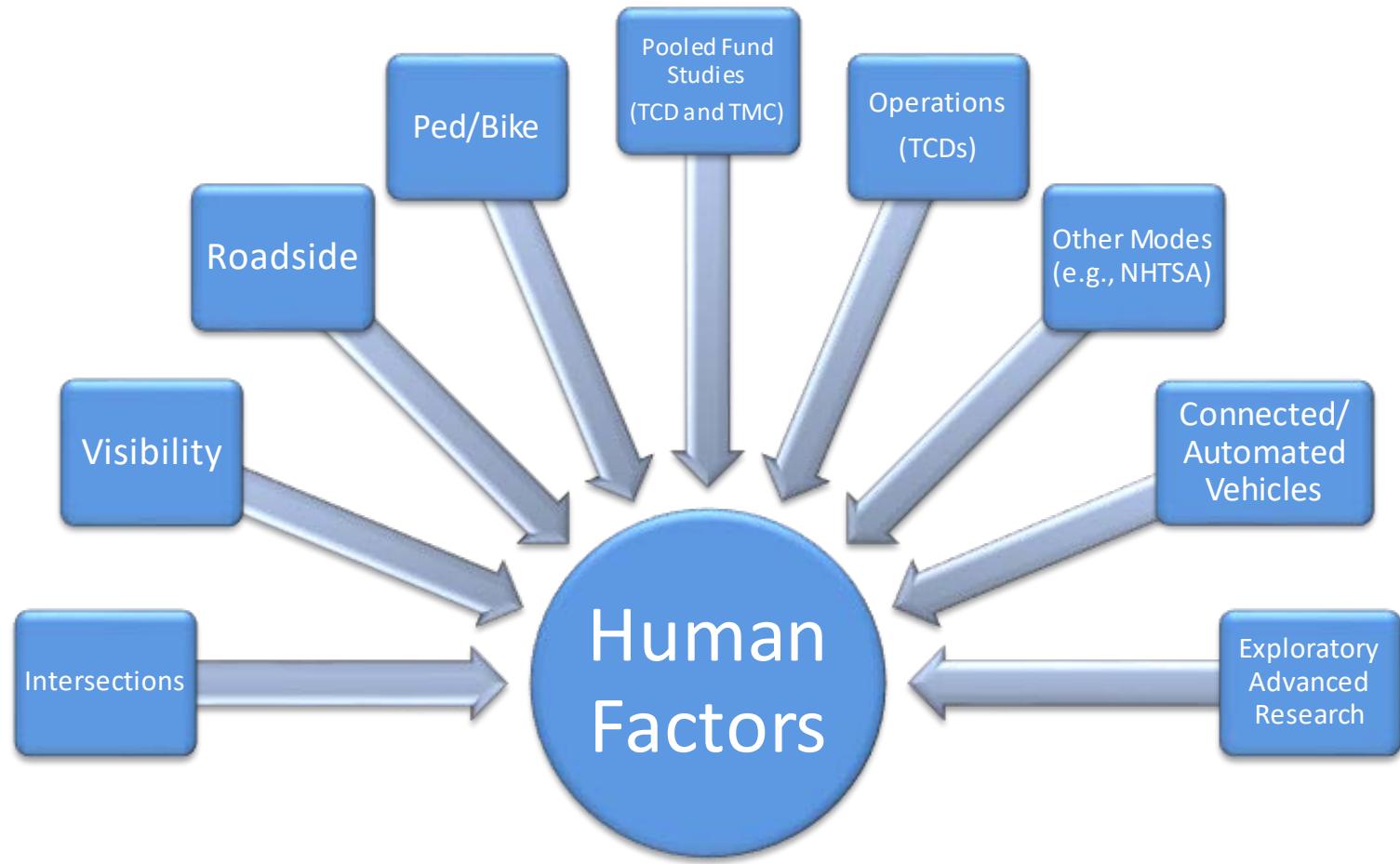
Driving Simulations

Examining driver responses in simulators to conduct safe and effective testing of new and existing driving scenarios and technologies.



Real World Testing

Studying driver behavior and performance in a real world setting.



Laboratory Capabilities Expansion

- Level 2 Automation Field Research Vehicle
- Integration of Field Research Vehicle with Highway Driving Simulator
- Virtual Reality Lab Bike Simulator
- Multiplayer Simulator Platform Development

