

# Turner-Fairbank Highway Research Center Office of Safety and Operations Research and Development (R&D)

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The Federal Highway Administration's (FHWA) Office of Safety and Operations R&D oversees nationally coordinated traffic safety and operations research to reduce highway crashes, fatalities, and injuries and produce next-generation technologies and tools to improve transportation system productivity, efficiency, and performance. The office consists of five teams: Roadway Safety, Safety Data and Analysis, Human Factors, Transportation Enabling Technologies, and Transportation Operations Applications. Major projects across the teams include Complete Streets, vulnerable road user safety initiatives, connected and automated vehicles, cooperative driving automation (CDA), and vehicle-to-everything technologies research. (See references 1–5.)



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The Office of Safety and Operations R&D coordinates research to advance the objectives of the Safe System Approach: safer people, safer roads, safer vehicles, safer speeds, and post-crash care.<sup>(6)</sup> The office's researchers coordinate with professionals across multiple transportation disciplines in the public sector, academia, and industry to attain shared objectives.

## FACT SHEET

### ROADWAY SAFETY

The Roadway Safety Team works to keep vehicles on the roadway and minimize the consequences of conflicts between vehicles and nonoccupants on roadways and intersections. The team performs research in the following areas:

- Improving intersection safety.
- Informing drivers about their vehicle's position on the road and protecting them from roadway departures.
- Exploring the safety and operational effects of roadway geometric design.
- Promoting safer driving speeds through engineering and behavioral strategies.

### SAFETY DATA AND ANALYSIS

The Safety Data and Analysis Team works to improve the data quality and analytical tools used to evaluate the effectiveness of safety improvements. The team maximizes high-value safety datasets to provide highway safety stakeholders and others in the transportation community with

training, technical assistance, and access to data and analytical tools to assess and improve roadway safety performance.

The team manages the Development of Crash Modification Factors (DCMF) program, which works toward these goals:

- Saving lives by identifying new safety strategies that effectively reduce crashes.
- Advancing plans for installing safety strategies nationwide by promoting their safety effectiveness.
- Managing the Evaluation of Low-Cost Safety Improvements Pooled Fund Study (ELCSI-PFS).<sup>(7)</sup> The ELCSI-PFS evaluates unproven, low-cost safety countermeasures to develop high-quality crash modification factors that meet the criteria for inclusion in the *Highway Safety Manual*.<sup>(8)</sup>

### HUMAN FACTORS

Human factors studies help researchers better understand transportation users' needs and limitations. By considering all road users' behaviors and capabilities,

roadway designers can minimize human errors and enhance public safety by decreasing crashes and fatalities. The Human Factors Team supports many of the research projects and programs undertaken within the other R&D focus areas. The team's current focus areas include vulnerable road user safety and the potential impacts of deploying automation in the transportation system.

The team participates in the following activities as part of the Traffic Control Device (TCD) PFS:<sup>(9)</sup>

- Identifying human factors, safety, and operational issues related to TCDs.
- Selecting new and existing TCDs for evaluation.
- Initiating and monitoring research projects.
- Disseminating results.
- Facilitating collaboration and information sharing among members.



## TRANSPORTATION ENABLING TECHNOLOGIES

The Transportation Enabling Technologies Team focuses on new and evolving technologies used in surface transportation, emphasizing improved safety, efficiency, and mobility in the movement of people and goods and the resilience of the transportation system. The team studies CDA, advanced modeling and simulation, vehicle-infrastructure integration, and Transportation Systems Management and Operations (TSMO).

Through this team, FHWA is leading national efforts to develop, test, and validate concepts for CDA and automated driving systems (ADS) based on concepts of operations for new TSMO strategies, such as identifying traffic incident management scenarios that provide new strategies for first responders using ADS.<sup>(10,11)</sup> This work focuses on the following:

- Using open-source software to encourage collaboration and participation between engineers and researchers.
- Accelerating market readiness and CDA technology deployment.
- Advancing safety, security, data, and artificial intelligence.

## TRANSPORTATION OPERATION APPLICATIONS

Research by the Transportation Operations Applications Team focuses on developing intelligent transportation systems and connected and automated vehicle (CAV) application technologies. The team

studies improved analysis, modeling, and simulation (AMS) tools; applications of advanced technologies for traffic management; and next-generation transportation management systems. Current activities include the following:

- Using AMS tools to evaluate novel transportation solutions that leverage emerging technologies, data sources, and alternative designs and strategies to optimize transportation safety and efficiency.<sup>(12)</sup>
- Defining an AMS framework for CAV applications to adapt, reengineer, and validate the models and tools available to agencies and provide a mechanism to share them with public agencies.<sup>(13)</sup>
- Participating in the Transportation Management Centers PFS, developing technical resources and information to support agencies as they plan for and invest in the capabilities needed to actively manage and operate the next generation of transportation management systems.<sup>(14)</sup>

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