

**United States Department of Transportation
Annual Modal Research Plan FY 2026
Program Outlook FY 2027**

FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION

*June 2, 2025 – Phase I Draft
July 18, 2025 – Phase II Draft
September 26, 2025 – Revised Draft
December 4, 2025 – Revised Draft*

*OFFICE OF RESEARCH AND REGISTRATION
JON MUELLER, ACTING ASSOCIATE ADMINISTRATOR*

*OFFICE OF RESEARCH
NICOLE MCHEL, ACTING DIRECTOR*

Executive Summary

Research & Technology Program Overview

The Federal Motor Carrier Safety Administration (FMCSA) carries out a multiyear Motor Carrier Research & Technology (R&T) Program under the authority of 49 U.S.C. § 31108. The R&T Program includes in-house, contract, congressionally mandated, and joint-funded initiatives with other U.S. Department of Transportation (DOT) organizations, the private sector, and academia. FMCSA is authorized to carry out research, development, and technology transfer activities with respect to:

- The causes of crashes, injuries, and fatalities involving commercial motor vehicles (CMVs), including crash analysis.
- Means of reducing the number and severity of crashes, injuries, and fatalities involving CMVs, including new entrant training and testing.
- Improving CMV safety and efficiency through technological innovation and improvement, including through advanced driver assistance systems.
- Improving CMV safety through driver-centric research including human factors, fatigue, impairment, distraction, training, compensation, and related driver issues, including information about safe truck parking.
- Improving technology used by enforcement officers when conducting roadside inspections and investigations to increase efficiency and accuracy of inspections.
- Increasing the safety and security of hazardous materials transportation.

FMCSA's mission is to reduce crashes, injuries, and fatalities involving large trucks and buses. In support of this goal, FMCSA's Office of Research works to reduce the number and severity of CMV crashes and enhance the efficiency of CMV operations by:

- Providing data, producing statistics, and conducting systematic studies directed toward fuller scientific discovery, knowledge, or understanding of motor vehicle safety performance.
- Identifying, testing, and supporting technology transfer and deployment of CMV safety technologies.

The R&T Program provides an empirical basis for answering research questions in support of the Agency's safety mission. By using research to better understand factors associated with crashes, FMCSA can streamline and prioritize its countermeasures development and enforcement efforts, focusing on vital Federal safety oversight functions.

FMCSA's FY 2026 R&T activities advance and align with the DOT strategic goals of Safety, Infrastructure, Innovation, and Efficiency. FMCSA's research efforts are focused, results-based, measurable, and produce documented findings to support stakeholders involved in improving CMV safety.

STRATEGIC GOAL

STRATEGIC OBJECTIVE

SAFETY

Reaffirm that safety is the Department's top priority.

- 1.1 Improve aviation safety
- 1.2 Reduce surface transportation-related fatalities and serious injuries
- 1.3 Improve transportation worker safety
- 1.4 Develop improved safety management systems across transportation modes

INFRASTRUCTURE

Invest in high-quality transportation infrastructure capacity to unlock American prosperity.

- 2.1 Accelerate project delivery
- 2.2 Construct projects to expand system capacity
- 2.3 Improve system condition and reliability
- 2.4 Position the U.S. transportation sector for economic competitiveness at home and abroad

INNOVATION

Lead the world by bringing the best of American ingenuity to transportation.

- 3.1 Reduce regulatory burden
- 3.2 Enable transportation technology development and adoption
- 3.3 Invest in transformative technologies

EFFICIENCY

Improve efficiency and accountability across the Department.

- 4.1 Modernize DOT operations

Anticipated Outcomes

FMCSA's R&T Program develops the knowledge, practices, and technologies needed to address safety challenges and answer questions that arise in prioritizing enforcement resources and improving the safety of commercial drivers, vehicles, and carriers. Crashes involving CMVs carry significant human costs in the form of injuries and fatalities. These human costs are also economically significant; specifically, in 2022, the estimated cost of all large truck and bus crashes was \$152 billion, and there were 5,279 fatalities associated with large truck and bus crashes. In general, research conducted by FMCSA contributes to (1) the development of safety technologies [for use by State enforcement entities](#) (principally highway patrol and law enforcement departments), as well as by commercial carriers, and (2) recommendations for best practices to improve driver performance and the safe operation of CMVs by motor carriers, thus contributing to a reduction in crashes. Through the R&T Program's research activities, FMCSA will:

- Better understand the causes and impacts of CMV crashes thereby supporting efforts to develop safety countermeasures to reduce crashes and remove unsafe drivers, vehicles, and carriers from the Nation's roads.

- Support continued progress in the development and testing of CMV safety technologies including advanced driver assistance systems (ADAS) and driver monitoring technologies, as well as advanced braking, tires, steering, lighting, and mirror systems.
- Better understand the safety impacts associated with the adoption of automated CMVs, identify carrier best practices for operating CMVs equipped with ADS (automated driving systems), and develop evaluation methods for assessing carriers' safety oversight for operating ADS-equipped CMVs.
- Identify, develop, and assess technologies used by enforcement officers when conducting roadside inspections and investigations to increase efficiency and accuracy of vehicle inspections.
- Investigate application of advanced remote and wireless-based concepts for completing vehicle and driver inspections at highway speeds.
- Advance the industry knowledge base related to [driver issues impacting safety such as fatigue](#), distraction, drug and alcohol use, training, and enforcement actions.
- Continue to identify and refine carrier best practices for maintaining and operating CMVs as well as for training and monitoring driver safety performance.
- Assess road network and infrastructure issues impacting CMV safety, including issues related to truck parking.
- Advance the Department's strategic goals through mission-specific research.

Ultimately, FMCSA's R&T efforts will contribute to the Agency's mission of reducing the number and severity of CMV-involved crashes on the Nation's highways, saving lives, and reducing associated economic costs.

Evaluation and Performance Measurement

FMCSA's R&T Program focuses on (1) supporting the safety goals and regulatory priorities of the Agency's other program offices, and (2) directives from other Federal organizations (e.g., Congress and the Government Accountability Office (GAO)). The R&T Program has specific annual performance goals, which demonstrate the program's outputs and impact across multiple research areas in support of FMCSA's safety mission and the Department's strategic goals. To ensure continuing integration with Departmental objectives, and to prevent duplicative research, the R&T Program participates in OST-R annual research reviews.

The R&T Program evaluates its own performance across the categories of mission support, publication of research reports, and customer feedback. These categories inform internal processes for measuring, sustaining, and improving performance.

The R&T Program establishes performance baselines, both at the program level and at the project level. Project statements of work establish deliverables, milestones, and monitoring plans. Contracted research teams submit monthly reports detailing progress and R&T Program staff continually monitor these projects to ensure baselines are met.

The R&T Program also has several mechanisms in place for analyzing emergent trends and evaluating the benefits created through DOT-sponsored research. First, the R&T Program collaborates closely with other DOT modes, participating in multiple working groups and coordinating joint research efforts when developing annual research plans. By participating in the DOT RD&T Planning Team, the R&T Program works to harmonize its efforts with those of other DOT modes, ensuring cross-modal collaboration and efficient use of Federal resources.

Next, the Agency's Research Executive Board (REB) review process includes discussion of the justification for each research initiative; if REB members are aware of other research efforts being conducted by other Federal or State agencies, or private organizations, the research idea is re-evaluated and/or removed from the budget request. The REB considers the potential benefits and risks of funding proposed research projects and makes recommendations accordingly.

The R&T Program also works closely with State governments and agencies and external stakeholders (e.g., industry associations and research institutes) to ensure the Agency's research and technology portfolio addresses current needs in the transportation safety environment. By maintaining regular communication with the States, independent committees, and industry stakeholders, FMCSA stays apprised of non-agency-funded research efforts and uses that knowledge to inform its research plans.

Table 1 - FY 2026 RD&T Program Funding Details

RD&T Program Name	FY 2026 President's Budget Request* (\$000)	Basic (\$000)	Applied (\$000)	Technology Transfer (\$000)	Facilities (\$000)	Experimental Development (\$000)	Major Equipment, R&D Equipment (\$000)
Produce Safer Drivers	\$1,735	\$189	\$825	\$318	-	\$298	\$105
Improve Safety of CMVs	\$4,575	\$498	\$2,176	\$838	-	\$787	\$276
Produce Safer Carriers	\$1,595	\$174	\$759	\$292	-	\$274	\$96
Advance Safety and Research Through Information Based Initiatives	\$5,313	\$579	\$2,527	\$973	-	\$914	\$321
Enable and Motivate Internal Excellence	\$854	\$93	\$406	\$156	-	\$147	\$52
Totals	\$14,073	\$1,533	\$6,693	\$2,577	-	\$2,420	\$850

*The AMRP reflects funding as found in the annual President's budget request per 49 U.S.C. Chapter 65 Sec. 6501 Research Planning. The enacted numbers will be posted as part of the President's budget request for the ensuing fiscal year.

Table 2 - FY 2026 RD&T Program Budget Request by DOT Strategic Goal

RD&T Program Name	FY 2026 President's Budget Request* (\$000)	Safety (\$000)	Infrastructure (\$000)	Innovation (\$000)	Efficiency (\$000)
Produce Safer Drivers	\$1,735	\$931	\$106	\$514	\$185
Improve Safety of CMVs	\$4,575	\$2,455	\$279	\$1,354	\$487
Produce Safer Carriers	\$1,595	\$856	\$97	\$472	\$170
Advance Safety and Research	\$5,313	\$2,852	\$324	\$1,572	\$565
Enable and Motivate Internal	\$854	\$458	\$52	\$253	\$91
Totals	\$14,073	\$7,553	\$858	\$4,165	\$1,497

***The AMRP reflects funding as found in the annual President's budget request per 49 U.S.C. Chapter 65 Sec. 6501 Research Planning. The enacted numbers will be posted as part of the President's budget request for the ensuing fiscal year.**

Table of Contents

Executive Summary.....	2
Chapter 1 – FY 2026 RD&T Programs.....	8
Program Name: Research & Technology.....	8
Program Description:.....	8
Major Program Objectives:	8
Anticipated Program Activities:.....	8
Potential Program Outputs, Outcomes, and Impacts on Technologies and Practices:..	14
Potential Economic or Societal Impacts:	14
Progress Made Toward Achieving Strategic Goals:.....	15
Collaboration Partners:.....	15
Chapter 2 – FY 2027 RD&T Programs.....	16
Program Name: Research & Technology.....	16
Program Description:.....	16
Major Program Objectives:	16
Anticipated Program Activities:.....	16

Chapter 1 – FY 2026 RD&T Programs

Program Name: Research & Technology

(\$14,073)

Program Description:

The FMCSA R&T Program provides scientific safety research on driver behavior, vehicle and carrier operations, and relevant technology. These contributions have proven critical in supporting Agency safety rulemakings, identifying enforcement priorities, and facilitating technology transfer to the marketplace. Program activities include developing enhanced safety technologies, promoting safe rest habits for drivers, evaluating the safety implications of automated and semi-automated vehicles, and improving database depth and utilization. For FY 2026, the R&T Program will continue its emphasis on research related to enhancing the safety of drivers, vehicles, and carriers, while expanding research in automated driving systems, roadside screening technologies, as well as driver employment, licensing, and fitness. These projects provide foundations for the Agency's rulemaking and enforcement priorities. The R&T Program is authorized under 49 USC 31108. It advances FMCSA focus areas and DOT strategic goals of Safety, Infrastructure, Innovation, and Efficiency.

Major Program Objectives:

- **Produce Safer Drivers:** Develop driver-based safety countermeasures to reduce crashes.
- **Improve Safety of Commercial Motor Vehicles (CMVs):** Improve truck and motorcoach safety through vehicle-based research and the deployment of CMV safety technologies.
- **Produce Safer Carriers:** Improve motor carrier safety by compiling and communicating best management practices to motor carriers and working with industry to accelerate adoption of safety-enhancing technology.
- **Advance Safety and Research through Information-Based Initiatives:** Support Agency research efforts by investigating the overall business, economic, and technical trends in the CMV industry, and by identifying and evaluating new and refined methods for collecting, analyzing, and disseminating safety-related information.
- **Enable and Motivate Internal Excellence:** Ensure the relevance, quality, and performance of research and technology activities and develop efficient methods to respond quickly and flexibly to Departmental and Agency needs.

Anticipated Program Activities:

FMCSA's R&T Program provides scientific research on driver, vehicle, and carrier issues impacting CMV safety. The R&T program also conducts cross-cutting research related to safety data collection and information sharing.

Driver-related research impacts safety performance in a variety of areas, including, but not limited to distraction, drowsiness, medical conditions, drug and alcohol use, in-cab human factors, hours-of-service rules, wellness, and factors impacting attainment and revocation of a commercial driver's license (CDL).

- **Truck Parking:** The lack of truck parking across the country continues to be a safety issue for CMV drivers that also affects their working conditions and quality of life. Safe and convenient truck parking is necessary for drivers to comply with hours-of-service regulations and get proper rest. FMCSA will continue efforts to improve Truck Parking Information Management Systems so that CMV drivers receive accurate and timely information on truck parking availability. Through a synthesis study of the technology in use across the country, FMCSA hopes to define a common technology platform that could be consistently deployed across the multiple jurisdictions. (DOT Strategic Goals supported: ***Safety, Infrastructure, Innovation***)
- **Driver Fitness:** The Federal Motor Carrier Safety Regulations (FMCSR) define the medical and physical conditions required to obtain the CDL Medical Certificate. Examples of past research include studies on the safety impacts of drivers with limb loss and impairment or commercial drivers who are deaf or hard of hearing. FMCSA will also undertake research into potential solutions for improving the working conditions of CMV drivers. (DOT Strategic Goals supported: ***Safety, Efficiency***)
- **Driver Behavior:** The behavior of CMV drivers and drivers of surrounding vehicles is a common factor in crashes. While there are national requirements for CMV driver training, the training for light vehicle drivers varies by State and in most cases, lacks sufficient content on safe driving around CMVs. FMCSA will compile information on how the public is trained to drive safely around CMVs, and if they are, to what degree. Results and findings will generate targeted outreach campaigns, materials, and the development of modifications to State-level driver training curricula. It's also essential to understand and influence the behavior of passenger car drivers while operating around CMVs, as their behaviors are often contributing factors in crashes where CMVs and passenger cars are involved. (DOT Strategic Goals supported: ***Safety***)
- **CMV Driver Fatigue:** Driver fatigue will remain an important area of focus for the R&T Program. Support will continue for the North American Fatigue Management Program to ensure the content of the training courses and materials keeps pace with the latest understanding of task monotony and fatigue/hypo-vigilance, also known as passive fatigue. In addition, targeted outreach for certain populations, such as those operating under an agricultural exemption, will ensure the program is reaching critical audiences. Two Phase II Small Business Innovative Research (SBIR) projects were completed in FY25 and have been awarded Phase IIb contracts. Both projects are focused on developing prototypes of different Driver Readiness Assessment technologies that will determine the level of driver alertness prior to the start of a driving shift. (DOT Strategic Goals supported: ***Safety, Innovation***)

Vehicle research focuses on the application of technologies, systems, and operating concepts to reduce crash risk and includes research on ADAS and ADS, as well as

improvements in traditional vehicle safety systems such as brakes, steering, mirrors, and lighting. Research on leveraging advanced monitoring and diagnostic technologies to improve motor vehicle screening by State CMV enforcement agency partners at the roadside is also included with a focus on improving both the thoroughness and efficiency of safety screening processes.

- **ADAS and Human Factors:** In 2024, FMCSA published research that documented empirical safety data that commercial fleets using ADAS, such as automatic emergency braking and forward collision warning, and lane departure warning systems, have experienced significant reductions of CMV rear-end crashes. Based on three years of data from 50,000 trucks traveling 5.7 billion miles and an analysis of 9,000 crashes and 9,000 near crashes, trucks equipped with ADAS had 20-40 percent lower crash rates when compared to trucks without any ADAS. While these findings are encouraging from a safety standpoint, the R&T Program is continuing research to ensure that CMV drivers stay engaged and vigilant with the driving task and not overly reliant on or complacent with ADAS. The goal is to understand the associated human factors and develop driver training materials for safe and effective use of ADAS. (DOT Strategic Goals supported: *Safety, Innovation*)
- **TechCelerate Now Program:** FMCSA will continue to partner with the motor carrier industry to promote the adoption of ADAS by fleets and drivers and measure deployment growth levels through the Agency's TechCelerate Now Program. The R&T Program will conduct further research to quantify the safety benefits of newer ADAS such as camera-based mirror systems and automated steering assisting systems. The Program will also deliver outreach with support from FMCSA field operations to reach an even larger population of small fleets and drivers. (DOT Strategic Goals supported: *Safety, Innovation*)
- **Automated CMV Evaluation (ACE) Program:** Automated vehicles offer the potential for improving safety and reducing environmental impacts by preventing and mitigating crashes. FMCSA R&T's ACE Program will continue perform track-based proof-of-concept testing of interactions between self-driving trucks and law enforcement or other roadside public safety officials and development of automation technologies using FMCSA's research vehicles. These tests will inform the development of national uniform consensus standards for the safe interaction of self-driving trucks with roadside truck inspectors, emergency responders, work zone workers, and others. The ACE Program is also researching safety metrics and oversight requirements in support of the Agency's related rulemaking activities. A key aspect of this will focus on collecting naturalistic driving data to serve as a basis for future operational safety metrics for ADS-equipped CMVs. Lastly, the Program will be conducting research into the safety impacts of the use of smart trailers in ADS fleet operations. The information gathered through the ACE program enables FMCSA to support the DOT Automated Vehicle Framework by researching operational scenarios unique to commercial motor vehicle operations, such as inspections and interactions with law enforcement personnel. This work emphasizes safety and regulatory clarity while supporting evidence-based standards and robust data collection. (DOT Strategic Goals supported: *Safety, Innovation*)

- **Commercial Motor Vehicle Roadside Technology Corridor (CMVRTC):** CMVRTC is a collaboration between FMCSA and several other Federal and State agencies to promote technology transfer. Specifically, CMVRTC supports testing facilities at weigh stations to demonstrate, test, evaluate, and showcase innovative safety technologies that detect unsafe vehicle issues under real-world conditions to improve commercial truck and bus safety. Results from the program such as roadside tire safety screening systems shape development of functional specifications for Motor Carrier Safety Assistance Program (MCSAP) and High Priority-Innovative Technology Deployment grant applications. A key focus in FY 2026 will be the dissemination of tire safety screening system technical specifications and performance results. (DOT Strategic Goals supported: *Safety, Infrastructure, Innovation*)
- **Longitudinal Study of CMV Intelligent Tires-Phase 2:** This project evaluates the dynamic (in motion) weight distribution of loads, particularly in dual tire applications, using intelligent/smart tire technology. This study will monitor and compare the impact of weight shift and imbalance due to differences in tire inflation, temperature, and tread wear among new and retread tires, and the overall impact on safety and vehicle stability. By collecting tire characteristics data and use patterns over 2 years will inform inspection criteria and rulemaking as well as drive innovation in tire design and tire inflation technologies. The project will improve understanding of factors that lead to tire failure, create a data set of tires in use on CMVs across the Nation under varying conditions, provide significant insight into the dynamic weight shifting of loads on CMV tires under normal operating conditions, increase knowledge of the extent of tire use and potential abuse in fleets, and evaluate tires that experience periods of excessive loading or decreased air pressure. (DOT Strategic Goals supported: *Safety*)

Carrier-related research focuses on evaluating, refining, and developing new and existing carrier safety assessment tools, methods, and data management systems utilized in carrying out the Agency's carrier oversight responsibilities. The R&T Program also conducts research to identify industry best practices for a variety of carrier-based management responsibilities and functions that impact safety including research into motor carrier safety culture, driver training and retention issues, and vehicle maintenance and inspection practices.

- **CMV Safety Culture Assessment:** A robust safety culture at a motor carrier is a significant contributor to improved safety performance. FMCSA will use past research and understanding of what safe carriers do to reduce crashes and improve overall safety to develop a Motor Carrier Safety Culture Self-Assessment Tool. Implementation of safety culture improvements that derive from a carrier's internal assessment are likely to be far more relevant and effective than guidance coming from FMCSA that would be generic and overly broad. (DOT Strategic Goals supported: *Safety*)
- **Hours of Service Pilot Programs:** To improve driver working conditions and quality of life, FMCSA is launching two new pilot programs to study increased flexibility in hours-of-service regulations. The goal for each pilot is to gather data on whether giving drivers more control over their schedules can improve rest and enhance safety.

- Flexible Sleeper Berth: This pilot will allow participating drivers to split their 10-hour off-duty period into more flexible combinations, including 6/4 and 5/5 splits. (DOT Strategic Goals supported: **Safety, Efficiency**)
- Split Duty Period: This pilot will allow participating drivers to pause their 14-hour on-duty period for a period of no less than 30 minutes and no more than 3 hours. (DOT Strategic Goals supported: **Safety, Efficiency**)
- **Safe Driver Apprenticeship Pilot (SDAP) Program:** As required by section 23022 of the Bipartisan Infrastructure Law (BIL), FMCSA established the SDAP Program, which is evaluating the safety performance of certain 18-, 19-, and 20-year-old CDL holders to operate CMVs in interstate commerce. The BIL specified a 3-year data collection period which will conclude in November of 2025. Recruitment of motor carriers, experienced drivers, and apprentices continues as we try to collect as much data as we can in order determine if the SDAP Program is meeting an equivalent level of safety compared to what is allowed by current regulations. A final report is expected in the summer of 2026. (DOT Strategic Goals supported: **Safety, Efficiency**)
- **Work-zone and high-risk incident areas:** Large trucks are overrepresented in fatal work zone crashes. Areas which are prone to congestion and often feature narrowed shoulders and complex signage, remain a hazardous space for interactions among vehicles. In FY 2026, the R&T Program will work with the Federal Highway Administration (FHWA) and State Departments of Transportation on developing a national framework for sharing standard data elements and following uniform operational procedures to reduce CMV crashes in work zones. These efforts will enable existing connected CMVs and future semi- and fully automated CMVs to safely navigate work zones and be alerted to slow moving traffic ahead due to other incidents and congestion. (DOT Strategic Goals supported: **Safety, Infrastructure**)
- **Development of Training on Fostering a Collaborative Safety Dynamic:** Achieving long-term compliance through collaborative safety relationships with motor carriers and drivers will further FMCSA's mission to reduce large truck and bus crashes. To realize this goal, training for safety investigators must go beyond the procedural elements of their work and provide them with the tools needed to gain compliance, including training on effective communication styles and strategies. This project will develop a short training course for safety investigators on creating and fostering a collaborative safety dynamic with motor carriers and drivers by leveraging effective communication styles and strategies. (DOT Strategic Goals supported: **Safety**)
- **Cybersecurity Outreach for Fleet Operators:** This project will extend FMCSA's outreach on cybersecurity awareness and best practices and develop innovative outreach methods that will change the way that information is presented to carriers and to the trucking industry in general. In addition, the project will develop different types of outreach materials to educate carriers and owner operators of good cybersecurity practices. (DOT Strategic Goals supported: **Safety, Infrastructure, Innovation**)

Cross-cutting research completed under the R&T program often focuses on enhanced data collection and information sharing activities, as well as on technologies and oversight processes with the potential to positively impact safety across multiple dimensions involving driver, vehicle, and carrier safety.

- **Level VIII Inspections:** Each year, State, and local truck inspectors conduct approximately 2.9 million roadside inspections and screen about 100 million CMVs. If technically and operationally feasible, this project may incentivize the implementation of electronic (in-motion) CMV inspections to reduce idling time at State roadside inspection stations, which will in turn increase the efficiency of CMV operations. In addition, the number of inspections conducted is limited by the number of personnel available to conduct inspections, whereas in-motion inspections would not have the same limitation. Proof of concept field testing began in March 2024 with four States and six motor carriers. The initial results were promising with the test system increasing enforcement touches by over 200 percent over traditional methods. In FY 2026, the field test will seek to address issues such as automated processing of data, driver validation, and related roadside interdiction procedures. (DOT Strategic Goals supported: ***Safety, Infrastructure, Innovation***)
- **Crash Causal Factors Program (CCFP):** The CCFP is a detailed crash data collection and analysis effort. The CCFP will identify key factors that contribute to crashes involving CMVs, inform countermeasures to prevent these crashes from happening, and establish a foundation for continued data collection, sharing, and analysis. Ultimately, the CCFP's goal is to help reduce crashes and improve safety on our Nation's roadways by pursuing a nuanced, updated understanding of crashes involving CMVs. The first study under this program, the Heavy-Duty Truck Study, is in the final stages of development with data collection planned to begin in the first quarter of 2026. (DOT Strategic Goals supported: ***Safety, Efficiency***)
- **Information Sharing:** New R&T Program data-related activities in FY 2026 include improved integration of safety information databases, and efforts to expediently disseminate driver, vehicle, and carrier safety information across State and Federal organizations involved with CMV safety oversight. Selected activities include efforts to incorporate new data sources into existing databases and a study to gather crash data that is not currently widely collected. (DOT Strategic Goals supported: ***Safety, Innovation, Efficiency***)
- **Small Business Innovation Research (SBIR) Program:** FMCSA's participation in the US DOT's SBIR Program will continue to stimulate technological innovation, utilize small businesses to meet Federal research and development needs and increase private sector commercialization of innovations made possible by Federal research funding. This program helps ensure that small businesses continue to play a key role in technological transformation. (DOT Strategic Goals supported: ***Safety, Innovation***)
- **Safe Driving Around CMVs:** For two-vehicle crashes involving a truck and a passenger vehicle, trucks were assigned the critical reason in 44 percent of the crashes

while passenger vehicles were assigned in 56 percent of the crashes (FMCSA's [Large Truck Crash Causation Study](#)). Driver recognition and driver decision errors were the cited as critical reasons for 89 percent of the passenger vehicle assigned crashes. In two other studies, ([Accident Analysis & Prevention](#)) 210 light vehicle – heavy vehicle critical incidents were recorded. Of these, 78% were initiated by light vehicle drivers, while the remaining 22% were initiated by heavy vehicle drivers. Aggressive driving, on the part of the light vehicle driver, was found to be the primary Contributing Factor for light vehicle driver-initiated incidents. Improving passenger car drivers' knowledge about how to safely operate around CMVs will reduce these types of crashes. This project will review National, State, public, private, and other organization's recommended passenger car driver training curriculum and document the content specific to safe driving around CMVs. The secondary goal is to develop recommendations and best practices for updating standard training curriculum to include safe driving around a CMVs. (DOT Strategic Goals supported: **Safety**)

- **Countermeasures that Work:** Crashes involving CMVs are a complex problem, with many mitigating factors. Traditional compliance and investigation programs only target areas within FMCSA's jurisdiction, and often causal factors fall outside of it. This includes crashes attributed to causal factors of passenger car drivers and involving vehicles or items that FMCSA does not have jurisdiction over, such as intrastate motor carriers, school buses, and roadway characteristics. In those instances, outreach, innovation, and education becomes of utmost importance, and many States have innovative programs in place to do so. This project will develop a repository of best practices from State CMV grants, for projects, programs, and initiatives that are effectively driving down CMV crashes beyond the traditional compliance programs. (DOT Strategic Goals supported: **Safety, Innovation**)

Potential Program Outputs, Outcomes, and Impacts on Technologies and Practices:

FMCSA's research efforts are focused, results-based, measurable, and they result in documented and communicated findings to support both industry and State government organizations involved in improving CMV safety. Research projects provide evidence for the Agency's rulemaking and enforcement priorities. In addition, FMCSA's research program surveys and interacts with the advanced technology developers in the CMV industry. FMCSA's active involvement results in the selection of highly relevant, and impactful technology-related research projects. On a periodic basis, FMCSA coordinates with OST-R to scan their entire research and technology profile, as required, to document the outputs and outcome of research as it relates to the impact on technologies and rulemaking.

Potential Economic or Societal Impacts:

CMV crashes can result in loss of life, debilitating injuries, and significant damage to property and surrounding infrastructure. FMCSA's research activities help the Agency target its limited resources to the highest-risk carriers and develop programmatic initiatives that address the most important driver, carrier, and CMV safety issues. Ongoing and planned programmatic activities support and improve safety, foster innovation in transportation, and utilize data to justify greater investment or inform decision making.

Progress Made Toward Achieving Strategic Goals:

The research completed by the R&T Program has proven critical in supporting the Agency's safety mission, informing Agency safety rulemakings, identifying enforcement priorities, and facilitating technology transfer to the marketplace. Program activities include developing enhanced enforcement technologies, promoting safe rest habits for drivers, evaluating the safety implications of automated and semi-automated CMVs, and improving safety-related data sharing systems.

Collaboration Partners:

Internal Collaboration Partners

The R&T Program is working with the Bureau of Transportation Statistics on a Crash Causal Factors Program (CCFP) that will provide new insights into contributing factors to CMV crashes, as well as coordinating with NHTSA to ensure minimal overlap between FMCSA's CCFP and NHTSA's planned expansions of the Crash Investigation Sampling System (CISS). FMCSA also works with FHWA and the Intelligent Transportation Systems Joint Program Office to answer research questions related to truck parking, automated and connected CMVs and associated human factors issues, heavy vehicle crash avoidance and enterprise data, and the accelerated deployment of CMV safety technologies.

External Collaboration Partners

The R&T Program regularly receives, reviews, and responds to safety-related CMV driver, carrier, and vehicle research questions and topics and provides research to support policy recommendations from other state and federal government agencies such as the Departments of Energy and Labor as well as independent associations: National Transportation Safety Board, the National Academies, the Transportation Research Board, the Motor Carrier Safety Advisory Committee, and the Commercial Vehicle Safety Alliance. FMCSA evaluates input from these organizations and adjusts the R&T agenda as needed. The R&T Program also maintains close contact with the motor carrier industry broadly, collaborating with industry associations, vehicle manufacturers, component suppliers, and motor carriers to advance safety improvement efforts.

Chapter 2 – FY 2027 RD&T Programs

Program Name: Research & Technology

The AMRP FY2027 outlook year chapter in the annual plan is not developed in alignment with the President's Budget Request of the same year due to the AMRP development schedule per 49 U.S.C. 6501 – Annual Modal Research Plans.

Program Description:

The FMCSA R&T Program provides scientific safety research on driver behavior, vehicle and carrier operations, and relevant technology. These contributions have proven critical in supporting Agency safety rulemakings, identifying enforcement priorities, and facilitating technology transfer to the marketplace. Program activities include developing enhanced safety technologies, promoting safe rest habits for drivers, evaluating the safety implications of automated and semi-automated vehicles, and improving database depth and utilization. These projects provide foundations for the Agency's rulemaking and enforcement priorities. The R&T Program is authorized under 49 USC 31108. It advances FMCSA focus areas and DOT strategic goals.

For FY 2027, the R&T Program will continue its emphasis on research related to enhancing the safety of drivers, vehicles, and carriers, while expanding research in automated driving systems, roadside screening technologies, as well as driver employment, licensing, and fitness. While the R&T Program is primarily directed at improving safety, projects and programs often address other DOT strategic goals.

Major Program Objectives:

- **Produce Safer Drivers:** Develop driver-based safety countermeasures to reduce crashes.
- **Improve Safety of Commercial Motor Vehicles (CMVs):** Improve truck and motorcoach safety through vehicle-based research and the deployment of CMV safety technologies.
- **Produce Safer Carriers:** Improve motor carrier safety by compiling and communicating best management practices to motor carriers and working with industry to accelerate adoption of safety-enhancing technology.
- **Advance Safety and Research through Information-Based Initiatives:** Support Agency research efforts by investigating the overall business, economic, and technical trends in the CMV industry, and by identifying and evaluating new and refined methods for collecting, analyzing, and disseminating safety-related information.
- **Enable and Motivate Internal Excellence:** Ensure the relevance, quality, and performance of research and technology activities and develop efficient methods to respond quickly and flexibly to Departmental and Agency needs.

Anticipated Program Activities:

FMCSA's R&T Program will continue to provide scientific research on driver, vehicle, and carrier issues impacting CMV safety. The R&T program will also continue to conduct cross-cutting research related to safety data collection and information sharing.

Driver-related research impacts safety performance in a variety of areas, including, but not limited to distraction, drowsiness, medical conditions, drug and alcohol use, in-cab human factors, hours-of-service rules, wellness, and factors impacting attainment and revocation of a commercial driver's license (CDL).

- Research to minimize the prevalence of fatigue, impaired, and distracted driving through education, evaluation of enforcement procedures, evaluation of safety systems, and development and support of outreach materials.
- Research related to human factors considerations, especially as they pertain to vehicle technologies and advanced driver assistance systems.
- Research into CMV driver fitness and qualifications, as well as CMV driver wellness to assess current and proposed policies regarding driver qualifications and fitness.
- Research related to driver hours-of-service regulations as well as effectiveness of current licensing and enforcement practices.
- Investigation of truck parking shortages and recommendations for improving truck parking availability and awareness.

Vehicle research focuses on the application of technologies, systems, and operating concepts to reduce crash risk and includes research on ADAS and ADS, as well as improvements in traditional vehicle safety systems such as brakes, steering, mirrors, and lighting. Research on leveraging advanced monitoring and diagnostic technologies to improve motor vehicle screening by State CMV enforcement agency partners at the roadside is also included with a focus on improving both the thoroughness and efficiency of safety screening processes.

- Research into safety critical vehicle systems and technologies to improve truck and motorcoach safety through deployment of CMV safety technologies and improvement of existing technologies.
- Research to test and demonstrate advanced technology, including promoting advanced driver assistance system technologies to increase industry adoption rates.
- Research to support the development and responsible deployment of automated driving systems.
- Research into vehicle maintenance considerations and vehicle inspection techniques.

Carrier-related research focuses on evaluating, refining, and developing new and existing carrier safety assessment tools, methods, and data management systems utilized in carrying out the Agency's carrier oversight responsibilities. The R&T Program also conducts research to identify industry best practices for a variety of carrier-based management responsibilities and functions that impact safety including research into motor carrier safety culture, driver training and retention issues, and vehicle maintenance and inspection practices.

- Research into the effectiveness or potential enhancements to inspection and enforcement techniques, including notices of claims or notices of violations.
- Research into carrier safety culture and development of outreach, tools, and resources to promote and encourage carriers to improve their safety culture.

Cross-cutting research completed under the R&T program often focuses on enhanced data collection and information sharing activities, as well as on technologies and oversight processes with the potential to positively impact safety across multiple dimensions involving driver, vehicle, and carrier safety.

- Research to support policy and rulemaking, such as pilot programs to evaluate the safety impacts of proposed alternative regulations.
- Research to collect data and evaluate the existing safety posture of deployed technologies, policies, and regulations.
- Research to collect data for use in evaluating future request for waivers or exemptions from existing regulations.
- Research into the causal factors of crashes to identify key contributing factors and inform countermeasures to prevent future crashes.

Additional information about DOT research can be found at <https://researchhub.bts.gov/search>.