

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

*National Highway Traffic Safety Administration
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Executive Summary

Supporting Secretarial Strategic Priorities and Research Goals

The National Highway Traffic Safety Administration (NHTSA), the successor to the National Highway Safety Bureau, was established by the Highway Safety Act of 1970 to carry out safety programs under the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966. NHTSA works every day to help Americans drive, ride, and walk safely. The Agency's mission is to "Save lives, prevent injuries, and reduce economic costs due to road traffic crashes through education, research, safety standards, and enforcement activity."

As one of nine modal administrations within the U.S. Department of Transportation (U.S. DOT), NHTSA conducts research through its Offices of Vehicle Safety Research (VSR) and Behavioral Safety Research (BSR). This research targets the safety of motor vehicles and their equipment, as well as the behavior of road users, both inside and outside vehicles, and their interactions with the surface transportation system. NHTSA's research aligns with the Secretary of Transportation's priorities of Safety, Transformation, and Cybersecurity, while also supporting the mission of the Office of the Assistant Secretary for Research and Technology (OST-R) within the U.S. DOT. OST-R focuses on integrating emerging technologies, transportation data, policy, and research across the U.S. DOT transportation modes, all aimed at making the transportation system safer, more efficient, competitive, and accessible. Likewise, NHTSA Research supports DOT's Strategic Goals of Safety, Infrastructure, Innovation, and Efficiency. Given NHTSA's safety mandate, its research programs primarily focus on safety and are organized under this priority and strategic goal. NHTSA's research also plays a crucial role in building the foundational knowledge required to support the development of data-driven standards across various automotive industry components.

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

Program Highlights

NHTSA organizes its research activities into six program areas, as outlined in the President’s Budget and mirrored in this Annual Modal Research Plan (AMRP): Vehicle Electronics and Cybersecurity, Automated Driving Systems (ADS), Advanced Safety Technologies, Crashworthiness, Alternative Fuels Safety, and Highway Safety Research. Within these program areas, key program activities are designed to further NHTSA’s mission. For Fiscal Year 2026, critical Program Activities will focus on initiatives supporting Departmental priorities and advancing research in topics specified in Congressional directives. In addition, NHTSA will focus on activities that map to high frequency and/or high –C severity crash problems to enhance safety for all road users. Figure 1 illustrates the relationship between NHTSA’s Research Resources, the Program Areas, Outputs, Outcomes, and Impacts detailed throughout this AMRP.

Figure 1. Visualizing Research



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Administration**



The successful execution and completion of research initiatives rely on collaborative efforts. NHTSA actively engages with a wide range of external partners, including original equipment manufacturers, suppliers, and other technology providers to explore new technologies. The Agency also works with standards development organizations to inform voluntary standards and best practices. In addition, NHTSA partners with research institutions such as the Transportation Research Board (TRB), universities, international counterparts, and various government entities to advanced shared research goals. Further, NHTSA works closely with State and local organizations such as the Governors Highway Safety Association, the American Association of Motor Vehicle Administrators, and the American Association of State Highway and Transportation Officials. NHTSA Research also fosters collaboration with other DOT modal administrations, particularly in projects and information sharing with its surface transportation counterparts, including the Federal Highway Administration (FHWA), the Federal Motor Carrier Safety Administration (FMCSA), and the Federal Transit Administration (FTA).

Other important activities related to information sharing and collaboration include NHTSA's annual public meeting showcasing the agency's safety research portfolio; joint efforts with SAE International to plan, execute, and present research at the annual SAE Government/Industry Meetings; and contributions to the biennial International Technical Conference on the Enhanced Safety of Vehicles (ESV) that the agency co-organizes. NHTSA also participates in specialized forums such as the Stapp Car Crash Conference, which focuses on impact biomechanics and human injury tolerance; and the International Research Council on Biomechanics of Injury (IRCOBI). Additional engagements include involvement in ITS America and its annual meeting; collaboration with the Automotive Information Sharing and Analysis Center (Auto-ISAC), including participation in its annual Cybersecurity Symposium; planning and attendance at the Lifesavers National Conference on Highway Safety Priorities; and active participation in TRB meetings and committees, including a dedicated NHTSA research and data session at their annual meeting.

Post-output information sharing, a fundamental aspect of NHTSA Research Technology Transfer activities, occurs throughout the fiscal year. NHTSA's primary focus is on applied research and development related to safety performance, safety measurement methods, and performance criteria that support technology-agnostic standards and policy considerations. The primary output of NHTSA Research is the publication of materials aimed at promoting the development of safer and more effective technologies, practices, and countermeasures. Knowledge transfer is achieved through various means, including the publication of reports, presentation of materials at meetings and conferences, journal publications, and the development of test procedures, all of which are shared with the public. NHTSA Research also submits research reports and data sets to the National Transportation Library on concluded studies, shares information on the agency's website in a consumer-friendly format, provides documentation to the public dockets via regulations.gov as appropriate, and organizes and hosts public meetings.

NHTSA's research reports, test data, technical papers, presentations, and test procedures support policy decisions related to agency actions, new safety countermeasures, and various safety programs and activities. The outcomes tie to agency programs, such as regulatory and deregulatory activities, the development of crash test dummies, integration of technologies into NHTSA's New Car Assessment Program (NCAP), creation of criteria for roadside evaluations, support for State Highway Safety Offices (SHSOs), and the design of national consumer education materials and campaigns. In addition, NHTSA Research may generate best practices, voluntary guidelines and guidance, and countermeasures aimed at promoting safe driving behaviors, first responder interactions, cybersecurity for the safety of modern vehicles, and safety design elements for the testing, development, and deployment of automated vehicle technologies.

Evaluation and performance measurement of NHTSA Research initiatives are conducted through a variety of Departmental and Agency mechanisms, including the Department's Performance Management Review, its Enterprise Risk Management Profile, and evaluation resources related to the Foundations for Evidence-Based Policymaking Act of 2018.

Funding Explanation

Table 1a highlights NHTSA's fiscal year (FY) 2026 base funding for Programs in the Office of Vehicle Safety Research found in "Research and Analysis" in the President's Budget Request and totals \$28,483,000. The table also includes FY2026 base funding for Programs in the Office of Behavioral Safety Research ("Highway Safety Research") found in "Research & Program Development" and totals \$5,000,000. Table 1b highlights the Agency's FY 2026 Supplemental funding from the Infrastructure Investment and Jobs Act (IIJA) and is stated as "Vehicle Safety and Behavioral Research" and includes \$70,000,000 for Vehicle Safety Research Programs and \$15,200,000 for Behavioral Safety Research ("Highway Safety Research") Programs.

Table 1a – FY2026 RD&T Program Funding Details, Base Funding

Budget Language	Program Name	FY 2026 President's Budget Request* (\$000)	Applied Research (\$000)	Technology Transfer (\$000)	Facilities (\$000)	Experimental Development (\$000)	Major Equipment, R&D Equipment (\$000)
Research and Analysis	Vehicle Electronics and Cybersecurity	3,500	3,500	0	0	0	0
Research and Analysis	Automated Driving System (ADS)	10,000	10,000	0	0	0	0
Research and Analysis	Advanced Safety Technologies	9,983	9,983	0	0	0	0
Research and Analysis	Crashworthiness	3,500	3,500	0	0	0	0
Research and Analysis	Alternative Fuels Safety	1,500	1,500	0	0	0	0
	Total Base Funding (VSR)	28,483	28,483	0	0	0	0
Research & Program Development	Highway Safety Research	5,000	5,000	0	0	0	0
	Total Base Funding (BSR)	5,000	5,000	0	0	0	0
	Total Base Research Funding	33,483	33,483	0	0	0	0

*The AMRP reflects programmable research funding, including NHTSA's Vehicle Research and Test Center (VRTC) program funds, as found in the annual President's budget request per 49 U.S.C. Chapter 65 Sec. 6501 Research Planning. It excludes any salary and benefits. The enacted numbers will be posted as part of the President's budget request for the ensuing fiscal year.

Table 1b - FY 2026 RD&T Program Funding Details, IIJA Supplemental Funding

Budget Language	Program Name	FY 2026 President's Budget Request* (\$000)	Applied Research (\$000)	Technology Transfer (\$000)	Facilities (\$000)	Experimental Development (\$000)	Major Equipment, R&D Equipment (\$000)
Vehicle Safety and Behavioral Research	Vehicle Electronics and Cybersecurity	6,000	6,000	0	0	0	0
Vehicle Safety and Behavioral Research	Automated Driving System (ADS)	23,000	23,000	0	0	0	0
Vehicle Safety and Behavioral Research	Advanced Safety Technologies	19,000	19,000	0	0	0	0
Vehicle Safety and Behavioral Research	Crashworthiness	18,000	18,000	0	0	0	0
Vehicle Safety and Behavioral Research	Alternative Fuels Safety	4,000	4,000	0	0	0	0
	Total Supplemental Funding (VSR)	70,000	70,000	0	0	0	0
Vehicle Safety and Behavioral Research	Highway Safety Research	15,200	15,200	0	0	0	0
	Total Supplemental Funding (BSR)	15,200	15,200	0	0	0	0
	Total Supplemental Funding	85,200	85,200	0	0	0	0

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Table 2a - FY 2026 RD&T Program Budget Request by DOT Strategic Goal, Base Funding

Budget Language	Program Name	FY 2026 President's Budget Request (\$000)	Safety* (\$000)	Infrastructure (\$000)	Innovation (\$000)	Efficiency (\$000)
Research and Analysis	Vehicle Electronics and Cybersecurity	3,500	3,500			
Research and Analysis	Automated Driving System (ADS)	10,000	10,000			
Research and Analysis	Advanced Safety Technologies	9,983	9,983			
Research and Analysis	Crashworthiness	3,500	3,500			
Research and Analysis	Alternative Fuels Safety	1,500	1,500			
	Total Base Funding (VSR)	28,483	28,483			
Research & Program Development	Highway Safety Research	5,000	5,000			
	Total Base Funding (BSR)	5,000	5,000			
	Total Base Research Funding	33,483	33,483			

*Activities in all Research programs are classified as Safety, given this is the primary mission of the Agency. However, many of the activities across Research also support other strategic goals such as Innovation and Efficiency. To avoid double-counting on this table, investments are categorized within the primary strategic goal of Safety.

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

Budget Language	Program Name	FY 2026 President's Budget Request (\$000)	Safety* (\$000)	Infrastructure (\$000)	Innovation (\$000)	Efficiency (\$000)
Vehicle Safety and Behavioral Research	Vehicle Electronics and Cybersecurity	6,000	6,000			
Vehicle Safety and Behavioral Research	Automated Driving System (ADS)	23,000	23,000			
Vehicle Safety and Behavioral Research	Advanced Safety Technologies	19,000	19,000			
Vehicle Safety and Behavioral Research	Crashworthiness	18,000	18,000			
Vehicle Safety and Behavioral Research	Alternative Fuels Safety	4,000	4,000			
	Total Supplemental Funding (VSR)	70,000	70,000			
Vehicle Safety and Behavioral Research	Highway Safety Research	15,200	15,200			
	Total Supplemental Funding (BSR)	15,200	15,200			
	Total Research Funding	85,200	85,200			

*Activities in all Research programs are classified as Safety, given this is the primary mission of the Agency. However, many of the activities across Research also support other strategic goals such as Innovation and Efficiency. To avoid double-counting on this table, investments are categorized within the primary strategic goal of Safety.

*The AMRP reflects programmable research funding, including NHTSA's Vehicle Research and Test Center (VRTC) program funds, as found in the annual President's budget request per 49 U.S.C. Chapter 65 Sec. 6501 Research Planning. It excludes any salary and benefits. The current fiscal year enacted numbers will be posted as part of the President's budget request for the ensuing fiscal year.

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Chapter 1 – FY 2026 RD&T Programs

Vehicle Electronics and Cybersecurity

\$9.5M (Base funding \$3.5M + \$6M Supplemental funding)

Program Description:

NHTSA's Vehicle Electronics and Cybersecurity program area covers the functional safety and Safety of the Intended Functionality (SOTIF) of vehicle electronics and cybersecurity. Ensuring the functional safety of Vehicle Electronics is crucial for overall system safety, as it involves managing safety risks related to potential failures in sensors, components, systems, and software implementations, as well as addressing operator errors and environmental changes. SOTIF analyses employ industry standards, such as ISO 21448, to evaluate the reliability, safety, and potential unintended consequences linked to advanced electronic control systems, software, and electromechanical systems, especially in cases of misuse and/or misapplication of the systems outside their intended functionality and operational domains. The cybersecurity research component addresses safety risk management associated with intentional manipulations of software, hardware, sensors, and associated onboard vehicle communication networks. Methodical identification of potential vulnerabilities and proactive management of heightened risks related to advanced electronic and software-controlled systems are essential for designing vehicle architectures that will respond safely, even in the face of electronic system failures, software errors, or malicious software attacks.

Major Program Objectives:

In response to the rapid advancements in vehicle technology and related trends, the Vehicle Electronics and Cybersecurity program conducts critical research activities aimed at maximizing the safe deployment of modern vehicles that incorporate a broad range of safety, efficiency, and convenience features enabled by extensive use of electronics and software. It also covers critical issues related to vehicle electronics, such as vehicle cybersecurity. In FY 2026, this program will build upon the research completed in FY 2025, while also initiating new projects to fill identified gaps that support agency decisions regarding vehicle automation technologies, electronics reliability, and cybersecurity.

FY 2026 Anticipated Program Activities:

Program activities will include research on the functional safety of interior driver monitoring systems for detecting drowsiness and inattention, support human factors studies and congressional mandates, and continue work on automatic shutoff technologies to prevent carbon monoxide poisoning in line with IIJA requirements. In vehicle cybersecurity, program activities will investigate how the industry manages cybersecurity risks throughout a vehicle's lifecycle, including defenses for in-vehicle networks, electric vehicle wireless battery systems, and firmware over-the-air updates. Laboratory research will support analysis of vehicle cybersecurity incidents, assess impacts on vehicle safety, explore new vehicle architectures and wireless interfaces, evaluate secure integration of third-party devices, and test reported hardware and software vulnerabilities using specialized tools.

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

The potential program outputs of this effort will be to develop research findings and data to support and facilitate industry's safe testing, development, and deployment of software intensive vehicles and telematics systems, including addressing cybersecurity issues resulting from increased connectivity into vehicles (e.g., remote assistance). Outputs from this program area may also may potentially support efforts in investigating potential defects in electronics and software. Such information may impact the outcome of a safety recall, identification of unintended safety risks, or other consumer complaint issues. This research potentially informs incident response when cybersecurity issues are reported or learned by the Agency from vehicle manufacturers, media outlets, or other sources. Agency data gathering and strategic planning efforts, as well as incoming research results, will continue to guide Agency decision making in this area.

Potential Economic or Societal Impacts:

This effort could help reduce failures in safety-critical vehicle electronics, preventing crashes, saving lives, and minimizing costs to consumers and the auto industry. It may also address consumer mistrust in vehicle technologies due to cybersecurity risks and bias in machine learning, highlighting the need for proactive research.

Potential Progress Made Toward Achieving Modal Strategic Goals:

The Vehicle Electronics and Cybersecurity research program has the potential to advance the safety of modern vehicle software and architectures, including electric vehicles, from hacking risks and other vulnerabilities. NHTSA's research program has facilitated introduction of vehicle cyber-resilient systems through issuance of cybersecurity best practices, encouragement of the establishment of the Automotive Information Sharing and Analysis Center (Auto-ISAC), collaboration on the development of a cybersecurity workforce curriculum. Through this research, NHTSA is positioned to evaluate issues quickly and accurately and to provide information to guide agency policy decisions. The work primarily contributes to the strategic goal of safety within NHTSA and the Department.

Collaboration Partners:

External collaboration partners in the area of Vehicle Electronics and Cybersecurity include the Auto-ISAC, original equipment manufacturers and suppliers, technology companies, standards development organizations, other domestic and international government agencies such as the National Institute of Standards and Technology, and all modal Administrations within the Department of Transportation. Additionally, NHTSA works with a range of research partners including test facilities, university research centers, and independent research institutions.

Automated Driving Systems

\$ 33M (Base funding \$10M + Supplemental \$23M)

Program Description:

NHTSA's ADS research program focuses on the following areas: system level safety, safety metrics and safety assessment methods, crashworthiness considerations for alternative vehicle designs, and ADS human factors research. The Office of Vehicle Safety Research diligently studies and identifies safety assessment methods for the agency, aimed at effectively overseeing the safety of ADS. This effort is critical, given the potential of ADS to enhance the safety and mobility of the traveling public at their maturity.

Major Program Objectives:

The major program objectives of the ADS research program area continue to focus on advancing the knowledge base essential for informing Agency decisions necessary to facilitate innovative concepts; creating the essential tools and knowledge base for assessing the safety of these systems; and conducting research aimed at ascertaining whether existing tools are capable of adequately evaluating the safety of emerging vehicle designs, spanning from passenger vehicles to commercial motor vehicles. Core research efforts will focus on two main areas: the safety performance of ADS and the impact of human factors. All ADS research supports the Department's Automated Vehicle Framework, which aims to promote domestic AV innovation and deployment by prioritizing safety, removing regulatory barriers, and enabling commercial deployment.

FY 2026 Anticipated Program Activities:

Research efforts in ADS include several key areas. One focus is on driverless operation, where ongoing work aims to refine a framework that integrates findings from current and emerging research to establish a baseline understanding of safe driverless operation. Another area is field data analysis and management, which involves expanding the study of performance and operational data from ADS in real-world conditions and developing tools for automated analysis and safety monitoring of deployed systems. Continued development of ADS test methods is also crucial, as repeatable, reproducible tests are required for future standards development. This work includes research into both virtual and physical testing approaches, as well as the implementation of a standardized testing framework to evaluate ADS competencies within specific operational design domains. Human factors research remains important, particularly in understanding user design needs and finalizing studies such as seating preferences in ADS-equipped vehicles. Finally, ADS subsystem research is advancing the study of safety applications for machine learning and artificial intelligence within the ADS vehicle environment.

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

NHTSA's research program is focused on providing the technical information and tools needed to advance the safe testing, development, and deployment of ADS-equipped vehicles. At their maturity, ADS-equipped vehicles may offer mobility alternatives to individuals unable to acquire a driver's license, including older adults and people with disabilities—cognitive, physical, and/or sensory. ADS technologies have the potential to

provide safe transportation options for the traveling public at large. In FY 2026, NHTSA plans to publish research reports that are supportive of Agency considerations about potential updates to the Federal Motor Vehicle Safety Standards (FMVSSs) and associated test procedures to accommodate nonstandard vehicle design concepts. Research will also be sponsored and conducted that supports improved transparency, development of objective safety performance evaluation methods, and a data-driven approach to safety assessments of these promising technologies.

Potential Economic or Societal Impacts:

The potential economic impacts of this research could facilitate the safe introduction of ADS-equipped vehicles, potentially leading to a reduction in motor vehicle crashes and their associated costs at their maturity. This reduction may also contribute to decreased expenses related to hospitalizations, emergency medical services (EMS), automotive repairs, and insurance premiums, among other economic and financial burdens. On a societal level, the impacts could include enhanced safety, less congestion resulting from crashes, and improved mobility for older adults and individuals with disabilities.

However, while there is significant optimism about the potential of ADS to reduce traffic fatalities and improve safety, accurately quantifying these impacts remains a complex challenge and an active area of ongoing research.

Potential Progress Made Toward Achieving Modal Strategic Goals:

ADS research activities and outputs primarily support NHTSA and Department strategic goals related to improving safety by advancing the understanding, performance, and safe integration of ADS into the transportation system. This research informs evidence-based regulatory decisions, policy development, and safety standards aimed at reducing roadway fatalities and serious injuries. In addition to its core focus on safety, many planned and ongoing research activities also contribute to the Department's strategic goals of innovation, and efficiency through the deployment of ADS-equipped vehicles. This includes evaluating how these technologies can improve transportation access, operational efficiency, and travel options for a range of users and communities. Research outputs will help assess the potential for ADS to improve first/last-mile connectivity, support new mobility services, and enhance the overall transportation network's safety and reliability. ADS research supports safety and innovation by addressing emerging safety challenges, developing robust operational concepts, and innovative simulation and testing capabilities for automated vehicle performance in complex scenarios. These efforts collectively help prepare the nation's transportation system for the safe and effective integration of automated driving technologies.

Collaboration Partners:

External collaboration partners in the area of ADS include original equipment manufacturers and suppliers, technology companies, standards development organizations, other government agencies such as the U.S. Access Board, the National Institute of Standards and Technology, and all modal Administrations within the Department of Transportation. Additionally, NHTSA works with a range of research partners including test facilities, university research centers, and independent research institutions.

Advanced Safety Technologies

\$28,983M (Base funding \$9,983M + Supplemental \$19M)

Program Description:

NHTSA's Advanced Safety Technologies research program area focuses on motor vehicle technologies and systems that aim to prevent crashes and assist drivers in performing the driving task, commonly referred to as advanced driver assistance systems (ADAS). Technologies covered under this program area include SAE Level 0 systems [crash avoidance systems such as automatic emergency braking (AEB)], as well as SAE Level 1 and 2 systems, which can provide sustained longitudinal and/or lateral support with the expectation that the driver will continually monitor and supervise system performance. SAE Level 2 systems in particular present emerging safety considerations within the driving automation spectrum of technologies. With respect to vehicle platforms, research on Advanced Safety Technologies covers a wide range of motor vehicles from passenger vehicles to large trucks and from buses to motorcycles. This research program area continues to cover advancements in conventional crash avoidance technologies (e.g., tires, brakes, mirrors) as well as ADAS technologies to improve the safety of road users, such as lane-keeping assist (LKA) and AEB systems designed to detect and react to pedestrians, bicyclists, and motorcyclists. This area also covers human factors research, including key areas such as driver distraction and driver monitoring technologies.

Major Program Objectives:

The primary objectives of the program are to lead national safety research efforts that advance and accelerate the responsible deployment of safety enhancing ADAS throughout the U.S. automotive fleet. The program is focused on safety systems and innovations that directly map to crashes involving light and heavy vehicles, pedestrians, bicyclists, motorcyclists, and other road users. Research is conducted with the objective of attaining a comprehensive understanding of ADAS-enabling technologies, including hardware and software. Research also encompasses quantifying ADAS performance, capabilities, limitations, effectiveness, consumer acceptance, and unintended consequences. The program will continue to focus on harnessing emerging technologies and innovative safety systems that show potential to address real world crashes and improve vehicle safety performance, including those that detect and react to other road users such as pedestrians, bicyclists, and motorcyclists.

FY 2026 Anticipated Program Activities:

The program targets several key activities to advance vehicle safety and support IIJA mandates, including accelerating research to enable rulemaking for Lane Keeping Assistance (LKA) systems. Human factors research will expand to study driver monitoring systems, Human-Machine Interfaces (HMIs), and advanced vehicle technologies, aiming to reduce driver disengagement and automation complacency in SAE Level 2 systems. This includes developing reliable test procedures to detect driver distraction and drowsiness and evaluating countermeasures like alerts and warnings. Research on driver attention will continue, focusing on measuring visual engagement and assessing how HMIs (e.g., touchscreens vs. knobs) and vehicle displays influence behavior. NCAP support activities will accelerate development of test procedures, tools, and performance metrics for

technologies such as Automatic Emergency Braking (AEB), LKA, and blind spot warning/intervention. Crash avoidance research will target innovative technologies to address real-world crash scenarios, including pedal misapplication and crashes involving pedestrians, bicyclists, and motorcyclists. Activities will also include evaluating SAE Level 2 system performance across operational domains, using both on-road and simulation methods to assess driver interaction and support policy development. Naturalistic data collection with SAE Level 2 systems will continue. For medium and heavy-duty vehicles, the program will focus on AEB, PAEB, LKA, and other crash avoidance technologies not currently covered under FMVSS No. 136. Research will also support rulemaking on camera-based visibility systems (CMS), assessing whether CMS can safely replace rearview mirrors through human subject testing. Development of web-based engineering analysis software will begin to support safety test evaluations, and efforts will continue to establish objective, repeatable methods for assessing driver drowsiness.

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

The potential program outputs of this effort will be research findings and data on advanced safety technologies that can enhance motor vehicle safety. Through proactive and collaborative research with internal and external stakeholders, deployment of state-of-the-art advanced safety technologies can be accelerated to significantly reduce crashes, fatalities, and injuries. Potential impacts from this program area may also include technical information for use in investigating potential defects in hardware and software and assisting in safety recalls or other consumer complaint issues.

Potential Economic or Societal Impacts:

The anticipated economic impacts of this program area are expected to be positive, driven by a reduction in crashes, fatalities, and injuries resulting from the deployment of advanced safety technologies. Many of these technologies incorporate both hardware and software components, which may allow for future safety enhancements to be implemented via software updates, potentially reducing the need for physical access to the vehicle to perform modifications. This approach could lead to more significant economic benefits by facilitating the software-driven introduction of new safety standards at relatively lower costs, as long as they are designed with appropriate cybersecurity protections.

Additionally, some of these software updates might be applicable to existing vehicles in the fleet. The potential societal impacts of this program area are also expected to be favorable, with research helping to facilitate and accelerate the development and deployment of crash avoidance technologies, potentially reducing consumer costs through economies of scale.

Potential Progress Made Toward Achieving Modal Strategic Goals:

The primary goal of this program area is to enhance the safety of motor vehicles. Advanced safety technologies are crucial in achieving further reductions in roadway fatalities and serious injuries, as these systems are designed to collectively address a broad spectrum of real-world crash scenarios, including driver distraction, impairment, speeding, and other contributing factors. Additionally, the technologies must be capable of delivering consistent performance to effectively address these scenarios in the real-world and significantly reduce crashes, fatalities, and injuries.

Collaboration Partners:

Collaboration partners in the areas of advanced safety technologies include original equipment manufacturers, technology suppliers and developers, standards development organizations, industry associations, other government agencies such as the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the Federal Transit Administration, and the Intelligent Transportation Systems Joint Program Office (ITS-JPO) within the Department of Transportation. Additionally, NHTSA works with a wide range of research partners including test facilities and university research centers, and independent research institutions.

Collaboration with key industry players is essential in understanding and evaluating the capabilities and limitations of state-of-the-art advanced safety technologies to accelerate deployment and reduce crashes, fatalities, and injuries.

Crashworthiness

\$21.5M (Base funding \$3.5M + Supplemental \$18M)

Program Description:

NHTSA's Crashworthiness Research Program plays a key role in informing the Agency's decisions on motor vehicle crash safety, including the causes of crashes and the resulting injuries to vehicle occupants and other road users. This program focuses on how vehicle crash performance effectively reduces fatalities and injuries resulting from motor vehicle crashes. This starts with in-depth investigations of real-world occupant and pedestrian injury cases collected by NHTSA's Crash Injury Research and Engineering Network (CIREN). The program supports both simulation- and experimental-based biomechanical research to study human injury response. Outputs from these studies often are applied in the development of advanced crash testing tools such as anthropomorphic test devices (ATDs or crash dummies) and human body models (HBMs). These tools regularly get applied in new crash test protocols along with enhanced injury metrics, both of which are also significant outputs of this program. Overall efforts culminate in studies showing how new or improved crash testing tools, performance measures, and/or test protocols can be used to promote the development of crashworthiness countermeasures that can reduce fatalities and injuries resulting from motor vehicle crashes. Current efforts include an emphasis on considerations for different sex, size, and age of occupants. This includes the development, evaluation, and documentation of advanced female crash test dummies, a Secretarial priority. Research also supports the development and application of test procedures to assess vehicle front end design countermeasures that mitigate pedestrian and bicyclist injuries. Crashworthiness considerations of ADS-equipped vehicles, including occupant response in nonconventional seating configurations, is also a topic of research.

Major Program Objectives:

This research program directly supports the Agency's mission in reducing motor vehicle crash-related injuries and fatalities on U.S. roadways, continuously assessing the potential of various approaches (e.g., collection and analysis of real-world crash data, development and evaluation of new testing tools, development and demonstration of new crash test procedures and protocols, and injury criteria) that can be deployed for use in encouraging (e.g., NCAP) and/or requiring (e.g., FMVSS) advancements in the development of crashworthiness safety technologies.

FY 2026 Anticipated Program Activities:

Planned program activities aim to support safety enhancements aligned with the Infrastructure Investment and Jobs Act (IIJA) and broader vehicle safety goals. These include continued research on side- and rear-guard designs for semi-trailers, limousine occupant protection standards, seat strength in rear impacts, and rear-seat child detection systems. Crash compatibility studies will examine battery electric vehicles and oblique frontal crashes. Advanced crash test dummy (ATD) development will progress alongside experimental biomechanics to improve injury prediction, while female and non-standard occupant safety will be studied through physical and computational testing using female-specific ATDs and anthropometric data. The program will also collect and analyze real-

world crash injury data through the CIREN program. For vehicles with Automated Driving Systems (ADS), research will assess crashworthiness in unconventional seating configurations using ATDs and human body models (HBMs). Additional efforts include modernizing crash test databases, applying machine learning in crash simulations, and advancing HBMs for virtual testing. Pedestrian and motorcycle safety will be addressed through evaluations of vehicle design impacts and helmet test methods. Child safety research will support updates to FMVSS 213 through new test procedures and advanced child ATDs. Broader occupant protection efforts will focus on head protection, advanced seat belt evaluation, and improved crash test barriers. Finally, structural integrity studies will target updates to FMVSSs, including work on vehicle glazing, motorcoach rollover tests, and crash safety involving electric vehicles.

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

Crashworthiness research produces several outputs that support modal priorities (e.g., considerations for development and application of new crash test dummies in FMVSSs and/or NCAP). The outputs under the respective Crashworthiness research activities aim to provide data, knowledge, tools, and/or test procedures that can impact safety efforts aimed at reducing injuries and fatalities associated with motor vehicle crashes.

Potential Economic or Societal Impacts:

The economic and societal impacts of Crashworthiness research lie in the potential benefits realized when research outputs—such as new testing tools, injury criteria, and vehicle safety evaluation procedures—are applied in efforts to mitigate injuries and prevent fatalities resulting from motor vehicle crashes. By advancing the understanding of how vehicles and occupants respond to crash forces, this research supports the development of safer vehicle designs, enhanced occupant protection systems, and more effective crash test protocols. The societal benefits include reductions in roadway fatalities and serious injuries, which have lasting impacts on public health, quality of life, and community well-being. Safer vehicles contribute to increased public confidence in road travel and support broader safety initiatives at the national, state, and local levels. Economically, reducing the severity and frequency of crash-related injuries and fatalities can lower healthcare costs, emergency response expenditures, and property damage losses. It also has the potential to reduce lost productivity and improve workforce stability by preventing crash-related disabilities and fatalities. Additionally, advancements in crashworthiness research can drive innovation within the automotive industry, supporting the development of new safety technologies and strengthening U.S. leadership in vehicle safety research and engineering.

Potential Progress Made Toward Achieving Modal Strategic Goals:

Crashworthiness research activities and outputs support the development of advanced crash test dummies and enhancing crash safety for all sexes. New vehicle and safety equipment testing protocols can address NHTSA and DOT strategic safety goals. Additionally, numerous planned research activities and outputs also address transformation in motor vehicle design and the implications for crash safety.

Collaboration Partners:

FY2026 external collaboration partners in Crashworthiness research include original equipment manufacturers and suppliers, technology companies, standards development organizations, industry associations, other government agencies such as the Federal Highway Administration, the Federal Motor Carrier Safety Administration, the Federal Transit Administration, and the Intelligent Transportation Systems Joint Program Office (ITS-JPO) within the Department of Transportation. Additionally, NHTSA works with a range of research partners including test facilities, university research centers, and independent research institutions.

Alternative Fuels Safety

\$5.5M (Base funding \$1.5M + Supplemental \$4M)

Program Description:

NHTSA's Alternative Fuels Safety research program area develops information on the safety of emerging transportation fuels, including battery, natural gas, hydrogen, and fuel cell technologies. In addition to developing test procedures and safety best practices for alternative fuels vehicle, NHTSA's research includes interfaces with fueling and charging infrastructures.

Major Program Objectives:

In FY2026, NHTSA's Alternative Fuels Safety research program will continue to focus on battery electric vehicle (BEVs) fire safety. Internal combustion engine vehicle fires are also a significant, ongoing contributor to societal property damage loss and loss of life [United States Fire Administration's National Fire Incident Reporting System (NFIRS) database, National Fire Protection Association 2020]. Fires in BEVs may not occur at the same rate; however, they are difficult to extinguish and present additional safety concerns, especially for enclosed parking spaces.

FY 2026 Anticipated Program Activities:

Planned program activities will address BEV safety through prevention, mitigation, and response research. Prevention efforts will include root cause analysis of battery failures during fast charging, evaluation of sensors for early detection of thermal events, and testing of cooling and discharge techniques to prevent thermal propagation. Research will also explore predictive battery diagnostics, assess charging safety across diverse systems, and examine failures due to saltwater immersion. Mitigation activities will focus on refining abuse test methods (e.g., overcharge, rapid charging), conducting battery pack teardowns to analyze design attributes, and using finite element modeling to simulate battery responses to mechanical stress. Response research will evaluate safe discharge tools for stranded energy, define best practices for battery monitoring during discharge, develop crash test protocols for post-collision battery assessment, and create guidance for safely managing BEVs exposed to flooding.

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

The Alternative Fuels Safety Program produces various outputs that support modal priorities, including the development of improved high-voltage battery safety countermeasures. These outputs provide critical data, knowledge, tools, and test procedures that contribute to safety efforts focused on reducing injuries and fatalities resulting from both crash-related and non-crash battery fires.

Potential Economic or Societal Impacts:

This research will inform agency decisions on the new propulsion variants being introduced into the market and will provide direct support for the safety of vehicle occupants, emergency response teams, and traffic incident management personnel.

Additionally, it offers guidance to the Emergency Management personnel during emergency response conditions.

Potential Progress Made Toward Achieving Modal Strategic Goals:

NHTSA has been collaborating with the U.S. Fire Administration to enhance best practices for responding to battery electric vehicle fires. This includes guidance for emergency response and traffic incident management personnel for appropriately responding to BEV incidents. NHTSA also informs standards development organizations on research that contributes to the development best practices for safer BEV designs and associated test methods.

Collaboration Partners:

NHTSA meets regularly with other governmental entities with interests in battery safety, including the Pipelines and Hazardous Materials Safety Administration, the Federal Railroad Administration, Department of Energy National Labs, and the Department of Homeland Security. Additionally, NHTSA works with a range of research partners including test facilities, university research centers, and independent research institutions. The Agency routinely reaches out to automotive original equipment manufacturers and suppliers, technology companies, industry trade groups, universities, and battery manufacturers to discuss safety, best practices, and common areas of research.

Highway Safety Research

\$20.2M (Base funding \$5M + Supplemental \$15.2M)

Program Description:

NHTSA's Highway Safety Research provides the scientific basis for the development of effective behavioral countermeasures aimed at reducing the occurrence and severity of traffic crashes. Highway Safety Research focuses on alcohol- and other drug-impaired driving, occupant protection, distraction, traffic law enforcement, emergency medical and trauma care systems, driver licensing, motorcycle rider safety, pedestrian and bicyclist safety, pupil transportation, and young and older driver safety. Highway Safety Research also evaluates the effectiveness of innovative behavioral traffic safety countermeasures for the purpose of enriching [*Countermeasures That Work*](#), a reference guide to help SHSOs select effective, science-based behavioral countermeasures. Finally, Highway Safety Research funds the Behavioral Traffic Safety Cooperative Research Program (BTSCRCP), which is administered by TRB. BTSCRCP is a forum for coordinated and collaborative research to address issues integral to traffic safety professionals at all levels of government and the private sector and provides practical, ready-to-implement solutions to save lives, prevent injuries, and reduce costs of road traffic crashes associated with unsafe behaviors.

Major Program Objectives:

The main program objective of Highway Safety Research increases the return on investment from NHTSA's Highway Safety Grant Program. Research in this area supports five strategic goals: preventing destructive traffic safety behaviors, encouraging positive traffic safety behaviors, leveraging public safety to improve traffic safety, protecting pedestrians, cyclists, micromobility users, and others who share the road with vehicles, and exploring advanced technologies to address traffic safety issues. The Highway Safety Research program develops and evaluates innovative behavioral safety countermeasures while also seeking more effective and efficient countermeasures for existing traffic risks. Highway Safety Research also conducts human factors research to explore how people use and misuse vehicle technology, including factors that may affect driver engagement, and develop and evaluate associated behavioral countermeasures.

FY 2026 Anticipated Program Activities:

The Highway Safety Research program focuses on several key activities to fulfill IJIA requirements and address both continuing and emerging behavioral issues. Research in this program identifies and fills gaps between the content of *Countermeasures That Work* and the Highway Safety Grants programs. Continued efforts will help prevent alcohol- and other drug-impaired driving, speeding, and distracted driving, including leveraging traffic safety law enforcement. If a State changes its impaired driving laws, research will evaluate the impact of the change on crashes, fatalities, and injuries. Research efforts will continue encouraging protective behaviors, including increasing seat belt and child restraint system use. Child passenger safety will be addressed by conducting observations of child seat and seat belt use and misuse and surveys of caregivers to better understand behavior. Human factors research will remain a focus, particularly related to the development and evaluation of technology-based tools to improve young and older driver safety and reduce distracted driving. Research will focus on cell phone blocking technology to prevent engaging in risk

driving behaviors, including distraction and speeding. Research will also target improvements to emergency medical services and post-crash care, particularly on the life-saving potential of pre-hospital blood transfusion programs through program demonstrations and evaluation. Highway Safety Research will continue to support evaluations of the effectiveness of behavioral countermeasures to provide States with objective information to select evidence-based countermeasures, particularly for behavioral countermeasures considered promising but for which additional research is needed such as conducting a process evaluation of driver education. Finally, BTSCRP members (NHTSA and the Governors Highway Safety Association (GHSA) with TRB support) plan to select four to six discrete projects producing applied research products for highway safety stakeholders to use immediately upon the completion of the research.

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

The primary output of the Highway Safety Research program is the production and dissemination of research reports and other materials related to countermeasures relevant for State Highway Safety Offices' support of NHTSA's Highway Safety Grants programs, with particular emphasis on enriching the body of evidence in [*Countermeasures That Work*](#). Contributions to the body of evidence in *Countermeasures That Work*, in turn, affect behavioral traffic safety countermeasure selection and deployment by State, local, and tribal governments and other entities. Research findings are also used by other parts of NHTSA to inform program development or suggest more broad-scale use of a program.

Potential Economic or Societal Impacts:

The Highway Safety Research program has large potential societal impacts through improving the safety of all road users. Research will result in safer road users, safer speeds, and improvements to post-crash care. In addition to saving lives, Highway Safety Research also has potential economic impacts by reducing the economic losses resulting from deaths and injuries related to crashes.

Potential Progress Made Toward Achieving Modal Strategic Goals:

The primary goal of Highway Safety Research is improved safety of all road users. Highway Safety Research supports the development and use of effective behavioral based countermeasures that are crucial to achieve further reductions in roadway fatalities and serious injuries. Each project explicitly considers the DOT strategic goal of safety and translating research into practice.

Collaboration Partners:

In addition to previously mentioned partners, NHTSA works collaboratively with GHSA to manage BTSCRP, which produces behavioral safety research with practical applications SHSOs can deploy or promote through their programs. Within the Department, NHTSA coordinates behavioral traffic safety research efforts with the Federal Highway Administration, the Federal Transit Administration, the Federal Motor Carrier Safety Administration, and the Federal Railroad Administration, through efforts such as the Human Factors Coordination Working Group and other informal activities.

Chapter 2 –Programs Outlook FY 2027

The AMRP development schedule, as outlined in 49 U.S.C. § 6501 – Annual Modal Research Plans, requires a program outlook for the following fiscal year to be prepared prior to the formulation of the corresponding President’s Budget. As a result, the FY 2027 section of this AMRP does not reflect the President’s Budget Request or its associated priorities and is subject to change once those are established.

Vehicle Electronics and Cybersecurity

Program Description:

NHTSA’s Vehicle Electronics and Cybersecurity program area covers the functional safety and Safety of the Intended Functionality (SOTIF) of vehicle electronics and cybersecurity. Ensuring the functional safety of vehicle electronics is crucial for overall system safety, as it involves managing safety risks related to potential failures in sensors, components, systems, and software implementations, as well as addressing operator errors and environmental changes. Analyses pertaining to SOTIF employ industry standards, such as ISO 21448, to evaluate the reliability, safety, and potential unintended consequences linked to advanced electronic control systems, software, and electromechanical systems, especially in cases of misuse and/or misapplication of the systems outside their intended functionality and operational domains. The Cybersecurity research component addresses safety risk management associated with intentional manipulations of software, hardware, sensors, and associated onboard vehicle communication networks. Methodical identification of potential vulnerabilities and proactive management of heightened risks related to advanced electronic and software-controlled systems are essential for designing vehicle architectures that will respond safely, even in the face of electronic system failures, software errors, or malicious software attacks.

Major Program Objectives:

Given the accelerated pace of vehicle technology advancement and the related issues that result, as well as cybersecurity, NHTSA’s Vehicle Electronics and Cybersecurity program conducts the critical research activities that are necessary to maximize the safety benefits of modern vehicle technologies while addressing the key issues associated with the extensive use of electronics and software such as vehicle cybersecurity. In FY 2027, this program will build upon research completed in FY 2026 and initiate new projects to close identified gaps in support of agency decisions on vehicle automation technologies as well as electronics reliability and cybersecurity.

FY 2027 Anticipated Program Activities:

- The program will build upon FY 2026 research while launching new initiatives to address identified gaps that support NHTSA’s decision-making on vehicle electronics and cybersecurity. Modern motor vehicles increasingly rely on complex electronics and software, and the rapid evolution of these systems presents both significant opportunities and unique safety challenges. In response, NHTSA is expanding its research activities to vehicle generate the science, data, and engineering insights necessary to guide future agency decision-making.

- In the critical area of cybersecurity – a U.S. Department of Transportation priority – NHTSA is planning to expand its research to examine motor vehicle cybersecurity risks emerging from the convergence of advanced, software-driven vehicle technologies, the growing number of wireless connectivity paths into vehicles, and the increasing integration of cyber-physical control capabilities in modern vehicles. Additionally, the Agency plans to accelerate research into next-generation vehicle electronic architectures that improve system resiliency and enable more effective cybersecurity risk management. Laboratory-based studies will underpin these efforts by supporting incident analysis, assessing safety impacts of cyber vulnerabilities, evaluating secure integration of third-party devices and wireless interfaces, and testing hardware and software weaknesses using specialized cybersecurity tools.

Automated Driving Systems

Program Description:

NHTSA's Automated Driving System (ADS) research program focuses on the following areas: system level safety, safety metrics and safety assessment methods, crashworthiness considerations for alternative vehicle designs, and ADS human factors research. The Office of Vehicle Safety Research diligently studies and identifies safety assessment methods for the agency, aimed at effectively overseeing the safety of ADS. This effort is critical, given the potential of ADS to enhance the safety and mobility of the traveling public at their maturity.

Major Program Objectives:

The major program objectives of the ADS research program area continue to focus on building the knowledge to support Agency decisions to enable innovative concepts, developing the necessary tools and knowledge to evaluate the safety of these systems, and performing the research necessary to determine if current tools can properly evaluate the safety of new vehicle designs (from passenger vehicles to commercial motor vehicles). The program will conduct core research in the areas of ADS safety performance and human factors. Research activities are consistent with the strategic safety research and policy objectives of the Department of Transportation and the Administration.

FY 2027 Anticipated Program Activities:

- Research will support agency's automated vehicle framework aimed at facilitating the safe deployment of ADS-equipped vehicles. Research will help establish consistent safety principles, objective performance assessment methods, and data-driven operational guidance for automated vehicle use cases.
- Research will continue to explore test methods for evaluating the safety performance of ADS-equipped vehicles through simulation, test track, and integrated approaches. This includes novel techniques to assess both subsystem performance and overall vehicle performance. Research will also focus on proven methods to validate simulation approaches against real-world data and examining simulation fidelity for ADS virtual testing. Human factors research will address emerging issues in ADS-equipped and ADS-dedicated vehicles. Crashworthiness considerations emphasizing occupant safety in alternative seating scenarios associated with ADS-equipped vehicles will also continue.
- Additional efforts will focus on the uses of machine learning and artificial intelligence-based techniques in driving automation, identification of risk factors and conditions for evaluating minimum risk maneuvers, completion of research on perception systems, development of methodologies for vehicle localization, and preventative maintenance techniques to support ADS safety.

Advanced Safety Technologies

Program Description:

NHTSA's Advanced Safety Technologies research program area focuses on motor vehicle technologies and systems that aim to prevent crashes and assist drivers in performing the driving task, commonly referred to as advanced driver assistance systems (ADAS). Technologies covered under this program area include SAE Level 0 systems [crash avoidance systems such as automatic emergency braking (AEB)], as well as SAE Level 1 and 2 systems, which can provide longitudinal and/or lateral operational control with the expectation that the driver will monitor and supervise system performance. SAE Level 2 systems present emerging safety considerations within driving automation technologies. With respect to vehicle platforms, research on Advanced Safety Technologies covers a wide range of motor vehicles from passenger vehicles to large trucks and from buses to motorcycles. This research program area continues to cover advancements in conventional crash avoidance technologies (e.g., tires, brakes, mirrors) as well as ADAS technologies to improve the safety of road users such as lane-keeping assist (LKA) and AEB for pedestrians, bicyclists, and motorcyclists. This area also covers human factors research, including key areas such as driver distraction and driver monitoring technologies, and studies the potential role and impacts of connectivity in vehicle safety.

Major Program Objectives:

The main program objectives are to lead national safety research to advance and accelerate the responsible deployment of safety beneficial ADAS across the U.S. automotive fleet. The program is focused on safety systems and innovations that directly map to crashes involving light and heavy vehicles, pedestrians, bicyclists, motorcyclists, and other road users. Research is conducted with the objective of attaining a comprehensive understanding of ADAS enabling technologies, including hardware and software. Research also encompasses quantifying ADAS performance, capabilities, limitations, effectiveness, acceptance, and unintended consequences. The program will continue to focus on harnessing emerging technologies and innovative safety systems that show potential to address real world crashes and improve vehicle safety performance, including those that detect and react to other road users such as pedestrians, bicyclists, and motorcyclists.

FY 2027 Anticipated Program Activities:

- The program will research crash avoidance technologies, with a focus on real-world scenarios involving other road users, particularly in complex traffic situations such as intersections and other pre-crash events.
- The program will develop approaches to assessing partial driving automation (SAE Level 2) systems objectively in both nominal and critical driving scenarios. Ongoing studies will examine naturalistic driving performance while using SAE Level 2 driver support systems, driver visual attention, and the influence of Human-Machine Interfaces (HMIs) in maintaining driver engagement.
- The program will also support the New Car Assessment Program (NCAP) with the development of test procedures, tools, and performance measures outlined in the NCAP

roadmap, and will conduct research on emerging technologies such as Intelligent Speed Assistance (ISA), evaluating user acceptance, effectiveness, and sensor performance.

- Additional activities will include human factors research on driver monitoring systems and HMIs to inform test procedures and criteria for distracted and impaired driving mitigation.

Crashworthiness

Program Description:

NHTSA's Crashworthiness Research Program plays a key role in informing the agency's decisions on motor vehicle crash safety, including the causes of crashes and the resulting injuries to vehicle occupants and other road users. This program focuses on how vehicle crash performance effectively reduces fatalities and injuries resulting from motor vehicle crashes. Research also supports the development and application of test procedures to assess vehicle front end design countermeasures that mitigate pedestrian and bicyclist injuries. Crashworthiness considerations of ADS-equipped vehicles, including occupant response in non-conventional seating configurations, is also a topic of research.

Major Program Objectives:

This research program directly supports the Agency's mission in reducing motor vehicle crash-related injuries and fatalities on U.S. roadways, continuously assessing the potential of various approaches (e.g., collection and analysis of real-world crash data, development and evaluation of new testing tools, development and demonstration of new crash test procedures and protocols, and injury criteria) that can be deployed for use in encouraging (e.g., NCAP) and/or requiring (e.g., FMVSS) advancements in the development of crashworthiness safety technologies.

FY 2027 Anticipated Program Activities:

- Research will continue to focus on collecting impact/injury response data for a variety of occupant and road user demographics, particularly small and average-sized females. The program will continue analyzing real-world crash and injury data through in-depth investigations of motor vehicle crashes involving occupants and pedestrians, published via the crash injury research engineering network (CIREN) Program. Research will also continue to assess occupant safety in reclined and side-facing seating configurations, particularly in limousines and ADS-equipped vehicles.
- Research will continue the development and application of virtual testing tools and protocols including those that apply human body models in studies emphasizing both vehicle occupants and other road users. Efforts will consider wide range of demographics and will also emphasize the development and application of virtual ATD models.
- Research will support updates to child restraint test procedures to better reflect the current vehicle rear seat environment, including implementation of advanced child ATDs.
- Occupant protection research will focus on advanced ATDs for frontal, side, rear, and frontal- offset crash testing and associated injury criteria, as well as methods to assess seat belt performance and head impact testing for rear seat components. The program will also explore safety enhancements for crashes between battery electric and internal combustion vehicles.

- Vehicle crashworthiness studies will focus on restraint and structural performance in an oblique crash mode. Crashworthiness research will also examine structural performance of battery-electric vehicles in non-standard crash modes. Research into other crash modes will include seat performance in rear impacts of light vehicles and side-facing seats in limousines. Studies will expand upon existing test procedures to assess vehicle crashworthiness for pedestrian safety.

Alternative Fuels Safety

Program Description:

NHTSA's Alternative Fuels Safety research program area develops information on the safety of emerging transportation fuels, including battery, natural gas, hydrogen, and fuel cell technologies. Through this program, NHTSA aims to understand the safety of evolving battery technologies and consider the need for developing new performance test procedures.

Major Program Objectives:

In FY 2027, NHTSA's Alternative Fuels Safety research program will continue with an emphasis on battery electric vehicles (BEVs). Research efforts will focus on first responder safety and best practices for responding to lithium-ion vehicle fires. Research will continue to evaluate methods to de-energize BEVs before and after transport to a storage facility. Evaluation of diagnostic systems to prevent fires from initiating will remain a significant objective.

FY 2027 Anticipated Program Activities:

- The research program will continue to focus on battery electric vehicles (BEVs) with emphasis on overall safety in three areas: prevention, mitigation, and response. This includes the development of best practices for responding to lithium-ion vehicle fires in the field.
- Research will continue to evaluate methods to de-energize BEVs of disabled vehicles. Activities will include a means to assess the safe state of a vehicle that is suspected to have a compromised battery. Evaluation of diagnostic systems to detect the onset of a catastrophic thermal event and to prevent a fire from initiating will remain a significant objective.
- Research will focus on the development of non-destructive test procedures to evaluate the ability of vehicle controls to protect batteries from overcharge, high temperatures, rapid discharging, and short circuits.
- Research will continue the development of computational vehicle models and battery packs for use in assessing battery deformation and energy absorption during a crash.

Highway Safety Research

Program Description:

NHTSA's Highway Safety Research provides the scientific basis for the development of effective behavioral countermeasures to reduce the occurrence and severity of traffic crashes. Highway Safety Research focuses on alcohol- and drug-impaired driving, occupant protection, distraction, traffic law enforcement, emergency medical and trauma care systems, driver licensing, motorcycle rider safety, pedestrian and bicyclist safety, pupil transportation, and young and older driver safety. Highway Safety Research also evaluates the effectiveness of innovative behavioral traffic safety countermeasures for the purpose of enriching [*Countermeasures That Work*](#), a reference guide to help SHSOs select effective, science-based behavioral countermeasures. Finally, Highway Safety Research funds the Behavioral Traffic Safety Cooperative Research Program (BTSCR).

Major Program Objectives:

The main program objective of Highway Safety Research is to increase the return on investment from NHTSA's Highway Safety Grant Program. Research in this area supports five strategic goals: preventing destructive traffic safety behaviors, encouraging positive traffic safety behaviors, leveraging public safety to improve traffic safety, protecting pedestrians, cyclists, micromobility users, and others who share the road with vehicles, and exploring advanced technologies to address traffic safety issues. The Highway Safety Research program develops and evaluates innovative behavioral safety countermeasures while also seeking more effective and efficient countermeasures for existing traffic risks. Highway Safety Research also conducts human factors research on the use and misuse of vehicle technology, including factors that may affect driver engagement, and develop and evaluate associated behavioral countermeasures.

FY 2027 Anticipated Program Activities:

- Research will evaluate State, national, and community behavioral countermeasures, such as potential changes to State BAC *per se* laws to prevent alcohol-impaired driving.
- Research will explore the potential of technology-based tools to improve traffic safety, particularly to prevent risky behaviors such as speeding and distracted driving.
- Research will continue efforts to identify promising behavioral-based countermeasures to prevent alcohol- and other drug-impaired driving and speeding.
- Foundational research will be established for EMS countermeasures, including pre-hospital blood transfusion.

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