DRIVING THE FUTURE OF SURFACE TRANSPORTATION

Technology is redefining surface transportation. MITRE is working to enable transportation innovations and their benefits, while keeping safety and security front and center.

A Focus on Safety and Security

The automation of our vehicles is increasing. New modes of transportation are coming on the scene. Meanwhile, cybersecurity threats to our transportation system are intensifying.

MITRE's multi-pronged research is accelerating the integration of transportation innovations. At the same time, we're addressing the new safety and security challenges they bring.

A primary focus is improving safety on our roadways.

As automated emergency braking, lane management, and other automated driver assistance systems become more common on the roads, we're studying how they perform in the real world. We've partnered with government and auto manufacturers to make that possible.

Data Sharing for Insight

Through the Partnership for Analytics Research in Transportation Safety (PARTS), the National Highway Traffic Safety Administration and automobile manufacturers share their safety data with us.

> "To maximize the benefits of advanced driver assistance systems, we must adopt approaches that accelerate industry-wide safety research, so we know what advanced technologies are most effective at saving lives and reducing harm.
>
> Amy Aukema, PARTS Project Manager

MITRE

We collect, aggregate, and link police-reported crash data with data indicating what advanced technologies were equipped on the vehicles involved in the crashes.

We then collaboratively analyze that data to understand the effectiveness of the automated driver assistance systems in real-world conditions, and share our findings with PARTS partners for action. The research will grow, expand, and mature over time. It provides actionable insights the individual partners cannot get on their own.

Proactive Safety Management

Leveraging our decades of Safety Management System (SMS) experience, we're collaborating with the Washington Metropolitan Area Transit Authority (WMATA) to create a program providing WMATA employees with the ability to report safety hazards voluntarily and confidentially. Those reports will be used to proactively identify and manage safety hazards, leading to a safer transit experience for WMATA's rail and bus riders.

We're also promoting the safety of automated systems even before they are deployed in the real world. Our SMS experts are helping automated driving system developers enhance safety management throughout the design, development, and deployment of these automated capabilities.

Enhanced Operability

In our Mobile Autonomous Systems Experimentation (MASE) Lab, we're evaluating higher levels of autonomy, such as those designed for military use. We're testing the performance of automated systems under a variety of use cases, including inclement weather, off-road conditions, and cooperative driving with unmanned aircraft systems (UAS) and other ground vehicles.

We're also using machine learning to improve vehicle perception of the objects and terrain around it. We're exploring how approaches developed for UAS might apply to automated ground vehicles to improve the fluidity of their movements. Our data-driven research guides our recommendations about tomorrow's fleet of vehicles.

Diversified Research

As micromobility services such as electric bicycles and scooters take our cities by storm, we're conducting research to illuminate the causes of accidents involving these new modes of transportation. And we're sharing our findings to inform the policy and infrastructure investments that will enhance their safety.

As railroads and mass transit systems become increasingly digitized, cyber threats loom large. We're working to identify cybersecurity vulnerabilities in these and other automated systems so our defenses can be strengthened.

Still other research addresses the unique problems associated with automated perception of pedestrians, how to build collision-avoidance algorithms into higher-level autonomous system behaviors, and how to choose and capture the hazard-based data that will be most relevant to future accident research. To all of these efforts we bring a breadth of expertise in autonomy, systems engineering, safety management, and cybersecurity.

It's a dynamic time for transportation. At MITRE, we're meeting the challenges head-on.

For information about MITRE's surface transportation expertise and capabilities, contact transportation@mitre.org.

A MULTI-PRONGED EFFORT

- Through PARTS, we're using collaborative analysis and data-driven insights to lead to reduced traffic fatalities.

- We've proposed a framework for managing the safety risk in automated driving systems.

- As micromobility services gain popularity, we're identifying safety risks and solutions.

- As the military and industry experiment with higher levels of vehicle autonomy, we're testing the performance and safety of these innovations.

- Our MASE Lab offers a testing environment supporting this research.

MITRE's mission-driven teams are dedicated to solving problems for a safer world. Through our public-private partnerships and federally funded R&D centers, we work across government and in partnership with industry to tackle challenges to the safety, stability, and well-being of our nation.

MITRE | SOLVING PROBLEMS FOR A SAFER WORLD®