



DRIVER RESEARCH FOR INTELLIGENT VEHICLES AND ENVIRONMENTS (DRIVE) LAB

The Driver Research for Intelligent Vehicles and Environments (DRIVE) Lab offers a state-of-the-art driver-in-the-loop simulation. From advanced driver assistance systems to fully autonomous vehicles, city streets to rural settings, the DRIVE Lab provides users an immersive setting to experience the vehicles and environments of tomorrow's integrated transportation system.

How It Works

The [DRIVE Lab](#) provides multiple capabilities for drivers and transportation specialists to evaluate different levels of automation in a variety of environments to facilitate better-informed technical, regulatory, and policy decisions. Using fully customizable scenarios and comprehensive data collection capabilities, DRIVE enables a turnkey solution for users to see, feel, experience, and evaluate new transportation technology.

The lab can simulate any type of vehicle and its driving capabilities—from cars with limited automation or assistance systems to highly autonomous vehicles—and it can generate customizable virtual test environments. The lab will be able to

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simulate various types of surface transportation interactions: for instance, between differently equipped vehicles, and between highly automated vehicles and their drivers. The lab also uses other capabilities, including virtual reality technology, to simulate interactions between vehicles and more vulnerable road users, such as pedestrians and cyclists. In doing so, the lab will help researchers discover solutions to the complex issues that rapid technological changes are introducing into the surface transportation ecosystem.

Integration into a Comprehensive Environment

The DRIVE Lab is part of a network of physical and virtual labs across MITRE that make up an integrated and immersive environment. The MITRE Immersion Lab facilitates interaction and experiences in multi-domain, multi-mission simulation environments to help reach consensus solutions on today's toughest transportation issues. The DRIVE Lab provides the driver's seat to do so.

For example, the DRIVE Lab will integrate with MITRE's Mobile Autonomous Systems Experimentation ([MASE](#)) and Integration Demonstration and Experimentation for Aeronautics ([IDEA](#)) Labs.

It is also designed for interoperability with external entities, such as the the Department of Transportation's (DOT) Virtual Open Innovation Collaborative Environment for Safety ([VOICES](#)) platform, built to allow transportation innovators to conduct collaborative testing of safety solutions in a synthetic test environment before deployment on the nation's highways.

The DRIVE Lab can also integrate with real vehicles and infrastructure, as well as simulators at external institutions. Running in its hardware-in-the-loop mode, the lab can execute high-fidelity studies incorporating commercial Intelligent Transportation System (ITS) products maintained by MITRE's Smart City Laboratory. These assets include on-board units, roadside units, traffic cameras and radar, and signal control systems. These connections enable research in multi-domain and multi-mission simulation environments.

Through these interconnections, researchers will be able to explore and collect data on the interoperability of connected and automated vehicles, human-machine interactions, highly automotive vehicle interactions with transportation infrastructure and physical environments, and more.

Researchers' findings will help inform decision makers about the policies and standards needed to integrate increasingly automated systems into the existing transportation system—safely and efficiently.



The DRIVE Lab supports multiple mediums and modalities for human-in-the-loop research. Some of the hardware capabilities include a 240° projection screen full-scale driving simulator, a three-screen mini driving simulator, an omni-directional treadmill for Virtual Reality (VR) pedestrian interactions, and micro-mobility VR simulators (e.g., bicycle and e-scooter simulators).

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