The MITRE Digital Proving Ground

MITRE's Digital Proving Ground (DPG) is an open and accessible national resource that can accelerate safe automated driving system (ADS) development and deployment. It provides a trusted simulation test environment tailored for ADS safety assurance applications, developed using open, industry-standard practices.

Building Trust in the Safety Assurance of Automated Technologies

As ADS technologies emerge and promise to enhance safety, mobility, accessibility, and efficiency, the key to unlocking these benefits lies in their responsible deployment with safety assurance as the cornerstone.

Stakeholders across the spectrum believe simulation should play a bigger role in making ADS safety cases. Simulation provides cost-effective, safe, and precise testing, but trust in these results depends upon the quality of the simulation technology employed, the objectivity of the work, and the transparency with which it can be questioned due to the proprietary nature of ADS. Therefore, a new approach is needed to maximize simulation's benefits.

DPG represents a game-changing solution that specifically addresses those challenges. A physically accurate virtual environment for testing automated vehicles, DPG offers developers, researchers, and regulatory authorities a

"Using tools like DPG objectively demonstrates the safety assurance of automated vehicles that industry seeks, that governments require, and that the public demands."

Joseph Kolly, Ph.D., Director, MITRE Integrated Systems Innovation Center

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secure, validated, and unbiased method to evaluate technologies through customized tools and virtually limitless scenarios. Its accessible environment enables controlled, secure collaboration and sharing to extend that trust among their stakeholder communities.

A New Way Forward: The Case for MITRE's Digital Proving Ground

Automated technologies require increasing reliance on simulation testing.

With automation's advancement, we can adapt our testing methods for greater effectiveness. While test tracks and on-road testing remain crucial, we can supplement them with safer, cost-effective, and scalable simulation solutions. Incorporating these changes will enable us to safely test a large number of "meaningful miles," including edge cases and close calls, to enhance safety assurance.

Simulation in DPG addresses stakeholder needs by mitigating risk, reducing cost, and increasing miles tested more quickly. These objective and trustworthy results can be used to enhance and augment a more complete safety assurance case and provide a basis for evidence-based safety decisions.

MITRE's DPG is the shared simulation environment of choice, offering:

1. The right mission – As a neutral third party operating in the public interest, MITRE can deliver objective, validated evidence packages in partnership with both government and industry.

2. The right safeguards – MITRE's proven track record of managing and protecting industry's proprietary data and assets enables trust and confidence in our security approaches.

3. The right tools – MITRE's simulation environment integrates NVIDIA Omniverse AV Simulation APIs with MITRE-developed components for high-fidelity, physically-based sensor simulation.

4. The right results – Trustworthy results are achieved using simulations that are sufficiently detailed, adequately validated, based on open standards, and objective—enabling the development of a justifiable safety case.

MITRE's DPG enables users to invest in their strengths and achieve cost and resource savings by offloading some of the burden of physical road testing and development of virtual environments to the DPG communal simulation environment. In this way, we hope to improve the safety assurance of ADS, accelerate the deployment of automated vehicles, and contribute to a dramatic increase in safety on our roadways.

For information about MITRE's Digital Proving Ground or to schedule a visit, contact DigitalProvingGround@mitre.org.

Example Use Cases

- Adherence to traffic rules/laws
- Crash reconstruction
- Edge case and close call analysis
- Safety of the Intended Functionality analysis
- Technical evaluations of system and sub-system of hardware and software
- Evidence to support AV self-certification and a safety case
- Evidence for Federal Motor Vehicle Safety Standards (FMVSS) exemptions
- Scenario testing for NHTSA's New Car Assessment Program (NCAP) and the European New Car Assessment Programme (Euro NCAP) pedestrian behavioral modeling

Autonomous vehicles would have to be driven hundreds of millions of miles and sometimes hundreds of billions of miles to demonstrate their reliability in terms of fatalities and injuries. – Driving to Safety: How Many Miles of Driving Would It Take to Demonstrate Autonomous Vehicle Reliability? RAND Corporation

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. For more information, visit www.mitre.org.

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