

UW-Madison on the map for driving research with new simulator

November 12 2010, by Sandra Knisely

There's only one place in Wisconsin where a driver can send text messages, speed or engage in other risky behaviors with no risk of an accident: the new University of Wisconsin-Madison Driving Simulation Laboratory.

Drivers not only are certain to survive the experience, but the consequences of their actions could be safer vehicles and road around the country and even around the world.

The driving simulator, located in the Mechanical Engineering Building, addresses a substantial need to test new [vehicle](#) technologies and road infrastructure quickly, says its founders, John Lee, the Emerson Electric Quality and Productivity Professor of Industrial and Systems Engineering, and civil and environmental engineering associate professor David Noyce, who also directs the Wisconsin Traffic Operations and Safety Laboratory.

In 1970, no software code was used in vehicles. Now, a vehicle can have millions of lines of code in just its navigation system.

"Vehicles are getting smarter, and we need to get ahead of that rapid change to understand how drivers respond to the technology," says Lee, an expert in [driver distraction](#). "The fundamental reason for the simulator is to understand how people respond to technology so we can design it better and save lives. The car is designed from the ground up to be the car of the future and something we can use to develop and test

next-generation [vehicle technology](#) and road infrastructure."

Funded by UW-Madison and the Wisconsin Department of Transportation, the simulator includes a Ford Fusion with a 24-foot screen wrapped around in front and an additional screen behind the car. Six projectors cast a virtual driving environment on the screens, immersing a driver in as much as 270 degrees of simulation.

The projectors are unique because they render images at the same resolution the human eye does. This allows researchers to, for example, project signage exactly as it would appear to a driver on a physical road. Additionally, the simulator is motion-based and capable of one degree of movement in any direction, which further enhances the realistic experience of driving the simulator.

Flexible software from Realtime Technologies Inc. combined with the high-end hardware will allow researchers to test a wide variety of driver behaviors and responses, many of which aren't economically or ethically possible to test on physical roads. For example, drivers could be dosed with alcohol or learn to navigate a new intersection design.

The simulator is likely to directly benefit Wisconsin drivers, as Noyce plans to replicate segments of roads around the state that are known to cause traffic problems and test traffic control solutions for those segments. Noyce also has spearheaded the effort to introduce a flashing yellow turn arrow, which has been implemented at more than 1,000 intersections nationwide, including two locations in Madison. The simulator will help researchers continue to study that and other new signals.

Additionally, national transportation agencies and vehicle industries stand to gain from research on the UW-Madison simulator. Lee and Noyce have collaborators in Detroit, Michigan and Sweden who also

may be involved on simulator projects.

Other advanced motion-based driving simulators around the country are prohibitively expensive to operate. The UW-Madison simulator is affordable enough that it will be accessible to researchers of all levels, including undergraduate students. Via class projects, students will help design new vehicle technologies using the simulator's rapid prototyping software.

"It's possible for students to get involved and do experiments that can really make a difference and influence the next line of cars," Lee says. "It's a really exciting opportunity"

Lee and Noyce plan to work closely on simulator projects. "Since I joined UW-Madison in 2002, one of my goals since has been to get this type of simulator going," says Noyce. That goal moved forward when Lee joined UW-Madison in 2009 and the two partnered to develop the simulator. "This will let us expand on our respective knowledge and capabilities as a team," says Noyce. "The [simulator](#) really puts Wisconsin on the map in terms of leadership and research on driver's issues and behaviors. This continues UW-Madison's top-ranked reputation in transportation and opens up whole new world of research for us."

Provided by University of Wisconsin-Madison

Citation: UW-Madison on the map for driving research with new simulator (2010, November 12) retrieved 4 June 2024 from <https://phys.org/news/2010-11-uw-madison-simulator.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.