The National Advanced Driving Simulator
The University of Iowa

TheDriverSeat

NADS - The National Advanced Driving Simulator - January 2013

Making Tractors Safer for Kids

Researchers hope to prevent children from dying in tractor accidents using NADS-1, a state-of-the-art driving simulator to help determine when kids can safely operate farm equipment. Teens are at least four times more likely to die on a farm than in any other workplace. The University of Iowa and the Marshfield Clinic in Wisconsin are trying to attack the problem from a different angle. They're looking at how children of different ages process information and make decisions while driving tractors in a first-of-its-kind study of cognitive development skills. The research results eventually could be used to revise voluntary guidelines for parents and employers about when teenagers are ready to perform a variety of farm tasks.

Eighty-eight farm children with tractor experience will use a John Deere tractor to take a virtual drive. The children, ages 10 to 17, will mow fields, navigate hills and maneuver around buildings, people and vehicles. They'll drive along gravel roads in traffic, merge, stop at intersections and pass cars.All the while, software will record their every move, including speeds, use of brakes, acceleration and eye movements. A control group of 10 adult farmers also will participate. The pilot study, funded by the National Institute for Occupational and Safety Health, aims to determine whether the simulator can pinpoint small differences in the children's performance.

NADS @ the 92nd annual Transportation Research Board meeting

Jan. 13-17, 2013 | Washington DC | Booth: 1319

Sue Chrysler will present findings from an Iowa DOT project on motorcycle conspicuity (Sunday - human factors workshop, separate registration required). Sue is also presenting several papers and posters on work completed with the Texas Transportation Institute. Sue , chair of Vehicle User Characteristics Committee meets Wednesday morning Virginia C room. Tim Brown , chair of a new joint subcommittee on Human Factors of In-Vehicle Systems, meets Tuesday at 1:30 in the Johnson room.

Andy Veit will have a MiniSim booth in the exhibit area Sunday afternoon – Tuesday, please stop by and say hello.

Introduction to Simulation Webinar and Workshop

How Do You Turn This Driving Simulator On?

Tutorial for Traffic Engineering and Roadway Design Research Using Driving Simulation

Dr. Sue Chrysler and Dr. Linda Boyle from the University of Washington will be leading a workshop that touches on topics related to the webinar series.

Sunday, January 13 | 1:30 – 4:30
Marriott, Balcony B
Free to TRB registrants

As driving simulation technology has become more affordable, an increasing number of Universities are purchasing driving simulators for research in traffic operations and roadway design. They are often new to the field of simulation and driver behavior and do not have the background to design, execute, and analyze a simulator study . Driving simulators have traditionally been used by behavioral scientists and human factors experts in psychology and industrial engineering departments. The TRB Committee on Simulation and Measurement of Vehicle and Operator Performance (AND30) at its 2012 meeting identified the need for outreach to civil engineering faculty and students who are new to simulation research.

Through funding from the Mid-America Transportation Center, the NADS staff are preparing for a webinar series during Spring Semester 2013. The details of the webinar broadcasts will be sent to all University Transportation Center directors and our newsletter distribution list. The webinars will be archived on our website for later viewing.

The topics will be:

1) Choosing appropriate research topics for your system
2) Optimizing your system hardware and installation
3) Developing scenarios
4) Running the study
5) Data reduction strategies
6) Data analysis methods
7) Using simulation for public outreach and education

Simulator rates for 2013 *
Now the highest fidelity research is more affordable!

NADS-1	$740 / hr	$2800 / day
NADS-2	$300 / hr	$1200 / day
miniSim	$50 / hr	$400 / day

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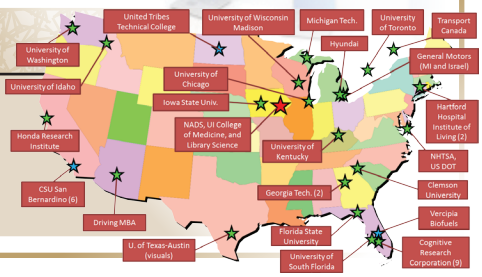
MiniSim™ Partners

Get ready for a webinar for all MiniSim users!

Drivers throughout the U.S drive differently, and we can, with our many partners, replicate/simulate all types of driver behavior and conditions for a research project.



New partners:

- University of Toronto
- University of Idaho
- Clemson University
- Honda Research Institute

FHWA Simulators in Highway Design

Highway safety depends on driver behavior, which is difficult to represent at the design stage and expensive to accommodate after roads are constructed. Simulators can examine novel roadway design concepts that have never been built and can assess dangerous situations while understanding driver behavior and guide roadway designs prior to construction.

This research will fill the gap by (1) developing transformations of simulator data so that it matches observed on-road behavior, (2) identifying the level of simulation fidelity needed to address particular design issues. We take a highway-design-centered focus and consider simulator fidelity as it relates to highway design problems. The level of behavioral fidelity design problems reflects the match between simulator characteristics and the demands of the roadway design. Our approach objectives were: defining highway design and traffic engineering issues that might benefit from simulator-based experimentation and evaluation; Identifying the dominant behavioral constraints of the design issues. Simulator characteristics are defined to replicate the needed constraints. Matching the design issue to the simulator characteristics provides a systematic basis to address a particular design issue and align the data with on-road data. Four levels of fidelity and on-road driver models assess the required simulator fidelity and assure that the driver performance data can predict on-road behavior.

The characterization of specific simulator platforms provides essential guidance to highway designers and traffic engineers regarding how a driving simulator can support their work. A set of transformation functions will relate data from representative simulators to on-road driver performance data. These transformation functions make it possible to understand the safety and highway capacity implications of the design alternatives considered in the simulator.

Great Plains Tractor Study

A crash in which a farm vehicle is struck by a non-farm vehicle is a critical problem on rural roadways. These crashes result in hundreds of injuries and dozens of fatalities .The conspicuity of tractors may play a role in these crashes Many of these crashes take place when a tractor is turning left and is struck by a vehicle attempting to pass. The study explores the role of placement of left turn signals in driver ability to see and understand the indication of turn information in the context of following a slow moving tractor before passing. This study found that when passing a tractor, that there is little difference in outcome based upon the signaling configuration, although there was a trend to fewer hard brake applications when a lateral turn signal was present. This project d raised concerns about the accuracy of driver knowledge related to when it is permissible to pass a tractor and what tractor operator hand signals represent. This project also found a combination of both lateral and high turn signals best represented a turning tractor. This project lays the groundwork for evaluating the effectiveness of these proposed tractor lighting and marking standards and will serve as the basis for the evaluation of these standards in a systematic manner.

The specific aims of this project are to:

- Measure driver response to left-turning tractors.
- Compare high cab-mounted turn signals and turn signals that extend laterally over the wheels of a tractor.
- Assess procedures for collecting lighting and marking information on tractors through the use of a portable low-cost driving simulator (the NADS MiniSim).
- Collect preliminary data to guide future study of tractor visibility issues.

Driver Impairment (DrIIVE)

This fall NADS began a new phase of its line of research into ways of detecting drowsy, distracted, and alcohol-impaired driving. The new project, sponsored by NHTSA, is titled "Driver Monitoring of Inattention and Impairment Using Vehicle Equipment (DrIIVE)". It aims to improve detection methods for these types of impairment and to evaluate the effectiveness of ways to reduce the effects of impairment by examining a system to alert drowsy drivers.

The full press release can be viewed at:
http://now.uiowa.edu/2012/10/detecting-drowsy-distracted-drivers

Recent studies @ NADS:

- Kelly Services
- Toyota Time Series Analysis
- School Bus - IDOT
- CWIM
- Driving MBA
- NHTSA IDIQ