NADS Engineering Capabilities

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National Advanced Driving Simulator (NADS)
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Our Capabilities

**Development**
- Hardware Engineering / Instrumentation
- Software Engineering
- Integration with 3rd Party Devices / Software
- Vehicle Dynamics
- Automated Vehicle Models
- Driver Behavior Models

**Human Subject Studies**
- Experimental Design / Test Plan
- IRB / Subject Recruitment / Handling
- Data Collection using Simulators, Instrumented Vehicles, Naturalistic Data Recorders
- Dosing/Drug Protocols
- Data Reduction / Analysis
- Report Writing
NADS-1 Projector and IG Upgrade

- (16) 1920 x 1200 LED Projectors
- Replaced 8 Barco Sim6 projectors installed in 2005
- Mounting system designed and installed in-house
- Image Generator (IG) software developed in-house
  - Rendering
  - Warping and Blending
  - Projector control/admin
  - IG node control
NADS-1 Projector and IG Upgrade
Development of a new cab for NADS-1
Development of a new cab for NADS-1

- Interior representative of modern vehicles
- CAN bus integration
- Fully programmable infotainment system
Infotainment system integrated with simulation software
NADS-1 Cab Scope

• New 2015 Camry purchased ‘off the lot’
• Disassembly and fabrication
  • Flex-plate/airbag assemblies for dome interface
  • Structural Reinforcements for Vibration Actuators
  • Power Entry and Equipment Rackspace
• Instrumentation
  • UEI Ethernet DAQ (www.ueidaq.com)
  • CANbus
  • Active Steering and Brake loaders (E2M, www.e2mtechnologies.eu)
  • Audio PC, amplifiers, speakers, tactile transducers
  • Chiller for cab air conditioning (dome is air-conditioned)
  • Custom Infotainment Interface
  • OLED display in gage cluster replaces OEM display
  • Cab controls work normally (ignition, gage cluster, climate control, driver controls, etc)
NADS miniSim™

- Portable, small footprint
- Off-the shelf parts. Single PC.
- Cost Effective, Reliable
- Multiple configurations
  - Quarter Cab
  - Simplified Cab
  - Desktop
- Tool for collaboration across institutions/industry/agencies
- Scenarios/software compatible with NADS-1, NADS-2 simulators
- Growing network of users
- Software actively being improved
  - Distributed simulation
  - Automated vehicle models
  - Multi-site studies
Simulator for Transportation Research

THE UNIVERSITY OF KANSAS

miniSim™
University of Kansas miniSim™

• Cab donated by OEM
  • Used simulator buck, all instrumentation removed

• Section cab to fit doorways

• Instrumentation
  • Commercial USB A/D and DIO boards
  • No CANbus interface
  • Active Steering (www.simxperience.com), Passive Brake
  • LCD Gage Cluster
  • Cab Controls: fan, windows, mirrors, ignition, lights, turn signals, horn, gear select
  • Audio PC, amplifiers, speakers, tactile transducers
University of Kansas miniSim™

Structural Modifications (roof removable, rolls on side)

Cab Instrumentation
Simulator for New Product Development and Demonstration

Heavy Truck
Truck miniSim™

• New Cab
• Custom Monitor Stand and frame
• Instrumentation
  • Commercial USB A/D and DIO boards
  • No CANbus interface
  • Active Steering ([www.simxperience.com](http://www.simxperience.com))
  • Passive Brake
  • Passive Gear Shift (x/y lever location)
  • OEM Air brakes
  • Custom clutch loader mechanism
  • LCD Gage Cluster
  • Cab Controls: fan, windows, mirrors, ignition, lights, turn signals, horn, gear select, radio
  • Audio PC, amplifiers, speakers, tactile transducers
Truck miniSim™

Metal Fabrication