

This topic is “practice ready.” Yes No

Streamlining Conversion From Transportation Design Models to Driving Simulator Scenarios

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Abstract

The purpose of our project is to automate the conversion of transportation design models into driving simulation scenarios. For the purpose of this paper, scenario is used to describe the visual 3D model appearance and the underlying meta-data that permits the simulator to place objects into the visual environment and maneuver them in a realistic and meaningful way.

Driving simulators have emerged as powerful tools to support highway safety evaluations. This capability combined with advances in CAD technology allows the creation of driving simulator scenarios that can be used to evaluate existing and proposed highway facilities impact on driver performance. These simulator-based evaluations provide an insight into the behavior of subjects on real roadways while benefiting from a controlled laboratory environment. However, the simulator scenario creation process is a lengthy and system-specific process.

Focusing on core aspects of scenario creation is key to streamlining the use of simulation visualization because the 3d modelling task and road definition are among the most time consuming tasks in scenario creation. Therefore, establishing a bridge between the design and simulation realms can result in time savings and a tremendous reduction in the workload of scenario creation.

Much of the information necessary for developing simulator scenarios already exists within the design models created by Departments of Transportation and contractors. Until recently, converting between the design and simulation models required the combined knowledge of the transportation design and simulation professionals. Bridging this gap is a way to provide interactive simulation experience at multiple stages of design, not just at the end of the design process for overall approval.

Experiencing the design in a simulator as a form of virtual audit, design professionals are able to quickly iterate design and performance variables, leading to more effective designs. Our hope is that facilitating the use of driving simulation in the design, review and approval processes will enhance these processes while supporting vehicle simulation safety research using real-world environments, leading to improved safety for all roadway users.

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