Tech Brief

3D/4D Sign Review Support

FHWA-NJ-2002-010-TB September 2002

HERE'S THE PROBLEM

There is a need for an appropriate, easy to use computer modeling program that is able to represent highway objects and 4D drive through simulations to aide in visualizing and illustrating alternative solutions to geometric highway problems associated with the design of signage.

AND, HERE IS THE SOLUTION…

To use 3D renderings of proposed signage projects and 4D "virtual drive-throughs" to evaluate newly proposed signage projects directly from the point of view of a driver moving along the roadway as they read the signage.

BUT, HOW CAN IT BE DONE?

By developing a new software system that supports 3D/4D modeling and visualization to review roadside signage.

THIS IS THE OBJECTIVE OF THE STUDY…

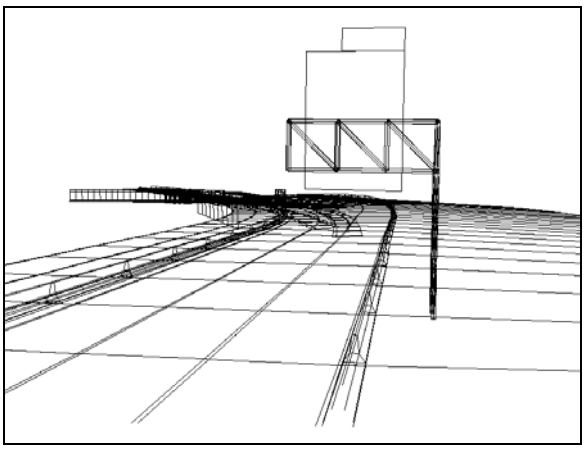
- To develop new software that is able to make 3D modeling simpler and more manageable as a visualization tool.
- To develop this software with a visualization-rendering tool.

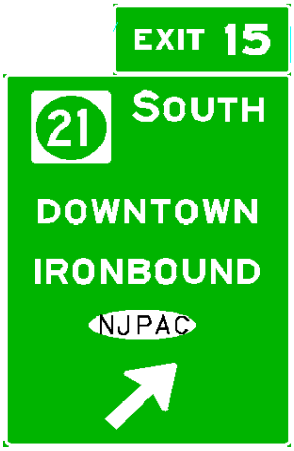
AND, HERE'S WHAT WE DID…

A background study of available 4D drive through visualizations and 3D models recently used for NJDOT were evaluated.

In order to make 3D models easier to use for visualizing highway signage projects, the

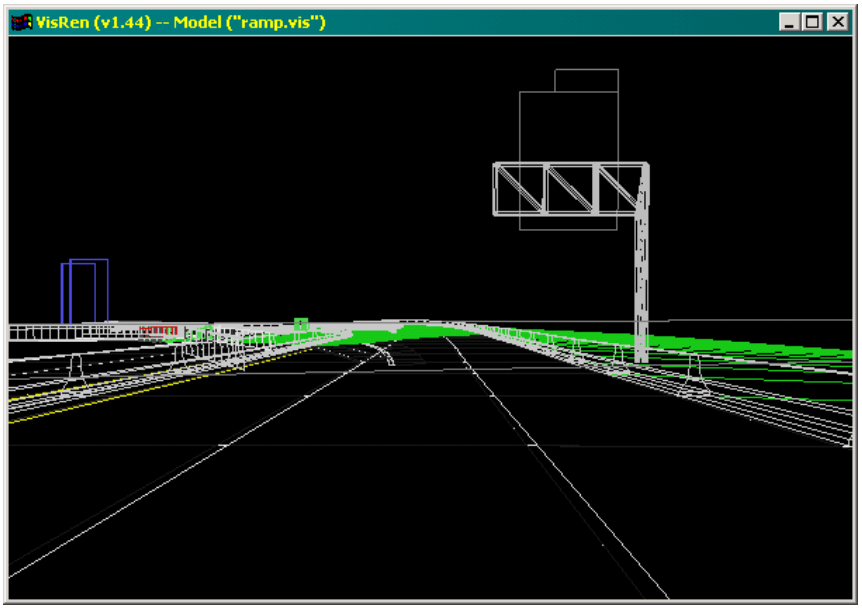
new software system was designed with four major tasks in mind: managing and converting image data into an appropriate texture; importing 3D objects into the 3D model being generated; processing highway alignment data for producing a 3D model of roadway components; and visualizing the proposed signage by rendering the entire 3D model from various driver points-of –view.





The new system was named VisView and consisted of three components. The first component was labeled VisGen, and is the visualization generator that aids in managing and manipulating image/texture data and allows the 3D objects to be imported from CAD programs and converted to formatted objects. The second component, VisUtil, permits the generation of 3D roadway model components from 3D alignment data. The final component, VisRen, is the visualization rendering component that permits the user to render the model statically using real-time rendering on accelerated graphics video hardware.

This software system allows the engineer to model the roadway and signage in three-dimensional space and then render the model graphically from various points of view in the model. The model generation component permits the user to import geometry data and image data and then convert it into a format appropriate for use by the rendering component of the system. The rendering component is then able to render the 3D model with sign faces, textures, etc. from any desired point of view.



The software system permits the designer to simulate potential signage problems by defining a driver–motion path through the 3D model and moving it along that path at a prescribed rate. Potential problems of excessive sign density, inadequate sight distance, and obstruction of sign faces can be identified prior to installing the signage in the field.

CONCLUSIONS…

A new software system has been developed that is able to support the process of reviewing proposed highway signage projects using computer rendering techniques. The system allows the user the ability to import and manage the image data and geometric data, generate the 3D model components, and render the proposed highway signage project either statically or dynamically.

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A final report is available online at http://www.state.nj.us/transportation/research/research.html

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an e-mail to Research.Bureau@dot.state.nj.us and ask for:

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