The Next Generation Simulation Program

THE OBJECTIVE OF THE NEXT GENERATION SIMULATION PROGRAM IS TO DEVELOP A CORE OF OPEN BEHAVIORAL ALGORITHMS IN SUPPORT OF MICROSCOPIC TRAFFIC SIMULATION, WITH SUPPORTING DOCUMENTATION AND VALIDATION DATA SETS. THIS FEATURE DESCRIBES THE OVERALL DESIGN OF THE NEXT GENERATION SIMULATION PROGRAM.

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INTRODUCTION

The Federal Highway Administration (FHWA) is leading the U.S. transportation community from an era focused primarily on system construction to an era focused increasingly on system operations and performance. In this changing environment, traffic simulation models offer significant potential for conducting research; analyzing alternative highway, transit, operational and intelligent transportation system (ITS) improvements; and developing and testing traffic control systems and strategies.

After 35 years of developing and applying traffic simulation tools, there is a small but viable market in traffic simulation packages. However, gaps remain in the functionality of traffic simulation tools that require new algorithm development. Furthermore, many users of traffic simulation tools are not sure how valid these models are or how their results are computed.

In response to these needs, FHWA's Traffic Analysis Tools Program has identified the goals of achieving wider acceptance and use of traffic analysis tools and ensuring that the tools can be trusted to provide accurate results. Therefore, the program strikes a balance between efforts to develop new, improved tools and efforts to facilitate the deployment and use of existing tools.

Deployment efforts are facilitated through a combination of outreach, training, guidance and technical support. Development efforts are focused on creating new tools and improving the analytical foundation of existing tools.

The Next Generation Simulation (NGSIM) program is part of this development activity. In undertaking the program, FHWA is acting as a market facilitator that manages public resources in a focused way to influence and stimulate the commercial modeling market by fostering an environment of public-private cooperation.

THE OBJECTIVE OF NGSIM

The objective of NGSIM is to develop a core of open behavioral algorithms in support of microscopic traffic simulation, with supporting documentation and validation data sets. These algorithms describe the interactions of multimodal travelers, vehicles and highway systems as well as the influences presented to them from traffic control devices, delineation, congestion and other features of the environment. NGSIM products will be openly distributed and made freely available to the transportation community.[1] NGSIM end products include:

- Real-world data sets with their corresponding data descriptions, which will be used to estimate and validate the core algorithms. The traffic simulation community also may use these data sets as a resource to assist in the verification, validation and calibration of existing models.
- Core simulation algorithms that will be developed, estimated, coded, tested and validated using the validation data sets.
- Documentation of the core algorithms (including theory and logic) and documentation of the validation data sets.

STAKEHOLDERS

To assist in the development of these products, three stakeholder groups were formed:

- Model users focus on the needs and requirements of end users of simulation tools. This group comprises representatives from state and local transportation agencies and consultants.
- Traffic modelers focus on the selection, development and validation of