

Priority, Market-Ready Technologies and Innovations

DYNASMART-P

New

Problem: Engineers need a tool for unifying planning and operations analyses

Historically, traffic and transportation engineers have treated network planning and operational analyses as two distinct functions. In recent years, however, the use of intelligent transportation systems (ITS) to plan and operate the Nation's transportation network has increased. In addition, the Transportation Equity Act for the 21st Century (TEA-21) requires transportation planners to promote efficient system management and operations as part of the transportation planning process. Due largely to these changing demands, engineers face an increasing need for tools that unify planning and operations analyses in a single, dynamic format.

Solution: DYNASMART-P is a state-of-the-art dynamic network traffic planning tool

DYNASMART-P is a dynamic traffic assignment analysis tool that operates on recent versions of Microsoft® Windows®. Transportation engineers and planners can use DYNASMART-P to address complex and dynamic transportation operations and planning issues, particularly in the ITS context.

DYNASMART-P overcomes the limitations of traditional static assignment and simulation models by using advanced traffic modeling techniques to capture the dynamics of congestion formation and dissipation associated with time-varying demands and network conditions. It represents a new generation of traffic analysis tools to support transportation network operations and planning decisions.

Potential applications of DYNASMART-P include:

- Providing dynamic traffic assignment methods for traditional transportation planning analyses.

Putting It in Perspective

To assist with the integration of planning and operations, the Federal Highway Administration's (FHWA) Offices of Operations and Planning have established a joint program titled Planning for Operations to address regionwide and/or statewide operations and planning issues.

The goals of the joint program are (1) to enhance the planning and operations to improve and strengthen the key institutional underpinnings and linkages that will be needed for effective transportation systems management and operations in the 21st Century, and (2) to enhance planning and process so that investments in operations provide regional benefit, when possible, and are on par with investments made in construction and preservation. DYNASMART-P can play a key role in this transition.

- Assessing the impacts of ITS technologies, such as dynamic message signs, ramp meters, and in-vehicle guidance systems, on the transportation network.
- Assessing the impacts of different traffic operations and control strategies.
- Supporting decisionmaking for regional work zone management.
- Evaluating incident management and special event management strategies.
- Evaluating congestion-pricing schemes.
- Providing information to support integrated transportation corridor investment decisions.
- Helping to improve estimates of mobile source emissions.

While DYNASMART-P can be used in a variety of applications, the technology does have several limitations. For example, DYNASMART-P:

- Cannot model detailed traffic maneuvers, such as car-following, lane-changing, and weaving operations, and cannot analyze complex emergency transportation management strategies.
- Includes only limited transit and intermodal modeling capabilities. Future versions of DYNASMART-P, however, will be better able to perform this type of modeling.

Benefits

- Analyzes dynamic traffic demand and traffic management strategies.
- Produces detailed operations data and graphical animation for regionwide operations planning analyses.
- Assists planners in evaluating ITS projects.
- Produces realistic traffic operations data for air quality analyses.
- Helps to assess impacts of different work zone management strategies, which have regional significance.

Successful Applications: DYNASMART-P helps across the Nation

DYNASMART-P has been used in successful applications across the country. For example, transportation planners and engineers have used DYNASMART-P to:

- Develop traffic management strategies for major highway reconstruction projects in Zwolle, a city in the Netherlands.
- Evaluate downtown traffic and environmental impacts of one- and two-way traffic flow reconfigurations. This project used a combination of DYNASMART-P and CORSIM, a comprehensive microscopic traffic simulation model.
- Undertake a pilot study to apply dynamic traffic assignment to next-generation urban transportation planning in the El Paso, TX, region.

Deployment Statement

By using DYNASMART-P, engineers and planners are able to integrate travel demand models into the transportation planning process to produce more realistic traffic operations data for air quality analyses. In addition, engineers and planners who use DYNASMART-P will be better able to evaluate ITS technologies and will be able to simultaneously address operations and planning issues.

Deployment Goal

Various activities are planned to continue deployment of DYNASMART-P. For example, FHWA will work with the software developer to improve the modeling features and to fix bugs in the software that have been reported by users. FHWA also will partner with State departments of transportation (DOT) and metropolitan planning organizations (MPO) to provide assistance in the use of DYNASMART-P. FHWA also plans to develop a CD-ROM containing stories about successful applications of DYNASMART-P. In addition, FHWA will include a demonstration of DYNASMART-P at the FHWA Traffic Analysis Tools Team Workshops in 2006.

Deployment Status

FHWA currently is conducting a prerelease test of DYNASMART-P Version 1.2. Based on the findings of the test, which is scheduled for completion in early 2006, the software developer will refine DYNASMART-P and make the revised software available to the public through the Center for Microcomputers in Transportation (McTrans Center) at the University of Florida. In addition, FHWA currently is exploring the potential application of DYNASMART-P to integrated corridor management and emergency transportation management analyses.

Additional Resources

More information is available at the DYNASMART-P Web site at <http://www.dynasmart.com>.

For more information, contact:

**Henry Lieu, FHWA Office of Operations
Research and Development**
Phone: 202-493-3273
E-Mail: henry.lieu@fhwa.dot.gov

John Tolle, FHWA Resource Center
Phone: 708-283-3541
E-mail: john.tolle@fhwa.dot.gov

John Halkias, FHWA Office of Operations
Phone: 202-366-2183,
E-mail: john.halkias@fhwa.dot.gov

**To request additional copies of this
publication, contact:**

**TaMara McCrae, FHWA Corporate
Research and Technology**
Phone: 202-493-3382
Email: tamara.mccrae@fhwa.dot.gov