

RD&T Technology Facilitation Action Plan

Traffic Estimation and Prediction System for Planning (TrEPS-P)

PRODUCT

Description of Product : *TrEPS-P* is a planning version of *TrEPS* which represents a new generation of tools to support transportation planning and operations decisions in the ITS and non-ITS environments. This tool combines (1) dynamic traffic assignment methods, used primarily for planning application and (2) traffic simulation models, used primarily for traffic operational studies. *TrEPS-P* supports the evaluation of strategic and tactical planning decisions by identifying deficiencies in design and evaluating the impact of alternative courses of actions in the context of the broader set of policy objectives for the study area.

MIT and the University of Texas at Austin developed two prototypes, *DynaMIT-P* and *DYNASMART-P*, respectively, in 2000 under Phase 1.5A of the DTA project. *DYNASMART-P* has been selected for field calibration and evaluation to assess its potential for planning application under Phase 1.5C of the DTA project. *DynaMIT-P* will be derived from the refined *DynaMIT* directly under Phase 1.5B.

(Note: *TrEPS-P* differs from *TrEPS* in using the origin-destination (OD) data. *TrEPS-P* assumes that the OD data are fixed for the analysis period. For *TrEPS*, the OD data used for network evaluation is estimated based on the surveillance data, historical OD data, and drivers' responses to traffic control strategies.)

Intended User: Transportation Planners, Researchers

Distribution methods: The technical information is available at the DTA web site: <http://www-cta.ornl.gov/cta/research/dta/index.htm>. Oak Ridge National Laboratory (ORNL) currently acts as a coordinator to distribute and support the *TrEPS-P* prototypes for potential field experiments. It is envisioned that the final product will include CDs and documentation and will be distributed and supported by an appropriately structured advocacy organization designated by FHWA. In addition, the same material could be distributed via the Internet and the FHWA Resource Centers. The final distribution method will be determined in the DTA Phase 2 study in 2003.

Alternative Formats:

Delivery Dates:

- 5/2000: Two *TrEPS-P* prototypes will be ready for field evaluation.
- 4/2001: *DYNASMART-P* will be available for work zone application.
- 1/2002: *DYNASMART-P* will be available for dynamic traffic assignment in the 4-step planning process.
- 1/2002 and beyond: Refined *DYNASMART-P* or *DynaMIT-P* will be made available if needed

PROGRAM/PRODUCT SUPPORT

CBU Contact(s):

Robert Rupert, Operations CBU, 202/366-2194
Pamela Crenshaw, Operations CBU, 202/366-1482
Ron Giguere, Operations CBU, 202/366 2203
Jon Obenberger, Operations CBU, 202/366-2221
Brian Gardner, Planning and Environment CBU, 202/366-4061
James Sorenson, Infrastructure CBU, 202/366-2221

Resource Center Contact(s):

Eastern Resource Center: Steve Clinger, 410/962-0095; Brian Betlyon, 410/962-0086; Bill Fitzgerald, 410/962-0720
Midwestern Resource Center: Erik Steavens, 708/283-3535

Division Office Contact(s):

New York: Michael Schauer, 518/431-4125 (x-236)
Puerto Rico: Eddie Rivera, 787/766-5600 (x-232)

Other Contact(s):

OUTREACH

Conference Presentations: TRB, ITS America, INFORMS, Rural ITS, ITE, etc.

Publications: Will publish: project roadmap, program interface control document, technical documents, and *TrEPS-P* applications in TFHRC Transporter, TRB TR News, ITE Journal, TRB and ITS America conferences and traffic and transportation journals, etc.

Other Outreach Activities: In collaboration with Operations CBU, Planning and Environment CBU and ORNL to identify:

- Potential partnerships with state DOTs and MPOs around the nation, and
- *TrEPS-P* advocacy organization that is closely linked with *TrEPS-P* users.

TRAINING

Materials Needed: Multi-faceted training will be required including training for the installation and operation of the software and maintenance of the software. The training courses may be of multiple forms including computer-based training and traditional classroom based training, etc. Each form of training will require different materials including multi-media presentation, interactive software, etc.

Instructor Requirements: *Installation and operation of software:* experience in distributed processing in a heterogeneous computer environment and MPO planning analysis.

Maintenance: familiarity with advanced software technologies and understanding of *TrEPS-P* software, database, requirements and application.

Schedule of Training/Workshop/Briefing: Two-phase training: An initial training is for early *TrEPS-P* deployments for selected groups of MPOs. The initial training will provide the technical foundation for an enhanced training course intended for a broader set of deploying organizations. Initial training will occur in

2002 in synchronization with initial deployments. Enhanced training for a broader audience will be synchronized with subsequent deployments of *TrEPS-P*. Enhanced training development should start in FY02, based on the results of the initial training, and be ready for delivery in FY03.

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Intended Audience: *Installation and operation of software:* MPO technicians and planners.
Maintenance: *TrEPS-P* developers and maintainers.

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Alternative Formats: FHWA Resource Centers or a selected organization for software distribution and technical support may provide the training. The final training format will be determined in the Phase 2 study.

PROGRAM INTEGRATION

CBU Contact:

- Robert Rupert, Operations CBU, 202/366-2194
- Pamela Crenshaw, Operations CBU, 202/366-1482
- Ron Giguere, Operations CBU, 202/366 2203
- Jon Obenberger, Operations CBU, 202/366-2221
- Brian Gardner, Planning and Environment CBU, 202/366-4061

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Research Contact: Henry Lieu, Operations R&D, 202/493-3273

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Follow-up Activities: Phase 2 study (4/2002-3/2004) will be initiated (1) to refine *TrEPS-P* based on lessons learned from the laboratory (Phase 1.5A) and field evaluation (Phase 1.5C); (2) to develop ACS_based *TrEPS-P* to address the Adaptive Control Software (ACS) issues; and (3) to form partnerships with MPOs for initial deployments.

Phase 3 study (4/2004-12/2007) is to enhance *TrEPS-P* for integration with new technologies such as wide-area surveillance and vehicle tracking systems and to promote partnership for long term research, development, evaluation, and deployment of *TrEPS-P*.



RD&T Technology Facilitation Action Plan

Traffic Estimation and Prediction System (TrEPS)

PRODUCT

Description of Product : *TrEPS* is a real-time traffic estimation and prediction system allowing Traffic Management Center (TMC) operators to implement pro-active traffic control strategies based on the traffic surveillance data. Information Service Providers and Emergency Management Systems can also use the traffic information to provide route guidance. For the off-line application, *TrEPS* can be used to evaluate different advanced traffic management system (ATMS) and advanced traveler information systems (ATIS) strategies and to synthesize origin-destination (OD) data by integrating with archived TMC data or a simulator. Two prototypes, *DynaMIT* and *DYNASMART-X*, were developed by MIT and the University of Texas at Austin, respectively, in 1998 under Phase 1 of the Dynamic Traffic Assignment (DTA) project. Upon completion of the laboratory evaluation in May 2000, both prototypes will be field-tested. The prototype(s) with potential for real time operations will be refined and made available for initial deployments in Phase 2.

The prototypes developed in Phase 1 do not incorporate Adaptive Control Systems in the traffic prediction process. A full version of *TrEPS* to address Adaptive Control System (ACS) issues (*ACS_TrEPS*) will be completed in 2004 under the DTA Phase 2 study.

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Intended User: On-line, real time traffic management version of TrEPS: TMC operators
 Off-line transportation analysis version of TrEPS : Planners, traffic engineers, and researchers

Distribution methods: The technical information is available at the DTA web site: <http://www-cta.ornl.gov/cta/research/dta/index.htm>

Oak Ridge National Laboratory (ORNL) currently acts as a coordinator to distribute and support the *TrEPS* prototypes for potential field experiments under the DTA project. It is envisioned that the final product will include CDs and documentation and will be distributed and supported by an appropriately structured advocacy organization designated by FHWA. In addition, the same material could be distributed via the Internet and FHWA Resource Centers. The final distribution method will be determined in the DTA Phase 2 study in 2003.

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Alternative Formats: Download from Internet

Delivery Dates: 5/2000: Two *TrEPS* prototypes will be ready for field evaluation
 5/2002: First *TrEPS* will be ready for off-line applications
 12/2003: First *TrEPS* will be ready for on-line real-time deployments

3/2004: *ACS_TrEPS* will be ready for deployments
4/2004 -12/2007: Refined *TrEPS* will be made available if needed

PROGRAM/PRODUCT SUPPORT

CBU Contact(s): Robert Rupert, Operations CBU, 202/366-2194; Pamela Crenshaw, Operations CBU, 202/366-1482; Ron Giguere, Operations CBU, 202/366 2203; Jon Obenberger, Operations CBU, 202/366-2221; Brian Gardner, Planning and Environment CBU, 202/366-4061

Resource Center Contact(s): Eastern RC: Steve Clinger, 410/962-0095; Jeffrey Van Ness, 410/962-0077 (x3054); Brian Betlyon, 410/962-0086

Division Office Contact(s): New York: Michael Schauer, 518/431-4125 (x-236); Puerto Rico: Eddie Rivera, 787/766-5600 (x-232)

Other Contact(s): Thomas Granda, Safety RD&T, SBU, 202/366-3365

OUTREACH

Conference Presentations: TRB, ITS America, INFORMS, Rural ITS, ITE, etc.

Publications: Will publish: project roadmap, program interface control document, technical documents, and *TrEPS* applications in TFHRC Transporter, TRB TR News, ITE Journal, TRB and ITS AMERICA conferences and traffic and transportation journals, etc.

Other Outreach Activities: In collaboration with Operations CBU and Oak Ridge National Lab, foster and identify:

- TMC consortium (a forum organized by Office of Safety RD&T),
- Potential partnerships with TMCs around the nation,
- Private/public partnership with Information Service Provides (ISP), and
- *TrEPS* advocacy organization that is closely linked with *TrEPS* users.

TRAINING

Materials Needed: Multi-faceted training will be required including training for the installation and operation of the software, maintenance of software, integration of *TrEPS* with TMC systems, and wide-area joint service ITS operations. The training courses may be of multiple forms including computer-based training and traditional classroom-based training, etc. Each form of training will require different materials including multi-media presentation, interactive software, etc.

Instructor Requirements:

Installation and operation of software: experience in distributed processing in a heterogeneous computer environment, TMC operations, and traffic management and control analysis

Maintenance: familiarity with advanced software technologies and understanding of *TrEPS* software, database, requirements, and application.

System integration: Telecommunications, technologies such as CORBA and PVM, hardware system, NEMA standard, NTCIP, WAN, relevant ITS standards, communication requirements of other systems at TMCs, etc

Wide-area joint-service ITS operations: Knowledge of ITS architecture and benefits derived from joint operations of ITS user services.

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Schedule of Training/Workshop/Briefing: Two-phase training: An initial training is for early *TrEPS* deployment for selected groups of TMCs. An enhanced training based on the results of initial training will be provided for a broader set of deploying organizations.

- The initial training materials including the user's guide and programmer's guide will be developed under the DTA Phase 1.5B and will be made available for initial *TrEPS* deployments, both off-line and on-line applications.
- The enhanced training materials will be developed in the follow-up study, Phase 2B, in synchronization with subsequent deployments of *TrEPS*.

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Intended Audience:

Installation and operation of software: TMC technicians and operators, transportation planners, traffic engineers, and researchers

Maintenance: *TrEPS* developers and maintainers.

System integration: TMC technicians.

Wide-area joint-service ITS operations: TMC operators.

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Alternative Formats:

FHWA Resource Centers or the selected organization for software distribution and technical support may provide the training. The final training format will be determined in the Phase 2 study.

PROGRAM INTEGRATION

CBU Contact: Robert Rupert, Operations CBU, 202/366-2194; Pamela Crenshaw, Operations CBU, 202/366-1482; Ron Giguere, Operations CBU, 202/366 2203; Jon Obenberger, Operations CBU, 202/366-2221; Brian Gardner, Planning and Environment CBU, 202/366-4061

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Research Contact: Henry Lieu, Operations R&D, 202/493-3273

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Follow-up Activities: Phase 2 study (4/2002-3/2004) will be initiated (1) to refine *TrEPS* based on lessons learned from the laboratory (Phase 1.5A) and field evaluation (Phase 1.5B); (2) to develop ACS_based *TrEPS* to address the ACS issues; and (3) to form partnerships with TMCs for initial deployments.

Phase 3 study (4/2004-12/2007) is (1) to enhance *TrEPS* for integration with new technologies such as wide-area surveillance and vehicle tracking systems; (2) to promote coordinated ITS services with *TrEPS*; and (3) to promote partnerships for long term research, development, evaluation and deployment of *TrEPS*.

