

OFFICE OF PLANNING



U.S. Department of Transportation
Federal Highway Administration
Office of Planning, Environment, and Realty

<http://www.fhwa.dot.gov/planning/>

FHWA's Office of Planning (HEPP) develops and implements programs and activities that advance comprehensive international, interstate, State, metropolitan, rural, tribal, and multi-modal planning.

The Federal Highway Administration's (FHWA) Office of Planning, Environment, and Realty offers research opportunities to improve transportation decision making and promote efficiency while protecting communities and the environment.

- ◆ Informs Decisions
- ◆ Reduces Environmental Impacts
- ◆ Enhances Quality of Life
- ◆ Accelerates Project Delivery
- ◆ Advances Transportation Planning

Research Focus

The Office's research efforts focus on advancing surface transportation planning with partners, customers and throughout FHWA by providing a cooperative, performance-driven process by which long and short-range transportation improvement priorities are determined. HEPP's research supports many emphasis areas including: census and travel modeling, congestion management, emergency preparedness and security, environmental linkages, freight planning, non-motorized planning, performance management, public involvement, and scenario and visualization.

Staff Contact: [Reena Mathews](#), 202-366-2076.

FEATURED RESEARCH ACTIVITIES

Virtual Public Involvement (VPI)

This Every Day Counts (EDC) initiative supports agencies' efforts to engage the public more effectively

by supplementing face-to-face information sharing and engagement with technology in the transportation decision making and project delivery process. In EDC V, VPI team members focused on introducing eight tools and techniques to advance virtual public involvement efforts with State DOTs. In EDC VI, team members are focusing on Environmental Justice, Realty, in addition to a local approach (outreach includes MPOs, RTPOs, local agencies, and Tribal governments). For more information, please visit the [VPI website](#).

Staff Contact: [Jill Stark](#), [Lana Lau](#), and [Carolyn Nelson](#).

Planning and Environment Linkages (PEL) Course

A new two-day course entitled "Planning and Environment Linkages" is now available through the National Highway Institute (NHI). In addition to covering the policies and authorities that encourage the implementation of PEL, the courses emphasize the benefits of PEL, which include: improving program and project decisions, accelerating project delivery, developing purpose and need early in the planning process, eliminating unreasonable alternatives during the planning process, promoting efficient and cost-effective solutions, and improving coordination with resource agencies and stakeholders. This live, instructor-led course is offered as either a "virtual" ([NHI Course 142078V](#)) or "in-person" ([NHI Course 142078](#)) delivery option. Additional information on PEL-related research, guidance, and other resources for practitioners is available on the [FHWA PEL Website](#).

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Statewide and Metropolitan Transportation Programming Course

This [web-based course](#) is intended to provide introductory-level information for transportation planning and programming staffs on the process and requirements for developing and implementing Metropolitan Transportation Improvement Programs (TIPs) and Statewide Transportation Improvement Programs (STIPs). The course highlights the FHWA/FTA requirements for statewide, non-metropolitan, and metropolitan transportation planning and programming processes, as well as describes the relationships, roles, and responsibilities of key partners and stakeholders in informed transportation decision-making. Learners will explore the connections between long-range transportation planning and how projects are prioritized for funding and subsequent implementation within TIPs and STIPs as part of an informed transportation decision-making process.

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Multi-Modal Planning at the Multi-Jurisdictional Scale, Phase II Report

The report includes three papers that explore how specific issues and conditions motivate long-range planning collaboration between or among multiple neighboring or proximate MPOs. It also explores the mechanisms and conditions that facilitate collaboration between or among multiple neighboring or proximate MPOs. Finally, the report looks at how multiple neighboring or proximate MPOs can measure progress in achieving interregional planning and programming goals. [View the Phase II Report](#).

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Enterprise Data Enhancement for Planning through Geospatial Enabled Linear Referencing (MPO/LRS)

This project is developing guidance by establishing a sound methodological approach enhancing planning technical capabilities to take full advantage of Linear Referencing System (LRS) based geospatial enterprise data. This study will document exemplary practices utilized by Metropolitan Planning Organizations (MPOs including Rural Planning Organizations (RPOs), Regional Planning Commissions (RPCs), and Councils of Government (COG), to develop methodologies that will leverage linear referencing as the core enterprise data program consistent with the National FHWA

geospatial programs such as the All Roads Network of Linear Referenced Data (ARNOLD). Ultimately the guidance will expand the geospatial data sharing and interoperability between the various transportation planning organizations including, MPOs, the State DOTs and FHWA.

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Applications of Enterprise GIS in Transportation (AEGIST)

The Applications of Enterprise GIS in Transportation (AEGIST) is an FHWA and States led pooled fund initiative that started in 2018. The goal of this initiative is to standardize management of spatial transportation data, including but not limited to the roads, intersections, interchanges, assets, projects (capital, maintenance), crashes, traffic data. The project involves working with State DOTs to compare and deploy the spatial data modeling, engineering, integration, quality control/assurance and analysis practices, as per the guidelines in the AEGIST Guidebook. The implementation experience is also being used to update the guidebook. The implementation scope involves spatial data management use cases such as asset management, emergency response management, safety, mobility and freight analysis. In addition to State level business use cases, the scope includes development, reporting and use of HPMS 9.0, MIRE 3.0, National Transportation Network. The updated guidebook will present standards and guidelines that are aligned with open national and international standards and can be used by transportation agencies for building information modeling (BIM) framework.

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VisionEval Strategic Modeling System

VisionEval is a modeling system to support scenario planning and strategy development. It allows agencies to explore combinations of policies and program elements to explore “what if” questions and develop flexible responses in the face of uncertain future conditions. FHWA is the lead agency for a pooled fund developing and deploying VisionEval. The pooled fund has seven state DOT members, and four MPOs, and it is open to new membership. Members receive technical support for deployment, as well as the opportunity to influence future development of the system. Visit the [VisionEval](#) website for the software and documentation.

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How-To: Quantify Uncertainty in Travel Forecasts

This report provides details on how uncertainty in travel forecasts and related performance measures can be quantified. Formal methods for quantifying risk or uncertainty profiles in key performance measures have been developed and are increasingly common in the context of investment grade traffic and toll revenue studies. This guide illustrates how these methods can be applied to other performance measures such as system VMT, delay, transit ridership, walk and bicycle mode shares, and greenhouse gases and other emissions. Three different risk analysis approaches are explained and illustrated using an activity-based model for Chattanooga, TN, and a four-step model for Toledo, OH: 1) traditional sensitivity analyses with simple risk profiling (similar to FTA guidance); 2) risk profiling based on univariate sensitivity analysis with Monte Carlo simulation and 3) more robust risk profiling using multivariate response surface methods and Monte Carlo simulation. View the report [Travel Forecasts](#).

Staff Contact: [Sarah Sun](#), 202-493-0071.

Understanding GPS and Mobile Phone Data for Origin-Destination Analysis

Emerging datasets such as mobile phone and GPS data have now become a promising data source for many transportation planning applications, including origin-destination (OD) analyses, which serve as the basis for transportation investment and policy decisions. Generated from an entirely different process from the traditional household travel surveys, these datasets possess many characteristics that together can affect the accuracy and representativeness of the derived results such as OD matrices greatly. The aim of this report is not to develop methods for OD analysis but to gain a thorough understanding of such emerging datasets. Two datasets are studied in the study: a mobile phone dataset and a GPS dataset. The study results demonstrate the many different characteristics possessed by the two and their implications for OD analysis are discussed. View the [GPS Mobile Phone Data Origin-Destination Analysis](#).

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Promises of Data from Emerging Technologies for Transportation Applications: Puget Sound Region Case Study

With the explosion of the number of studies using big, passively-generated data for transportation analysis, this study focuses on understanding the properties of

such data and how these properties affect our ability in deriving trip-related characteristics. Two big, passively solicited datasets were analyzed: a mobile phone data generated primarily on phone calls with locations identified through cellular triangulation and an app-based data generated primarily on app usage with locations identified through a mix of positioning technologies including GPS and cellular triangulation. Both datasets were compared against their household travel survey counterparts. It is shown that the two datasets, generated through different positioning technologies and usage mechanisms clearly have different spatial and temporal characteristics, which then affect trip related attributes such as trip rates and OD patterns. Implications in planning applications and future work are discussed. View the [Puget Sound Region Case Study](#)

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TMIP Exploratory Modeling and Analysis Tool (TMIP-EMAT) Beta Test Results

The objective of this project is to demonstrate and motivate the use of regional travel demand models in an exploratory/experimental manner, as opposed to the traditional single point predictive approach, specifically for analyzing the impacts of new technology. The study contributes to our understanding of the impact that the rapid technological evolution has on the movement of people and goods on surface transportation system. It also evaluates the applicability of the robust decision-making process on transportation planning by identifying and addressing hurdles in the application of an exploratory analysis to support real-world planning analysis. [The report describes the successful deployment of TMIP-EMAT](#) at three beta-test sites: Greater Buffalo-Niagara Regional Transportation Council (GBNRTC), Oregon Department of Transportation (ODOT), and San Diego Association of Governments (SANDAG). The beta-tester core models represent three of the major travel demand model software programs and the applications range from regional, sub-regional and corridor level analyses. Each of the beta-testers utilized their calibrated, official models or subcomponents of the official production model. This report also describes the beta-test process, summarizes the applications and highlights lessons learned and areas for future improvement in the TMIP-EMAT application process and in the tool, itself.

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