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 and customers by providing a cooperative, performance-driven process by which long and short-range transportation priorities are determined. HEPP’s research supports many emphasis areas including: census and travel modeling, congestion management, transportation equity, public involvement, rural planning, environmental linkages, freight planning, non-motorized planning, performance management, public involvement, scenario planning, and visualization.

Staff Contact: Reena Mathews, 202-366-2076.

FEATURED RESEARCH ACTIVITIES

Assessment on the Effectiveness of Performance-Based Planning and Programming
In June 2021, FHWA published a report with the findings of a study on how Performance-Based Planning and Programming (PBPP) influences transportation planning and programming decisions at State departments of transportation (DOTs) and metropolitan planning organizations (MPOs). Research was conducted throughout 2020 using online reviews of planning and programming documents, interviews, and peer exchanges with practitioners, and a survey of FHWA Division and Federal Transit Administration (FTA) Region staff. This report documents current practices and identifies opportunities for enhancements. The aim is to help planning and programming staff from the State DOTs, MPOs, and partner agencies (e.g., public transit providers, FHWA, and FTA) not just to meet Federal regulations, but to achieve their own goals for the performance of the transportation system. Here is a link to the final report.

Staff Contact: Corbin Davis, 202-366-6072.

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 and virtual engagement in the transportation decision making and project delivery process. In EDC-5, VPI team members focused on introducing eight tools and techniques to advance virtual public involvement efforts with State DOTs. In EDC-6 team members are focusing on Environmental Justice, institutionalizing VPI, 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.

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.

**Staff Contact:** Joseph Hausman, 202-366-9629.

**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.

**Staff Contact:** Jeremy Raw, 202-680-9573.

**How-To: Quantify Uncertainty in Travel Forecasts**
This report provides details on how uncertainty in travel forecasts and related performance measures can be quantified. 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 Travel Forecasts report.

**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. The aim of this report is not to develop methods for OD analysis but to gain a thorough understanding of such emerging datasets. 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 report.

**Staff Contact:** Sarah Sun, 202-493-0071.

**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. View the Puget Sound Region Case Study.

**Staff Contact:** Sarah Sun, 202-493-0071.

**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 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). View the TMIP Beta Test results.

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**TMIP Modeling and Analysis Tool (TMIP-EMAT) for Forecasting Uncertainty**
Over the past decades, transportation agencies have used predictive planning with a predetermined plan within a specific timeframe. However, emerging connected and autonomous vehicle (CAV) technology, new mobility services, and changing travel patterns will potentially have significant unpredictable impacts on future surface transportation operations and travel demand. The FHWA Travel Model Improvement Program has developed an Exploratory Modeling and Analysis Tool (TMIP-EMAT). TMIP-EMAT aims to empower metropolitan planning agencies to manage uncertainties by providing insights of potential, possible, plausible, probable, or preferred futures. The final report is now available at [https://www.fhwa.dot.gov/planning/tmip/publications/other_reports/uncertainty_travel_forecasting/](https://www.fhwa.dot.gov/planning/tmip/publications/other_reports/uncertainty_travel_forecasting/).

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