Research Project: SP009B4S
Date: May 20, 2011

RESEARCH SUMMARY

FEASIBILITY AND BENEFITS OF ADVANCED FOUR-STEP AND ACTIVITY-BASED TRAVEL DEMAND MODELS FOR MARYLAND

Problem

Maryland (MD) is facing a number of transportation planning and policy issues including highway congestion management, performance measuring and monitoring, multimodal transit planning, socioeconomic and land use scenario analysis, freight mobility and reliability, pollution and green house gas emissions, and stimulating economic development with transportation infrastructure investment. Decision-makers in MD need reliable information on the relative effectiveness of alternative projects and policies that address these important issues. This has led to the development of the Maryland Statewide Transportation Model (MSTM). MSTM is a comprehensive travel forecasting and analysis tool that enables efficient transportation decision-making across multiple transportation modes. The value of MSTM is already being demonstrated in several ongoing applications. However, the complexity of the multimodal transportation issues in MD cannot be fully addressed by the current version of MSTM.

Objective

The primary objective of this research project is to develop a Strategic MSTM Improvement Plan (SMIP) for enhancing MSTM capabilities and broadening its applications. This research also explores the feasibility and the derived benefits of advanced four-step and tour/activity-based methods for statewide transportation analysis in MD. In addition, this project develops a prototype departure time choice model for much-needed peak spreading analysis in MD.

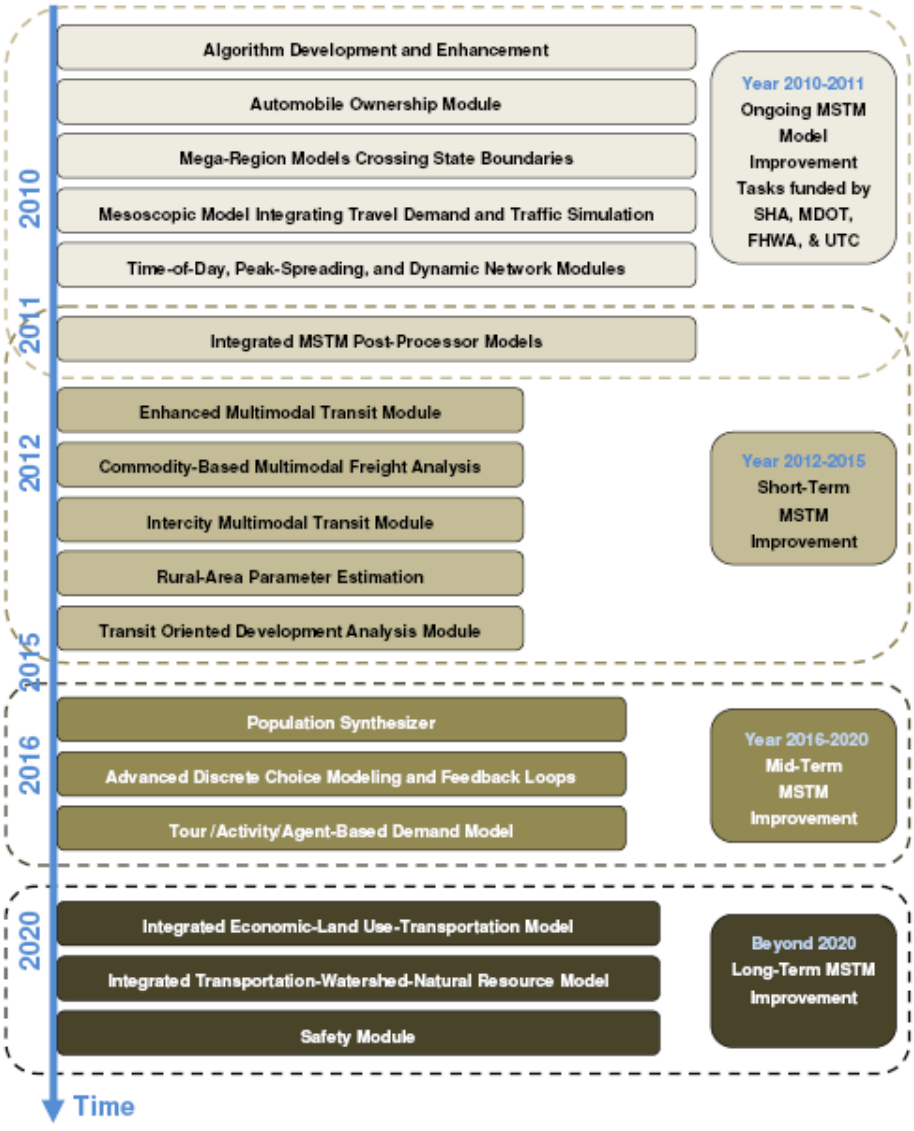
Description

The University of Maryland research team, led by Drs. Lei Zhang and Cinzia Cirillo from the Department of Civil and Environmental Engineering, has identified current and emerging transportation planning and policy needs at SHA that should guide MSTM improvement activities. To ensure that the proposed SMIP is feasible and cost-effective, the research team has also identified available data sources for transportation modeling in MD, and synthesized the best statewide transportation modeling practices in more than 30 other states in the US. Finally, all proposed MSTM model improvement tasks are prioritized based on data availability, development/maintenance costs, and the extent they address the most urgent planning needs at SHA. In developing the departure time choice model, the research team employs discrete choice modeling methods to estimate how congestion delay, scheduling delay (i.e. arriving earlier or later than preferred arrival time), innate scheduling preferences, and other factors influence departure time choices and peak spreading.

RESEARCH SUMMARY

Results

The proposed Strategic MSTM Improvement Plan (SMIP) is illustrated below. The prototype departure time choice model has been developed and successfully applied to estimate peak spreading effects along the I-270 corridor (e.g. a 50% increase in congestion delay between 7 and 8 am would cause 5.1% drivers to depart before 7am and 2.7% drivers to depart after 8am).



Report Information

Lei Zhang, Ph.D. (Project P.I.)
Dept. of Civil & Environmental Engineering , University of Maryland
Phone: 301-405-2881, Email: lei@umd.edu

Maryland State Highway Administration Research Division,
707 N. Calvert Street, Baltimore MD 21202 Tel: 410-545-2916 or 1-888-204-0157