Research Project: *SP109B4P*
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RESEARCH SUMMARY

DEVELOPING MESOSCOPIC MODELS FOR THE BEFORE AND AFTER STUDY OF THE INTER-COUNTY CONNECTOR

Problem

It has become apparent in recent years that significant benefits will be obtained if the Maryland State Highway Administration (SHA) can combine its data products and modeling tools for integrated transportation operations and planning. Examples of integrating operations and planning at SHA include: archiving ITS/operations/count data for planning applications and performance monitoring; applying travel demand models to evaluate operations projects; and combining travel demand and microscopic traffic simulation models for more efficient congestion management at the corridor level. In addition to these general benefits, integrating microscopic operations and macroscopic planning models is also necessary for a variety of scenarios and policy analyses that are important to SHA. For instance, it is desirable to develop mesoscopic models that link microscopic traffic simulation, dynamic traffic assignment, and travel demand models to analyze both the local congestion effects and the regional demand effects.

Objective

This research project has three main objectives: (1) Develop a data framework that helps SHA Operations and Planning Offices identify and archive existing data and model assets for integrated operations and planning; (2) Develop a methodological framework for integrating microscopic traffic simulation and macroscopic travel demand models at SHA; and (3) Demonstrate the methodological framework by developing traffic diversion and peak spreading models that capture the two most important types of demand responses to traffic operations and pricing.

Description

In particular, this study developed a mesoscopic model for the before and after study of MD 200, the Inter-County Connectors (ICC). It is in line with recent efforts by SHA in developing effective modeling tools for traffic analysis and travel forecasting. The integrated models are capable of capturing detailed traffic dynamics and the impacts of traffic operation improvements. At the same time, the scale of the integrated model is large enough to capture any regional impacts. A route diversion model and an agent-based departure time choice model were developed and integrated to predict individual behavioral reactions to network changes, thus allowing the integrated model to reflect both spatial and temporal traffic demand adjustment and regional traffic dynamics.

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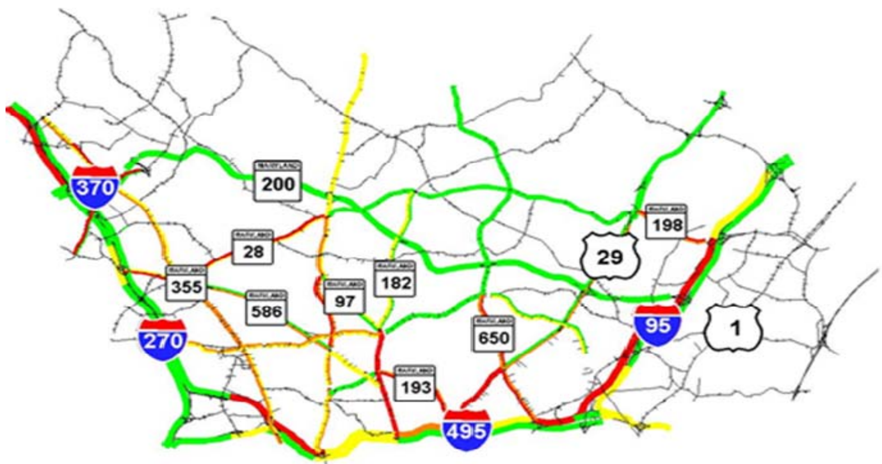
Results

Results from the integrated travel demand and network traffic model show that the ICC can significantly reduce delay, travel time, and number of stops in the study area (see table below). ICC usage and revenue predictions are also available from the model outputs. The level of service map shows that the ICC can primarily benefit citizens in Montgomery, Prince George, and Howard Counties. The benefits of ICC will become even more significant in future years as travel demand continues to increase in the region. Applications of the integrated mesoscopic model go well beyond the before and after study of new network infrastructure. It may also be applied to study a wide spectrum of transportation-related issues, including traffic operational improvement, various tolling and pricing strategies, demand management policies, land use impact, incident management, and ITS/ATIS projects.



Based Year Moring Peak 5:00AM – 10:00 AM ICC Benefits

Variables	Without ICC		With ICC	
	Mean	Std. Dev.	Mean	Std. Dev.
Delay/Trip (min.)	10.97	14.43	10.40	14.48
Stop Time/Trip (min.)	6.33	11.99	5.86	11.00
# of Stops/Trip	9.58	14.45	9.74	16.06
ICC Usage/Morning Peak	N/A		9,187	
Toll Revenue/Morning Peak	N/A		$17,769	

Report Information

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