

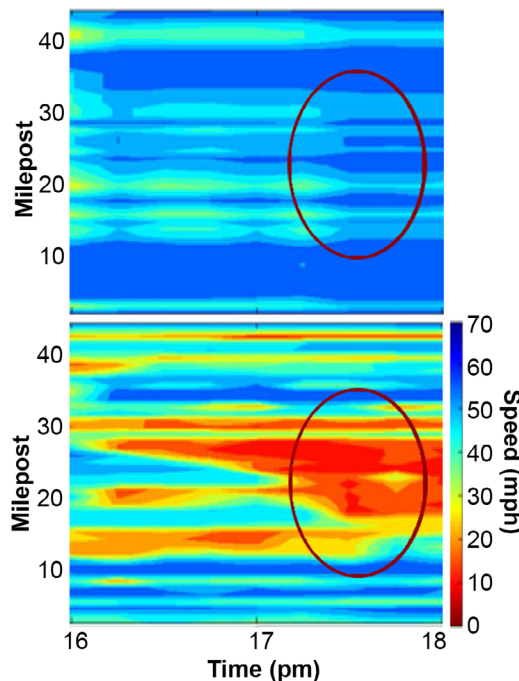


Transportation agencies realize that, often, adding lanes is not a feasible or effective solution for increases in traffic congestion. So, agencies have applied advanced strategies to better use existing capacity. One such strategy, managed lanes (ML), is considered most promising to address congestion problems. ML, like other advanced strategies, must be supported by advanced technologies, such as intelligent transportation systems (ITS), which deliver the kind of data needed for both real-time and offline analysis of traffic conditions.

ML is a lane(s) in a freeway that can be dynamically managed according to preset criteria, such as level of service or minimum speed. For example, ML tolls can be automatically adjusted in response to traffic conditions, in order to maximize throughput and optimize travel time. Such advanced management involves traffic management centers dynamically adjusting their operation parameters. However, the impact of traffic on ML parameters is complex and the subject of much research.

In this study, Florida International University researchers developed a demand estimation framework to assess ML strategies by utilizing dynamic traffic assignment (DTA) instead of the traditional static traffic assignment (STA). Effective planning for ML strategies requires the accurate assessments of traffic flow conditions provided by advanced models, such as DTA coupled with mesoscopic or microscopic modeling.

The researchers found that existing ML modeling frameworks varied greatly in level of detail and complication. This offered them a selection of approaches, for example, in choosing the right procedures for supply and demand calibration or convergence.



*These speed contour maps show vehicle speeds along a stretch of I-95 at evening peak hours. The dynamic model (lower) correctly models the slowdown and bottlenecks (circled) seen in the field. The static model (upper) predicts the opposite behavior, smoother traffic flow.*

While DTA simulates real-world behavior well, its use demanded more detailed and higher quality data, drawn from multiple sources and requiring validation or calibration. Modeling based on these data proceeded using the Cube software suite, whose developers worked closely with the study team to improve the prototype procedure and increase its reliability. The DTA model produced estimates of several traffic flow measures on each link in the study area. From these, broader parameters were derived, such as free-flow speed and bottleneck identification. Results were compared with other data, such as the Southeast Regional Planning Model (SERPM).

This project demonstrated successful integration of high-quality, high-volume data with advanced modeling software. It showed the advantages of dynamic over static modeling in understanding ML performance and management. Better simulations mean better planning and management, and ultimately more efficient and cost-effective transportation in the crowded corridors where ML plays a key role.