Network Modeling Center (NMC) - Outline

• A Research Center and a Resource
• Benefits of Dynamic Traffic Assignment (DTA)
• Applications of DTA
• NMC Present and Future
A Research Center and a Resource
Part of UT’s Center for Transportation Research

TRANSPORTATION ECONOMICS
Innovative construction
Transportation funding
Freight planning and logistics
HIGHWAY DESIGN
Transportation law and policy
Pavement management and performance
Non-destructive testing
Network modeling
MARKETING RESEARCH

Supply chain
Workzone mobility
Traffic simulation
ITS
Safety

Statistics
Traffic operations

Spatial analysis
MORE!
NMC Mission

• Further the state-of-the-art and state-of-the-practice in transportation network models
Benefits of Dynamic Traffic Assignment (DTA)
# Choosing the Right Tool for the Job

<table>
<thead>
<tr>
<th>CAMPO Model</th>
<th>DTA</th>
<th>Microsimulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Regional scale</td>
<td>• Small area scale</td>
<td>• Local/Corridor scale</td>
</tr>
<tr>
<td>• Large time</td>
<td>• Small time interval</td>
<td>• Very small time interval</td>
</tr>
<tr>
<td>interval</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Signals are causing queuing and congestion

DTA outputs include:
1) volumes every six seconds
2) intersection delay
3) travel time of each modeled vehicle
Signals are causing queuing and congestion. DTA outputs include:

1) Volumes every six seconds
2) Intersection delay
3) Travel time of each modeled vehicle

Example from study for City of Austin:

Current conditions

- Average time = 11.65 min
- Average distance = 3.78 miles

2-way 7th St. and 8th St.

- Average time = 9.27 min
- Average distance = 3.48 miles
DTA provides the flows and turning movements to assume for future years and different scenarios.
Applications of DTA
Why use DTA for toll road analyses:

• Toll road usage depends partly on availability and quality of alternate routes
• Tolls can vary by time of day
• Allows for users to have different values of time
• Evaluate how toll affects conditions on toll road and rest of network
Scenario Modeling for State Highway 45 Southwest

(Cautionary note: Environmental process is ongoing)

Source: Austin American Statesman
SH 45 SW Modeled Area
Route 1 SB Calibration

Scheduled Run Time (min)

GPS-Measured and Simulated Run Time (hr)

Measured Run Time

Scheduled Run Time

Simulated Run Time

Scheduled

Measured

Simulated

Transit Evaluation
• Ongoing research: Use DTA to improve ridership predictions
  – Integrate with CAMPO model
• Ongoing research: Use DTA to improve ridership predictions
  – Integrate with CAMPO model
  – Define smaller analysis zones
• How large is the area impacted by a new development?

• Feedback with regional travel model to predict the impact of a new development
  – Define small zones within the subarea

• Dynamic predictions of congestion, turning movements (intersection LOS)
• To predict congestion, need to consider rerouting
• Use DTA to model long-term (assume equilibrium) or short-term (simulation) work zones
• Can provide users with information via electronic roadside signs
• May be helpful in determining road user cost (cost to contractor)
• Assume 4 to 2 lane closure along SH45 eastbound
• Long-term closure
Signal controlled late merge

STAY IN LANE
Local performance measures

- Speed
- Delay (difference in link travel time compared to base case)
- Density (as a proxy to queuing)
Diversion

- Diversion rate during the peak hour: 35%
• MOVES (MOtor Vehicle Emissions Simulator) updated MOBILE 6

• MOVES can take vehicle trajectories from DTA as input
  – Improvement over average measures
NMC Present and Future
• Focus on dynamic traffic assignment
• Focus on Central Texas
• Funding primarily from TxDOT and CAMPO with smaller contracts with Williamson County and City of Austin
• Fostering close relationship with CAMPO modeling staff
NMC Future

• Pushing the state-of-the-art and state-of-practice in network modeling
• Become a hub for modeling knowledge and data in the region
• Expand geographical focus to Texas and beyond
• Continue close relationship with CAMPO modeling staff
• Train practitioners to use NMC-developed tools
More Information

1) Visit our website: www.utexas.edu/centers/nmc

2) Email me: jduthie@mail.utexas.edu