Status of Transportation Modeling Enhancements

ICG, January 4, 2017

Expanding the Region’s Toolset

• BRTB Funded Activity
  – PopGEN 2.0
  – Initiate to Simulate Individual Travel Events (InSITE) – Advanced ABM/Tour Based, Disaggregate Model and Person Trip Tour Roster

• Joint SHA/BRTB SHRP2 Grants
  – C20 – Freight Modeling System – Disaggregate Model, Tour Based and Freight Trip Tour Roster
  – C10 – Activity Based Model & Dynamic Traffic Assignment Integration – Route Choice
  – L04 – Incorporation of Reliability Within Travel Simulation
Aggregate/Disaggregate Modeling (InSITE & C20)

- 1960's – Trip Based/4-Step Modeling
- 2000's – Activity Based Modeling – Tour Based

InSITE adopts the Day Activity-Schedule approach, where a day activity schedule is defined through the concepts of activity pattern, and activity schedule. For each TAZ, the total number of households, persons, and employment is calculated. Some market segmentation and joint distributions are also provided.

Motorized Person Trips:
- Home-Based Work
- Full-Time Work
- Drive
- 1 Work 824 240 8:00 8:30
- Shop 240 203 4:00 4:30
- Return Home 203 824 5:00 5:00
- Social Recreation
- Drive
- Social Recreation 824 733 7:00 7:00
- Return Home 733 824 8:30 8:30

Route Choice – C10

- Three Levels
  - Macro – Static Highway Assignment
  - Meso – Dynamic Traffic Assignment (DTA)
  - Micro – Synchro (deterministic), VISSIM (simulation)
- C10 – InSITE & DTALite Integration
  - Assign Vehicles in 15 minute packs – Vehicle Trajectories
    - Improve
      - Simulation Capacity in Estimation Duration and Location of Delay
      - Travel Time Estimates by TOD
      - Volume and LOS Measurements – Abandoning V/C Ratios
      - Travel Demand Management Policies (Especially Pricing)
      - Transportation Systems Management and Operations
Reliability – LO4

- Scenario Manager
- Vehicle Trajectory Processor

![Graph showing operating speed and various event types]

MOVES Emission Impact?

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Total VMT</th>
<th>Running and Crank Start and Case Running Emissions</th>
<th>Evaporative, FUEL Vapor Uplift, Fuel Leaks</th>
<th>Total NOx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorcycle</td>
<td>0.84</td>
<td>0.62</td>
<td>0.00</td>
<td>0.31</td>
</tr>
<tr>
<td>Passenger Car</td>
<td>6.81</td>
<td>3.15</td>
<td>0.00</td>
<td>3.79</td>
</tr>
<tr>
<td>Passenger Truck</td>
<td>5.59</td>
<td>0.70</td>
<td>0.00</td>
<td>2.41</td>
</tr>
<tr>
<td>Light Commercial Truck</td>
<td>1.45</td>
<td>0.50</td>
<td>0.47</td>
<td>1.36</td>
</tr>
<tr>
<td>Heavy Duty Tractor</td>
<td>0.51</td>
<td>0.03</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td>School Bus</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Refuse Truck</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Single Unit Short-Haul Truck</td>
<td>0.47</td>
<td>0.23</td>
<td>0.19</td>
<td>2.06</td>
</tr>
<tr>
<td>Single Unit Long-Haul Truck</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Motor Home</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Combination Short-Haul Truck</td>
<td>0.12</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Combination Long-Haul Truck</td>
<td>1.09</td>
<td>0.00</td>
<td>0.00</td>
<td>1.09</td>
</tr>
<tr>
<td>Total</td>
<td>16.70</td>
<td>2.59</td>
<td>5.95</td>
<td>3.38</td>
</tr>
</tbody>
</table>

Baltimore Metropolitan Council
Status

• InSITE
  – Validation Completed
  – Model Sensitivity Test (January)
• C20 – Freight Modeling System
  – Software Code (January)
• C10 – Integrated Model
  – Software Code (January)
• L04 – Project Start – March

Schedule/Timeline

• Maximize 2045 (2019) – Support using TBM – Project Prioritization and Air Quality Conformity
• InSITE
  – Round 9 Demographic Scenarios
    ☞ Aging of the Population, Household Structure (childless and no Worker Households)
  – Private Public Partnership
    ☞ Simulated Value of Time
  – Rail Transit Market Analysis
    ☞ Mandatory Tour Patterns/Schedule, Household Interactions
• C20 – SHA Freight Plan
  ☞ Long Distance Supply Chain
  ☞ Intermodal Transfer
  ☞ Pick-up/Delivery, Tour Scheduling, Last Mile
• L04 – Too Early