CURRENT STATUS AND FUTURE OF TRAVEL DEMAND MODELING IN PRINCE GEORGE'S COUNTY; TRANSFORM MODEL

M-NCPPC

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Agenda

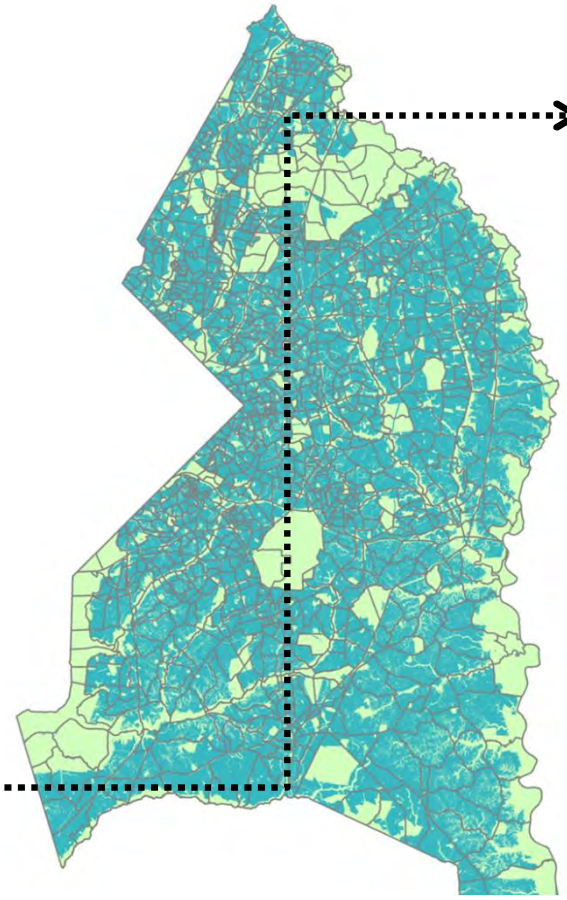
- Travel demand modeling in Prince George's County
- Overview of existing model; TransForM ver. 1.5
- Features and capabilities of TransForM ver. 1.5
- Improvement opportunities
- Overview of future model; TransForM ver. 2.0
- Features and capabilities of TransForM ver. 2.0

History of Travel Demand Modeling in Prince George's County

JHK & Associates 1990, SYSTEM II Model, Updated in 1995

Caliper, 1999, TransForM model (MWCOG 2.1D)

Model Updates, 2009-2011, TransForM ver. 1.4 model



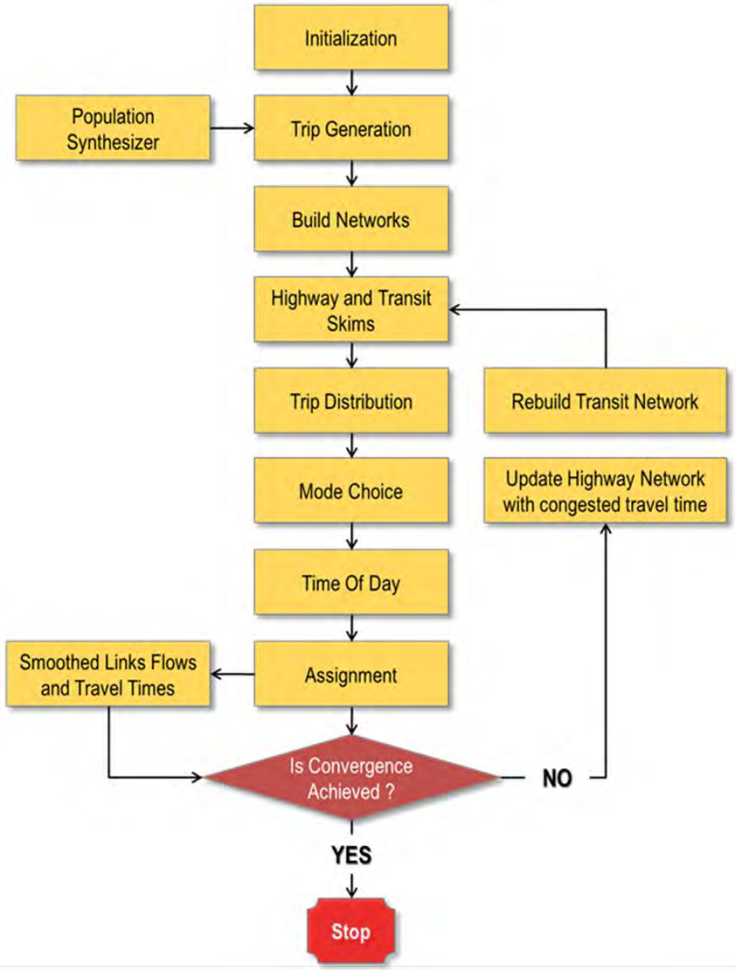
AECOM, 2012-2013, Calibrated TransForM ver. 1.5 for Year 2010

AECOM, 2014, TransForM ver. 2.0 (Dynamic Traffic Assignment)

Long term vision for 2017 and beyond, full activity base model

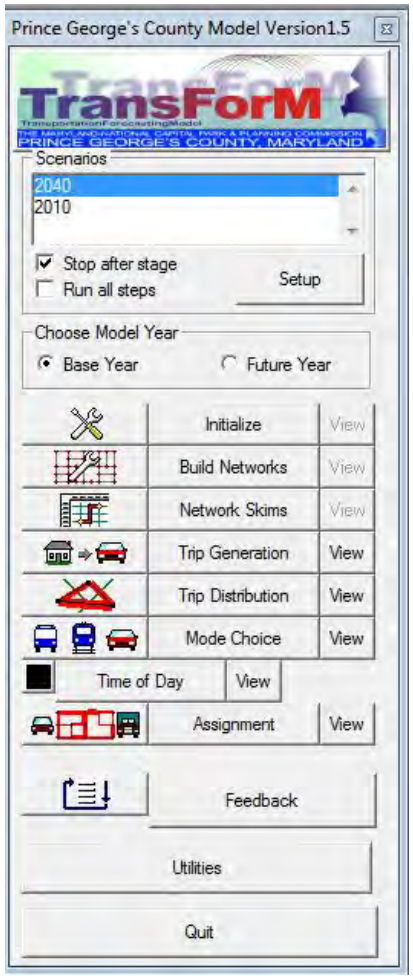
TransForM ver. 1.5 Model Overview

- Adaptation of MWCOG version 2.3 model, Traditional Four-Step Trip Based travel demand model
- Enhanced zone system within Prince George's County (50% more zones than MWCOG model)
- Equipped with Population Synthesizer tool (using latest PUMS data)
- Five trip purpose (HBW, HBS, HBO, NHW, and NHO)
- Multinomial and nested logit mode choice model
- Four modeling time periods (AM, PM, MD and NT)
- Multi-Modal Multi-Class Assignment (MMA)



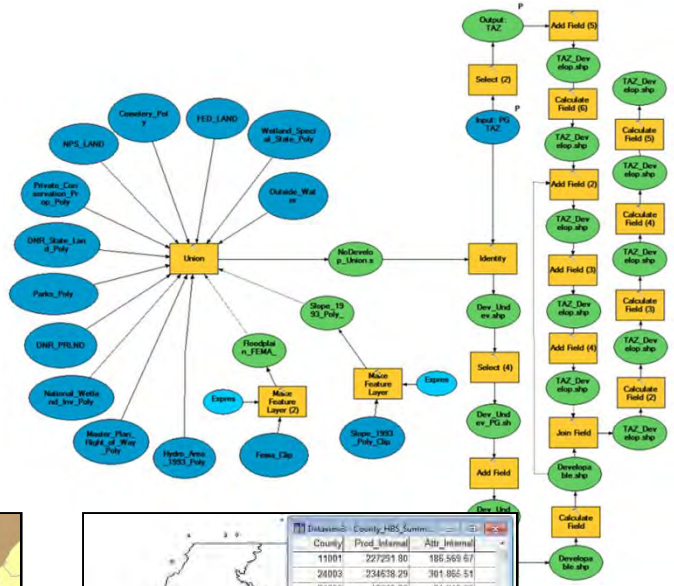
TransForM ver. 1.5 Model Features

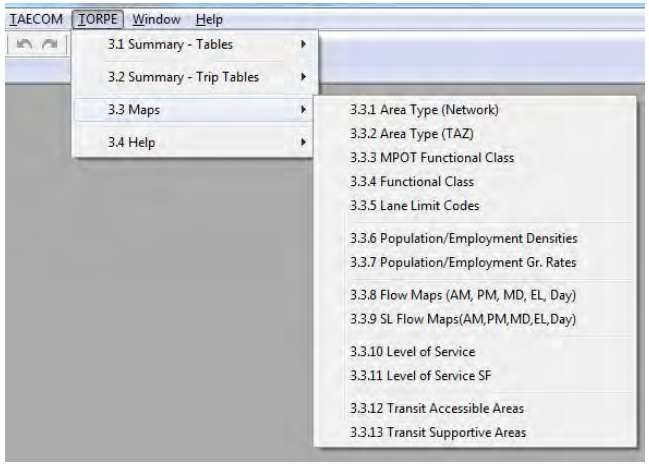
- Properly documented (Technical Report and User's Guide)
- Equipped with an advanced mode choice program, ModeChoice, also used by WMATA
- Maintains trip purposes in traffic assignment
- Applicable for Select Link analysis
- Successfully supports planning and TIS studies
- Provides reasonable outputs;
  - traffic volumes on major roadways and system-wide transit ridership
- Moderate data requirements
- Reasonable runtime particularly for alternative analysis

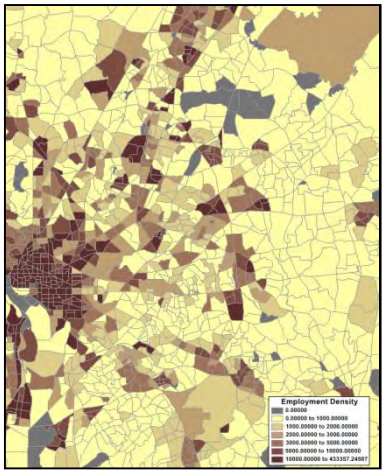


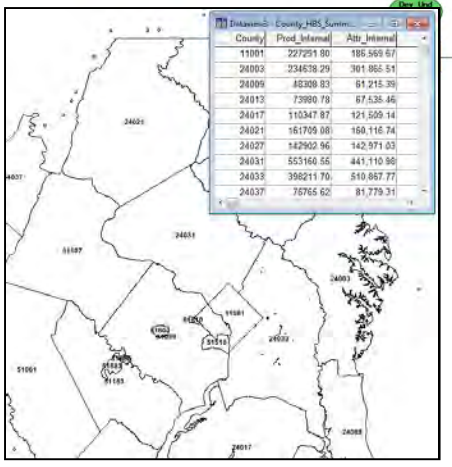
TransForM 1.5 Model Utilities

- Advanced GIS Sub-allocation tool to process Cooperative Land Use Data
- Future year demographic generator; classify household data by size, income and vehicle ownership
- TAECOM → Facilitate data edits, scenario comparison, scenario management, etc…
- TORPE → Facilitate report production, post processing, visualization, etc…





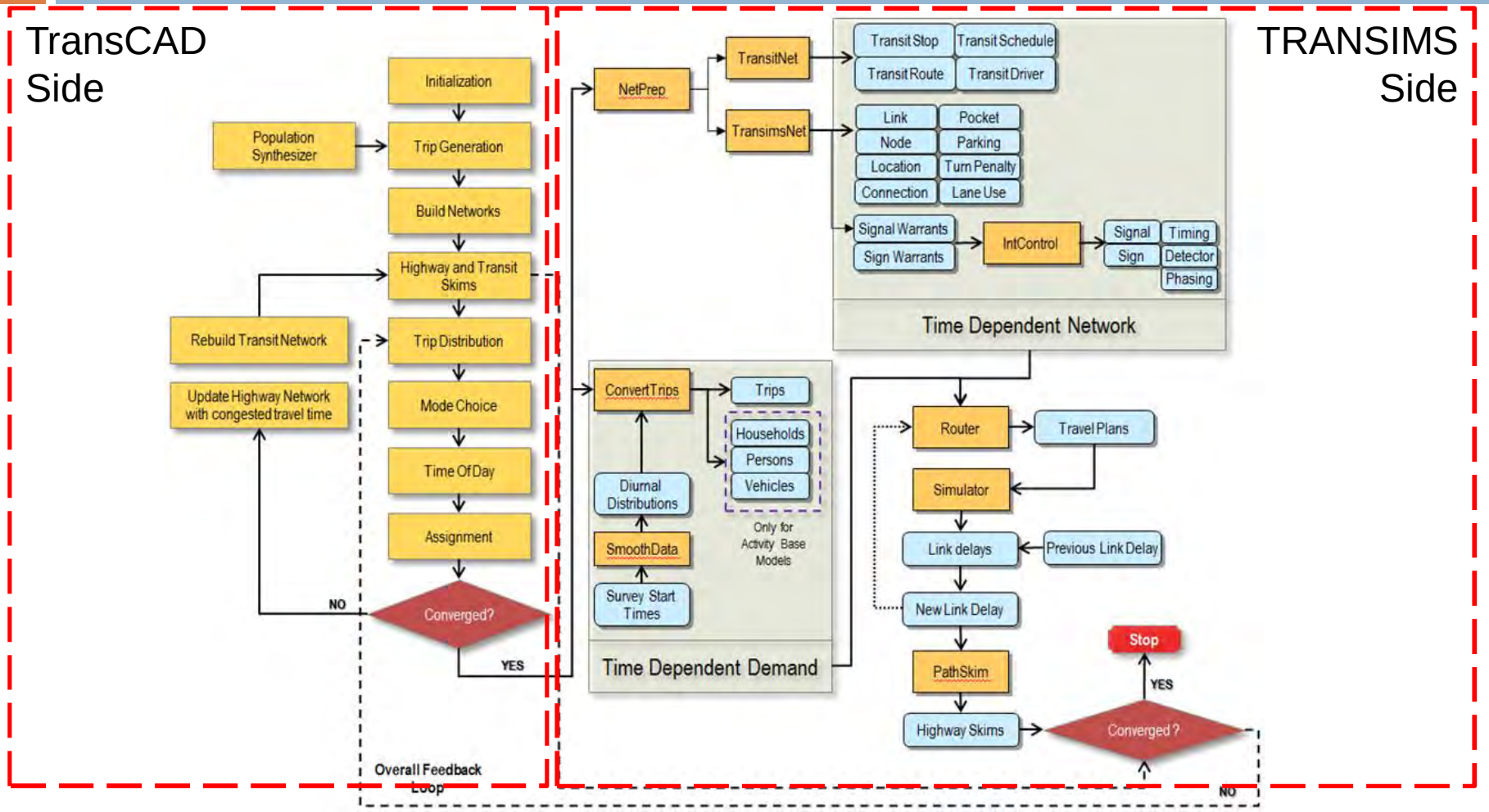




TransForM Model Improvement Opportunities

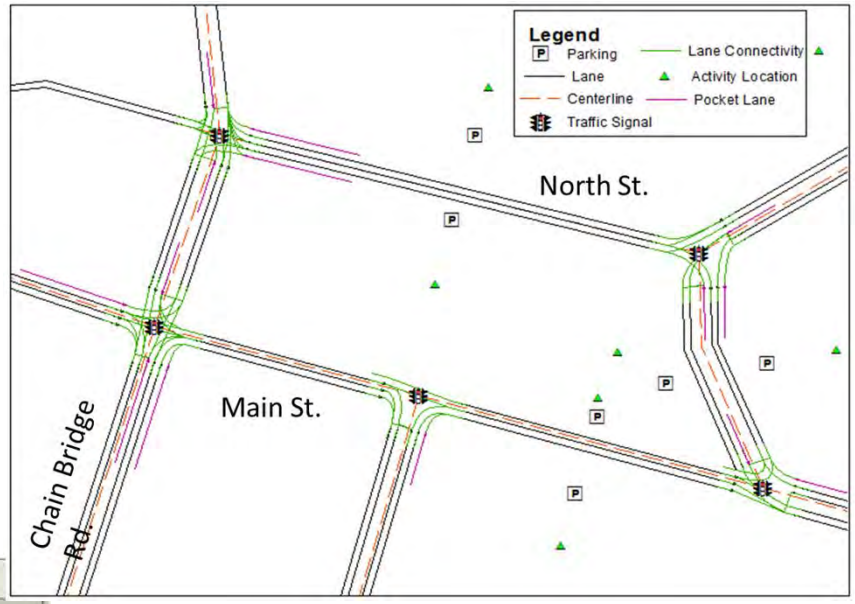
- Disaggregated travel demand at various activity locations within a TAZ
- Detailed modeling time periods beyond AM, MD, PM, and NT
- Roadway capacity variation by time of day
- Signal delays, lane control policies, fringe parking, traveler information system, etc.
- HOT and HOV lanes, variable and dynamic priced facilities
- Pedestrian and bicycle trips modeling
- Transit system accessibility

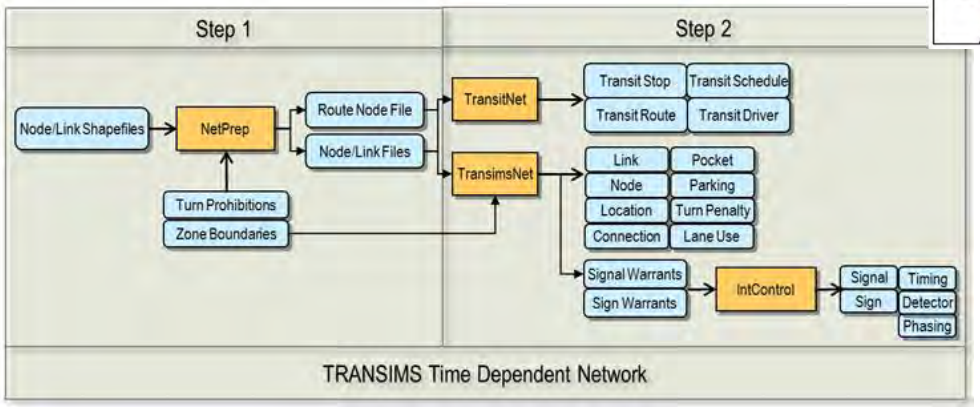
TransForM 2.0 Model Overview
Hybrid TransCAD/TRANSIMS



TransForM 2.0 Model Features

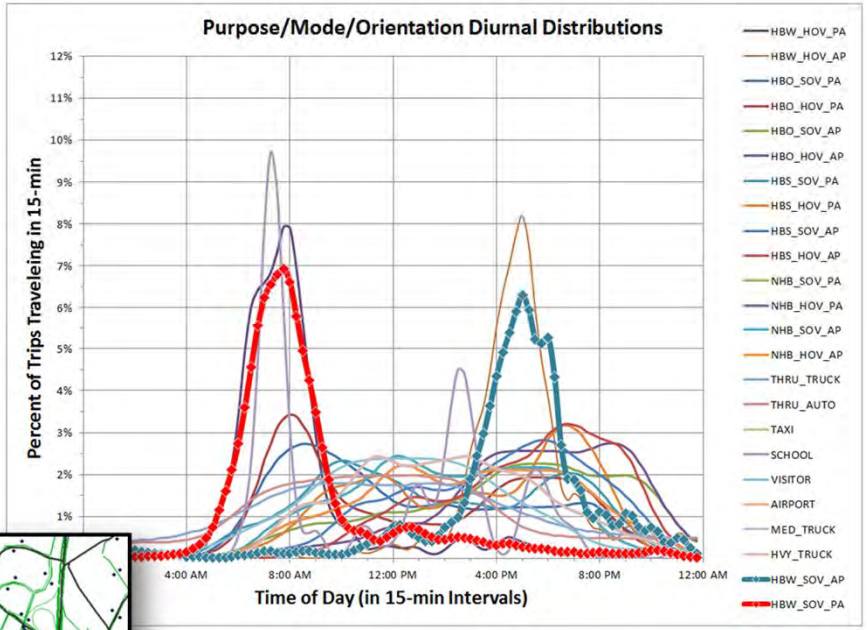
- Highly detailed roadway and transit networks
  - Lane configuration, usage, pocket lanes, turning movements
  - Signal timing, phasing plan, intersection control
  - Transit routes, operation plans, arrival time at each stop





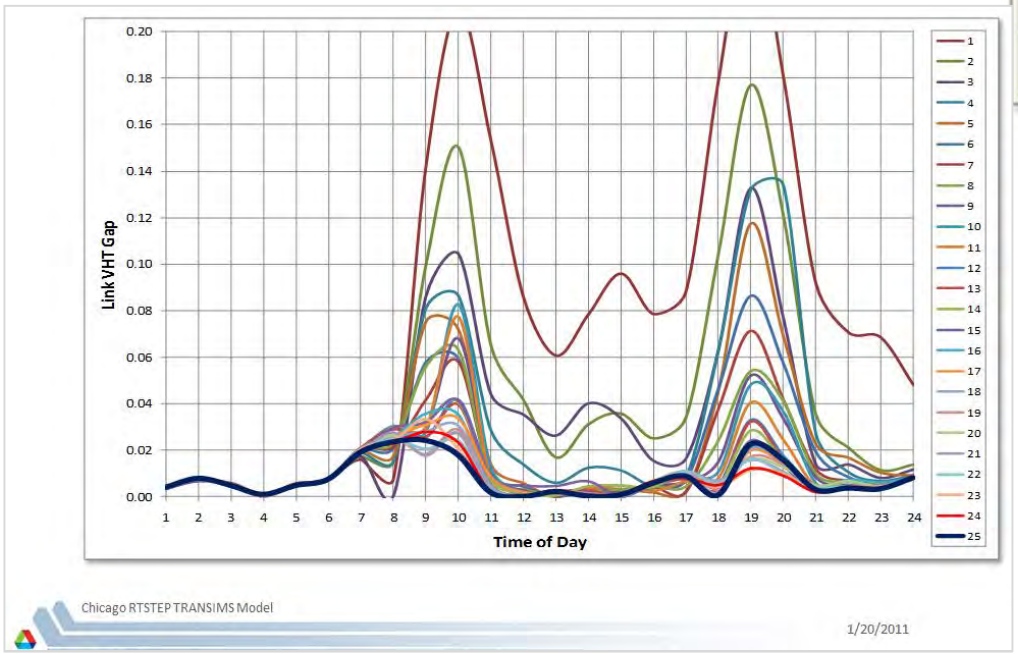
TransForM 2.0 Model Features - Demand

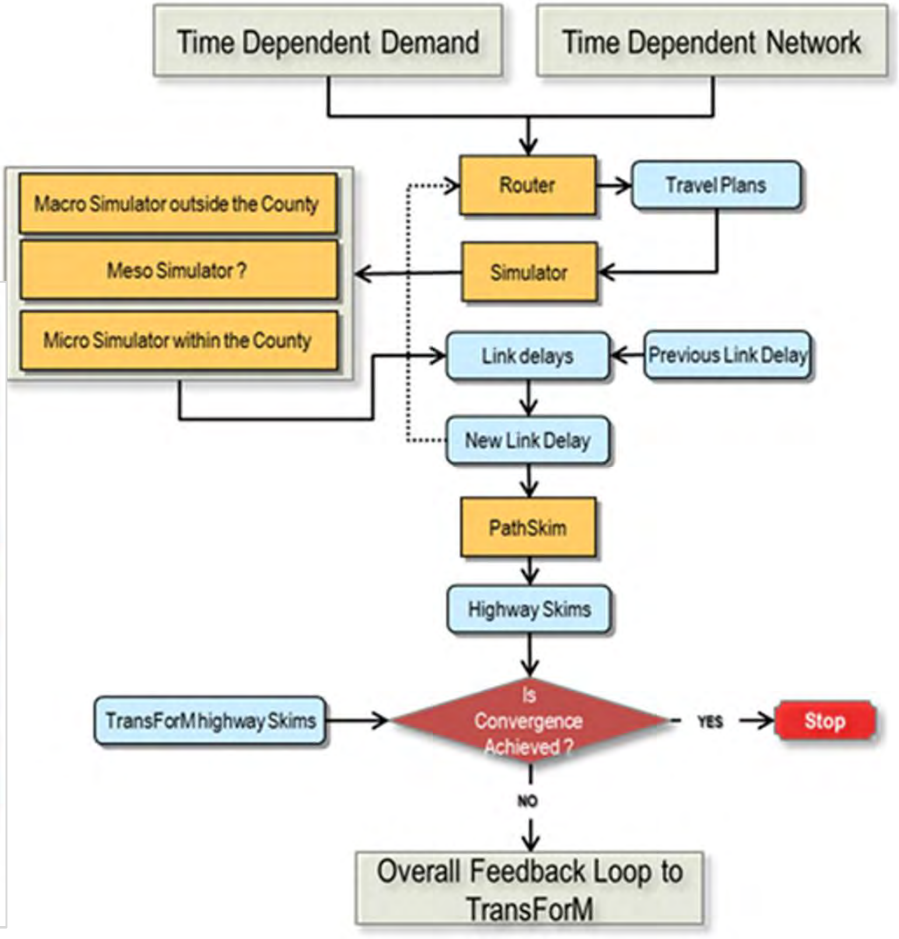
- Travel plans for each person
  - Estimates start and end time for each travel plan
  - Loading points along roadways at fairly correct locations



TransForM 2.0 Model Features - Assignment

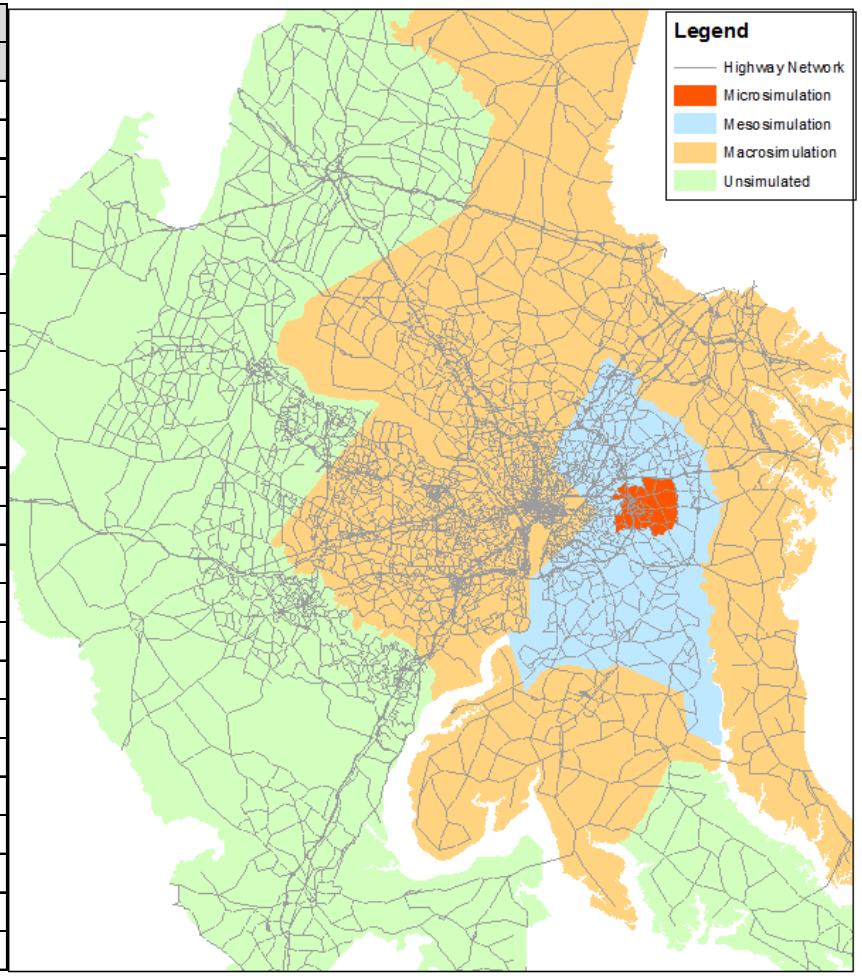
- Dynamic Traffic Assignment – leaving at 8:05 AM is different from leaving at 8:20 AM





TransForM 2.0 Model Features - Simulation

	Subarea Methods			
Parameter	Unsimulated	Macroscopic	Mesoscopic	Microscopic
Simulation Period	24+ hours	24+ hours	24+ hours	24+ hours
Time Steps	events	1 - 10 seconds	1 second	0.1 - 1 seconds
Cell Size	N/A	~25 feet	~25 feet	<= 25 feet
Movement Size	links	cells	cells	sub-cells
Vehicle Length Method	N/A	single cell	multi-cell	multi/sub-cell
Speed Fidelity/Increments	constant	cells/time step	cells/time step	feet/second
Vehicle Accel/Decel	N/A	one cell	one cell	feet/sec/sec
Intersection Controls	N/A	capacity rate	signals/signs	signals/signs
Merge Conflicts	N/A	first come	priority link	priority lane
Random Slow Downs	N/A	no	cells-based	feet/second
Driver Reaction Time	N/A	no	cells-based	feet/second
Plan Following Priorities	N/A	no	cells-based	speed-offset
Parking Lane Enforcement	N/A	no	yes	yes
Look Ahead Lane Changes	N/A	no	cells-based	speed-offset
Lane Swapping Options	N/A	no	yes	no
Permission Probability	N/A	no	no	yes
Max Comfortable Speed	N/A	no	cells-based	feet/second
Reload Capacity Problems	N/A	no	no	yes
Transit Vehicles	N/A	yes	yes	yes
Transit Passengers	N/A	no	yes	yes
Transit Crowding	N/A	no	no	yes
Auto Passengers	N/A	no	no	yes
Walk/Bike Plans	N/A	no	no	yes

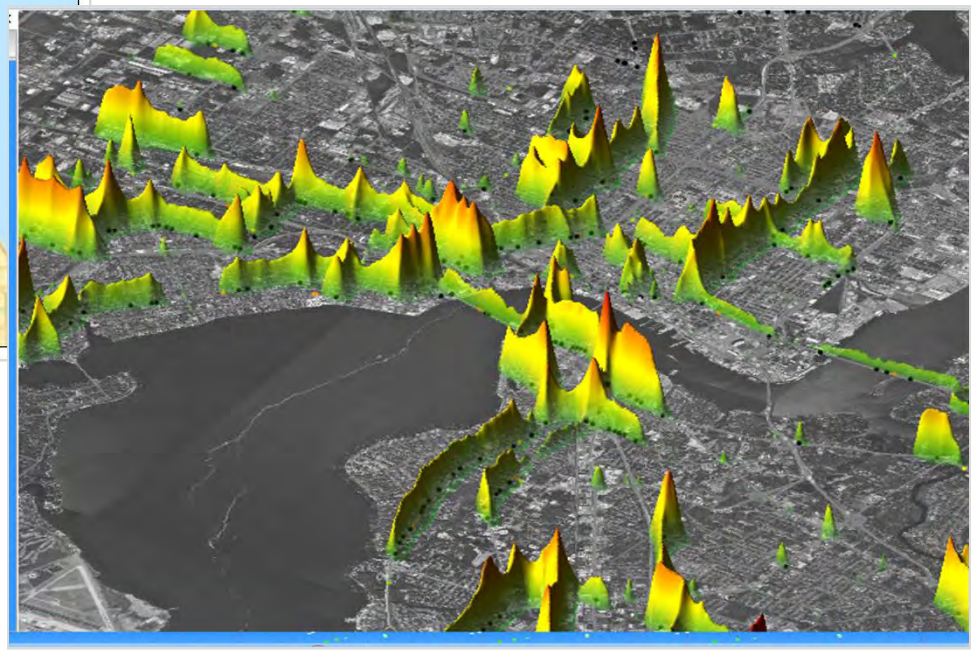


Customized Model Visualization

Change of Travel Plan at Mid Point –

Variable Message Sign

Visualizing Congestion



Potential New Model Applications

- Evaluate Travel Demand Management (TDM) policies; Parking, Roadway Pricing
- Emergency evacuation, construction management and incident response
- Detailed performance measures for highway and transit projects as well as changes in transit operational plans
- Assess impacts of ITS measures; Signal Progression, Variable Message Signs
- Truck Impact on Highway
- Detailed view of Thru trips in Prince George's County (Composition, TOD variation, O-D counties, Micro-location)

Discussion
&
Questions