Activity-Based Modeling Resources At a Glance

Better Methods. Better Outcomes.

OCTOBER 2012

TMIP Activity-Based Modeling Webinar Series

TMIP recently sponsored a webinar series on Activity-Based Modeling including three (3) non-technical sessions for managers and nine (9) technical sessions for travel model practitioners as listed below. Presentation slides and session recordings are available on the Recorded Webinars section of the TMIP Online Community of Practice: **http://www.tmiponline.org**

1. Executive Session
2. Management Session - Institutional
3. Management Session - Technical
4. Activity-Based Model Frameworks and Techniques
5. Population Synthesis and Household Evolution
6. Accessibility and Treatment of Space
7. Long-Term Location and Mobility Models
8. Activity Pattern Generation
9. Scheduling and Time of Day Choice
10. Tour Mode, Intermediate Stop Location, Trip Mode
11. Network Integration
12. Forecasting, Performance Measures & Software

An Instructor's Manual will be posted on TMIP website at the conclusion of the series

ACTIVITY-BASED MODELING REFERENCES

The following list of select references represents the latest and most relevant literature on the development, estimation and application of activity-based models (ABMs). These references may be of use to any agency considering the adoption of activity-based modeling systems.

Resource Systems Group. (2012). *The ARC and SACOG Experience with Activity-Based Model: Synthesis and Lessons Learned.* Washington, D.C.: Association of Metropolitan Planning Organizations.

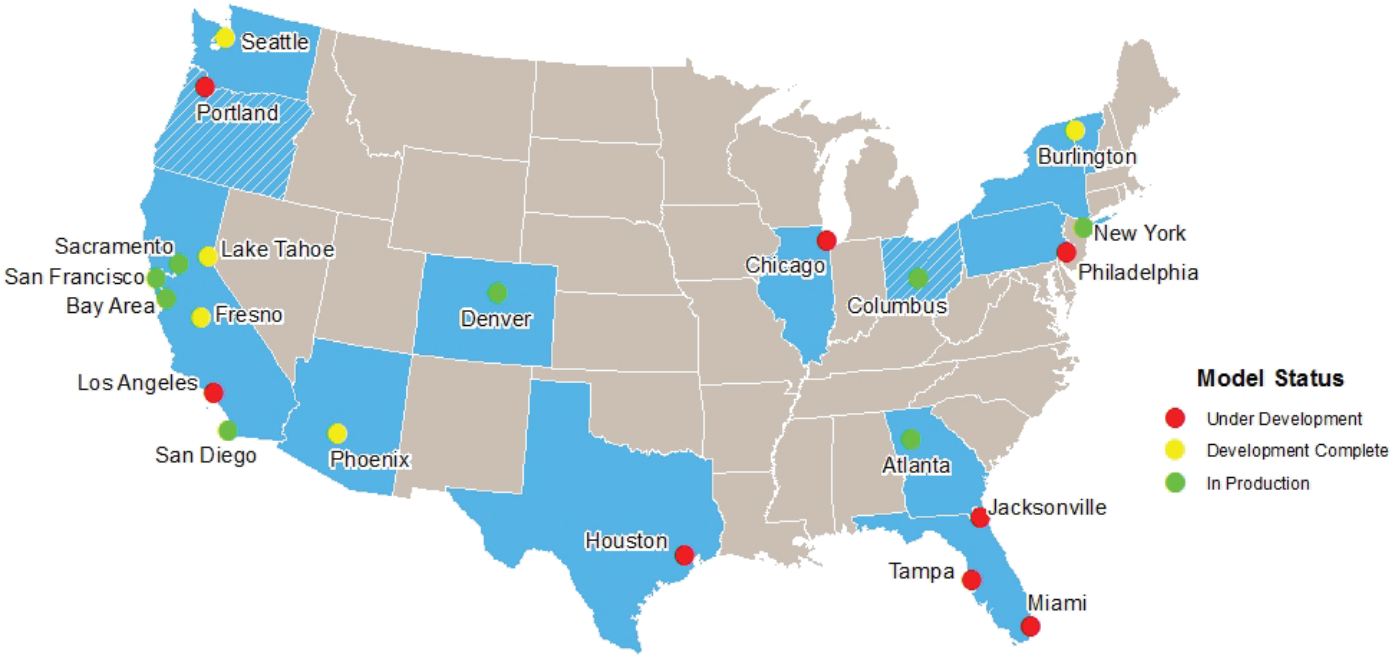
Vanasse Hangen Brustlin, Resource Systems Group, Shapiro Transportation Consulting and Urban Analytics. (2011). *Advanced Travel Modeling Study: Final Report.* Washington DC: Association of Metropolitan Planning Organizations.

Ferdous, N., Bhat, C., Vana, L., Schmitt, D., Bradley, M., & Pendyala, R. (2011). *Comparison of Four-Step versus Tour-Based Models in Predicting Travel Behavior Before and After Transportation System Changes--Results, Interpretation and Recommendations.* Ohio Department of Transportation Office of Research and Development; U.S. DOT Federal Highway Administration; Center for Transportation Research, University of Texas, Austin.

Donnelly, R., Erhardt, G. D., Moeckel, R., & Davidson, W. A. (2010). *NCHRP Synthesis 406: Advanced Practices in Travel Forecasting: A Synthesis of Highway Practice.* Washington, DC: National Academy of Sciences, Transportation Research Board.

Activity-Based Models in the U.S.

The map below illustrates the regions of the country where activity-based models have been adopted by the planning agency and their development and application status. Note, Oregon DOT and Ohio DOT have implemented statewide activity-based models.



For more information on ABMs references please contact Sarah Sun, TMIP Outreach Manager sarah.sun@dot.gov

U.S. Department of Transportation
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Is An Activity-Based Model Right For Your Agency?

Activity-based models can take advantage of a much wider range of data than trip-based models, and are more complex as a result. They produce a richer dataset for analysis, but that data requires knowledgeable staff to summarize and interpret effectively. Custom software, and sometimes hardware solutions that include distributed computing, can also be required to apply activity-based models. Taking all of this into consideration, you may be wondering whether an activity-based model is right for your agency. Taking a big-picture perspective, there are some fundamental questions that an agency should ask when considering whether to "take the plunge" towards an activity-based model system.

Big Picture Questions for Taking the Plunge

- Should the next model update be an **activity-based model**?
- If an activity-based model, what additional investment should be expected in terms of data and consultant support?
- What innovative data development and management advances should be considered with or without an activity-based model?
- What is the best organization structure to accomplish regional modeling goals (activity-based or advanced trip based)?
- Have stakeholders historically been actively engaged in travel demand model analysis?
- Has there been a history of resource-based support for travel model development?
- Does the agency staff have the required level of technical expertise to run an activity-based model?
- Are policy makers or the general public advocating policies that require an activity-based model?

Source: Jerry Everett, "Triangle Regional Model Expert Panel Review: Summary Report", November 17-18, 2011

Factors for Self-Assessment

The checklists below are designed to help an agency perform a self-assessment as to whether adoption of an activity-based modeling system is appropriate.

Staff Experience Checklist

Skill Sets	Need for Activity Model?	Need for Trip-Based Model?
Facility with simulation programming and outputs	Essential	Not necessary
Knowledge of discrete choice model structures, behavior, utility theory	Essential	Desirable
GIS manipulation of land use parcel data	Essential/Desirable	Desirable
SQL scripting and database manipulation	Essential/Desirable	Not necessary

Policy Tests Checklist

Policy Tests	Use an Activity Model?	Use a Trip Model?
Pricing strategies	Yes	Limited
Non-motorized investments	Yes	No
Transit oriented development	Yes	No
Transit schedules	Yes, round trips	Yes, one-way
Transit fare policies	Yes	Limited
Travel demand management programs	Most	No
Transportation systems management*	Yes	No
Equity evaluations	Yes	No

Impacts of Interest Checklist

Impacts of Interest	Use an Activity Model?	Use a Trip Model?
Induced Demand	Yes	No
Emissions for a Household	Yes	No
Peak spreading	Yes	No
Travel time variability*	Yes	Limited
Start/stop emissions by time of day	Yes	No
Vehicle type and choice	Yes	No
Equity by income group	Yes	No

**Addressing travel time variability and systems management requires a very detailed and realistic supply-side network model (dynamic traffic assignment or preferably microsimulation).*

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