

# Travel Forecasting Subcommittee Meeting Highlights

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*Friday, July 17, 2009, 9:30 AM to 12:00 noon*

## Meeting attendees

- John (Jay) Evans (Cambridge Systematics, Inc.)
- Dan Goldfarb (Cambridge Systematics, Inc.)
- Eric Graye (M-NCPPC, Montgomery County)
- Kristin Haldeman (WMATA)
- Elizabeth Harper (Parsons Brinckerhoff)
- Bahram Jamei (Virginia DOT, No. Va. Office)
- Eric Jenkins (M-NCPPC, Prince George's County)
- Dial J. Keju (Frederick County)
- David Kline (Fairfax County DOT)
- John Li (Michael Baker Corp.)
- Yuanjun Li (M-NCPPC, Montgomery County)
- Feng Liu (Michael Baker Corp.)
- Bill Mann (Virginia DOT, No. Va. Office)
- Dan Stevens (Fairfax County DOT)
- Sara Woolfenden (Stafford County)

## TPB staff in attendance

- Joe Davis
- Michael Farhoodi
- Charles Grier
- Bob Griffiths
- Wanda Hamlin
- Charlene Howard
- Hamid Humeida
- Martha Kile
- Ron Milone
- Mark Moran
- Jinchul Park
- Jane Posey
- Wenjing Pu
- Clara Reschovsky
- Meseret Seifu
- Robert Snead
- Feng Xie

The meeting was chaired by Eric Graye, M-NCPPC, Montgomery County, since the regular chair, Wendy Jia, WMATA, was out of town.

### **1. Introductions and approval of meeting highlights**

The highlights from the May 22 meeting of the Travel Forecasting Subcommittee (TFS) were approved as written.

### **2. Scan of best practices in travel demand forecasting**

This item was presented by John (Jay) Evans and Dan Goldfarb, both of Cambridge Systematics, Inc. (CS). CS is on retainer with TPB to perform a scan of the best practices in travel demand modeling in the U.S. CS has been given three task-order projects in the past, and these were presented to the TFS on November 21, 2008: 1) Fuel Prices in Travel Models and 2) Recommended Approach to Near-Term

Model Enhancements, 3) Framework for Before-and-After Study of HOV Network Effects Due to New HOT Lanes. In May, CS was given two additional, and final, task orders for FY 2009: 1) Improving the Model's Sensitivity to Land Use Policies and Non-Motorized Travel, 2) Recommendations on Feedback Convergence Methods. These last two tasks were the subject of today's presentation. The reports on all five tasks will be distributed to the TFS, for review and comment, for its September meeting. Mr. Evans gave the presentation on model sensitivity to land use policies and non-motorized travel. There were several motivating factors behind this task:

- Identification of 58 Regional Activity Centers and Clusters (RACCs) along major transportation facilities where focused development exists or is planned;
- Completion of the 2007/2008 household travel survey, which was specially formulated to include representation of travel behavior associated with RACCs;
- Development of a new transportation analysis zone (TAZ) system to permit study of observed travel at a finer scale;
- Conflation of the regional highway network to NAVTEQ centerline map to improve accuracy and allow enhanced coding detail;

Some of the suggestions from CS include:

- Consider the benefits of an integrated transportation/land-use model (e.g., Baltimore Metropolitan Council).
- Consider using a RACC dummy variable in the model, though it would be preferable to first determine if an alternative, fully objective measures of pedestrian and transit supportive land use could be used to achieve a similar differentiation of household composition and travel behavior.
- Consider expanding the estimation of non-motorized trip in trip generation to all trip purposes (currently, non-motorized trip ends are generated for work trips only).

A member of the TPB staff mentioned a concern about the causality of some effects. For example, if a new smart growth development results in a smaller increase in VMT than would be the case for a more traditional development, is the reduction due to the smart growth development pattern itself, or is it due to self selection? On the issue of land use modeling, a member of the subcommittee mentioned a two-day training course that is being offered by VDOT and Citilabs about the new land use module, called "Cube Land." A subcommittee member commended the work done by CS, but felt that the CS report should recommend adding the following variable to the travel model: dwelling unit by type. According to this member, the planning directors already forecast dwelling unit by type and it is a very powerful variable. The member asked whether CS saw, during its research, other models that used dwelling unit by type. Mr. Evans indicated that he did not recall examples where that was used, but he will pay special attention to it as he is finalizing the report.

Mr. Goldfarb gave the presentation on feedback convergence methods. He said that many researchers consider a relative gap of  $10^{-5}$  to indicate a very converged solution, but the actual number chosen will

depend on the context for which the model is being used. Some of the recommendations from CS included:

- Apply the method of successive averaging (MSA) procedure for speed feedback, but still assign a final trip table to the highway network. This will provide continuity in the final trip tables, the transit assignment applied in Version 2.3, and the final loaded highway network. It will also provide for continuity in application of select-link analyses and sub-area extractions.
- Determine a criterion for the number of feedback loops similar to the DRCOG measure (e.g., first, identify links whose volume or VMT change more than 10% from one iteration to the next, then, when the number of links meeting this condition is less than 1% of the links in the network, feedback terminates).
- Set criteria for relative gap convergence instead of a maximum number of iterations for the highway assignment in the short term.
- Evaluate the impacts on the results of applying a hybrid assignment model that uses an incremental as well as an equilibrium approach. This could involve running the model to reach convergence of close to  $10^{-5}$  as a test, and then using the fixed weights in some form from the results of that assignment for earlier iterations in the model. Then for the final assignment or the later model iterations, applying a user equilibrium assignment with set criteria.
- Follow the developments in acyclic sub-network path-based algorithms. In the near term, improvements to the algorithms should provide the ability to reduce the number of speed feedback iterations and provide for faster convergence in highway assignment.

Questions and comments: A TPB staff member mentioned that some researchers have proposed not only averaging link volumes, but also skim matrices. Mr. Goldfarb could not recall any examples of averaging the skim matrices in the review he has conducted, but he agreed to go back and check into this more when he writes the paper. He said that most agencies indicated that they feed back the skims to trip distribution, without mentioning whether they conduct MSA or other averaging of the skim matrices. A member of the subcommittee mentioned that his jurisdiction uses the OUE algorithm in TransCAD. He felt that TransCAD was very fast at obtaining a well-converged solution.

### **3. End-of-year reports: Model development**

This item was presented by Ron Milone and Mark Moran of COG/TPB staff. Mr. Milone discussed the structure of the end-of-year models development report and the background of the Version 2.2 and Version 2.3 travel models. He mentioned that, although the Version 2.3 travel model was released in draft a year ago, it remains in development due to two key decisions taken in FY 2009: First, to recalibrate the entire model on the new 3,700-TAZ zone system and network; and second, to recalibrate the entire model using the latest household travel survey (2007/2008) and transit surveys (2007 Metrorail and 2008 bus). Mr. Moran discussed sensitivity tests that had been conducted on the Version 2.3 travel model (using the 2,191-TAZ zone system).

A member of the audience brought up the issue of how the TPB travel model represents non-Metrorail transit fares as aggregated information. For example, the “bus fare” matrix is a 21 x 21 matrix representing the average non-Metrorail fare between 21 “bus fare zones.” The fare in any cell of the

matrix is the average fare for that O/D pair. So, if an O/D pair has two non-Metrorail transit modes (e.g., commuter rail and bus), then the fare for that cell would be the average of the two non-Metrorail transit fares. The subcommittee member indicated that his firm had come up with a more disaggregate way of representing non-Metrorail transit fares. Mr. Moran indicated that TPB staff would be interested in learning more about this new way to represent fares and indicated that TPB staff would like to see the consultant documentation when it is done.

Mr. Milone talked about work done by TPB staff to reflect transit subsidies, such as SmartBenefits, in the inputs of the travel model. Mr. Moran then discussed ways to decrease the run time for the regional travel model. He also discussed the various tracks in the models development program, such as the methods track and the research track. Lastly, Mr. Milone presented the latest timeline for all the tasks related to developing the Version 2.3 travel model on the new zone system. The goal is to have the Version 2.3 model on the new zone system calibrated, validated, and ready to use for the 2010 update of the long-range plan.

#### **4. End-of-year reports: Network development**

Bob Snead, COG/TPB, presented this item. He gave an overview of the network development program, including a timeline of the network coding activities and how they relate to major projects, such as the air quality conformity assessment. He talked about the sections of the report, including network inputs for the Version 2.2 travel model and planned improvements in network development.

#### **5. Release of the new 3,700-TAZ system**

Charlene Howard, COG/TPB, presented this item. The new transportation analysis zone (TAZ) system is finally done. It has 3,675 internal zones (compared to 1,972 in the current zone system). If the number of external stations remains the same, at 47, the total number of zones would be 3,722 (as compared to 2,191 currently), though it is possible that the number of external stations might go up (we will not know this until the more detailed highway networks are coded).

A member asked whether the Round 7.2 Cooperative Forecast of land activity is now available for the new TAZ system. TPB staff indicated that there will not be official Round 7.2 forecasts on the new zone system. The plan is that the Round 8.0 forecasts will be the first to be released on the new zone system. However, since the TPB modeling staff will need land activity on the new zone system before the round 8.0 is produced, TPB staff plans to develop its own (Round 7.2) land activity data set on the new zone system. It will do this by conducting a combination of area proration and using other data sources. For example, TPB staff, along with the Cooperative Forecasting Committee, has procured Dunn and Bradstreet data that has information about individual employers by address.

#### **6. Status report on surveys**

This item was presented by Bob Griffiths of COG/TPB staff. Mr. Griffiths said that TPB staff has now developed the final survey weights and the expanded household totals. He distributed and discussed three handouts: 1) Comparison of 2007/2008 Household Travel Survey and ACS by jurisdiction; 2) Comparison of 2007/2008 Household Travel Survey and ACS for the MSA; and 3) Comparison of 2007/2008 Household Travel Survey and Metrorail Ridership.

## **7. Status of developing networks for the new zone system**

Ron Milone presented this item. He discussed the new zone system, which would require a new set of highway and transit networks with more detail, to match the finer detail of the new zone system. The new zone system will also require a new set of zone centroids and new centroid connectors, which, in turn, will create a series of link splits where the connectors attach to the network. He also discussed the project to improve the way we edit and maintain our multi-scenario transportation networks, using a new ArcGIS tool developed by a consultant, Daniel Consultants, Inc. (DCI). He then discussed the work TPB staff is doing to conflate the master highway network with the more spatially accurate street centerline information found in the NAVTEQ database.

## **8. Regional Transportation Data Clearinghouse**

This item was presented by Martha Kile of COG/TPB staff. The Traffic Data Viewer for the Regional Transportation Data Clearinghouse was released in June and includes AADT/AAWT data for 2000-2007, where available. TPB staff is currently making some updates, including adding year 2008 data, and is open to any other suggested changes or comments (send an e-mail to [mkile@mwkog.org](mailto:mkile@mwkog.org)). Ms. Kile also went over some of the transit data that has been added to the clearinghouse, e.g., WMATA has provided average daily ridership by year. She also discussed the vehicle classification data and the hourly count data. She concluded by saying that, when TPB staff is done conflating the master highway network to NAVTEQ, the updated network will be then brought into the clearinghouse, for a more accurate representation of network links.

A member of the subcommittee commended the TPB staff on the Regional Transportation Data Clearinghouse and had the following comment: on the map with hourly volumes, when you click on the map, it does not show you the name of the link/road; instead, it shows the A-node and B-node. It would be useful if the clearinghouse would show the road name also.

## **9. Other business**

The next proposed meeting of the TFS is September 18 from 9:30 AM to 12:00 noon. There was no other business. The meeting adjourned at 12:00 noon.

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These highlights were written by Mark Moran.