



TPB TRAVEL FORECASTING SUBCOMMITTEE

HIGHLIGHTS OF THE NOVEMBER 20, 2020 MEETING

Meeting time & location: 9:30 AM to 11:30 AM, **Web conferencing ONLY, due to COVID-19 precautions. There was no on-site meeting.**

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MEETING ATTENDEES

MEMBERS, ALTERNATES, AND PARTICIPANTS

- Bill Allen (Bentley Systems Inc)
- Keith Belcher (MDOT-SHA, TFAD)
- Jim Bunch (Sabra & Associates)
- Zuxuan Deng (DDOT)
- Michael Eichler (WMATA)
- Joel Freedman (RSG Inc)
- Dan Goldfarb (NVTC)
- Eric Graye (M-NCPPC, Montgomery Co.)
- Navid Kalantari (AECOM)
- Kyeongsu Kim (Connetics Transportation Group)
- David Kline (Fairfax County DOT)
- Jaesup Lee (M-NCPPC, Montgomery Co.)
- Yuanjun Li (M-NCPPC, Montgomery Co.)
- Feng Liu (Cambridge Systematics)
- Sam Murrey (Arlington Co.)
- Krishna Patnam (AECOM)
- Marie Pham (Loudoun Co.)
- Mark Radovic (Gannet Fleming)
- Harun Rashid (NVTA)
- Rich Roisman (Arlington Co.)
- Amir Shahpar (VDOT)
- Elham Shayanfar (MDOT)
- Lisa Shemer (MDOT-SHA)
- Aichong Sun (AECOM)
- Jiaxin Tong (WSP)
- Steve Weller (Kimley-Horn & Assoc.)

COG STAFF

- William Bacon
- Tim Canan
- Anant Choudhary
- Joe Davis
- Nazneen Ferdous
- Charlene Howard
- Ken Joh
- Martha Kile
- Sanghyeon Ko
- Arianna Koudounas
- James Li
- Nicole McCall
- Jessica Mirr
- Mark Moran
- Ray Ngo
- Wanda Owens
- Jinchul (JC) Park
- Jane Posey
- Meseret Seifu
- Dusan Vuksan
- Feng Xie
- Jim Yin
- C. Patrick Zilliaccus

This meeting of the Travel Forecasting Subcommittee (TFS) was chaired by Mr. Amir Shahpar.

1. INTRODUCTIONS AND APPROVAL OF MEETING HIGHLIGHTS FROM THE PREVIOUS MEETING

First, a roll call was conducted. Next, the highlights of the September 18, 2020 meeting of the TFS were approved without changes.

2. OVERVIEW OF THE RECENT TRANSPORTATION MODELING ACTIVITIES AT THE PRINCE GEORGE'S COUNTY PLANNING DEPARTMENT AT M-NCPPC

This item was presented by Mr. Patnam, AECOM, and Dr. Kalantari, AECOM, who spoke from a set of presentation slides. Mr. Patnam spoke first. He noted that the Maryland-National Park and Planning Commission (M-NCPPC or "the Commission") comprises the Montgomery County and Prince George's County planning departments. The client for this project was the Transportation Planning Section within the Countywide Planning Division of the Prince George's County Planning Department. Next, Mr. Patnam went over the planning tools used by the Commission including a brief history of the development of the Commission's trip-based aggregate travel demand forecasting model – "TransForM," and contrasted its current form (TransForM 2.5) with the Gen2/Ver 2.3 Model. Mr. Patnam then described the two key recent modeling activities at the Commission, which included firstly, the ongoing development of a "lightweight" activity-based model (called "FLEX") jointly with a multi-resolution simulation-based dynamic traffic assignment (DTA) model as part of the next version of TransForM – 3.0, and secondly, its enhancement to incorporate the upcoming household travel survey, emerging mobility technologies, and the planned development of a new tool (called "GMSA" – Growth Management System and Analysis Tool) to assist with the development review process.

Mr. Patnam elaborated on the motivations for the development of a joint activity-based model with a DTA model and their design considerations. Dr. Kalantari then described the general planned workflow with TransForM 3.0 and the its software environment. Subsequently, Dr. Kalantari expounded on the various sub-models within FLEX and also presented its preliminary results, comparing it to observed data. Mr. Patnam returned to speak about the workflow within the DTA and between FLEX & DTA. Toward the end, Mr. Patnam described the motivation for the planned development of GMSA and its anticipated role in the development review and planning processes at the Commission, acknowledged the team, and welcomed input from the TFS's audience regarding any materials/experience in relation to growth-management (development impacts) that might be helpful to the Commission.

Mr. Moran asked if it was a challenge to develop and maintain the network details required by DTA. Mr. Patnam noted that the challenge was in the initial process of importing signal operations into the network, but the semi-automated import procedures came in handy. Mr. Patnam further noted that synthetic rules created from the input data assisted in synthesizing network details in other parts of the network easily. Mr. Rashid asked whether having mode choice as part of the supply side would result in losing some of the travel behavioral details. Both Mr. Patnam and Dr. Kalantari mentioned that it was a design/simplification decision to keep mode choice outside of FLEX, however, the feedback loops between FLEX and DTA would avoid disconnects in travel behavior between the models. Mr. Xie asked about the run time for TransForM 2.5 given higher number of TAZs and links compared to the Gen2/Ver 2.3 Model, and if the mode choice in TransForM 3.0 was conducted at the disaggregate or aggregate level. Mr. Patnam answered that TransForM 3.0 was still in development, but TransForM 2.5, which consisted of TransCAD and TRANSIMS ran in about 2 days,

and that the mode choice model worked at the PGTAZ zone level as opposed to a finer resolution such as parcel level.

Mr. Rashid asked if there was a potential to create segmentation based on environmental justice criteria within PopSyn and, if so, whether the trip paths could be separately tracked during the tour path skims. Dr. Kalantari replied that population synthesis in TransForM was an Iterative Proportional Updating (IPU) model similar to many existing models and that it used the PUMS, which represents the population already living in that PUMA and the TAZs within it. Dr. Kalantari also said that the transit-friendliness model used some environmental variables, and it could potentially also include more variables of that nature and that the model could track trip paths for each traveler. Mr. Patnam noted that he thought that Mr. Rashid's question essentially boils down to creating different "traveler-types", which were possible to track through the model system. Mr. Lee, regarding long-term decision-making processes, asked whether transit accessibility should have had higher priority over workplace or school/university and commented that it looked counter-intuitive to him. Dr. Kalantari apologized for any confusion and said that transit accessibility was present in all destination-choice models and daily-pattern choice models and that their influence was just different in different models. Mr. Vuksan asked if Caliper was used in the new model (TransForM 3.0) in any way, and whether the staff from Prince George's County were able to run the process in-house or were the consultants mainly running it. Mr. Patnam replied that, in TransForM 3.0, TransCAD is not needed, and that the staff from the Commission are and will be able to run it in-house. Mr. Freedman asked about the treatment of time in the model, the size of the time-period and whether the models explicitly considered time windows for scheduling of tours and stops. Dr. Kalantari replied that both FLEX and DTA models used 15-minute time intervals, and that both the start-time and duration of the activities were based on 15-minute intervals. Dr. Kalantari also said that in terms of the time window, the DTA model could consider time-constraints, and that it dynamically adjusts the start time based on the time constraints of each traveler.

3. ARLINGTON COUNTY'S NEW TOUR-BASED TRAVEL MODEL

This item was presented by Ms. Sherman Baker and Mr. Allen who spoke from a set of presentation slides. Ms. Sherman Baker introduced the background of Arlington County's new tour-based travel model and Mr. Allen followed with an in-depth presentation.

Arlington County was motivated to create a travel demand model for local transportation planning studies, especially with the development of Amazon HQ2 spurring development throughout the County. The model structure is a traditional focused model, covering the entire MWCOG modeled region with greater detail in Arlington County. The model uses an innovative simplified tour-based structure and is being developed in Cube by Bentley Systems. The tour-based structure allows the model to more accurately represent trip purposes, to avoid the negative issues associated with non-home-based travel, and to reduce aggregation error associated with four-step models. The simplified nature of the process provides most of the benefits and features of discrete choice models without the complexity and lengthy run times of most activity-based models.

It is a completely new model, but it also relies on several parts of the MWCOG model, in which case some features of the existing MWCOG model were modified, most notably the transit network processing. Network coding is simplified and the Cube Public Transport module will be used to implement a European-style assignment step that splits total transit trips by sub-mode and path. Highway network coding is done in true shape format, which is necessary in order to accurately represent the complex roadway network near the Pentagon, National Airport, and Rosslyn. The network also features an integrated bike network. The model is calibrated using the COG 2007-08

Household Travel Survey and will be validated to 2019 conditions with respect to VDOT and county traffic counts, available transit data, and available bike counts.

Mr. Moran asked, regarding slide 11, if a person works from home and does not make any trips during the day, is that considered zero tours? Mr. Allen confirmed that that was the case, since the Arlington model does not model activities. Regarding slide 15, Mr. Moran asked what mode choice decisions are handled in the mode choice model versus transit assignment model. Mr. Allen answered that top-level choices, such as choosing to take transit, are handled in the mode choice model. By contrast, lower-level choices, such as transit sub-mode (e.g., bus versus LRT) are handled in transit assignment.

Mr. Xie asked if there is a speed feedback loop in the model. Mr. Allen said that there is a conventional feedback loop, which will run the entire model, do an assignment, and then use that information to calculate new travel speeds and feed that back through the model. There will be a maximum of about 3-4 speed feedback loops.

Mr. Kalantari asked two questions: 1) whether the stop frequency model uses a stop-and-go model structure; 2) how to synthesize population for the AV mode. Regarding the first question, Mr. Allen said that the model works in two steps: 1) We determine the probability that a person trip will make 0, 1, 2, or 3 stops for each half of the tour (both to and from the destination); 2) Once we know how many stops the person will make, we determine the location. The location of their first stop is conditioned on their start location, but the location of their second stop (if making other stops) is conditioned on where the first stop was located and so forth. Regarding the second question, Mr. Allen said that this household synthesizer does not use a PUMS-based process. It uses Census data and a series of Fratar-type models to calculate household attributes for every zone, which is different from other population synthesizers and is much faster.

Ms. Ferdous asked 1) whether the model represents tour modes as well as trip modes; and 2) if the model considers proximity for the destination choice model. Regarding the first question, Mr. Allen said that the model restricts every tour to one mode for the first version of the model. He said that they realize that that is not 100% accurate, but it makes the process much simpler and faster. In subsequent versions, Mr. Allen said that they may include multiple tours per mode, recognizing that is a feature that will have significant implications for accuracy, run time, and complexity. He added that we will need to weigh the benefits and costs of this addition. For the second question, he responded that the sub-models proceed in sequence. The destination choice is done first, then mode choice is conditioned on destination, and then the stop model is conditioned on your mode and destination. So, for example, the intermediate stop model is designed so that if a person is taking transit, there is a lower likelihood of taking an intermediate stop.

4. COG/TPB GEN3 TRAVEL MODEL: STATUS REPORT

This item was presented by Mr. Freedman, who spoke from a set of presentation slides. Mr. Freedman provided an update on Gen3 Phase 1 Model development activities, include population synthesis and household travel survey data coding. Mr. Freedman described the PopulationSim software setup and application, including the directory structure, the batch process used to run PopulationSim, and outputs. Mr. Freedman showed base year and future year validation results, and explained that the purpose of validating the synthetic population is to understand the goodness of fit of the procedure compared to the control data (marginals) used to generate the population at the level of geography for which the controls are specified. Mr. Freedman described the process used to code the household travel survey data into a format consistent with ActivitySim. Mr. Freedman presented the visualization tool used to summarize and visualize the household travel survey data in ActivitySim format. Finally, Mr. Freedman provided a brief update on ongoing Gen3 Model development activities.

5. ANNOUNCEMENT OF NEW CHAIR FOR 2021

The chair of the TFS generally rotates on a calendar-year basis between four entities: the District of Columbia, Maryland (state or local agency), Virginia (state or local agency), and a transit or regional agency (e.g. WMATA, VRE, MARC, and/or a regional or sub-regional agency). Since the November TFS meeting is the last scheduled meeting of the calendar year, Mr. Moran thanked Mr. Shahpar for his service to the subcommittee, the TPB, and the region. Mr. Moran presented a certificate of appreciation to Mr. Shahpar, which had been signed by the TPB chair. Finally, Mr. Moran introduced Mr. Eichler, WMATA, as the chair of the TFS in 2021.

6. ROUNDTABLE DISCUSSION OF CURRENT MODELING EFFORTS AROUND THE REGION

Mr. Shahpar announced that his team in VDOT, with the help of the Virginia Transportation Research Council, started a collaborative research project with FHWA's Volpe Center to adapt the VisionEval scenario planning tool for use in Virginia state planning exercises. The geographical boundary for this initial test was chosen to be Fairfax County.

Mr. Rashid from NVTA introduced to their new request for proposals (RFP) for long-range transportation planning to create a new travel model.

7. OTHER BUSINESS

A. 2017-18 Regional Travel Survey: Status report

Dr. Joh provided a brief status report on the Regional Travel Survey (RTS). COG/TPB staff is continuing to focus on tabulating the data from the RTS trip file. The data files from the Maryland Travel Survey (MTS) have been merged with those from the RTS for the three overlapping BMC jurisdictions (Anne Arundel, Carroll, and Howard counties). COG/TPB staff is currently preparing the final RTS data files and technical documentation for public release, which will be released around the beginning of 2021.

B. Big Data Evaluation

Mr. Canan informed the Subcommittee that the Kimley-Horn contractor team completed the Big Data Evaluation report, and the project has entered a new phase, which entails consultations with key agencies to review the report findings and identify any potential opportunities for partnering in acquiring Big Data. Mr. Canan indicated he will report back to the subcommittee when there are notable milestones or decisions made as the project moves forward.

C. Monthly snapshots of effects of COVID-19 on travel available on COG website

Ms. Kile reported that COG/TPB staff has developed the first in a series of monthly snapshots to illustrate how the COVID-19 pandemic is impacting travel in the metropolitan Washington region. The charts show changes in roadway traffic and enplanements compared to 2019 levels. The intention is to update this report on a monthly basis, adding additional travel modes as data become available. The snapshot is available on the COG website using this link (<https://www.mwcog.org/documents/2020/10/27/covid-19-travel-monitoring-snapshot/>). The next snapshot with data through October 2020 will be available in the coming weeks.

D. Meeting schedule for CY 2021 and scheduling future TFS presentations

Mr. Moran noted that six planned meeting dates for TFS meeting for 2021 are listed on TFS website. Meetings will be held on third or fourth Friday of odd numbered months in 2021. The first TFS meeting in 2021 will be Friday, January 15, 2021.

E. Gen2/Ver. 2.4 Model release schedule

Mr. Moran announced that the next version of Gen2 Model will be the Ver. 2.4 Model, and it is expected to release during the first quarter of 2021.

8. ADJOURN

The meeting adjourned at 11:35 A.M. The next meeting is scheduled for Friday, January 15, 2021 at 9:30 A.M.