

Status report on COG/TPB's travel demand modeling improvement efforts:

FY 2016 task orders: Overview and status of COG/TPB staff work

Mark Moran, Principal Transportation Engineer

Metropolitan Washington Council of Governments

National Capital Region Transportation Planning Board

TPB Travel Forecasting Subcommittee

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Overview

- Background
- FY 16 Task Orders
- Task Order 16.2: Advice and Testing
 - Rationale for each task
 - Status of each subtask (focus on COG's efforts)
- Conclusions/next steps

- CS will discuss their status on T.O. 16.2 as well as
 - Task Order 16.3: Managed Lanes
 - Task Order 16.4: Non-Motorized Model Enhancements
 - Task Order 16.5: Mode Choice Model Enhancements



Background (1 of 2)

- Seven-year strategic plan for model improvement
- Three phases

| | Description | Fiscal Years | Model Name |
|---|---|--------------|------------|
| 1 | Updates to the existing four-step model (FSM) | 16-17 | Ver. 2.5 |
| 2 | Development of an activity-based model (ABM) with existing data | 18-20 | Ver. 3.0 |
| 3 | Development of an ABM with new data * | 21-22 | Ver. 3.2 |

* New household travel survey to be conducted in FY 17; ready for use in FY 20



Background (2 of 2)

- Strategic plan has lead to
 - Short-term implementation plan: Updates to the FSM (first two years of strategic plan)
 - FY 16 task orders
- Consultant for FY 15 & 16
 - Cambridge Systematics, Inc. (CS) & Gallop Corporation



FY 2016 Task Orders

| T.O. # | Name | Date Authorized | Budget |
|--------|--|-----------------|--------|
| 16.1 | Attend meetings and respond to ad-hoc requests | 6/23/15 | \$50k |
| 16.2 | Advice and Testing | 12/28/15 | \$60k |
| 16.3 | Managed Lanes | 2/10/16 | \$50k |
| 16.4 | Non-Motorized Model Enhancements | 2/10/16 | \$40k |
| 16.5 | Mode Choice Model Enhancements | 2/10/16 | \$85k |
| | Total | | \$285k |



T.O. 16.2 Advice & Testing: Overview

- 14 tasks
- Joint effort by consultant and COG/TPB staff
- For some tasks, consultant takes the lead role
- For others, COG/TPB staff takes the lead role



Task 1: Version Control and Bug-Tracking Software

- Idea: Better management of model code/scripts
- Subtasks

| Entity | Subtask | Status |
|--------|--|------------------------|
| COG | Provide to CS: 1) Research already conducted by COG; 2) List of MPOs that may be using VCS | Done |
| CS | Conduct a small-effort review of practices at a few MPOs | Approaching completion |
| CS | Document findings | In progress |
| COG | Implement VCS, if warranted | Not started |



Task 2: Non-Resident Trips Update

- Idea: Improve model's representation of airport-related travel & visitor travel using vehicle probe data
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| COG | Provide to CS: documentation of AirSage data, analyses conducted, appropriate data, and any issues needing special attention | Not started |
| CS | Review data, analyses, and issues | Not started |
| CS | Provide recommendations | Not started |
| COG | Update airport-related travel and visitor/tourist travel in the model | Not started |



Task 3: Screenlines/Cutlines

- Idea: Add additional screenlines for summarizing estimated traffic and transit volumes
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| COG | Provide CS with recommendations from VHB, 2007 | Done |
| COG | Review recommendations made by VHB in 2007 | Done |
| COG | Create new screenlines in GIS | Done |
| COG | Make adjustments to screenlines | In progress |
| CS | Review past recommendations and provide comments/recommendations | In progress |



Task 4: Speed/Travel Time Validation Improvement

- Idea: Can adjustments to the freeway volume-delay functions (VDFs) result in better estimated link speeds?
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| COG | Provide materials to CS/Gallop: VDFs, and, possibly, observed traffic speeds from vehicle probe data (INRIX) | Done |
| Gallop | Propose a plan for investigation | Done |
| Gallop | Conduct analysis and document findings and proposed next steps | In progress |



Task 5: Migration of Transit Path-Building Software

- Idea: Continue/complete migration of transit path-building software (TRNBUILD > Public Transport, PT)
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| COG* | Complete methodologies & validation for migration | In progress |
| COG* | Design & implement PT fare calculation methods | Not started |
| COG* | Path conditioning: Build transit paths and adjust path-building coefficients to match observed paths | Not started |

*COG with support from Gallop Corp. as needed



Task 6: Perform Transit Network Coding Enhancements

- Idea: Find ways to improve the representation of transit service in the transit network used by the model
- Subtasks

| Entity | Subtask | Status |
|--------|--|--------------|
| COG* | Express bus: 1) Designate board-only/alight-only nodes; 2) Differentiated speeds | Not started |
| COG* | Consolidation of mode codes (10 currently > 6) | Under review |
| COG* | Coding vertical separation in Metrorail system | Under review |
| COG* | Re-designating time-of-day periods | Under rev.** |

*COG with support from CS and Gallop Corp. as needed.

** Have already decided not to increase the number of TOD periods



Task 7: Include Transit Drive-Access Trips into Highway Assignment

- Idea: Transit drive-access trips are not currently included in traffic assignment
- Subtasks

| Entity | Subtask | Status |
|--------|---|-------------|
| CS | Provide a current procedure for including these trips | Not started |
| COG* | Test the procedure proposed by CS | Not started |
| COG* | Incorporate new procedure into regional travel demand model | Not started |

*COG with support from CS as needed



Task 8: Add External-to-Internal Transit Trips

- Idea: Current model does not include external-to-internal transit trips (only internal-to-internal)
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| COG | Review past suggestion from 2012 consultant report | In progress |
| COG* | Incorporate new procedure, or a variant, into regional travel demand model | Not started |

*COG with support from CS as needed



Task 9: Revise Bus Speed Linkage to Highway Speeds

- Idea: Determine if there is a better way to model the interaction between road link speeds and bus speeds
- Subtasks

| Entity | Subtask | Status |
|--------|---|-------------|
| CS | Review state of the practice and alternative approaches for linking bus speeds to road speeds | In progress |
| COG | Come to a decision on a recommended approach | Not started |
| COG | Begin implementation in FY 17 (or FY 16 if possible) | Not started |



Task 10: Migration of Mode Choice Application Software

- Idea: Migrate from Fortran AEMS program to C++ ModeChoice program (part of TRANSIMS)
- Subtasks

| Entity | Subtask | Status |
|--------|---|-------------|
| COG | Complete the mechanical migration of TPB mode choice model from AEMS to TRANSIMS ModeChoice | In progress |
| CS | Provide review and advice, as necessary | Not started |



Task 11: Walk-Access Script Enhancement

- Idea:
 - AECOM developed an automated, ArcPy process to generate transit walksheds & calc. % walk to transit.
 - COG hopes to enhance the automated process
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| COG | Possible enhancements to automated, ArcPy walkshed process: 1) Enable it to run with newer versions of ArcGIS; 2) Improve run times; 3) Enable the ability to run concurrent instances | In progress |
| CS | Provide review and advice, as necessary | Not started |



Task 12: Develop Parcel-Level Development Database

- Idea:
 - Develop a **parcel-level development DB** that could be used to enhance existing FSM and to develop future ABM
 - E.g. for FSM: Improving non-motorized trip generation and mode choice
- Subtasks

| Entity | Subtask | Status |
|--------|---|-------------|
| CS | Develop specification for a parcel-level database | In progress |
| CS | Document: 1) Overview of existing DBs in DC, MD, & VA; 2) Attributes that are useful for enhancing FSM and developing ABM; 3) Limitations with such DBs | In progress |
| COG | Use the CS specification to develop parcel-level DB | Not started |



Task 13: Develop Census and Household Travel Survey Database

- Idea:
 - Develop a **model-estimation DB** that could be used to enhance existing FSM and to develop future ABM
 - E.g. for FSM: Improving non-motorized trip generation and mode choice
- Subtasks

| Entity | Subtask | Status |
|--------|--|-------------|
| CS | Develop specification for a model-estimation DB | In progress |
| CS | Provide an overview of variables useful for enhancing FSM and developing the ABM, including limitations with these variables | In progress |
| COG | Use the CS specification to develop estimation DB | Not started |



Task 14: Prepare Non-Motorized GIS Database

- Idea:
 - Prepare for development of a **NM GIS DB** that can be used to develop enhanced non-motorized capability in the ABM
 - Focus: NM infrastructure, e.g., sidewalks, bike paths, trails
- Subtasks

| Entity | Subtask | Status |
|--------|---|-------------|
| COG | Assess the availability of NM network data | In progress |
| CS | Develop potential specification for the NM DB and provide advice to COG | Not started |
| | Planned that this task would be completed in FY 17 | |



Conclusions and next steps

- Task orders were developed later in the fiscal year than usual, so it will be challenging to finish all the work.
- Goal: Task Orders 16.1-16.5 completed in FY 16 (June 30)
 - Though some implementation steps will occur in FY 17 (e.g., implementing bus-speed model and development and use of the NM DB).
- Documentation for T.O. 16.2
 - Technical memos, which may later be stitched into a report

