Model Update and Validation for 2016 RTP/SCS Approach and progress to date

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Objectives

The purpose of year 2012 model update and validation program is to develop a base year model for the analysis of 2016 RTP and related programs, including conformity analysis (Title 40 CFR Part 93.122) and development of Sustainable Communities Strategy (SCS).

The model will be:
- specified based on observed data
- validated against observed data (CFR 93.1 22(b)(1)(i))
- sensitive to changes in the time(s), cost(s), and other factors affecting travel choices (CFR 93.122(b)(1)(vi))
- able to measure the benefits of land use strategies aimed at reducing GHG emissions
SimAgent

Simulator of Activities, greenhouse gas emissions, networks and travel

Model Concept

- SimAgent is an activity-based or agent-based model
- SimAgent simulates the entire weekday travel pattern of each person in the SCAG region (18+ million):
  - derives travel from activity participation decisions
  - explicitly accounts for within household interactions
  - incorporates spatial and temporal constraints and influences when predicting activity participation and travel
  - operates on a detailed representation of the region’s population, land use and transportation networks
### Stage 1 Model Development

- **Model Framework and Specification**
- **Model Estimation 2001 HTS**
- **Software Development**
- **2003 Model Validation and Scenario Analysis**

April 2009 → Jan 2013

### Model Enhancement Goals

- Improve the representation of auto and transit choices and their attributes
- Improve the sensitivity to level of service attributes across all relevant sub-models, particularly in mode choice, destination choice, and trip scheduling
- Improve the representation of accessibility:
  - level of service dimension
  - activity dimension
  - decision-maker dimension
  - temporal dimension
- Improve the sensitivity to land use / built environment
### Proposed Model Updates

- **New sub-models:**
  - occupation
  - work at home
  - primary destination choice (non-mandatory)
  - trip mode choice

### Proposed Model Updates

- **Re-estimate existing models:**
  - tour mode choice
  - work location
  - non-mandatory tour frequency
  - intermediate stop frequency
  - home stay duration
  - travel time to stop
**Proposed Model Updates**

- Calibrate and validate the model to 2012 base year
  - preparation of model input data
  - development of calibration targets
  - preparation of model validation data

- Test model sensitivity to key inputs/parameters

- Optimize the model implementation
  - to reduce run time
  - for user friendliness

**Schedule**

<table>
<thead>
<tr>
<th>TASK DESCRIPTION</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL ESTIMATION, ENHANCEMENT, EXPERT SUPPORT</strong></td>
<td></td>
<td></td>
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<tr>
<td>Model development plan</td>
<td></td>
<td></td>
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<tr>
<td>Prepare household survey data</td>
<td></td>
<td></td>
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<tr>
<td>Model estimation</td>
<td></td>
<td></td>
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<tr>
<td><strong>MODEL IMPLEMENTATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of enhanced SimAgent</td>
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<tr>
<td><strong>MODEL CALIBRATION, VALIDATION, PEER REVIEW</strong></td>
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<tr>
<td>Prepare calibration targets</td>
<td></td>
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<tr>
<td>Base year model calibration</td>
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<tr>
<td>Base year model validation</td>
<td></td>
<td></td>
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<tr>
<td>Sensitivity tests</td>
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</tbody>
</table>
Progress to date:
Analysis of the CA and SCAG Household Travel Surveys

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>NuStats</th>
<th>SRBI</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Households</td>
<td>24,486</td>
<td>10,563</td>
<td>35,049</td>
</tr>
<tr>
<td>Complete households</td>
<td>15,716</td>
<td>3,848</td>
<td>19,564</td>
</tr>
<tr>
<td>Partially complete households</td>
<td>45</td>
<td>479</td>
<td>524</td>
</tr>
<tr>
<td>Only recruit data</td>
<td>8,725</td>
<td>6,236</td>
<td>14,961</td>
</tr>
<tr>
<td>Complete and partially complete households</td>
<td>15,716</td>
<td>4,327</td>
<td>20,043</td>
</tr>
<tr>
<td>Weekday</td>
<td>67%</td>
<td>71%</td>
<td>68%</td>
</tr>
<tr>
<td>Weekend</td>
<td>33%</td>
<td>29%</td>
<td>32%</td>
</tr>
</tbody>
</table>
Household Travel Data Preparation

Data Quality Checks

Completeness of Trip Records

- Valid Mode: 99.97%
- Valid Departure & Arrival Time: 99.41%
- Valid Geocoded Destination: 96.52%
- All Valid: 96.00%
Data Quality Checks

Completeness of Tour Records

- Valid Mode: 99.9%
- Closed Tour: 94.9%
- Valid Time: 97.2%
- Valid Primary Destination: 92.9%
- All Valid: 99.2%
- Symmetric Mode: 98.5%

Data Quality Checks

Person Type Distribution

- MAG/PAG
- MTC
- ARC
- SANDAG
- NCTCOG
- SCAG
Data Quality Checks

Average Time Allocation, SCAG (min)

Average Time Allocation, U.S. Metro Areas (min)
Data Quality Checks

Average Tour Rate
(excluding Summer observations)

Mandatory Tour Rate
Full-Time Workers

Including Summer households  Excluding Summer households
Survey Expansion

- Survey control totals developed for approximately 100 clusters of TAZs, covering the entire SCAG region
- Control variables:
  - Total households
  - Households by number of workers (0, 1, 2, 3+)
  - Households by size (1, 2, 3, 4, 5+)
  - Single-family, multi-family household
  - Household income (4 classes)
  - Population age (6 classes)
  - Person type (region-level control)

More information:

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