DaySim Activity Based Model Implementation for Jacksonville, FL

presented to
Panel on Activity-Based Models

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May 26, 2010
Presentation Outline

- Overview of C10
- DaySim History Nationally
- DaySim Data Needs & Availability in Jacksonville
- Required Data Processing
- DaySim Transfer Plan for Florida
Overview of C10

- Project goal: Integrate an activity-based travel demand model (DaySim) with a dynamic traffic assignment model, in a way that is transferable to other users

- Jacksonville, Florida
  - Burlington, Vermont (model test bed)

- Features
  - Spatial and temporal disaggregation
  - Fully open source
  - Policy sensitive
  - Transferable
  - Scalable
C10: Enhanced Policy Sensitivities

- Traffic shifts by time-of-day
  - Peak spreading & Peak shifting

- Tolling and pricing impacts
  - Tolling
  - Congestion pricing

- Travel time reliability effects

- Operations impacts
  - Signals and coordination
  - ITS

- Travel Demand Management
  - Flexible work schedules
  - Work / shop at home
AB Models with DaySim Software

With static assignment
- Sacramento—in use since 2007
- Seattle (hybrid with trip-based model)—in use since 2009
- Seattle (full AB model system)—in development
- Denver – in “tuning” stage

With dynamic assignment (active R&D projects)
- Burlington VT
- Jacksonville FL
- Sacramento CA
## Data Needs & Availability in Jacksonville

<table>
<thead>
<tr>
<th>Data Need</th>
<th>Source</th>
<th>Availability</th>
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<tbody>
<tr>
<td>Synthetic Population</td>
<td>Census, regional socioeconomic forecasts</td>
<td>Data and tools readily available</td>
</tr>
<tr>
<td>Housing Units (Parcel)</td>
<td>Assessor's GIS</td>
<td>Available, required additional processing</td>
</tr>
<tr>
<td>Jobs by Sector (Parcel)</td>
<td>InfoUSA, others</td>
<td>Available, Required significant cleaning</td>
</tr>
<tr>
<td>School Enrollment by Grade (Parcel)</td>
<td>Florida Dept. of Education</td>
<td>Available, required geocoding to parcel</td>
</tr>
<tr>
<td>Urban Form Variables (Parcel)</td>
<td>&quot;All Streets&quot; GIS network, Parcel-level jobs and housing data</td>
<td>Available, prepared using GIS buffer analysis at parcel-level</td>
</tr>
<tr>
<td>Transit Stop Access (Parcel)</td>
<td>Transit operators' GIS</td>
<td>Available, prepared using GIS proximity analysis</td>
</tr>
<tr>
<td>Parking supply and cost (Parcel)</td>
<td>Parking authorities, business groups</td>
<td>Locations available, but no info on cost or capacity</td>
</tr>
<tr>
<td>Network impedances</td>
<td>Transportation model networks</td>
<td>Data and tools readily available</td>
</tr>
<tr>
<td>Travel survey data</td>
<td>NHTS, NE Florida HH survey, SP Surveys</td>
<td>Available</td>
</tr>
</tbody>
</table>
Data Processing

- Data cleaning / preparation
  - Housing units by parcel imputed from GIS parcel database attributes, calibrated to match county control totals
  - Employment by sector by parcel derived from extensively cleaned database (multiple sources) of employment by location (InfoUSA, NFTPO)
  - School locations and enrollment geocoded and attached to parcels

- Parcel-level urban form GIS buffers and proximity analysis
  - # of intersections with 1 link, 3 link, and 4+ links within ¼ mile and ½ mile of parcel
  - Households, jobs by sector, school enroll. within ¼ mile and ½ mile of parcel
  - Distance to nearest transit stop (by transit submode) from parcel
Data Processing: Total Emp w/i ½ Mile Buffer

- 579,535 C10 Jacksonville Total Employment (at parcel level)
- 573,617 NERPM Total Employment (at TAZ level)
Data Processing: School Proximity ½ Mile

- 271,518 students - K12 (coded to parcels)
- 57,078 students – Higher Education (coded to parcels)
DaySim Model Transferability

- **Methods & Tools**
  - DaySim widely used and both peer reviewed

- **Data usage**
  - Select data that are readily available
  - Data processing methods & tools that are reusable
  - Develop analyses for analyzing the readiness of the data

- **Documentation**
  - Document on how model was implemented
  - Document on how to use the model
  - Document on policy analyses performed during study

- **Transferability of Parameters**
DaySim Short Term Steps (2010-2012)

- Complete an integration of DaySim with Cube in Jacksonville (Cube integration not funded by C10). Calibrate model and use it in the 2012 LRTP cycle alongside FSUTMS.

- Estimate DaySim model jointly for Tampa and Jacksonville using NHTS data (important step in transferability effort).

- Test DaySim into a second region (possibly Tallahassee). Calibrate it and use it in 2012 LRTP cycle alongside FSUTMS.

- Enhance DaySim/Cube software to serve as Florida version for FSUTMS-DaySim (need a catchy name).

- To conduct training on AB modeling and DaySim specifically

- Integrate DaySim into Tampa’s TBRPM model. Calibrate it and use it in 2012 LRTP cycle alongside TBRPM.
Goal of Short Term Steps:

- To illustrate the transferability of the DaySim model system
- To understand the transferability of the estimated parameters
- To test the outcome of DaySim as compared to FSUTMS in a policy context
- To perform all the necessary steps to prepare the model, data structures, tools and methods for further implementation throughout Florida as desired
Long term steps (2012 and beyond)

- Re-estimate DaySim with a combined data set including more regions (further transferability effort)
- Continue enhancing FSUTMS-DaySim software and improving integration with Cube
- Provide support for MPOs to implement FSUTMS-DaySim
- Sponsor project(s) to operationalize the C10A product (DaySim-DTA) in one or more regions of the state.