Planning for Incorporating Ancillary Demands in the Next Generation FSUTMS

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Funded by
Florida Department of Transportation
Background

Four-Step Model Structure

Zonal Socio-Economic Characteristics

Zonal Land Use Characteristics

Inter-Zonal Roadway Network Characteristics

Inter-zonal Transit Network Characteristics

Trip Generation

Trip Distribution

Mode Split

Internal-Internal Travel Demand of Residents by Mode (“OD Matrix”)

External Travel (IE, EI, and EE) Demand

Freight Travel Demand

Non Resident Travel Demand

Total Daily Travel Demand by Mode (“OD Matrix”)

Highway Assignment

Transit Assignment
Background

Activity-based Model Structure

Zonal Socio-Economic Characteristics
Zonal Land Use Characteristics
Inter-Zonal Roadway Network Characteristics
Inter-zonal Transit Network Characteristics

Population Synthesizer
Long Term Choices Simulator
Detailed Population Characteristics

ABM

Simulated Travel Patterns of Each Person in Population
Internal-Internal Travel Demand of Residents by Mode & Time of Day (“OD Matrix”)

External Travel (IE, EI, and EE) Demand
Freight Travel Demand
Non Resident Travel Demand

Total Travel Demand by Mode & Time of Day (“OD Matrix”)

Highway Assignment
Transit Assignment
Background

Substantial efforts towards advancing Florida’s travel-demand modeling practice via Activity-based Models (ABMs) are directed at a single but substantial component of travel demand – the daily, internal-internal trips of the residents of the region.

It is also critical to enhance the forecasting of the ancillary demands so as to improve the overall accuracy of the demand forecasts.

Ancillary Demands => external travel (IE, EI, and EE), travel of non-residents such as tourists, urban goods movements, and travel generated by special attractors such as airports and universities.

ABMs do not generate productions and attractions when the existing methods to deal with ancillary demands often rely on adding to and adjusting the PA matrices.
Objectives

1. Identify the major ancillary-demand components that are relevant to the different modeling regions of Florida.

2. Review current best practices in incorporating ancillary demands within the overall forecasting framework (both Trip-based and Activity-based).

3. Document existing sources of data and future data need.

4. Develop a strategic plan document that will guide the process of enhancing the ancillary demand modeling efforts within FSUTMS.
Conceptual Framework

Special Generators

Residential Internal

External

EI

Autos

Trucks

Urban Goods

External

IE

Visitors

Hotels

Attractions

Airports

Hubs

Ports
Survey of State Agencies

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1. How is this travel market modeled and how is this model linked to the residential internal-demand estimation process?

2. What data are required for model development/validation/application and how are these data obtained/forecasted?

3. What applications or studies have been applied using this model component? A few examples.

4. Is the current modeling approach sufficient to address this travel market in your region? Do you expect any update or improvement regarding the data and model?
# Survey Response – Special Generator

<table>
<thead>
<tr>
<th>Comparison Parameter</th>
<th>District 3</th>
<th>District 4/6</th>
<th>District 5</th>
<th>District 7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estimation &amp; Forecasting Methodology</strong></td>
<td>Standard FSUTMS process and ITE trip generation rates.</td>
<td>Special generators attractions are held as constant, and then applies the adjustments only to the non-special generator zones.</td>
<td></td>
<td>The airport trips are calculated as a separate trip purpose in the trip generation module.</td>
</tr>
<tr>
<td>Integration with internal travel</td>
<td></td>
<td>Special generator is integrated in trip generation model. The lifestyle trip generation model considered airport trip as 1 of the 11 trip purposes.</td>
<td></td>
<td>This model component is not addressed in District 5 model.</td>
</tr>
<tr>
<td><strong>Data for estimation &amp; Validation</strong></td>
<td>Employees, square footage, dwellings, or acres data based on the land use.</td>
<td>The special generators used in the MPO files were used in the regional model.</td>
<td></td>
<td>Year 2000 and 2007 Household Survey</td>
</tr>
<tr>
<td>Input Data</td>
<td></td>
<td>The airport model relies on the number of daily enplanements. The enplanement data is entered in the ZDATA3B file.</td>
<td></td>
<td>Social economic data</td>
</tr>
<tr>
<td>Model Applications</td>
<td>Traffic Impact Studies, DRI analysis, Comp plan amendments, Site impact analysis.</td>
<td>SERPM6 is particularly useful in studies larger than a single Southeast Florida county</td>
<td></td>
<td>Will be combined with the ABM components in the upcoming 2014 LRTP model.</td>
</tr>
<tr>
<td>Model Adequacy</td>
<td>No.</td>
<td>NO</td>
<td></td>
<td>No.</td>
</tr>
</tbody>
</table>
## Survey Response – Visitor Model

<table>
<thead>
<tr>
<th>Comparison Parameter</th>
<th>District 3</th>
<th>District 4/6</th>
<th>District 5</th>
<th>District 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation &amp; Forecasting Methodology</td>
<td>Standard FSUTMS Cross classification Trip generation.</td>
<td></td>
<td>2002 Regional Study on Tourism/Commuter Trips travel survey</td>
<td>Directly extracted from the trip generation module.</td>
</tr>
<tr>
<td>Integration with internal travel</td>
<td>It consider seasonal residents as a percentage.</td>
<td></td>
<td>Calculate and categorize visitor trips to the Central Florida attractions for distribution and assignment.</td>
<td>Visitor trips are converted to vehicle trips and then combined with the internal-internal trips after the ABM process.</td>
</tr>
<tr>
<td>Data for estimation &amp; Validation</td>
<td>Census Data.</td>
<td>This model component is not addressed in District 4/6 model.</td>
<td>Percentage splits of tourist trips, resident trips, external trips as well as the external trip distribution for special attractors.</td>
<td>Year 2000 and 2007 Household Survey (including household visitors), Year 2008 Hotel/Motel Survey</td>
</tr>
<tr>
<td>Input Data</td>
<td>---------------------------</td>
<td></td>
<td>Tourism and commuter survey data. The data is recorded in two file: specatr1_yya.dbf and spectra2_yya.dbf.</td>
<td>Hotel/motel units, Visiting households, Social economic data.</td>
</tr>
<tr>
<td>Model Applications</td>
<td>PD&amp;E studies, Design studies etc.</td>
<td></td>
<td>Regional Study on Tourism/Commuter Trips – this study was used for the EE/EI splits as well as for the special attraction program.</td>
<td>Will be combined with the ABM components in the upcoming 2014 LRTP model.</td>
</tr>
<tr>
<td>Model Adequacy</td>
<td>No.</td>
<td></td>
<td>Yes. The current modeling approach is very detailed and addresses this travel market in this region.</td>
<td></td>
</tr>
</tbody>
</table>
### Survey Response – Urban Goods Model

<table>
<thead>
<tr>
<th>Comparison Parameter</th>
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<th>District 4/6</th>
<th>District 5</th>
<th>District 7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estimation &amp; Forecasting Methodology</strong></td>
<td>A separate truck model (generation, distribution and assignment) was implemented. The structure of the truck model follows the one suggested in FHWA’s Quick Response Freight Manual (QRFM). Internal-external trips are part of internal-internal trips. The external-external truck table is constructed by fractaging the external-external vehicle trip table.</td>
<td>This model component is not addressed in District 5 model.</td>
<td>The truck trip rates and distribution friction factors are adopted from the FHWA Quick Response Freight Manual.</td>
<td></td>
</tr>
<tr>
<td><strong>Integration with internal travel</strong></td>
<td>This model component is not addressed in District 5 model.</td>
<td>1999 EETRIP file which is adjusted slightly by comparing the 1999 and 2000 traffic counts at the external stations.</td>
<td>Truck trips are converted to vehicle trips and then combined with the internal-internal trips after the ABM process.</td>
<td></td>
</tr>
<tr>
<td><strong>Data for estimation &amp; Validation</strong></td>
<td>Truck traffic count data.</td>
<td>This model component is not addressed in District 5 model.</td>
<td>Year 2003 Truck Survey</td>
<td></td>
</tr>
<tr>
<td><strong>Input Data</strong></td>
<td>SERPM6 is particularly useful in studies larger than a single Southeast Florida county</td>
<td></td>
<td>External to external trips, External to internal trips by purpose at each external station.</td>
<td></td>
</tr>
<tr>
<td><strong>Model Applications</strong></td>
<td>No</td>
<td></td>
<td>Truck trip applications have not been applied yet but will be combined with the internal-internal trips from the ABM components in the upcoming 2014 LRTP model. No. D 7 is currently under the process of designing a Truck Survey and a Cordon Line Survey to better understand the freight trips.</td>
<td></td>
</tr>
<tr>
<td><strong>Model Adequacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Quantitative Measures in FDOT Models

<table>
<thead>
<tr>
<th></th>
<th>GTCRPM</th>
<th>NWRPM</th>
<th>CFRPM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of TAZs</strong></td>
<td>33</td>
<td>41</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total Trips</strong></td>
<td>720,773 (11.3% of total trip)</td>
<td>189,881 (6.4% of total trip)</td>
<td>220,382 (0.9% of total trip)</td>
</tr>
<tr>
<td></td>
<td>44,768 (0.7% of total trip)</td>
<td>8,468 (0.28% of total trip)</td>
<td>34,140 (0.1% of total trip)</td>
</tr>
<tr>
<td><strong>Additional trips</strong></td>
<td>Additional trips 106,900</td>
<td>Additional trips 106,900</td>
<td>Additional trips 243,189</td>
</tr>
<tr>
<td></td>
<td>160,020 (2.52% of total trips)</td>
<td>81'503</td>
<td>25,161,000</td>
</tr>
<tr>
<td></td>
<td>6,360,102</td>
<td>2,981,926</td>
<td></td>
</tr>
</tbody>
</table>

### Trips by Mode/Purpose

- Auto = 82.6%
- LTRK = 6.6%
- HTRK = 10.8%

Additional notes:
- HBW=10%, HBSH=7%, HBSR= 38%, HBSC=1%, HBO = 1%, NHBW=2%, NHBO=5%, LTRK = 13%
- HTRK=7%, EI=0.3%
- Airport = 0.6% , University= 7%
(1) What are the primary auxiliary components in your model?

(2) How were these modeled in the four-step approach, if you had one before?

(3) How were these modified to fit within or integrated with an ABM framework for the residential travel demand?

(4) Are there any on-going / planned efforts to improve any of the auxiliary components via additional data and/or models?
Tasks and Timeline

**Task 1**: Hold kick-off meeting (by January 31, 2013)

**Task 2**: Identification of the Major Ancillary Demand Components (January 1, 2013 – March 30, 2013)

**Task 3**: Review of Best Practices in Incorporating Ancillary Demands within Travel-Demand Models (January 1, 2013 – March 30, 2013)

**Task 4**: Document Existing Data and Identify Future Needs for Modeling Ancillary Demands (March 1, 2013 – May 31, 2013)

**Task 5**: Develop Simplified Models or Data Collection Procedures for Selected Ancillary Demand Components (March 1, 2013 – August 30, 2013)

**Task 6**: Presentations to the Advisory Group and Feedback (May 1, 2013 – May 31, 2013)

**Task 7**: Develop a Strategic Plan Document to Guide Enhancing Modeling Ancillary Demands within FSUTMS (June 1, 2013 - August 31, 2013)

**Task 8**: Document all Research Activities in a Final Report (August 1 2013 – August 31, 2013)

**Task 9**: Revisions to the Final Report (September 1 2013 – November 30, 2013)