Presentation Outline

- FLSWM Overview
- FLSWM Phase 1 Efforts
- FLSWM Phase 2 Planned Enhancements
Florida Statewide Model Ver. 1.0

Statewide Highway Network
- Input Network
- Toll Link File
- Turn Penalties

Statewide Passenger Model
- Passenger Model
- Target Zone Data
- Record File
- Auto Trips

Statewide Passenger & Freight Joint Highway Assignment
- Auto Type
- Joint Highway Assignment
- HNOI
- RAISE

Statewide Freight Supply-chain Intermodal Model (FreightSIM)
- Truck Skim
- Rail Skim
- Water Skim
- Port-GW & IM Eq
- Node Equivalents
- Zonal Data
- Area Type

Open Cluster Node for FLSW
- Script File
- PILOT

Close Cluster Node for FLSW
- Script File
- PILOT

Cube/Voyager Model
Model Overview

- Traditional four-step model on the passenger side

- Provides traffic analysis capability for all areas of the state

- Rural area forecasting capabilities where local models have not been developed

- Currently no plans to move the FLSWM to an Activity-based Model (ABM)
FLSWM is two models – passenger model and freight model.

**Single Network - Blended Assignment Methodology**

- **Passenger Model**:
  - Trip Generation
  - Trip Distribution
  - Auto Occupancy

- **Blended Assignment**

- **FreightSIM Model**

**Single Network**
Model Overview

- **Zonal Structure**
  - 8,518 Florida TAZs
  - 9,538 total TAZs including out-of-state zones for freight plus external stations

- **Network**
  - Includes all SIS facilities
  - Many local roads
  - Total of 68,900 lane miles
Model Overview

FLSWM Analysis Applications

Existing corridors

Potential corridors

Legend

- Existing Corridor
- SIS Highways
- Water

Existing Statewide Corridors
1. Interstate 10
   AL Stateline to Duval County
2. Interstate 75
   Collier County to GA State Line
3. Interstate 95
   Miami-Dade County to GA State Line
4. Interstate 4
   Hillsborough County to Brevard/Volusia Counties
5. US-27
   Miami-Dade County to Lake/Sumter Counties
6. Florida Turnpike Enterprise
   Miami-Dade to Wildwood

New Statewide Corridors
1. Escambia-Lower Alabama
2. Bay-Lower Alabama
3. West Central Florida-Lower Georgia
4. Hillsborough-Duval
5. Orange-Duval
6. Hernando-Brevard
7. Charlotte-Hernando
8. Collier-Polk
9. Manatee-St. Lucie

Legend

- Potential Corridor
- SIS Highways
- Water
Other potential uses

– Regional model EE/EI analysis
– Subarea extraction and sub-region model development
  • Rural region model development (i.e. Big Bend)
  • District model development for those with larger rural areas (i.e. District 2 model)
– Freight analysis
Overview of 2010 Model Updates

- **Zones/SE Data**: Updated zone structure and socioeconomic data (Pop, DU, Emp)
- **Network Updates**: Updated speeds, area and facility types and refined 2010 count database
- **Trip Generation**: Developed trip rates for each trip purpose by county
- **Trip Distribution**: Updated friction factor curves, recalibrate gravity model, refined trip distribution and length by trip type
- **Trip Assignment**: Updated/refined volume-delay curves by area type and facility type
- **Truck Component**: Incorporated freight model; removed the QRFM components and replaced with standard FSUTMS truck/taxi purpose
Network updates

– Posted speeds now used
  • Main source is the RCI database for the state system
  • Many local roads have been updated via Google’s streetview

– Urban/rural area types refined to reflect 2010 definitions

– Facility types refined to reflect FDOT functional classifications

– 2010 counts input onto the network
  • Used 2010 Turnpike State Model count database as a reference to improve on count accuracy in volume and location where necessary
FLSWM Phase 1 Efforts

Trip Generation Rate Changes

Previous trip generation based on 17 regions

Now trip generation based on 67 areas (county level)
### Trip Distribution Updates

#### FLSWM Trip Length Distribution

**Person Trips**

<table>
<thead>
<tr>
<th>Miles</th>
<th>Total</th>
<th>FLSWM</th>
<th>NHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>53,799,266</td>
<td>69.6%</td>
<td>92.0%</td>
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<tr>
<td>25-50</td>
<td>4,240,695</td>
<td>7.1%</td>
<td>5.6%</td>
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<td>50-150</td>
<td>1,802,312</td>
<td>3.0%</td>
<td>1.8%</td>
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<td>150-300</td>
<td>181,488</td>
<td>0.3%</td>
<td>0.4%</td>
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<tr>
<td>&gt;300</td>
<td>-</td>
<td>0.0%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total</td>
<td>60,023,760</td>
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</table>

**Vehicle Trips**

<table>
<thead>
<tr>
<th>Miles</th>
<th>Total</th>
<th>FLSWM</th>
<th>NHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>31,333,001</td>
<td>68.6%</td>
<td>92.0%</td>
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<tr>
<td>25-50</td>
<td>2,656,422</td>
<td>7.5%</td>
<td>5.6%</td>
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<td>50-150</td>
<td>1,220,485</td>
<td>3.4%</td>
<td>1.6%</td>
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<tr>
<td>150-300</td>
<td>166,730</td>
<td>0.5%</td>
<td>0.4%</td>
</tr>
<tr>
<td>&gt;300</td>
<td>-</td>
<td>0.0%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total</td>
<td>35,376,638</td>
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</table>
# Trip Person and Vehicle Trip Purpose Comparison

<table>
<thead>
<tr>
<th>Person Trip Purposes</th>
<th>Vehicle Trip Purposes</th>
<th>Person Trip Purposes</th>
<th>Vehicle Trip Purposes</th>
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</thead>
<tbody>
<tr>
<td>Passenger HBW</td>
<td></td>
<td>Passenger HBW</td>
<td></td>
</tr>
<tr>
<td>Passenger HBSH</td>
<td>Short Urban/Rural</td>
<td>Passenger HBSH</td>
<td>Short Urban/Rural</td>
</tr>
<tr>
<td>Passenger HBSR</td>
<td></td>
<td>Passenger HBSR</td>
<td></td>
</tr>
<tr>
<td>Passenger HBO</td>
<td></td>
<td>Passenger HBO</td>
<td></td>
</tr>
<tr>
<td>Passenger NHB</td>
<td></td>
<td>Passenger NHB</td>
<td></td>
</tr>
<tr>
<td>Passenger In-state Tourist</td>
<td>In-state Tourist</td>
<td>Passenger In-state Tourist</td>
<td>In-state Tourist</td>
</tr>
<tr>
<td>External/Internal</td>
<td>External/Internal</td>
<td>External/Internal</td>
<td>External/Internal</td>
</tr>
<tr>
<td>QRFM Light Truck</td>
<td>Light Truck</td>
<td>QRFM Light Truck</td>
<td>Light Truck</td>
</tr>
<tr>
<td>Freight model</td>
<td>Medium Truck</td>
<td>Freight model</td>
<td>Medium Truck</td>
</tr>
<tr>
<td></td>
<td>Heavy Truck</td>
<td></td>
<td>Heavy Truck</td>
</tr>
</tbody>
</table>
Volume/Delay Curve Updates

Current FLSW Volume/Delay Curves
FLSWM FreightSIM

– Only supply chain statewide model in the U.S.
– Captures import/export and domestic freight movements

– Purposes:
  • Support freight planning
  • Evaluate potential large-scale infrastructure investments
  • Provide corridor level freight evaluations
  • Regional transportation planning tool
## 2010 FLSWM Phase 1 Recap

<table>
<thead>
<tr>
<th>Task</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>FLSWM Input Data (Network Updates)</td>
</tr>
<tr>
<td>A-1</td>
<td>Update passenger vehicle speeds</td>
</tr>
<tr>
<td>A-2</td>
<td>Update truck speeds</td>
</tr>
<tr>
<td>A-3</td>
<td>Update facility types based on FDOT functional classifications</td>
</tr>
<tr>
<td>A-4</td>
<td>Update capacities</td>
</tr>
<tr>
<td>A-5</td>
<td>Back-check of overall network updates</td>
</tr>
<tr>
<td>B</td>
<td>Trip Generation Updates</td>
</tr>
<tr>
<td>B-1</td>
<td>Develop trip generation rates by county using expanded TSM trip table as a guide</td>
</tr>
<tr>
<td>B-2</td>
<td>Rewrite the scripting of trip generation</td>
</tr>
<tr>
<td>B-3</td>
<td>Verify trip generation rates are within acceptable ranges</td>
</tr>
<tr>
<td>B-4</td>
<td>Reporting/documentation/QA</td>
</tr>
<tr>
<td>C</td>
<td>Trip Distribution Refinement</td>
</tr>
<tr>
<td>C-1</td>
<td>Recalibrate friction factor curves and the gravity model</td>
</tr>
<tr>
<td>C-2</td>
<td>Refine trip distribution by trip type (including long-distance business trip rework)</td>
</tr>
<tr>
<td>C-3</td>
<td>Verify trip length distribution reasonably replicates surveys</td>
</tr>
<tr>
<td>C-4</td>
<td>Reporting/documentation/QA</td>
</tr>
<tr>
<td>D</td>
<td>Trip Assignment</td>
</tr>
<tr>
<td>D-1</td>
<td>Develop volume-delay curves</td>
</tr>
<tr>
<td>D-2</td>
<td>Refine volume-delay curves</td>
</tr>
<tr>
<td>D-3</td>
<td>Finalize model validation</td>
</tr>
<tr>
<td>D-4</td>
<td>Reporting/documentation/QA</td>
</tr>
<tr>
<td>E</td>
<td>Update Truck Component</td>
</tr>
<tr>
<td>E-1</td>
<td>Update truck percentages using 2010 data</td>
</tr>
<tr>
<td>E-2</td>
<td>Rewrite the scripting to remove QRFM medium and heavy trucks from that process</td>
</tr>
</tbody>
</table>
Phase 2 Goals

**Network and Land Use Updates**
- Migrate to Navteq
  - Bring in more network and make zone splits
  - Bring in parcel data for SE data refinement

**Trip Generation**
- Trip generation by purpose and county in place

**Trip Distribution**
- Trip length distribution by purpose in place

**Trip Assignment**
- Further refine the volume-delay curves
  - Add in a dynamic area type feature
  - Improve volume-to-count ratios and RMSEs

**Truck Component**
- Improve the truck volume-to-count ratios
Key network/database enhancements

- Use Navteq network features
- Populate all appropriate Navteq segments with modeling network attributes
- Develop zones and zonal data that are true to Navteq line work and take into account natural feature boundaries such as lakes, rivers, coastal areas, etc.
- Provide an interface that implements a many-to-one conversion process
- Develop a product that gives the ability to
  - warehouse all necessary network attributes in a database
  - bring in the correct attributes and model year into Cube for processing
  - output model attributes back to the database for analysis and use by others
  - reduce model run times (passenger model under 2 hours with 8-core system)
- Bring in parcel data for each county to better geo-reference existing socioeconomic data and provide a mechanism to merge land use modeling with the travel demand forecasting process
Many-to-one and One-to-many

- **Many-to-one process**
  - Navteq Attributes
  - Model Attributes
    - Area type
    - Facility type
    - Lanes
    - Speeds
    - AADT
  - Line work database

- **One-to-many process**
  - Navteq Attributes
  - Model Attributes
    - Area type
    - Facility type
    - Lanes
    - Speeds
    - AADT
    - Model output attributes
      - Volumes, congested speeds, etc.
  - Linework database
  - Cube/Voyager Network
  - Zonal database
Current 2010 network – downtown Lakeland
FLSWM Phase 2 Efforts

Network adjustments will be made using Navteq
Advantages of Navteq Network

- Navteq more accurately reflects Florida’s road alignments
- Florida public agencies have access to Navteq through the state-wide contract
- FDOT has placed its Linear Referencing System (LRS) on Navteq
- Every Navteq segment in the State Highway System or TranStat basemap has a Roadway ID, Begin Mile Post, End Mile Post
Because each FLSWM segment will be tagged with LRS and model information....

- FLSWM existing and future year data can be extracted for the Strategic Intermodal System (SIS) by roadway ID/MP and included in Central Office’s SIS Investment Tool (SIT). SIT is used to rank roads in most need of work program dollars.

- FLSWM future volumes can be compared to those submitted by the Districts in the LOS submittal to Central Office. The comparisons can be done using the roadway ID/MP definition.
Land Use Modeling Integration

- Made possible by
  - Migration to Navteq
  - Use of parcel data
- Uses county control total forecasts from other agencies (i.e. BEBR)
- Allocates incremental land use growth amounts within the county based on
  - Available land
  - Accessibility
  - Other variables
FLSWM Beyond Phase 2 Efforts

• Development of a light truck model based on truck surveys
• Toll Choice Model
  – Develop toll choice within the mode choice phase
  – Implement ramp-to-ramp tolling
• Tourist Model Development
  – Need for tourist surveys