Imperial County Transportation Model (ICTM)

Update and Enhancement

presented to
SCAG Modeling Task Force

presented by
Cambridge Systematics, Inc.
Sean McAtee

July 25, 2018
Outline

- Imperial County Overview
- Subregional Model Development Tool (SMDT) Application
- Calibration and Validation
- Added Modules and Tools
- Conclusions and Lessons Learned
Imperial County Overview

About 1% of the SCAG population

<table>
<thead>
<tr>
<th></th>
<th>Imperial County</th>
<th>SCAG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>183,309</td>
<td>18,705,638</td>
</tr>
<tr>
<td>Households</td>
<td>49,630</td>
<td>5,944,448</td>
</tr>
<tr>
<td>Employment</td>
<td>67,100</td>
<td>8,052,142</td>
</tr>
</tbody>
</table>

Adjacent to Mexicali, Population ~700K – 1M

Heavy agricultural Influence

Population grouped in small communities
SMDT Application

Zone disaggregation + 7x

<table>
<thead>
<tr>
<th></th>
<th>Tier 1</th>
<th>Tier 2</th>
<th>ICTM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial County</td>
<td>110</td>
<td>239</td>
<td>745</td>
</tr>
<tr>
<td>SCAG</td>
<td>4,109</td>
<td>11,267</td>
<td>1,128</td>
</tr>
</tbody>
</table>

Total internal zones

- Manual centroid connector placement
- Build on 2008 ICTM
- Coordinate refinements with SCAG and Caltrans District 11
SMDT Application

Network refinement +60% more roadways

<table>
<thead>
<tr>
<th></th>
<th>SCAG</th>
<th>ICTM</th>
<th>Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centerline Miles</td>
<td>1,989</td>
<td>3,228</td>
<td>1,239</td>
</tr>
<tr>
<td>Lane Miles</td>
<td>4,034</td>
<td>6,511</td>
<td>2,477</td>
</tr>
</tbody>
</table>

Non-centroid connector highway links

Thorough network review
» Combine SCAG 2012RTP Network and 2008 ICTM Network
» Recent projects and attribute/alignment review

Node consolidation
» Retain extra nodes only where key variables change
Calibration and Validation

Household Travel Survey (2012 – 2010)
- 347 Households, ~5000 Trips

Traffic Count Data – Screenlines
- 15 Screenlines, 160 Counts (some estimated)
- Data collection coordinated with SCAG Regional Screenlines

Transit Data
- About 3,200 daily boardings

Calibrate and validate each model step
Trip Distribution

- Calibration of the Destination Choice distance decay function
- Maintain interaction with Riverside County

### Trip Length Frequency Distribution (HBW)

<table>
<thead>
<tr>
<th></th>
<th>HBW</th>
<th>HBNW</th>
<th>NHB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td>8.1</td>
<td>7.1</td>
<td>4.4</td>
</tr>
<tr>
<td>SMDT (Initial)</td>
<td>6.9</td>
<td>3.9</td>
<td>3.4</td>
</tr>
<tr>
<td>ICTM</td>
<td>8.1</td>
<td>6.7</td>
<td>5.2</td>
</tr>
</tbody>
</table>
## Traffic Assignment

<table>
<thead>
<tr>
<th></th>
<th>Volume / Count</th>
<th>% RMSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>110%</td>
<td>24%</td>
</tr>
<tr>
<td>Expressway/Parkway</td>
<td>113%</td>
<td>28%</td>
</tr>
<tr>
<td>Principal Arterial</td>
<td>93%</td>
<td>29%</td>
</tr>
<tr>
<td>Minor Arterial</td>
<td>100%</td>
<td>41%</td>
</tr>
</tbody>
</table>
Sensitivity Testing

- Close a section of I-8 near El Centro
  - Verify reasonable results with and without running feedback
Through Travel

Problem

- The SMDT *preloads* all non-county traffic.
- This *includes* traffic passing through

Symptom:

- Discontinuous volumes
- No sensitivity to through travel (e.g., to network changes)
Through Travel - Discontinuities

Preloaded link splits will cause problems in application

Link splits for centroid connectors

SMDT Produced a directional N/S imbalance
Through Travel

Option 1

• Add a "Preload ID" field to the network
• Update ICTM to preload using this field

Option 2 (Selected)

• Remove all Imperial County preload values
• Generate a new through trip table
• Add through trips to the OD tables for assignment
IE/EI Travel – Mexicali, San Diego, New Mexico

Problem

• SMDT volumes inconsistent with counts
• SMDT distribution unrealistic (calibrated regionally)
• Lack of sensitivity to network and SED changes

Solution

• Completely replace IE/EI model
• Input traffic count data directly
• Singly constrained gravity model
• Calibrated based on the 2007 cross-border survey
External Travel

Counts / Volumes

% EE Shares

External Model
Model Dashboard – Summary Report
Model Dashboard - Mapping

- Quickly produce daily and peak period volume maps
- Compare two similar model runs
- Interactive select link and zone review
Model Dashboard - Mapping
Model Dashboard - Mapping
Conclusions and Lessons Learned

<table>
<thead>
<tr>
<th>SMDT</th>
<th>• A great tool. Requires careful attention to detail and QA/QC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't re-invent the wheel</td>
<td>• Build on past work, don't start from scratch</td>
</tr>
<tr>
<td>Border crossing</td>
<td>• Requires direct attention to model correctly</td>
</tr>
<tr>
<td>Traffic Counts</td>
<td>• Plan, coordinate and get permits early!</td>
</tr>
</tbody>
</table>
Thank You!

**SCAG**
Hao Cheng – Project Manager, SMDT Application
KiHong Kim – Count Database, Network assistance

**Caltrans**
Hanwen Yi and Maurice Eaton

**Cambridge Systematics**
Chao Wang, Haiyun Lin, Michelle Bina, Eric Bierce

**Count Collection**
Traffic Research & Analysis (TRA)