Southern California Association of Governments

2016 Regional Screenline Count Database

presented to
SCAG Modeling Task Force

presented by
Cambridge Systematics, Inc.
SCAG

May 23, 2018
Discussion Items

- Motivation for the study
- Data Collection Approach
- Data Assimilation and Data Analysis
- Database Development
- Quality Control and Quality Assurance
Motivation and Background
Motivation and Background

- SCAG’s Regional Travel Demand Model for 2020 RTP/SCS (Base Year 2016)
- Model validation and update
  - 35 screenlines and 40 external cordons
- Detailed classification data required:
  - AAWT (Annual Average Weekday Traffic)
  - 5 time periods (AM, MD, PM, EVE, NT)
  - 4 vehicle types (LM, LHDT, MHDT, HHDT)
- Leverage existing data to the extent possible
Data Collection Approach
# Three-step Approach

## Primary Data Collection
- Freeways
- Non-Freeways

## Secondary Data from Caltrans
- PeMS
- TAMS
- Caltrans Counts

## Local Data Collection
- County/city data

- Data collected on Tuesday-Wednesday-Thursday
- No data collected on Holidays & Days after Holidays
- No data collection around Universities during Spring Break
Primary Data Collection

- Includes screenlines and external cordons
- Includes freeways and arterials
- 2012 locations used as starting point
Primary Data Collection

Phase 1
• Design of a quality control plan

Phase 2
• Obtains permits from Caltrans for data collection on State Highways and Freeways

Phase 3
• Conduct traffic count data collection
Primary Data Collection

Locations identified by SCAG

<table>
<thead>
<tr>
<th>Screenline/Cordon</th>
<th>Freeways</th>
<th>Non-Freeways</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screenline</td>
<td>231</td>
<td>547</td>
<td>778</td>
</tr>
<tr>
<td>External Cordons</td>
<td>20</td>
<td>33</td>
<td>53</td>
</tr>
</tbody>
</table>

Dropped low volume roadways

Final list of locations

<table>
<thead>
<tr>
<th>Screenline/Cordon</th>
<th>Freeways</th>
<th>Non-Freeways</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screenline</td>
<td>248</td>
<td>526</td>
<td>774</td>
</tr>
<tr>
<td>External Cordons</td>
<td>18</td>
<td>32</td>
<td>50</td>
</tr>
</tbody>
</table>
Primary Data Collection

Non-Freeway locations
» All locations counted using tubes
» Data obtained in 15-minute intervals
» Includes all 13-FHWA classes of vehicles

Freeway locations
» Primary data collected at 30 locations
» Used a combination of Wavetronix and video
» Remaining locations obtained using existing data from Caltrans
» One-day data collection at all locations
Primary Data Collection

Collection Periods:
» Spring 2017 and Fall 2017

Number of Sites Counted during each Month

<table>
<thead>
<tr>
<th>Month</th>
<th>Tube Data Collection</th>
<th>Wavetronix Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>25</td>
<td>NA</td>
</tr>
<tr>
<td>March</td>
<td>76</td>
<td>NA</td>
</tr>
<tr>
<td>April</td>
<td>180</td>
<td>NA</td>
</tr>
<tr>
<td>May</td>
<td>110</td>
<td>NA</td>
</tr>
<tr>
<td>June</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>September</td>
<td>98</td>
<td>12</td>
</tr>
<tr>
<td>October</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>November</td>
<td>8</td>
<td>34</td>
</tr>
</tbody>
</table>
Secondary Data Collection

» PeMS data
  » Comprehensive coverage
  » Historical data
  » Detailed time slices
  » No vehicle classification

» Major steps
  » Assign station to screenline
  » Evaluate data quality
  » Drop poor performing stations
Secondary Data Collection

- TAMS Data
  - Truck Activity Monitoring System
  - Developed by UC Irvine Researchers
  - Captures vehicle classification
  - Subset of PeMS

- Detailed vehicle classification
City-County Data Assimilation

- Imperial County Count Database
  - Collected in May and early June 2017
  - 15-minute increments for 13-vehicle classifications
City-County Data Assimilation

LA Metro Arterial Count Database

- Over 600 locations in LA County
- Conducted by LA Metro
- With latitude and longitude info for count locations
- Only hourly counts are available
Three sub-tasks

Data Assimilation

Data Processing

Quality control checks
Data Assimilation

Assimilate data from different sources into one database with consistent variables and formats

Key features of Individual Count Databases

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Seasonality</th>
<th>Vehicle Classification</th>
<th>Time-of-Day Dimension</th>
<th>Essential for Model Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Data Collection</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>California PeMS</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>TAMS</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>LA Metro Arterial Count Database</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Imperial County Traffic Database</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Data Processing

Adjust counts to account for seasonal and monthly variations

Three rounds of adjustments were implemented:

» Annual Adjustment Factors
» Monthly Adjustment Factors
» Vehicle Class Distribution Disaggregation
Database Development

**Master Database**

- Raw data collected from all sources:
  - Primary Data Collection
  - PeMS
  - TAMS
  - LA Metro Arterial Count Database
  - and the Imperial County Traffic Database

**Validation Database**

- Processed counts for all screenlines:
  - Daily directional counts
  - Directional counts for five time periods
  - Daily directional counts by four SCAG vehicle classes
  - Directional counts for five time periods by four SCAG vehicle classes
• Over all traffic increase 8% (19.5 million to 21.0 million) from 2012 to 2018
• Consistent with 7.4% employment increase, 3 percent population increase and 3.4% vehicle ownership increase (SCAG 2016 RTP model)
Quality Control
2012 Screenline Counts Comparison

Comparison of 2012 and 2016 Screenline Counts by County

- Ventura County
- San Diego County
- San Bernardino County
- Riverside County
- Orange County
- Los Angeles County
- Imperial County

2016 Counts vs 2012 Counts
The temporal patterns were relatively consistent across all the counties and were also consistent when compared to the 2012 count database.
Vehicle Classification by County and Freeway Type

<table>
<thead>
<tr>
<th>County</th>
<th>Arterial</th>
<th>Freeway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imperial</td>
<td>80%</td>
<td>90%</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>85%</td>
<td>95%</td>
</tr>
<tr>
<td>Orange</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>Riverside</td>
<td>70%</td>
<td>75%</td>
</tr>
<tr>
<td>San Bernardino</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>Ventura</td>
<td>80%</td>
<td>90%</td>
</tr>
<tr>
<td>Region</td>
<td>90%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Legend:
- Llight/Medium
- LHDT
- MHDT
- HHDT
CS and SCAG Team
Team Members

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Thank You