Model Preparation for the next Regional Transportation Plan
Outline

• RTP Overview

• Modeling Initiatives:
  – Moving to a 2018 Base Year
  – Soundcast Improvements
  – Open Street Map (OSM) Based Networks
RTP Overview

• Anticipate modeling in Fall 2020
• Land-use to be consistent with Vision 2050 Growth Strategy.
• Emerging Transportation Technology
• New Transportation Projects.
2018 Base Year
• Recognize the need to start with (more) current conditions:
  – 2022 Plan Adoption
  – New Infrastructure
  – Changing Behavior / Trends
2018 Base Year- Landuse

• Data Development
  – Parcels, Buildings (Assessor’s Extracts)
  – Employment
  – Synthetic Population (HHs & Persons)
2018 Base Year- UrbanSim

• Need to create new Landuse datasets that reflect the adopted Vision Growth Strategy.
  – Run using same jurisdictional control totals developed for Vision..
  – First set of land use products post vision.
  – Will be used as inputs to Soundcast for RTP.
2018 Base Year - Soundcast

- Data Development
  - Networks
  - Tolls/Fares/Parking costs
  - Observed data
    - Traffic Counts
    - Transit Boardings
• Estimation/Calibration
  – Estimate models if significant changes have occurred:
    • Mode Choice Models to include TNCs.
  – Otherwise calibrate to HH Survey
• Validation & Sensitivity Testing
  – Daysim model results will be validated against HH Survey.
  – Assignment Results validated against traffic counts, boardings
  – Sensitivity/Reasonableness Tests constructed to test the types of questions/analysis in the next RTP.
Soundcast Improvements
Soundcast Improvements

• Adding features to address and improve:
  – Connected Autonomous Vehicles (CAVs)
  – Ridehailing (aka TNCs, Uber/Lyft/etc.)
Guidance on Model Improvements

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP RESEARCH REPORT 896

Updating Regional Transportation Planning and Modeling Tools to Address Impacts of Connected and Automated Vehicles

Volume 2: Guidance

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http://www.trb.org/Main/Blurbs/178393.aspx
NCHRP Recommendations

• Context
• Addressing & Communicating Uncertainty
• CAV Modeling Frameworks
• Model Adaptations
# Short-Term Improvements

<table>
<thead>
<tr>
<th>Model/Parameter</th>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Ownership</td>
<td>Add CAV as ownership option</td>
<td>Complete</td>
</tr>
<tr>
<td>Mode Choice</td>
<td>Allow CAV as separate mode</td>
<td>Complete</td>
</tr>
<tr>
<td>Mode Choice</td>
<td>Allow TNC as separate mode</td>
<td>Complete</td>
</tr>
<tr>
<td>Mode Choice</td>
<td>Adjust value of time for CAV</td>
<td>Complete</td>
</tr>
<tr>
<td>Mode Choice</td>
<td>TNC/CAV access to transit</td>
<td>In Progress</td>
</tr>
<tr>
<td>Assignment</td>
<td>Modify capacity for full CAV fleet</td>
<td>Complete</td>
</tr>
<tr>
<td>Assignment</td>
<td>Modify volume delay functions</td>
<td>In Progress</td>
</tr>
</tbody>
</table>
Existing Improvements

• Allows testing of:
  – 100% CAV environment
    • 100% vehicles owned are CAVs (adjust constant)
    • Increased capacity on freeways and some arterials
    • Assert parking cost reductions
  – CAV ownership model
    • Simple model: age, income, commute time, VOT in CAV
  – CAV priority lanes/roads
## Longer Term Improvements from NCHRP

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</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Ownership</td>
<td>Add purchase cost, CAV incentives, parking cost, accessibility, etc.</td>
<td>?</td>
</tr>
<tr>
<td>Activity Generation &amp; Mode Choice</td>
<td>Remove age constraints from CAVs</td>
<td>?</td>
</tr>
<tr>
<td>Activity Generation</td>
<td>Track empty vehicle trips</td>
<td>?</td>
</tr>
<tr>
<td>Pricing</td>
<td>Dynamic pricing for CAV/TNC</td>
<td></td>
</tr>
<tr>
<td>Parking Model</td>
<td>Add parking choice model, with off-site parking options, dynamic pricing and availability</td>
<td></td>
</tr>
</tbody>
</table>
Other Considerations

• Trucks
  – Benefit from increased capacity
  – Less guidance on including impacts here

• Externals
  – Longer distance travel impacts?
Soundcast GUI

Soundcast
PSRC’s Regional Travel Model

Initial Setup
- Run Accessibility Calculations
- Setup Envme Project Folders
- Setup Envmebank Folders
- Copy Scenario Inputs
- Import Networks

Model Procedures
- Start with Freewflow Assignment and Skims
- Run Assignment and Skimming
- Run Truck Model
- Run Supplemental Trips
- Run Day/Time Choice Models
- Generate Summaries

Modes
- Include AV Modes
- Include TNCLs
- TNCLs are AV

Pricing
- Apply Per-Mile Distance Pricing
  - am
  - md
  - pm
- Include HOT Lane Tolls
  - am
  - md
  - pm

Run Soundcast
Quit
Emissions Modeling

• Emissions (tons/day) generated automatically for all runs:
  – GHGs and all criteria pollutants
  – MOVES 2014 rates incorporated for all years, multiplied by link VMT, binned by speed, hour, facility type, county
  – Includes start and running emissions
Soundcast Version Release

• V 2.1.1 -> v2.2
• Minor release to include:
  – bug fixes
  – Code/repo clean up
  – GUI
  – AV/TNC mode capability
  – Emissions summaries
OSM-Based Networks

• Overall Goals of the project
  – Replace existing roadway geometry with OSM
  – Use PSRC’s existing network attributes, update changes since 2014.
  – Carry forward important OSM attributes
    • OSM ID
    • One-way flag
OSM Overview

• What is OSM
  – “...is built by a community of mappers that contribute and maintain data about roads, trails, cafes, railway stations, and much more, all over the world.”
  – Community Driven
  – Open Data
OSM-Based Networks

• Why OSM?
  – One set of geometry, not a patchwork of local datasets
  – Highly detailed- freeways to trails.
  – Easy to update
  – Data sharing
OSM-Based Networks

• Project Steps
  – Create a Routable Network:
OSM-Based Networks

• Project Steps cont.
  – Used GIS tools to conflate old network to OSM
  – Significant Amount of QC work.
  – Added Non-OSM features
    • Centroid Connectors
    • Park & Rides
    • Future Network
OSM-Based Networks

• Project Steps cont.
  – Import 2018 Transit Network
    • Completed
  – Import Future Transit Networks
  – Add other spatially coincident data
    • Project Routes
OSM networks – more detail
Latest interchange configurations
Directional arterial edges
Too much detail?
Arterial delay implications
Centroid Connectors
Turn prohibitor issues
OSM - Concerns

- More detail (EMME node limit?)
  - Current Network = 25,600 nodes & 68,700 links
  - OSM Network = 28,400 nodes & 71,500 links

- Turn prohibitors (u-turns)

- Arterial delay implications