APA Transportation Planning Division

2018 State of Transportation Planning Webinar

July 20, 2018
How LA is using technology to deliver urban mobility

APA Transport
State of Transportation Planning 2018 Webinar
July 20, 2018
Presenters

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Urban MOBILITY in a Digital Age
LADOT Technology Strategy Framework

1. Build a solid data foundation.
2. Leverage technology + design for a better transportation experience.
3. Create partnerships for more shared services.
4. Support continuous improvement through feedback.
5. Prepare for an automated future.

POLICY + IMPLEMENTATION + PILOTS

PLATFORM FOR MOBILITY INNOVATION

DATA AS A SERVICE + MOBILITY AS A SERVICE + INFRASTRUCTURE AS A SERVICE
Implementing LA’s Transportation Technology Strategy

1. Collected trip data from housing & mixed use sites in our City

2. Updated Travel Demand Forecasting (TDF) Model

3. Defined localized trip generation rates & vehicle miles traveled (VMT) estimates
Using transportation data from our region
Trip data from housing & mixed use sites in our City
Updated Travel Demand Forecasting (TDF) Model
Localized trip generation rates & VMT
Status of LA’s Transportation Technology Strategy Implementation

1. Build a solid data foundation.
2. Leverage technology + design for a better transportation experience.
3. Create partnerships for more shared services.
4. Support continuous improvement through feedback.
5. Prepare for an automated future.

Built a customized VMT Calculator

LADOT
Emphasis on local vehicle delay has encouraged development far away from frequented destinations.

68.5% of all Angelenos drive alone to work.

Source: U.S. Census Bureau
Creating tools to support sustainable transportation outcomes

- Reduce transportation sector-related greenhouse gas emissions
- Make smart mobility decisions that improve the environment
- Build communities, not sprawl

- Promote clean mobility options to reduce criteria pollutants and greenhouse gas emissions
- Reduce exposure to pollutants and increase infrastructure for active transportation

California
Assembly Bill 32

California
Senate Bill 375

California
Senate Bill 743

Caltrans Strategic Management Plan

Caltrans Bicycle & Pedestrian Plan

LA Metro Countywide Sustainability Planning Policy
Creating tools to support sustainable transportation outcomes

- Promote clean mobility options to reduce criteria pollutants and greenhouse gas emissions
- Deliver options and inform choices for more sustainable travel
- Provide clean environments & healthy communities
LA’ Planned Project Review Process

Step 1

Project Screening Criteria will describe the types of projects that are not required to submit a technical analysis.
LA’ Planned Project Review Process

Step 1: Project Screening Criteria

Step 2: Prepare a VMT Impact Analysis

Does not meet project screening criteria
Customized VMT Calculator
VMT Calculator requires a project description.
VMT Calculator estimates effectiveness of VMT reduction strategies based on place.
VMT Calculator provides many VMT reduction strategies to choose from.
Apply TDM Measures to Reduce VMT

- Parking management
- Transit incentives
- Education + marketing
- Commute trip sharing
- Neighborhood connectivity
- Shared mobility services
VMT Calculator estimates proposed project VMT impact

<table>
<thead>
<tr>
<th></th>
<th>Proposed Project</th>
<th>With Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Vehicle Trips</td>
<td>6,042</td>
<td>3,891</td>
</tr>
<tr>
<td>Daily VMT</td>
<td>44,799</td>
<td>28,845</td>
</tr>
<tr>
<td>Household (HH) VMT</td>
<td>7.4</td>
<td>4.8</td>
</tr>
<tr>
<td>per Capita</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work VMT</td>
<td>11.3</td>
<td>7.2</td>
</tr>
<tr>
<td>per Employee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail VMT</td>
<td>20,796</td>
<td>13,390</td>
</tr>
</tbody>
</table>

Significant VMT Impact?

<table>
<thead>
<tr>
<th></th>
<th>HH: Yes</th>
<th>HH: No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>15% Below APC</td>
<td>15% Below APC</td>
</tr>
<tr>
<td>Work: No</td>
<td>Threshold = 11.8</td>
<td>Threshold = 11.8</td>
</tr>
<tr>
<td></td>
<td>15% Below APC</td>
<td>15% Below APC</td>
</tr>
</tbody>
</table>

LADOT
LA’ Planned Project Review Process

**Step 1**
Project Screening Criteria

**Step 2**
VMT Impact Analysis

**Step 3**
Project implements TDM and reduces vehicle miles traveled
Outcomes Angelenos care about
New Evaluation Process

New Transportation Study Procedures

Affordable Housing & Mixed Use Vehicle Trip Adjustments

Credit System & Monitoring for TDM

Localized Trip Generation Rates & VMT

Area-Specific VMT Impact Criteria
New Transportation Study Procedures

Updated Tools for Evaluation

Affordable Housing & Mixed Use Vehicle Trip Adjustments

Credit System & Monitoring for TDM

Localized Trip Generation Rates & VMT

Area-Specific VMT Impact Criteria

New Evaluation Process

LADOT
DISCLAIMER

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WHAT IS AN AUTONOMOUS VEHICLE?


WHO’S DEVELOPING THEM?

- TESLA Model S
- Ford Fusion
- Google Waymo
- GM Cruise LV
- Daimler-Bosch
LEVELS OF AUTOMATION

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Automation&lt;br&gt;Zero autonomy; the driver performs all driving tasks.</td>
</tr>
<tr>
<td>1</td>
<td>Driver Assistance&lt;br&gt;Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.</td>
</tr>
<tr>
<td>2</td>
<td>Partial Automation&lt;br&gt;Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.</td>
</tr>
<tr>
<td>3</td>
<td>Conditional Automation&lt;br&gt;Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.</td>
</tr>
<tr>
<td>4</td>
<td>High Automation&lt;br&gt;The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.</td>
</tr>
<tr>
<td>5</td>
<td>Full Automation&lt;br&gt;The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.</td>
</tr>
</tbody>
</table>

CHALLENGES

• Combining heavy equipment plus complex software difficult

• Liability

• Cost

• Full benefits may not be realized for a while

• Limited Market Penetration initially

• Economic impacts
WHAT IS BEING DONE NOW

Full-Scale Research Facilities at the Thomas D. Larson Pennsylvania Transportation Institute
http://larson.psu.edu/about/test-track.aspx

### AV IMPACTS OVER TIME

<table>
<thead>
<tr>
<th>Impact</th>
<th>Functional Requirements</th>
<th>Planning Impacts</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Become legal</td>
<td>Demonstrated functionality and safety</td>
<td>Define performance, testing and data collection requirements for automated driving on public roads.</td>
<td>2015-25</td>
</tr>
<tr>
<td>Increase traffic density by vehicle coordination</td>
<td>Road lanes dedicated to vehicles with coordinated platooning capability</td>
<td>Evaluate impacts. Define requirements. Identify lanes to be dedicated to vehicles capable of coordinated operation.</td>
<td>2020-40</td>
</tr>
<tr>
<td>Independent mobility for non-drivers</td>
<td>Fully autonomous vehicles available for sale</td>
<td>Allows efficient non-drivers to enjoy independent mobility.</td>
<td>2020-30s</td>
</tr>
<tr>
<td>Automated carsharing/taxi</td>
<td>Moderate price premium. Successful business model.</td>
<td>May provide demand response services in affluent areas. Supports carsharing.</td>
<td>2030-40s</td>
</tr>
<tr>
<td>Independent mobility for lower-income</td>
<td>Affordable autonomous vehicles for sale</td>
<td>Reduced need for conventional public transit services in some areas.</td>
<td>2040-50s</td>
</tr>
<tr>
<td>Reduced parking demand</td>
<td>Major share of vehicles are autonomous</td>
<td>Reduced parking requirements.</td>
<td>2040-50s</td>
</tr>
<tr>
<td>Reduced traffic congestion</td>
<td>Major share of urban peak vehicle travel is autonomous.</td>
<td>Reduced road supply.</td>
<td>2050-60s</td>
</tr>
<tr>
<td>Increased safety</td>
<td>Major share of vehicle travel is autonomous.</td>
<td>Reduced traffic risk. Possibly increased walking and cycling activity.</td>
<td>2040-60s</td>
</tr>
<tr>
<td>Energy conservation and emission reductions</td>
<td>Major share of vehicle travel is autonomous. Walking and cycling become safer.</td>
<td>Supports energy conservation and emission reduction efforts.</td>
<td>2040-60s</td>
</tr>
<tr>
<td>Improved vehicle control</td>
<td>Most or all vehicles are autonomous.</td>
<td>Allows narrower lanes and interactive traffic controls.</td>
<td>2050-70s</td>
</tr>
<tr>
<td>Need to plan for mixed traffic</td>
<td>Major share of vehicles are autonomous.</td>
<td>More complex traffic. May justify restrictions on human-driven vehicles.</td>
<td>2040-60s</td>
</tr>
<tr>
<td>Mandated autonomous vehicles</td>
<td>Most vehicles are autonomous and large benefits are proven.</td>
<td>Allows advanced traffic management.</td>
<td>2060-80s</td>
</tr>
</tbody>
</table>

CONSIDERATIONS FOR PLANNERS

1. Increase public investment in research and development in technology

2. Paradigm shift: “Mobility as a Service”

3. Continue incentivizing alternative modes; especially ride-sharing

4. Trade-offs between reduced parking and increased congestion.

5. Cultural shift in travel behavior.
CONSIDERATIONS FOR PLANNERS
(continued)

6. Land Use Strategies to accommodate AV operation

7. Legal Issues

8. Plan for mixed traffic

9. Time to begin planning is NOW!


https://www.youtube.com/watch?v=sB3vXYr4kL4

Dedicated lane for networked vehicles

Dedicated lane for non-networked vehicles: using induction control technology
QUESTIONS

• For Further Information, contact

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Advances in Automated Bicycle & Pedestrian Counting

Nathan Hicks, AICP

07/20/2018
Advances in Automated Bicycle & Pedestrian Counting

- What is most often used now?
  - Infrared (Passive and Active)
  - Pneumatic Tubing
  - Manual Methods

- Pros and Cons?
  - Cheap/easy to install
  - Difficulties with data
Advances in Automated Bicycle & Pedestrian Counting

- CDM Smith completed a non-motorized transportation data collection study for the Florida Department of Transportation.
  - We utilized the most common methods for counting bicyclists and pedestrians, but found there were limitations.
    - Nature and the built environment can influence the data.
Where is the field progressing?

- Significant research in the field of “Computer Vision”. This is influencing not only autonomous vehicles, but is opening doors in other fields as well.
Advances in Automated Bicycle & Pedestrian Counting

- What can “Computer Vision” allow?

  - The ability to count bicyclists and pedestrians in different environments.
  - Not only is it important that bicyclists and pedestrians are counted, but these advances could allow for additional types of analyses.
Advances in Automated Bicycle & Pedestrian Counting

- What can “Computer Vision” allow?
  - It can also determine direction, speed, classification, helmet usage and potential conflicts between users.
  - Safety analyses at intersections are one example, furthering the goal of “Vision Zero”.
  - Behavior analyses is another potential use.
Advances in Automated Bicycle & Pedestrian Counting

- There is ongoing and future research!
  - Robotics Institute at Carnegie Mellon University.
  - UBC Bureau of Intelligent Transportation Systems and Freight Security.

- Both organizations have completed research using Computer Vision and counting bicyclists and pedestrians.
  - Accuracy of bicyclists and pedestrian counting ranged from 90.1% to 95.1%.
Advances in Automated Bicycle & Pedestrian Counting

- What can be expected in the coming years?
  - Additional research and refinement is needed. Accuracy is good, but needs to be improved.
  - As new modes come into play, models will need to be adjusted (Dockless scooters).
Transportation Agencies Adopt a Scenario Planning Approach for the Uncertain Road Ahead

Summary Presentation

Presented by: Tim Storer (ICF)

July 20, 2018
Driving Change

- **Los Angeles**
  - 1920s: one of the world’s largest transit systems and busiest pedestrian crossings
  - Decades of auto-centric actions contributed to reversing this trend
  - Today: routinely ranks among the most traffic congested cities in the world (INRIX)

- **Portland**
  - Similar decision making trajectory; by 1970s, much of downtown devoted to parking
  - 1980s: forward-thinking policies directed growth towards key corridors, facilitated density, and helped revitalize the economy
  - Today: Routinely ranks as one of the best cities in the US for bicycling, walking and transit
Setting the Stage: A Changing Landscape

The role, function, and behavior of automobile travel has been reasonably stable established pattern in prior decades... but that is changing rapidly.

New technologies change the paradigm:
- Vehicle automation
- Connectivity advancement
- New modes (e.g. Hyperloop)

Uncertain policy and behavioral contexts:
- Regulations
- Industry agreements
- Standards and partnerships

Emergent Phenomenon
- Ride-hailing
- Higher vehicle utilization
- Multi-modalism
- Electrification
- ???

Outcomes
- VMT & Congestion
- Emissions
- Land-Use
- Safety
- Car Ownership
- Parking
- Accessibility
- Affordability
- & more!
Planning for Uncertainty

- Scenario planning offers a systematic approach to:
  - Survey past and present transportation developments
  - Explore possible trajectories of change and their underlying drivers
  - Assess opportunities and risks associated these trajectories

- State of Technology Readiness Planning
  - National League of Cities (2015): 6% of agencies incorporated AVs
  - National League of Cities (2018): 36% of cities planning for AVs
  - Early adopters include Jacksonville Transportation Authority, Maryland DOT, Washington State DOT
Determine Goals
1. Promote itself in the community.
2. Improve service
3. Pursue tech and partnerships
4. Identify tech-enabled efficiency improvements
5. Be involved with land development process

Analyse Plans
- Future population distribution/composition
- Planned/programmed investments

Workshop (2017)
- Convene peer agencies
- Form scenarios

Conceptual Rendering of Jacksonville’s Ultimate Urban Circulator
(Source: JTA)
FHWA’s Scenario Planning for CVs and AVs: Project Goals

**Purpose:**
- Equip agencies to deal with uncertainty
- Reduce burden on state and local agencies in addressing CV/AV risks and opportunities
Project Outcomes and Deliverables

- Develop **5-6 descriptive scenarios** of potential futures related to CV/AV deployment, adoption, use and likely impacts through a collaborative approach with FHWA, invited stakeholders and subject matter experts
- Conduct **2 workshops** to validate, refine, and test the descriptive scenarios
- **Final report** including (1) Methodology for creating the scenarios and (2) high-level qualitative assessments of scenario impacts to planners and to society
- **Practitioner Guidance** document to serve as a stand-alone resource for planners to conduct their own scenario planning exercises
## Scenario Development Process

### Drivers and Levers

<table>
<thead>
<tr>
<th>Technological Developments</th>
<th>Consumer Preferences</th>
<th>Socio-Economic Factors</th>
<th>Government Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 5G and/or DSRC advancement</td>
<td>- Car Ownership</td>
<td>- Demographics</td>
<td>- Technology mandates or bans</td>
</tr>
<tr>
<td>- Rapid sensorization</td>
<td>- Acceptance of new tech</td>
<td>- Urbanization</td>
<td>- Federal tax incentives</td>
</tr>
<tr>
<td>- Growth in mobile platforms</td>
<td>- Security vs Convenience</td>
<td>- New Business models (e.g. TNCs)</td>
<td>- International/national climate policy</td>
</tr>
<tr>
<td>- Cybersecurity Standards</td>
<td>- Eco-Consciousness</td>
<td>- VMT/congestion pricing</td>
<td>- Transit investment</td>
</tr>
<tr>
<td>- New smartphone applications</td>
<td>- Bike/ped preferences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Big Data analytics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- New vehicle designs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Declining EV prices</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Key Uncertainties

- SAE levels of automation are available and affordable, and in what areas can they operate?

### Cooperation

- To what extent do agencies and companies adjust their operational practices and policies in accordance with other entities? Is there integrated payment, synchronization in schedules, multi-modal infrastructure development, etc.?

<table>
<thead>
<tr>
<th>Cooperation Level</th>
<th>Innovation Proliferates (Green)</th>
<th>CV Technology Progresses Rapidly (Red)</th>
<th>TNC-Like Services Proliferate Rapidly (Yellow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niche Service Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultimate Traveler Assist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managed Automated Lanes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AV lanes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competing Fleets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automated Integrated Mobility</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How do we maximize usefulness of the scenarios?

Scenario Planning Workshop (Nov, 2017)

- Scenario Implications
- Implications to Planning and Operations
- Agency Needs and Advice for Developing Practitioner Guidance

Day 1

- Scenario Risks and Opportunities
## Common Risks in the Scenarios

<table>
<thead>
<tr>
<th>Common Risks</th>
<th>Relevant Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slow Roll</td>
</tr>
<tr>
<td>Decreased value of roadway capacity expansion</td>
<td>X</td>
</tr>
<tr>
<td>Equity - benefits felt only by certain groups</td>
<td>X</td>
</tr>
<tr>
<td>Inadequate EV charging</td>
<td></td>
</tr>
</tbody>
</table>

## Commonly Valuable Agency Actions

<table>
<thead>
<tr>
<th>Commonly Valuable Agency Actions</th>
<th>Relevant Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slow Roll</td>
</tr>
<tr>
<td>Begin piloting and testing V2I systems</td>
<td>X</td>
</tr>
<tr>
<td>Digitize road signage, speeds, markings</td>
<td>X</td>
</tr>
<tr>
<td>Incentives for CV retrofits</td>
<td>X</td>
</tr>
</tbody>
</table>
Practitioner Guidance Components

1. Define and Understand CV/AV
2. Determine goals and stakeholders in your planning process
3. Understand Driving Forces and Scenario Origins
4. Frame and Tailor the Scenarios
5. Incorporate Scenario Results into Decision-Making
6. Monitor industry and policy developments

Done iteratively
Conclusions

- Scenario planning has been and will continue to be a valuable tool for state and local planners.
- There is no one-size-fits-all approach to scenario planning:
  - Different contexts, resources, goals, and perspectives.
  - Normative and exploratory.
APA Transportation Planning Division

2018 State of Transportation Webinar Presenters

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