Transportation Planning Implications of Automated/Connected Vehicles on Texas Highways

Project 0-6848
AV/CV Symposium
Thompson Center, Austin Texas
August 2015
Transportation Planning
Implications of
Automated/Connected Vehicles

Assess how the potentially transformative automated/connected vehicle technology can be included in the Texas transportation planning process by defining the technology, surveying potential behavioral response, testing scenarios with travel modeling, and sharing ideas with the transportation planning community.
1. Define Current and Future Technology
2. Potential Impacts to Personal Travel
3. Potential Impacts to Commercial Travel
4. Potential Impacts to Travel Forecasting Process
5. Behavioral Preferences Survey
6. Stakeholder Workshops (3)
7. Evaluate Impacts to Transportation Planning Process

August 2016
• An **Automated Mobility Environment** might include elements of current trends in:
  • AV/CV and integrated, sensing infrastructure
  • Social/employment Trends
    • Shared Economy
    • Gig Economy
  • Personal Communications

**Not just AV/CV**
Promising Impacts of Smart Mobility

- Increased System Efficiency
- More Travel Options
- Better Traveler Information
- Trip Reduction
- More Efficient Pricing and Payments

“Smart Mobility for a 21st Century America”
Transportation for America, ITS America, the Association for Commuter Transportation and the University of Michigan’s SMART Initiative.
October 2010
Automated Mobility Environment
How Would AV/CV and an Automated Mobility Environment Impact Personal Travel?
<table>
<thead>
<tr>
<th>Travel Option</th>
<th>Potential AV/CV Impact (Automated Mobility Environment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip/Activity Generation</td>
<td>Travel Cost – when &amp; how we pay, Vehicle ownership/availability</td>
</tr>
<tr>
<td>Tour Formation</td>
<td>Vehicle Sharing, Cost allocation, Expanded mobile population</td>
</tr>
<tr>
<td>Trip Length/Travel Time</td>
<td>Urban form, In-vehicle time use, Congestion?</td>
</tr>
<tr>
<td>Mode Selection/Definition</td>
<td>Public transportation, Bike/Walk access, Legacy systems?</td>
</tr>
<tr>
<td>Routing and Navigation</td>
<td>Maximize infrastructure use, User information &amp; daily activity planning</td>
</tr>
</tbody>
</table>

**AV/CV Transforming Personal Travel Options/Choices**
### AV/CV Goals
- Improve safety
- Reduce future cost of infrastructure/equipment
- Increase comfort and convenience
- Reduce time spent driving
- Reduce user costs
- Reduce travel time
- Enhance mobility options
- Reduce traffic congestion
- Improve efficient use of infrastructure
- Reduce labor costs
- Improve fuel efficiency
- Reduce emissions

### MAP-21 Goal Areas
- Safety
- Infrastructure Condition
- Congestion Reduction
- System Reliability
- Freight Movement and Economic Vitality
- Environmental Sustainability
- Reduced Project Delivery Delays

Adapted from Schladover, 2015

**AV/CV and Planning Goals**
A New Era of Goal Achievement?

• 1950’s-1980’s
  • Building out systems to meet growth
• 1980’s-2010’s
  • Funding shortfalls
  • Sustainability concerns
  • “Expect a Rough Road Ahead”
• 2020’s-?
  • Achieving Desirable Goals and Objectives?
“While highways were the 20th century’s innovative response to an accelerated economic expansion, travel demand management is this century’s answer to increased urbanization and dramatic population growth.”
How Shall we Plan for AV/CV?
## Potential Use Cases

<table>
<thead>
<tr>
<th>Technology</th>
<th>Driver-Assisted</th>
<th>Monitored Fleet</th>
<th>Private</th>
<th>Common Use Fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Level 3+</td>
<td>Level 4</td>
<td>Level 4</td>
<td>Level 4</td>
</tr>
<tr>
<td>Driver</td>
<td>Driver required to take over</td>
<td>System monitor required</td>
<td>No driver required</td>
<td>No driver required</td>
</tr>
<tr>
<td>Typical Use</td>
<td>Automation available- and restricted- areas</td>
<td>Public transit, shuttle services</td>
<td>Private ownership, restricted to small group of authorized users</td>
<td>Common use subscription or general On-demand services</td>
</tr>
</tbody>
</table>
• Designed to prepare for uncertain futures
• Scenario Planning is not the same as Alternatives Analysis
• Current plans focus on a single future/alternative/scenario
• Process is driven by planning policy
  • Transportation Planning Process
  • Fiscal Constraint Requirements

Scenario Planning is Key
Scenario Planning is Key

- Scenario Planning Process
  - Develop Alternative Scenarios
  - Determine Fundamental Impacts from all Scenarios
  - Assess both Likelihood and Magnitude of Impacts
  - Consolidate Plans to Address Most Likely and Impactful Items
  - Re-assess Less Likely and Impactful Items Periodically

Scenario Planning is Key
Texas Transportation Planning: the Next 4 Years

- Develop Reasonable Scenarios, Timeframes
- Coordinate Common Themes across Regions
- Estimate Potential Behavioral Changes, Refining over Time with Observed Data
- Demonstrate Capacity Impacts of AV/CV
- Estimate Impacts with Existing Tools
- Develop New Tools as Deployment Occurs
Making decisions based on past certainty when faced with knowledge of an uncertain future is folly.

Adapting Transportation Plans to Uncertainty