Cooperative Automated Transportation (CAT)

WSDOT’s efforts to prepare for connected and automated vehicles (CAV)

Urbanism Next Conference, Preparing for Emerging Technologies in the Pacific Northwest
Kyle Miller, Transportation Planning Specialist, WSDOT
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Connected Automated Vehicle

**Connected Vehicle**
Communicates with nearby vehicles and infrastructure; Not automated

**Connected Automated Vehicle**
Leverages autonomous automated and connected vehicles

**Autonomous Vehicle**
Operates in isolation from other vehicles using internal sensors
# Vehicles with Automation

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>What car does</td>
<td>None</td>
<td>Assistance</td>
<td>Partial</td>
<td>Conditional</td>
<td>High</td>
<td>Full</td>
</tr>
<tr>
<td><strong>What driver does</strong></td>
<td>Everything</td>
<td>Everything with some assistance</td>
<td>Everything with more assistance</td>
<td>Remain alert ready to resume control</td>
<td>Nothing restricted operating environment</td>
<td>Nothing</td>
</tr>
<tr>
<td>Where to Find</td>
<td>Your (grand) parents' car</td>
<td>Present fleet</td>
<td><strong>Today</strong></td>
<td>Tesla Autopilot</td>
<td><strong>2019 - 2022</strong></td>
<td>Sometime in the future</td>
</tr>
</tbody>
</table>

Source: Johanna Zmud, Senior Research Scientist, Texas A&M Transportation Institute, Nov. 13, 2018
CAT is much more than CAV
What is Cooperative Automated Transportation (CAT)?

Cooperative: Deploying technology to encourage all modes of transportation to work in concert

Automated: Automating functions (traffic management systems, fare collection, trip planning and scheduling, etc.) or access to various vehicle types (automobile, van, plane, truck, bus, rail, ferry, bicycle, scooter, etc.)

Transportation: The entire transportation system working together (vehicles, infrastructure, modes, services, etc.)
Activity #1

- Develop a CAT policy framework considering both community and regional transportation system needs.

- Eight Policy Goals:
  - Organizing for innovation
  - Shared mobility
  - Economic vitality and livability
  - Infrastructure & context sensitive street design
  - Land use
  - Equity
  - Safety
  - Environment
## Equity (Strategies and Illustrative Actions)

### 6. Equity

<table>
<thead>
<tr>
<th>Number</th>
<th>Potential Strategy</th>
<th>Example Action</th>
<th>Legislative Goals Addressed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Encourage and incentivize local land use that maintains the community's character and supports transportation system efficiency</td>
<td></td>
<td>1, 6</td>
</tr>
<tr>
<td>2</td>
<td>Develop and implement policies that ensure TNC Ride hailing companies report when, where and who they are providing services.</td>
<td></td>
<td>1, 6</td>
</tr>
<tr>
<td>3</td>
<td>Encourage CAT solutions that serve diverse populations and enhance services to our state’s most vulnerable populations.</td>
<td>1. Require a percentage of shared automated vehicle fleets to be ADA accessible</td>
<td>1, 6</td>
</tr>
<tr>
<td>4</td>
<td>Ensure shared mobility services meet the unique transportation needs of vulnerable populations such as seniors, families with children, and individuals with mobility or other physical impairments.</td>
<td>1. Implement an AV Shuttle Pilot corridor in an urban and rural setting that are targeted to serve vulnerable populations.</td>
<td>1, 6</td>
</tr>
<tr>
<td>5</td>
<td>Integrate shared automated vehicle fleet application programming interfaces (API) into Mobility as a Service (Maas) / Mobility on Demand (MOD) platforms and services to ensure all shared fleet options are available to consumers.</td>
<td></td>
<td>1, 4, 6</td>
</tr>
<tr>
<td>6</td>
<td>Ensure that automated vehicles are deployed in a way that does not encourage displacement</td>
<td></td>
<td>1, 6</td>
</tr>
<tr>
<td>7</td>
<td>Incentivize CAT strategies that promotes equitable access to jobs and housing in every community across the state.</td>
<td></td>
<td>1, 4, 6</td>
</tr>
<tr>
<td>8</td>
<td>What other strategies are needed?</td>
<td>What are 1 or 2 example actions that support the proposed strategy?</td>
<td>What Legislative Goals are Addressed?</td>
</tr>
</tbody>
</table>

*Transportation System Policy Goals: 1) Economic Vitality, 2) Preservation, 3) Safety, 4) Mobility, 5) Environment, 6) Stewardship*
### Infrastructure and Systems Subcommittee – Activity #1

**Clearinghouse of CAT Policy Frameworks and Policy Statements:**

<table>
<thead>
<tr>
<th>Agency / Organization</th>
<th>Content</th>
<th>Summary of Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado</td>
<td>CAT Program</td>
<td>Includes mission, purpose, issues, objectives, priorities, and risks associated with the Connected and Autonomous Technology in Colorado.</td>
</tr>
<tr>
<td>Oregon</td>
<td>State of Oregon Task Force on Automated Vehicles</td>
<td>Describes:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Overview of automated vehicle technology and considerations that prompted the creation of the task force</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Task force membership, structure, and process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Elements of a permitting process for testing highly automated vehicles in the state and additional policy recommendations in each of the subcommittee areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Topics for further consideration identified by the task force</td>
</tr>
<tr>
<td>Washington DOT (WSDOT)</td>
<td>Cooperative Automated Transportation (CAT) Policy Framework</td>
<td>To achieve this vision, this policy framework sets shared expectations to guide and monitor technology implementation. The framework is intended to spur innovation and investment while improving safety, mobility, and transportation system efficiency.</td>
</tr>
</tbody>
</table>

[https://transportationops.org/CATCoalition/clearinghouse-cat-policy-frameworks](https://transportationops.org/CATCoalition/clearinghouse-cat-policy-frameworks)
WA State AV Workgroup
– Infrastructure and Systems Subcommittee

Activity #2:
• Develop project selection criteria
• Discuss potential funding approaches to enable the selection of near-term pilot deployment proposals and projects.
Activity #3:

Action 1

- Create opportunities for partnerships with industry, local partners, and others.
- Enhance collaboration with those who are self-certified to test autonomous vehicles in WA State via the Department of Licensing process.

Action 2

Examples of Current Efforts and Near-Term Pilot Opportunities
CAT in 2019 Target Zero Update

- Public comment period ends May 29th, 2019.

https://www.wtscppartners.com/tz-update
CAT technology has the potential to significantly reduce crashes caused by human error.

**Forward collision warning**
- 27% Front-to-rear crashes
- 20% Front-to-rear crashes with injuries
- 9% Claim rates for damage to other vehicles
- 16% Claim rates for injuries to people in other vehicles

**Forward collision warning plus autbrake**
- 50% Front-to-rear crashes
- 56% Front-to-rear crashes with injuries
- 13% Claim rates for damage to other vehicles
- 23% Claim rates for injuries to people in other vehicles

**Lane departure warning**
- 11% Single-vehicle, sideswipe and head-on crashes
- 21% Injury crashes of the same types

**Blind spot detection**
- 14% Lane-change crashes
- 23% Lane-change crashes with injuries
- 7% Claim rates for damage to other vehicles
- 8% Claim rates for injuries to people in other vehicles

**Rear automatic braking**
- 78% Backing crashes (when combined with rearview camera and parking sensors)
- 12% Claim rates for damage to the insured vehicle
- 30% Claim rates for damage to other vehicles

**Rearview cameras**
- 17% Backing crashes

**Rear cross-traffic alert**
- 22% Backing crashes

Source: Insurance Institute for Highway Safety and Highway Loss Data Institute (May 2018)
Mobility on Demand

- Carsharing: Provides members with access to a car for short-term use
- Bikesharing: Provides members with access to a bike for short-term use
- Ridesharing: Carpools, vanpools, and real-time ridesharing services
- TNCs and Taxis: Transportation Network Companies (TNCs) and Taxi Services
- Car Rental: Conventional Rental Car Services
- Real-Time Travel & Operations Data: Includes public agency and private sector traffic data
- Public Transportation: Public Bus, Light Rail, Heavy Rail and other Public Transport Services
- Integrated Payment: Allows users to pay for services using a smartphone app
- Incentives: Rewards and incentivizes users for good travel choices
- Smart Parking: Allows users to reserve and pay for parking using a mobile app
- Trip Planning & Navigation Services

Source: USDOT
“Good for human drivers today … Prepares for Automated Vehicles tomorrow”
Leveraging the Public Right of Way Asset

- Telecom Partnerships (Long Term Lease Agreements)
  - 5G small cell nodes
  - Fiber optic trunk lines
  - Smart City Applications
Questions? Suggestions? Thoughts?

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WSDOT CAT Program: https://www.wsdot.wa.gov/travel/automated-connected/home