Beyond Speculation
Automated Vehicles and Public Policy

Authors:
Paul Lewis
Stan Turner
Greg Rogers
About the Eno Center for Transportation

• Founded in 1921 by William Phelps Eno

• Only think tank focused on all modes of transportation, up and down the federalist chain with public, private, non-profit sectors

• The Digital Cities initiative explores how tech is changing transportation & how policy can drive innovation while also protecting the public interest
Agenda

- Certification, Liability, and Insurance
- Cybersecurity and Data Ownership
- Infrastructure and Funding
- Vehicle Connectivity
- Federal Safety Programs
- Environmental Programs
- Research Investment
- Workforce Development
<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
<th>Automated System Role</th>
<th>Human Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Automation</td>
<td>None</td>
<td>All driving functions of the vehicle</td>
</tr>
<tr>
<td>1</td>
<td>Driver Assistance</td>
<td>Features such as adaptive cruise control or lane centering to independently assist the driver</td>
<td>Responsible for all core driving functions</td>
</tr>
<tr>
<td>2</td>
<td>Partial Automation</td>
<td>Conducts some parts of the driving task, such as steering, acceleration, and deceleration</td>
<td>Responsible for monitoring the external driving environment and ready to take control with or without warning from the system</td>
</tr>
<tr>
<td>3</td>
<td>Conditional Automation</td>
<td>Performs most driving functions and monitors the driving environment. May request human driver to intervene for specific driving tasks</td>
<td>Must remain ready to take control and respond appropriately to the AV systems’ request to intervene</td>
</tr>
<tr>
<td>4</td>
<td>High Automation</td>
<td>Conducts all driving tasks and monitors the driving environment. However, can only operate in certain environments and designed for specific situations, such as a defined route shuttle. No steering wheel, pedals or shifting mechanisms required for a human driver</td>
<td>Human is present but does not need to take back control</td>
</tr>
<tr>
<td>5</td>
<td>Full Automation</td>
<td>Conducts all driving functions under all environments without a human driver</td>
<td>Human provides destination or navigation input but does not control the vehicle at any point. Designers may include features such as steering and speed control to allow human operator when system is not engaged</td>
</tr>
</tbody>
</table>

*Source: Adapted from SAE Levels of Automation*
## Expected Commercial Availability

<table>
<thead>
<tr>
<th>Organization</th>
<th>Year</th>
<th>Type of Organization</th>
<th>Automation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford Motor Company</td>
<td>2021</td>
<td>Vehicle Manufacturer</td>
<td>Level 4</td>
</tr>
<tr>
<td>Uber</td>
<td>2021</td>
<td>Transportation Network Company</td>
<td>Unspecified</td>
</tr>
<tr>
<td>Volvo</td>
<td>2021</td>
<td>Vehicle Manufacturer</td>
<td>Level 4</td>
</tr>
<tr>
<td>General Motors</td>
<td>2020</td>
<td>Vehicle Manufacturer</td>
<td>Unspecified</td>
</tr>
<tr>
<td>Tesla</td>
<td>2018</td>
<td>Vehicle Manufacturer</td>
<td>Level 3 or 4</td>
</tr>
<tr>
<td>Google</td>
<td>2020</td>
<td>Technology Company</td>
<td>Level 4</td>
</tr>
<tr>
<td>Victoria Transport Institute</td>
<td>2020-2030</td>
<td>Research Organization</td>
<td>Unspecified</td>
</tr>
<tr>
<td>National Association of City Transportation Officials</td>
<td>2020</td>
<td>Association</td>
<td>Level 4</td>
</tr>
<tr>
<td>IHS Markit</td>
<td>2020</td>
<td>Market Research Company</td>
<td>Level 4 and 5</td>
</tr>
<tr>
<td>ABI Research</td>
<td>2021</td>
<td>Market Research Company</td>
<td>Level 4 and 5</td>
</tr>
<tr>
<td>Juniper Research</td>
<td>2025</td>
<td>Market Research Company</td>
<td>Unspecified</td>
</tr>
</tbody>
</table>

Status of State Legislation Related to Automated Driving – April 2017

Source: National Conference of State Legislatures; The Center for Internet and Society; and individual state-legislatures

Created by: Ann Henebery / Eno Center for Transportation
Certification, Liability, and Insurance

• NHTSA should issue system certifications according to SAE levels automation

• State tort laws should align liability with the system certifications and designation of human vs. AV driving responsibilities

• Stakeholder working groups should oversee the development of laws
Cybersecurity and Data Ownership

- Ownership of the vehicle’s data should correspond to the operator of the vehicle
- AV industry must protect the privacy of vehicle owners
- AV developers should have limited liability for crashes resulting from a security breach
- Data sharing agreements should be established to enhance local transportation planning & operations
- States and cities should update laws that prohibit & punish any deceiving or disabling of AV communications
Infrastructure and Funding

- Congress should develop a VMT fee system on vehicles with non-human certification
- States and localities should invest in maintaining & repairing infrastructure
Vehicle Connectivity

• The FCC should maintain the existing spectrum for connected vehicles

• NHTSA should continue to work closely with the automotive industry on standards for V2V and V2I communications
Federal Safety Programs

- Congress should make AV technologies eligible for federal safety programs to improve transportation operations
Environmental Programs

- Congress should create a federal transportation discretionary grant program that targets projects that meet both environmental and accessibility goals.

- The potential impacts of AVs on regional transportation systems should be considered in long-range plans at all levels of government.

- States & cities should consider using pricing to mitigate negative externalities of AVs.
Research Investment

- States and cities should fund AV research programs at local universities
Workforce Development

- Federal, state, and local governments should work with academic institutions to retrain workers for jobs that may be lost to automation.
Questions

publicaffairs@enotrans.org

Twitter: @Enotrans (#EnoAV, #autonomous)
Upcoming Events

- May 11: @Microsoft Panel Discussion Driving Toward Tomorrow: A Conversation on Connected and Self-Driving Vehicles. REGISTER: tinyurl.com/kfrr8n7

- June 13: The Road to Autonomous and Electric Vehicles – with guest speaker David Somo, On Semiconductor. REGISTER: tinyurl.com/EnoOnSemi