Automated Vehicle Safety: Engaging Drivers and Law Enforcement

Webinar Wednesday, October 16, 2019 1:00 pm
Jim Hedlund, Highway Safety North
In the next 30 minutes

- The expert panel: why, who, what it did
- Brief background on AVs
- AV challenges
- Panel’s conclusions
- Panel’s recommendations
The expert panel

- Reasons for forming a panel
- Members of the panel
- Goals of the panel
Panel background: Why

- AVs are coming, some shuttles already operating
- Public lacks good information about AVs
- AV messaging often misleading or inaccurate
- Many states and law enforcement agencies not prepared for AVs
Panel background: Who

- Expert panel met May 8 in Washington
  - Federal government: NHTSA, FMCSA
  - States: SHSOs, AASHTO, AAMVA
  - Auto manufacturers
  - Lyft and Uber
  - Insurance
  - Law enforcement, criminal justice: IACP, NSA, NDAA
  - Traffic safety groups
  - Communications experts
Panel background: What

- Panel goals: for states, law enforcement, and criminal justice
  - Document the key issues AVs raise
  - Recommend what to do to prepare for AVs
- White paper summarizing the panel’s discussion and recommendations released August 6

Automated Vehicle Safety Expert Panel: Engaging Drivers and Law Enforcement

Available from GHSA
Brief background on AVs

- What’s an AV?
- How an AV works
- AV status in 2019
- AV deployment projections
What’s an AV?

- **Level 0**: no automation, driver in complete control
- **Level 1**: driver assistance
  - Cruise control or lane position, driver monitors at all times
- **Level 2**: occasional self-driving
  - Control both speed and lane position in limited situations, like Interstates; driver monitors at all times

1-2: Advanced Driver Assistance (ADAS); 3-5: Highly Automated (HAV)

- **Level 3**: limited self-driving in some situations, like Interstates
  - Vehicle in full control, informs when driver must take control
- **Level 4**: full self-driving under certain conditions
  - Vehicle in full control for entire trip, such as urban ride-sharing
- **Level 5**: full self-driving at all times
The AV begins with a map
Senses what’s around it
Predicts where things will move
And chooses route and speed
AV status 2019

- **Level 1 available for many years**
  - Adaptive cruise control, lane-keeping assistance

- **Level 2 available now**
  - BMW, GM, Mercedes, Tesla, VW, …

- **Levels 3-5 coming soon**
  - Waymo (Google) test fleet: 10 million miles as of October 2, 2019; another million miles every 40 days
  - 64 companies with AV testing permits in CA as of August 2019; 201 crashes as of October 10, 2019
  - By 2020: available (perhaps) from Audi, BMW, Ford, GM, Mercedes, Tesla, Toyota, Volvo, VW; Delphi, FCA, JLR, Lyft, NuTonomy, Uber, Waymo, …
AV status 2019

- 15 states and DC authorize on-road AV testing;
  10 states authorize deployment
- Extensive testing or deployment in at least 12 states
- AV shuttles operating in at least 9 states

  Colorado       New York
  Florida        Ohio
  Maryland       Rhode Island
  Michigan       Virginia
  Nevada
# AV projections

![Figure 5: Predictions of Sales, Vehicles on the Road, and Travel for Level 4 and 5 Vehicles](image)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Decade</th>
<th>Vehicle Sales</th>
<th>Vehicle Fleet</th>
<th>Vehicle Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large price premium</td>
<td>2020s</td>
<td>2.5%</td>
<td>1.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Moderate price premium</td>
<td>2030s</td>
<td>20-40%</td>
<td>10-20%</td>
<td>10-30%</td>
</tr>
<tr>
<td>Minimal price premium</td>
<td>2040s</td>
<td>40-60%</td>
<td>20-40%</td>
<td>30-50%</td>
</tr>
<tr>
<td>Standard feature on most new vehicles</td>
<td>2050s</td>
<td>80-100%</td>
<td>40-60%</td>
<td>50-80%</td>
</tr>
<tr>
<td>Saturation (everybody who wants it has it)</td>
<td>2060s</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Required for all vehicles on road</td>
<td>???</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Littman (2018)
AV projections

Autonomous Vehicle Fleet Projections
(as a percentage of all vehicles on the road)

2020’s: Large Price Premiums
(01%-02%)

2030’s: Moderate Price Premiums
(10%-20%)

2040’s: Minimal Price Premiums
(20%-40%)

2050’s: Standard on Most New Vehicles
(40%-60%)

Source: GHSA
The big takeaway

- AVs and DVs (driver-controlled vehicles) will share the road for a long time – perhaps forever
AV challenges

- For overall policy
- For states
- For the public
- For law enforcement
Policy challenge: new roles

- Traditional
  - Vehicle is a piece of hardware; changes slowly if at all (except wear and tear)
  - Driver completely responsible for operation
  - NHTSA regulates vehicles: FMVSS, defects
  - States regulate drivers: licensing, traffic laws and enforcement, liability

- Level 5 AVs
  - Vehicle is both hardware and software; can change overnight
  - Vehicle completely responsible for operations; no driver
  - NHTSA still regulates hardware
  - Who regulates software?
Policy challenge: new roles

- **Level 2-4 AVs**
  - Vehicle is both hardware and software; can change overnight
  - Vehicle and driver responsible for operations, sometimes jointly (Level 2), sometimes passing back and forth (Level 3 and perhaps 4)
  - NHTSA still regulates hardware
  - Who regulates operations?
State policy challenges

- Regulations for AV testing and deployment
- How to achieve consistency across states
- How to educate the public about AVs
Public challenges

- Limited knowledge of AVs: levels, compliance with traffic laws

<table>
<thead>
<tr>
<th>Current AVs</th>
<th>Human drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obey all traffic laws</td>
<td>Violate traffic laws daily</td>
</tr>
<tr>
<td>Strictly obey speed limits</td>
<td>Often exceed speed limit</td>
</tr>
<tr>
<td>Come to a complete stop at a</td>
<td>Often “roll through” stop signs</td>
</tr>
<tr>
<td>stop sign</td>
<td></td>
</tr>
</tbody>
</table>

- Need accurate and consistent information
Law enforcement challenges

- Identifying AVs on the road
- Communicating with AVs on the road
- AVs and traffic laws
- Access to AV data
- Crash reporting
- Crash liability
Expert panel conclusions

- The two most important ones
Broad conclusions

- AV issues are complex
- Addressing them will require
  - Clear, accurate, and honest information on AVs
  - Consistency across states on AV laws and regulations
  - Consistency across AV developers on how AVs operate
  - Cooperation to produce needed information, performance standards, and training
Expert panel recommendations

- For State Highway Safety Offices (SHSOs)
- For law enforcement and EMS
- For GHSA
For SHSOs & GHSA

▪ Promote AV technologies – Highly Automated Vehicles (HAVs) and Advanced Driver Assistance Systems (ADASs)

▪ Help develop a toolkit or library of AV information and messages agreed on by all stakeholders

▪ Continue to address current behavioral traffic safety problems
For SHSOs

- Understand how AVs fit into your mission
- Promote HAV testing and deployment; make it a priority
- Participate actively in state AV activities
- Build AV partnerships – other state organizations, law enforcement, AV and insurance industries, safety organizations
- Deliver AV information and messages
- Consider using a staff member as a single point of contact on AV issues
For law enforcement and EMS

- Establish priority for HAV testing and deployment
- Participate actively in state AV working groups
- Coordinate closely with HAV testing and deployment
- Establish HAV policies, procedures, and training
- Provide AV information to prosecutors and judges
- Establish a single law enforcement point of contact for AV issues
Questions

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Available at www.ghsa.org

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