Autonomous Vehicles Meet Human Drivers: Traffic Safety Issues for States

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Lifesavers
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Today

• **Background**
  - What’s an autonomous vehicle (AV)?
  - What’s on the road now?
  - What’s coming and when?
  - What does the public think about AVs?
  - What are current state laws on AVs?

• **Priorities for states**
  - AV testing
  - AV operations

• **What can states do now (and what shouldn’t they do)?**
• **What can national organizations do to help states?**
• **Questions**
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

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• 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
  ▪ Cruise control or lane position
What’s an AV?

Five Levels of Vehicle Autonomy

Level 0
No automation: the driver is in complete control of the vehicle at all times.

Level 1
Driver assistance: the vehicle can assist the driver or take control of either the vehicle’s speed, through cruise control, or its lane position, through lane guidance.

Level 2
Occasional self-driving: the vehicle can take control of both the vehicle’s speed and lane position in some situations, for example on limited-access freeways.

Level 3
Limited self-driving: the vehicle is in full control in some situations, monitors the road and traffic, and will inform the driver when he or she must take control.

Level 4
Full self-driving under certain conditions: the vehicle is in full control for the entire trip in these conditions, such as urban ride-sharing.

Level 5
Full self-driving under all conditions: the vehicle can operate without a human driver or occupants.

Source: SAE & NHTSA
What’s on the road now?

• Level 1 available for many years
  ▪ Cruise control, electronic stability control, lane-keeping assistance

• Level 2 available now
  ▪ Tesla Autopilot

• Level 3-5 being tested extensively
  ▪ Google test fleet: 2 million miles
  ▪ Uber in Pittsburgh
  ▪ 33 companies worldwide working on some aspect of AVs
What’s coming and when?

• Level 3-5 vehicles available commercially in 3-5 years
  ▪ Tesla – current Autopilot has Level 5 software
  ▪ Volkswagen – predicts 2019
  ▪ GM, Toyota – predict 2020
  ▪ Ford – predicts 2021
What’s coming and when?

**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
What does the public think about AVs?

- **Skeptical**
  - Prospect of wide use? 34% excited, 57% worried
  - Will AVs reduce crashes? 35% yes, 46% no
  - Would you ride in an AV today? 17% yes, 75% no
  - Would you buy an AV when available? ≈ 20% yes, ≈ 50% no

- **Prefer AVs that allow drivers to take control**
  - Over 80% in two surveys

5 surveys (4 in 2016 and 1 in 2015), 4 in US and 1 in Canada
What are current state laws?

• AVs probably can operate in most states without law changes

• AV laws in place in 9 states and DC
  ▪ CA, DC, FL, NV: testing and operations
  ▪ MI, UT: testing
  ▪ LA: defines AV, ND authorizes a study, TN establishes certification,
    VA allows viewing a visual display in autonomous mode

• AV executive orders in 2 states
  ▪ AZ executive order: testing and operations
  ▪ MA executive order: testing
State AV priorities - testing

Encourage AV testing while protecting public safety

• Some considerations
  ▪ How and where testing will be conducted
  ▪ Test driver selection and training
  ▪ Test vehicle identification
  ▪ Reporting: overall, incidents, crashes
State AV priorities - operations

Encourage AV operations while protecting public safety
- AV certification
- AV registration and titling
- AV drivers
- Laws on AV operations
- Law enforcement
- Crashes: emergency response, crash investigation
- Data systems: how to identify AVs
- Liability and insurance
- Vehicle inspection
- Coordination across states
What can states do?

• Be informed; stay informed

• Be a player
  ▪ Join or start a state AV task force
  ▪ Work with other states to develop consistent laws, policies, procedures

• Understand state roles
  ▪ Federal role: regulate vehicles
  ▪ State roles: license vehicles and drivers, establish and enforce traffic laws, vehicle insurance and liability

• Don’t rush to establish AV laws or regulations
  ▪ Aim for consistency across states

• Be flexible
  ▪ AVs are disruptive technology, developing very quickly
What can national organizations do?

• Develop model AV laws and regulations
• Document the traffic safety issues of AVs
• Develop model public education materials
• Establish an AV information clearinghouse
• Issue vehicle regulations and guidance promptly
• Establish regulations or guidelines to identify AVs easily
• Involve law enforcement, SHSOs, and DMVs in AV discussions
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Download the report:  www.GHSA.org