SUBCOMMITTEE ON LAW ENFORCEMENT AND CRASH REPORTING

Consensus Items from First Subcommittee Meeting

Reporting Requirements
- The subcommittee agreed to refer post-testing reporting requirements to the Subcommittee on Licensing and Registration

Safety Requirements
- The subcommittee agreed that this area should be handled by the National Highway Traffic Safety Association (NHTSA) and did not need to be addressed in this subcommittee

Traffic Law and Driver Responsibilities
- The subcommittee agreed that current seatbelt and impaired driving laws do not need to be changed when considering AV testing and deployment
- The subcommittee decided that minimum age laws for riding in a vehicle should be addressed in the Subcommittee on Licensing and Registration

Considerations for Law Enforcement and Crash Reporting

Goals and Values
- Ensure the safety of all road users, including pedestrians, bicyclists, and motorcyclists
- Ensure safety for law enforcement officers and first responders
- Promote law enforcement and first responder understanding of legal, technical, and administrative requirements/limitations of automated technology
- Promote social equity

Topics

Traffic Laws and Driver Responsibilities
- Ensuring that automated vehicles can adhere to laws across various jurisdictions
- Establishing safe following distances
- Enforcing automated ride-hailing fleets use of pick-up and drop-off zones
- Roles and responsibilities of various users of automated vehicles
- Minimum age requirements for various users of automated vehicles
- Other driver responsibilities (e.g., ensuring passengers wear seatbelts)
- Impaired driving
• Distracted driving

Law Enforcement and First Responder Engagement
• Vehicle response to an automated incident or direction from law enforcement (e.g., alerting emergency responders, displaying insurance and registration information, etc.), both with and without a human in the vehicle
• Clear direction to law enforcement on how to interact with automated vehicles
• Autonomous mode identification and understanding of how to engage and disengage autonomous mode during or after an incident
• Ability of law enforcement to override vehicles
• First responder safety
• ‘At fault’ assignment

Crash and Incident Reporting
• Event data recorders to record information shortly before and after an incident
• Vehicle data recording duration (i.e., how much should be recorded)
• What data or events should be recorded
• What data or events inside the vehicle should be recorded? (e.g. in a ride-hailing fleet vehicle)
• Consistency in format of vehicle data
• Retention and access to incident or vehicle data
• Retention and access to app data for automated ride-hailing services
• Distinction between public and private data, e.g. intellectual property

Questions for Law Enforcement and Crash Reporting

Law Enforcement and First Responder Engagement
• Should automated vehicles be clearly identifiable, and if so, how? (See Memo on Vehicle Identification and Distracted Driving)
  o AAMVA recommends requiring permanent labeling on the rear and sides of highly automated vehicles (6.10)
  o How will first responders discern a vehicle’s level of automation in order to determine who to hold responsible for violations?
• Should law enforcement be able to override an automated vehicle that poses a danger, and if so how?

Crash and Incident Reporting
• Should manufacturers and other testing entities be required to report crashes and other incidents?
  o AAMVA recommends requiring a summary of the manufacturer’s analysis of the incident (6.1.1)
o How could Oregon leverage existing crash reporting systems and structures for this purpose?

- What information should be required in a crash report?
  o AAMVA recommends adopting US DOT’s Model Minimum Uniform Crash Criteria, 5th edition, which include guidance for collecting information on automated vehicle crashes. (6.1.2)
  o California has a standard crash report form that manufacturers are required to complete in the event of a crash.

- Should automated vehicles be required to use event data recorders (i.e. “black boxes”) to record data shortly before and after a crash?
  o If so, how much time before and after a crash should the vehicle record?
  o How should manufacturers make this data available to law enforcement? For example, AAMVA recommends that manufacturers should make this data retrievable in a standard, nonproprietary format for read access. (MOE 7)
  o Should manufacturers include time stamp and GPS location in this data? (MOE 8)

- What data would law enforcement need to access after a crash or incident?
  o What data should automated vehicles be required to retain and for how long?
  o Who can access that data and how? How can we ensure consistency and readability of the data?
  o For ride-hailing fleet vehicles, will law enforcement need access to data from the ride-hailing apps?
  o Does making certain data accessible to law enforcement raise consumer privacy or intellectual property concerns?

Adherence to Traffic Laws

- Should manufacturers be required to ensure automated vehicles are aware of and able to comply with all Oregon traffic laws?
- Should test users be held responsible for violating existing traffic laws? (6.4.3)
- Should automated vehicles be subject to additional requirements regarding operation in safety or construction zones?
- Should jurisdictions wait to modify current traffic laws specifically to accommodate SAE Level 5 vehicles until they are further along in development? (6.11.2)
- Should safe following distance laws be different for automated vehicles?

Driver Responsibilities

- Distracted Driving
  o At what level of automation will distracted driving laws apply? (6.3.1) (See Memo on Vehicle Identification and Distracted Driving)
  o How will law enforcement determine if a person is driving distracted or if the vehicle is operating autonomously? (AAMVA Recommendation 13 for Manufacturers and Other Entities [MOE])
MEMORANDUM

To: Subcommittee on Law Enforcement and Crash Reporting, Oregon Task Force on Autonomous Vehicles
From: ODOT Staff
Date: July 25, 2018
Re: Response to Subcommittee Research Request

Introduction
At the first meeting of the Subcommittee on Law Enforcement and Crash Reporting on June 6, 2018, the Subcommittee requested that ODOT staff conduct research on law enforcement and crash reporting requirements for autonomous vehicle (AV) policies in other states and in automated vehicle policy guidance from the American Association of Motor Vehicle Administrators (AAMVA). This memo communicates the results of that research.

Background: Model Minimum Uniform Crash Criteria
The National Highway Traffic Safety Administration (NHTSA) produces and updates the Model Minimum Uniform Crash Criteria (MMUCC) with input from traffic safety experts and stakeholders from around the country. The MMUCC serve as a guideline for states in developing their crash data and collection policies. The 5th edition of MMUCC (2017) includes a new category, “Dynamic Data Elements.” These elements are so named because they “are either in such a state of flux or so new to the evolving discipline in acquisition they cannot yet be measured reliably.” The only Dynamic Data element included in the 5th edition report is motor vehicle automation. The report recommends, “states should consider the following when adopting this dynamic data element:

- Automated vehicle technologies and associated guidance—including the SAE standard referenced in the data element—are fluid and expected to change.
- Collecting information about vehicle automation is difficult because (a) law enforcement considers collecting this data through observation unreliable at best and (b) a centralized database on vehicle automation does not yet exist.”

Results
The subcommittee discussed law enforcement training and engagement and elements of law enforcement interaction plan at the June 21, 2018 meeting. The tables below compare jurisdictional requirements related to 1) response to a crash or law enforcement without a human driver in the vehicle and 2) information required in crash or incident reports. The tables indicate what elements are required in each of the AV regulations recommended by AAMVA, NHTSA, and from various states.

The states included in the tables below are those that have AV-specific crash reporting requirements. A few states explicitly acknowledge in legislation that AVs are subject to the same crash reporting requirements as conventional vehicles, in addition to any AV-specific crash reporting requirements. To avoid confusion, such requirements are not included in the tables below; in many states, AVs are required to comply with the conventional vehicle code unless otherwise noted, and these states therefore do not need to positively affirm the applicability of conventional crash reporting requirements.
### Response to a Crash or Law Enforcement without a Human Driver in the Vehicle

<table>
<thead>
<tr>
<th>In the event of a crash, the vehicle or the operator/owner must contact law enforcement</th>
<th>NHTSA</th>
<th>Calif.</th>
<th>Mich.</th>
<th>North Carolina</th>
<th>Georgia</th>
<th>Tenn.</th>
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<td>✅</td>
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</table>

| If appropriate, vehicle or owner/operator must promptly call for medical assistance | | | | | | ✅ |
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<thead>
<tr>
<th>In the event of a reportable crash, the vehicle must remain at the scene until law enforcement arrives and vehicle registration and insurance information is provided</th>
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<th>In the event of a non-reportable crash, the vehicle must remain at the scene until registration and insurance information have been provided to affected parties</th>
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</table>

| Must have a process to display or communicate vehicle owner or operator information | | | | ✅ | | |
|---|---|---|---|---|---|

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1. Michigan requires that any vehicle participating in a SAVE project, a pilot project for AV fleets, be equipped with automatic crash notification technology.
Automated Vehicle Crash Report Requirements and Information

<table>
<thead>
<tr>
<th></th>
<th>AAMVA</th>
<th>California</th>
<th>Nevada</th>
<th>Michigan</th>
<th>Mass.¹</th>
</tr>
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<tbody>
<tr>
<td>Must report crashes that result in</td>
<td>✓ 2</td>
<td>✓</td>
<td>✓ 3</td>
<td>*</td>
<td>✓</td>
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<td>the damage of property or bodily</td>
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<td>injury to DMV</td>
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<td>Must report citations for violation</td>
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<td>of laws</td>
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<td>Report must include the SAE level</td>
<td>✓</td>
<td>✓</td>
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<td>of automation</td>
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<td>Report must indicate whether</td>
<td>✓ 4</td>
<td>✓</td>
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<tr>
<td>autonomous technology was engaged</td>
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<tr>
<td>Report must include names and</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>current addresses of all persons</td>
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<td>involved</td>
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<tr>
<td>Report must include full description</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>of how crash occurred</td>
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1. While Massachusetts lays out some requirements for testing of AVs in its application form, it also requires manufacturers or other testing entities to enter into a Memorandum of Understanding (MOU) with the Massachusetts Department of Transportation before the application can be approved. Additional requirements may be imposed in the MOU, but MOUs by their nature may vary. The requirements listed in this column come from Massachusetts’ “Template Memorandum of Understanding for AV Testing.”

2. AAMVA recommends adopting US DOT’s Model Minimum Uniform Crash Criteria (MMUCC), 5th Edition, which includes guidance for collecting information on AV crashes. MMUCC recommends adding 3 data elements to crash reports: 1) whether or not automation systems exist in the vehicle; 2) the level of automation of the vehicle from 0 to 5 corresponding with SAE levels of automation; and 3) the level of the automated system engaged at the time of the collision.

3. In Nevada, the property damage must exceed $750.

4. US DOT’s Model Minimum Uniform Crash Criteria recommends indicating the SAE level of automation of the technology engaged at the time of the crash.

* Michigan requires manufacturers participating in an AV fleet pilot project to “maintain incident records and provide periodic summaries related to the safety and efficacy of travel of the participating fleet to the department and the National Highway Traffic Safety Administration.”
MEMORANDUM

To: Law Enforcement and Crash Reporting Subcommittee, OR Task Force on Autonomous Vehicles
From: ODOT Staff
Date: July 25, 2018
Re: Response to Subcommittee Research Request

Introduction
At the second meeting of the Subcommittee on Law Enforcement and Crash Reporting on June 21, 2018, the subcommittee requested more information about crash data reporting requirements in other states. ODOT staff identified event data records (EDRs) as an important aspect of crash data reporting. This memo communicates the result of ODOT staff’s research into other states’ automated vehicle (AV) legislation that addresses EDRs.

Background: Event Data Recorders
The purpose of an EDR is to collect data during crashes. EDRs have been common in passenger motor vehicles since the 1990s. Today, as many as 96 percent of new vehicles come equipped with EDRs, according to the National Highway Traffic Safety Administration (NHSTA). EDRs are especially valuable for determining fault in negative events, including for insurance purposes. In 2012, NHTSA proposed requiring EDRs in all vehicles, but that proposal was not realized. NHTSA does regulate what information should be collected by an event data recorder if one is present.

Background: Task Force Recommendation
The Task Force on Automated Vehicles voted on July 12, 2018 to adopt the following recommendation from the Subcommittee on Insurance and Liability:

For automated vehicle testing, preserve and store some form of standardized, non-proprietary recorded data from a crash or incident involving an automated vehicle for the duration of the applicable statutes of limitation. Data should be capable of being shared with law enforcement, government entities, or parties involved in an incident, subject to appropriate legal process.

Scope
This memo compares the EDR requirements in AV legislation in California, Michigan, Massachusetts, Nevada, and Texas. These states were chosen because their AV legislation or policy has requirements specific to event data recorders. This memo also compares the recommendations of the American Association of Motor Vehicle Administrators (AAMVA) and NHSTA.

Results
The table below indicates what EDR elements are required in each of the AV legal frameworks from AAMVA, NHTSA, California, Michigan, Massachusetts, Nevada, and Texas.

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<tbody>
<tr>
<td>Certify that the AV is equipped with an EDR for testing</td>
<td>✔</td>
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<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td>Certify that the AV is equipped with an EDR for deployment</td>
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<td>✔</td>
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<tr>
<td>EDR must capture and store data for a specified time before and after a crash</td>
<td>30 seconds</td>
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<td>30 seconds</td>
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<tr>
<td>Data must be recorded specially for crashes when autonomous driving mode is engaged</td>
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<td>✔</td>
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<td>✔</td>
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<tr>
<td>Data must include autonomous technology sensor data</td>
<td>✔</td>
<td>✔</td>
<td>*3</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Data captured must include speed, direction, and location</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Data must be in a read-only format</td>
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<tr>
<td>Data must be assessable and easily retrieved</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Data must be stored for a specified period of time after the crash</td>
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<td>✔</td>
<td>✔ 3 years</td>
<td>✔</td>
<td>✔ 3 years</td>
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</table>

1. Michigan requires event data recorder in vehicles participating in “SAVE Programs.” These allow manufacturers to operate on-demand fleets, but still fall within the realm of testing.
2. In their draft Memorandum of Understanding (MOU), Massachusetts requires a test vehicle without a human driver to capture and record data to enable “post-drive analysis.”
3. Michigan requires an event data recorder to “record the automated driving system’s status.”
MEMORANDUM

To: Subcommittee on Law Enforcement and Crash Reporting, Oregon Task Force on Autonomous Vehicles
From: ODOT Staff
Date: July 25, 2018
Re: Response to Subcommittee Research Request regarding California Requirements

Introduction
At the second meeting of the Subcommittee on Law Enforcement and Crash Reporting on June 21, 2018, the Subcommittee requested that ODOT staff reach out to contacts at California’s automated vehicle program and make inquiries on behalf of the Subcommittee. The Subcommittee had questions regarding:

1) Whether it would be possible to see an example of a law enforcement and first responder interaction plan; and
2) How law enforcement might be able to “recognize whether a vehicle is in autonomous mode,” per California’s regulations on law enforcement and first responder interaction plans.¹

Results
ODOT staff contacted the Deputy Director of California’s Department of Motor Vehicles (DMV), Bernard Soriano, who provided information and clarification regarding the Subcommittee’s inquiries. The meeting took place via conference call on July 3, 2018.

1) Example of a law enforcement and first responder interaction plan

California only requires that manufacturers submit a law enforcement and first responder interaction plan if they intend to “conduct testing of autonomous vehicles capable of operating without the presence of a driver inside the vehicle on public roads.”² California allowed testing of automated vehicles without a human driver inside the vehicle beginning April 2, 2018, and had received permit applications from two companies as of July 3, 2018. Both of those companies submitted law enforcement and first responder interaction plans as part of their applications.

California DMV is working with the California Highway Patrol to vet the interaction plans and ensure the information provided is sufficient for law enforcement and first responders to carry out their duties. For example, the interaction plans did not include enough information about how to safely remove the automated vehicle from the roadway. California DMV is working with the manufacturers to establish a simple, straightforward standard going forward.

² Ibid.
The law enforcement and first responder interaction plans will be available to law enforcement agencies and other first responders, but will not be made accessible to the public as manufacturers expressed concern that the information could be misused if widely available. Therefore, no examples of interaction plans could be provided.

2) **Example of how to recognize whether a vehicle is in autonomous mode**

California’s law enforcement and first responder interaction plan requires manufacturers to provide information on “how to recognize whether the vehicle is in autonomous mode, and if possible how to safely disengage the autonomous mode.” California’s requirement is deliberately non-specific to allow manufacturers flexibility in the design of their system. Therefore, the regulations do not stipulate how the vehicle must indicate to law enforcement that it is in autonomous mode.

The interaction plan is only required for testing without a human driver inside the vehicle, which was permitted in California starting April 2, 2018. As of July 3, 2018, no manufacturer had yet begun driverless testing in California and therefore no examples could be provided.

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3 Ibid.
Oregon State Police Crash Reconstructionists: Automated Vehicle Data Needed for Crash Reconstruction

Background:

Capt. Bloom gathered information about crash reporting data from four Crash Reconstructionists with the Oregon State Police. The Crash Reconstructionists identified what data from an automated vehicle (AV) would be useful to them in assessing and reconstructing a crash. Their responses are copied below.

Responses:

1. Although I have never investigated a collision involving an autonomous vehicle, all of the same information would need to be collected as other investigations with the exception of the driver’s info. (Concerned on what this would look like)

2. As far as AV’s (again depending on the complexity of the case) I would collect all the same info as if it were a non-AV except you don’t get a ‘drivers statement.’ More importantly in these cases would be EDR (event data recorder) data if available.

3. An analysis of vehicle damage, to include contact and induced damage; examinations of tires, lights, seatbelts, interior damage (blood evidence), and electronic data such as event data recorders.

4. The list of required data is going to be extensive since the vehicle is going to be receiving a variety of sensor data, interpreting, and reacting. Since uncorroborated data means nothing, we will request access to all available input data and the action sequence the onboard or a remote computer executed leading up to the event. My big question has always been where is the data going? Will a complete record remain in the onboard “hard drive” or will it be transmitted? If it is local will the Bosch CDR kit be able to access the data? Will there be an alternate forensic pass-through device that will be available to LE to access the data? If it is transmitted, where is it going and how could I get a preservation letter in place to make sure that it remains intact pending a warrant? There are a ton of fascinating questions that come with this. Since there is not a “driver,” who has the protected privacy interest? Would we request consent from the manufacturer? Is there a potential for the system software, sensors, or GPS to be wirelessly hacked? How will LE be able to prove that software was uncorrupted?