Autonomous Vehicles in California

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Deputy Director – Chief Counsel
California Department of Motor Vehicles
California Vehicle Code Section 38570

- As soon as practicable, but no later than January 1, 2015, DMV must adopt regulations setting forth requirements for:
  - Manufacturers’ testing of autonomous vehicles on public roadways
  - Regulations effective September 2014
  - Operation of autonomous vehicles on public roadways
Requirements for a Testing Permit

- $5 million in insurance, bond, or self-insurance
- Manufacturer has tested vehicle under controlled conditions that simulate, as closely as practicable, the real world conditions and has reasonably determined it is safe to operate the vehicles on public roads under those conditions
- Test driver requirements:
  - No DUI, not an at-fault driver, and no more than 1 point
  - Successful completion of test driver training program
  - Employee, contractor, or designee of manufacturer
- Test driver must be seated in driver seat during testing
- Report any accident within 10 days
- Report unanticipated disengagements of autonomous technology annually
- Testing permit valid for one year
- Vehicles excluded from testing: Commercial vehicles that are > 10,000 lbs GVW and motorcycles
Approved Testing Permits

- 2 test vehicles + 28 test drivers
- 5 test vehicles + 20 test drivers
- 73 test vehicles + 230 test drivers
- 2 test vehicles + 10 test drivers
- 8 test vehicles + 5 test drivers
- 2 test vehicles + 18 test drivers
- 2 test vehicles + 23 test drivers
- 7 test vehicles + 27 test drivers
- 1 test vehicle + 2 test drivers
- 1 test vehicle + 2 test drivers
- 2 test vehicles + 5 test drivers

Totals: 105 vehicles + 370 drivers.
Reports of Accidents

- A manufacturer whose autonomous vehicle is in any manner involved in an accident originating from the operation of the autonomous vehicle on a public road that resulted in the damage of property or in bodily injury or death shall report the accident to the department within 10 days after the accident.

- Reports are on DMV website:
  https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/autonomousveh_ol316

- Number of reports – 11
  - Google: 9 reports
  - Cruise: 1 report
  - Delphi: 1 report
**REPORT OF TRAFFIC ACCIDENT INVOLVING AN AUTONOMOUS VEHICLE**

**Instructions:** Please print within the spaces and boxes on this form. If you need to provide additional information on a separate piece of paper(s) or you include a copy of any law enforcement agency report, please check the box to indicate "Additional Information Attached."

- Write "unk" (for unknown) or none in any space or box when you do not have the information on the other party involved.
- Give insurance information that is complete and which correctly and fully identifies the company that issued the insurance policy or surety bond, or whether there is a certificate of self-insurance.
- Place the National Association of Insurance Commissioners (NAIC) number for your insurance or surety company in the boxes provided. The NAIC number should be located on the proof of insurance provided by your company or you can contact your insurer for that information.
- Identify any person involved in the accident (driver, passenger, bicyclist, pedestrian, etc.) that you saw injured or complained of bodily injury or know to be deceased.
- Record in the PROPERTY DAMAGE line any damage to telephone poles, tollbooth, street signs, guard post, trees, livestock, dogs, buildings, parked vehicles, etc., including a description of the damage.
- Once you have completed this report, please mail to: Department of Motor Vehicles, Occupational Licensing Branch, P.O. Box 942942, MS. LS34, Sacramento, CA 942942-9420.

**SECTION 1 — MANUFACTURER'S INFORMATION**

<table>
<thead>
<tr>
<th>MANUFACTURER NAME</th>
<th>Google Auto LLC</th>
</tr>
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<tbody>
<tr>
<td>MANUFACTURER ID</td>
<td>GV1000</td>
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<tr>
<td>STREET ADDRESS</td>
<td>1660 Amphitheater Plw</td>
</tr>
<tr>
<td>CITY</td>
<td>Mountain View</td>
</tr>
<tr>
<td>STATE</td>
<td>CA</td>
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<td>ZIP</td>
<td>94043</td>
</tr>
</tbody>
</table>

**SECTION 2 — ACCIDENT INFORMATION**

| DATE OF ACCIDENT | 06/27/2002 |
| ACCIDENT LOCATION | Mountain View |
| CITY              | CA |
| ZIP               | 94040 |
| TIME              | 6:00 AM |
| WEATHER           | Clear |
| ROAD CONDITIONS   | Dry |
| VEHICLE IN ACCIDENT | Moving |
| VEHICLE INVOLVED IN ACCIDENT | Left  |
| WEATHER IN ACCIDENT | Rain |
| ROAD CONDITIONS IN ACCIDENT | Wet |

**SECTION 3 — OTHER PARTY'S INFORMATION**

| VEHICLE YEAR | 2015 |
| VEHICLE MODEL | ATTY 5G |
| VEHICLE NUMBER | 2015ATL045 |
| STATE NUMBER | 4 | |
| STATE | CA |
| NUMBER OF VEHICLES INVOLVED | 2 |
| PARTICIPANTS | Driver |
| VEHICLE IN ACCIDENT | Moving |
| VEHICLE INVOLVED IN ACCIDENT | Left |

**Additional information attached.**
Sample Accident report (continued)

SECTION A - INJURY/DEATH, PROPERTY DAMAGE

SECTION B - VEHICLE INFORMATION

SECTION C - ACCOUNTABLE PERSON

SECTION D - PROPERTY INFORMATION

SECTION E - ACCIDENT DETAIL'S DESCRIPTION

SECTION F - CERTIFICATION

Additional information attached.
Reports of Disengagement

• A manufacturer shall retain data related to the “disengagement” of the autonomous mode.

• “Disengagement” means a deactivation of the autonomous mode when a failure of the autonomous technology is detected or when the safe operation of the vehicle requires that the autonomous test driver disengage the autonomous mode and take immediate manual control of the vehicle.

• Annual report – covering December 1 to November 30, due by January 1.

• 7 companies were required to report. (on our web site: https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/disengagement_report)
Reporting Disengagement

• Bosch reported 625 disengagements in 935 miles driven.
• Delphi reported 405 disengagements in 16,662 miles driven.
• Google reported 341 disengagements in 424,331 miles driven.
• Nissan reported 106 disengagements in 1,485 miles driven.
• Mercedes-Benz reported 967 disengagements in 1,337 miles driven.
• Tesla Motors reported zero disengagements (No testing on public streets)
• Volkswagen reported 260 disengagements in 14,945 miles driven.
Reasons for Disengagement

- Weather conditions during testing
- Software discrepancy
- Unwanted maneuver of the vehicle
- Traffic Light Detection – poor sun conditions
- Construction Zone
- Other unexpected driver behavior
- Driver was uncomfortable
- Technology evaluation management
Reasons for Disengagement

• “There were 69 events across our fleet in which safe operation of the vehicle required the disengagement by the driver... of the 69 reportable safe operation events, 13 were ‘simulated contacts’ – events in which, upon replaying the event in our simulator, we determined the test driver prevented our vehicle from making contact with another object.”

• “In 10 of the 13 simulated contact events, the SDC’s (self-driving car) predicted behavior would have, in simulation, caused contact... in these cases, we believe a human driver could have taken a reasonable action to avoid the contact but the simulation indicated the SDC would not have taken that action.” Google Report on disengagements (emphasis added)
Draft Deployment Regulations

- Maintain $5 million in bond, insurance, or self-insurance
- Identify if vehicle is capable of operating without a driver inside
- Certify that autonomous technology meets and does not make inoperative any FMVSS
- Certify that autonomous vehicle has:
  - Mechanism to easily engage/disengage autonomous technology
  - Visual indicator that autonomous technology is engaged
  - System to alert the operator when a failure of the autonomous technology is detected
  - Separate mechanism to record sensor data 30 seconds prior to collision
Draft Deployment Regulations

• Identify all areas where the vehicle can operate autonomously and certify it is incapable of operation outside those areas.

• Identify commonly occurring restrictions on operation (snow, fog, rain, construction zones)

• Identify what the vehicle will do if the autonomous technology fails

• Certify that the AV technology will obey traffic laws
Third Party Demonstration Test

• Certifications made by the manufacturer are validated by a third-party testing organization that is independent from the manufacturer.

• The third-party testing organization will conduct a vehicle demonstration test and provide an independent verification of the vehicle’s ability to perform key driving maneuvers typically encountered in real world driving conditions.
Provisional Deployment Permit

• The Permit will be initially issued with a three year term.

• Vehicles can only be operated by the manufacturer or made available to the public on a lease basis.

• Manufacturers will be required to submit reports on the performance, safety, and usage of the vehicles.

• Manufacturers will still be required to report accidents that occur while the vehicle is in autonomous mode.

• Manufacturers will be required to report any safety-related defects in the autonomous technology.
Privacy and Cyber-Security

• Information Privacy – disclosure to operator of the information that is collected that is not necessary for safe operation of the vehicle and written approval to collect this information.

• Cyber Security – certification that the vehicles are equipped with self-diagnostic capabilities to detect unauthorized commands, alert the operator, and allow the operator to override spurious commands.
Public Workshops on Draft Regulations

- Government Code Section 11346.45: to increase public participation and improve the quality of regulations, state agencies shall involve parties who would be subject to the proposed regulations in public discussions regarding those proposed regulations, when they involve complex proposals.

- 1st workshop held on January 27, 2015 – prior to a draft text.

- 2nd workshop in Sacramento on January 28, 2016, to discuss the draft regulation.

- 3rd workshop in Los Angeles on February 2, 2016, to discuss the draft regulation.
What happened at the Workshops

• Attendees included: advocates for the disabled, OEM’s, auto industry trade associations, consumer advocates, local government representatives, the media, members of the public.

• Concern that requiring a driver will impede the development of the technology and prevent the disabled from enjoying the promise of mobility and independence.

• The U.S. relies on self certification and a rigorous NHTSA recall process – the third party demonstration test is not the way we do things.

• The regulations are ambiguous because they don’t establish the standards that the third party tester will use.

• Why limit the deployment to just leasing the vehicles?

• The data that companies collect and are required to report could be sensitive trade secrets.
The Autonomous Technology is the Driver

• NHTSA Letter to Google
  – “If no human occupant of the vehicle can actually drive the vehicle, it is more reasonable to identify the driver as whatever (as opposed to whoever) is doing the driving. In this instance, an item of motor vehicle equipment, the SDS, is actually driving.
  – “An interpretation may not... make a substantive change to the statutory or regulatory regime or the clear language of a provision... an interpretation may not adopt a new position that is irreconcilable or repudiates existing statutory or regulatory provisions.
Items that don’t meet FMVSS

• “FMVSS No. 135 contains requirements for service brakes... Among these requirements is S5.3.1, which states that service brakes shall be activated by means of foot control... The fact that the SDS may be programmed to perform the tests enumerated in FMVSS 135 does not overcome the plain language of S5.3.1.”

• “the fact that the SDS may be programmed to cancel the turn signal and switch the headlamp beams does not overcome the (other) plain language of S9.1.1... that provision requires that the turn signal be capable of cancellation by a manually operated control.”
What’s next for California?

• Review comments received from the workshop.
• Prepare a proposed regulation to be formally noticed.
• Commence the official rulemaking process.
Questions

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