



California's Autonomous Vehicles Testing Program

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Why Autonomous Vehicles?

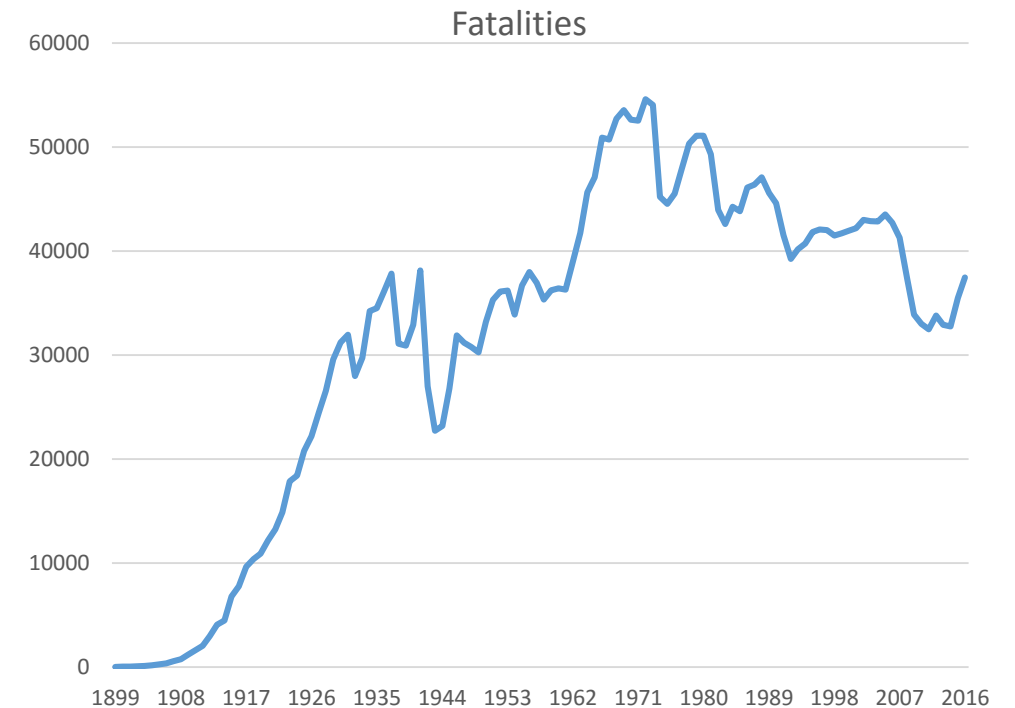
Safety

- 37,461 people killed in crashes on U.S. roadways (2016)
 - 30% of fatalities attributed to alcohol-impaired driving
 - 10% because of distracted driving
 - 27% due to speeding-related crashes
 - 18% were non-occupants (pedestrians, cyclists, etc.)
- Estimated that 94% of fatalities due to human choice
- ~7K injured per day

Mobility

Efficiency (Time, resources, traffic flow, land use, etc.)

Source: NHTSA National Center for Statistics and Analysis



California Senate Bill 1298 (2012)

Vehicle Code §38750

- Develop regulations setting forth requirements for
 - Manufacturer's **testing** of autonomous vehicles on public roadways
 - **Operation** of autonomous vehicles on public roadways
- Ensure the safe operation on public roadways, with or without the presence of a driver



California's Definition of Autonomous Vehicle

“Autonomous technology”: technology that has the capability to drive a vehicle without the active physical control or monitoring by a human operator.

“Autonomous vehicle”: any vehicle equipped with autonomous technology that has been integrated into that vehicle.



Autonomous Vehicle Steering Committee



Regulatory Process

- Meet with manufacturers and interest groups
- Meet with USDOT, other States, and foreign countries
- Participate in working groups (NGA, NCSL, AASHTO, AAMVA, etc.)
- Public workshops
- Draft & revise regulations
- Seek public comment
- Public hearings
- Office of Administrative Law
- Approval!



Regulations Summary: Testing with a Driver



- \$5 million in insurance, bond, or self-insurance
- 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
 - > 10,000 lbs GVW
 - Motorcycles



Approved Testing Permits Today (56 current)



Approved Testing Permits Today (56 current)

- | | | |
|-------------------------------------|--|---------------------------------|
| 1. Volkswagen Group of America | 21. AutoX Technologies Inc | 41. Voyage |
| 2. Mercedes Benz | 22. Subaru | 42. CYNGN, Inc |
| 3. Waymo LLC | 23. Udacity, Inc | 43. Roadstar.Ai |
| 4. Delphi Automotive | 24. Navya Inc. | 44. Changan Automobile |
| 5. Tesla Motors | 25. Renovo.auto | 45. Lyft, Inc. |
| 6. Bosch | 26. UATC LLC | 46. Phantom AI |
| 7. Nissan | 27. PlusAi Inc | 47. Qualcomm Technologies, Inc. |
| 8. GM Cruise LLC | 28. Nuro, Inc | 48. aiPod, Inc. |
| 9. BMW | 29. CarOne LLC | 49. SF Motors Inc. |
| 10. Honda | 30. Apple Inc. | 50. Toyota Research Institute |
| 11. Ford | 31. Bauer's Intelligent Transportation | 51. Apex.AI |
| 12. Zoox, Inc. | 32. Pony.AI | 52. Intel Corp |
| 13. Drive.ai, Inc. | 33. TuSimple | 53. Ambarella Corporation |
| 14. Faraday & Future Inc. | 34. Jingchi Corp | 54. Gatik AI Inc |
| 15. Baidu USA LLC | 35. SAIC Innovation Center, LLC | 55. Didi Research America LLC |
| 16. Wheego Electric Cars | 36. Almotive Inc | 56. TORC Robotics Inc |
| 17. Valeo North America, Inc. | 37. Aurora Innovation | 57. Boxbot Inc |
| 18. NIO USA, Inc. | 38. Nullmax | 58. EasyMile |
| 19. Telenav, Inc. | 39. Samsung Electronics | |
| 20. NVIDIA Corporation | 40. Continental Automotive Systems Inc | |



California by the Numbers

56 active permits to test with a driver

468 autonomous vehicles permitted for testing on public roads

1,677 test drivers

1.6 million+ autonomous miles
driven

80 crashes



A (Very) Brief History of California AV Regulation



- **September 25, 2012:** Senate Bill 1298 authorizes the DMV to adopt regulations for the operation of autonomous vehicles in California.
- **September 16, 2014:** First set of regulations governing how manufacturers could test autonomous vehicles (with a driver) on California roads went into effect.
- **April 2, 2018:** DMV can begin approving applications for autonomous vehicle testing without a driver and deployment (public use).



Regulations Summary: Testing Without a Driver

- \$5 million insurance, bond, or self-insurance
- Communication link with the remote operator.
- Process to display or communicate vehicle owner or operator information to a law enforcement officer.
- AV complies with all FMVSS and CVC Div. 12 (Equipment of Vehicles), or NHTSA has approved an exemption.
- Meets the description of level 4 or 5 automated driving system.
- Law enforcement interaction plan
- Remote operators + training program
- Passengers that are not employees/contractors will be notified what personal information, if any, may be collected and how it will be used.
- Annual report of disengagements to the DMV.
- Report collision resulting in damage of property, bodily injury, or death to DMV within 10 days.
- No charging of a fee or receiving other compensation for providing a ride to members of the public.



California and Model State Policy

American Association of Motor Vehicle Administrators (AAMVA) Autonomous Vehicles Working Group

- Sixteen states and two Canadian provinces
 - Members represent technology, licensing, and law enforcement areas
 - California (Chair) and Michigan (Vice-Chair)
-
- NHTSA-funded
 - Framework for states to follow as technology develops



Questions?

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