

Autonomous Vehicles: A Perspective from the California Department of Motor Vehicles

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Abstract On September 25, 2012, California Governor Jerry Brown signed into law California Senate Bill 1298 (Chapter 570; Statutes of 2012) authorizing the California Department of Motor Vehicles (DMV or Department) to develop regulations for the testing and operation of autonomous vehicles on California’s public roadways. This marked the first time that California regulations regarding automotive technologies were developed prior to federal regulations. After meeting with governmental, academic, and industry stakeholders in order to gain insights into the technology, the DMV embarked on the development of two separate regulatory actions. As the technology advances, the DMV will revise the regulations accordingly.

Keywords Autonomous vehicle · California · California Department of Motor Vehicles · DMV · Regulations

1 The California Department of Motor Vehicles

Just before the turn of the century, a new mode of transportation was seen and heard on the California landscape. Some referred to it as a “horseless carriage;” others called it an “automobile.” It was to have a more profound impact upon

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the state than any other invention. Initially, the automobile was an instrument of adventure. However, the early day “motor wagon” was also considered a dangerous instrument. Several California counties passed ordinances requiring motorists to maneuver to the side of the road and remain standing when horse drawn vehicles approached. One court decision characterized the new contraptions as “highly dangerous” when used on county roads. Ordinances prohibited operations of the horseless carriage at night.

It was not long before restrictive legislation, designed to protect horse and mule traffic from the noisy horseless carriage, faded into the past. Speedy and convenient individual transit was welcomed as a benefit to society. California statutes of 1901 authorized cities and counties to license bicycles, tricycles, automobile carriages, carts, and similar wheeled vehicles. In 1913, the California Legislature approved legislation prohibiting the operation or driving of a motor vehicle without a license. In 1915, the first DMV was created with enactment of Senator F. S. Birdsell’s “Vehicle Act of 1915.”

1.1 The DMV of Today

Over the past 100 years, the DMV has grown in size and responsibility, reflecting the diverse landscape and population of California (37,826,000 residents in 2012) and the variety and complexity of the motor vehicle industry. At over 170 field offices, the DMV tests applicants and issues driver licenses to qualified drivers, provides identification services to the public, and verifies the identity of all licensed drivers and identification card holders. In 2013, the Department’s database contained over 27 million driver license and identification cards. By monitoring the driving performance of licensed drivers, the DMV promotes traffic safety. Furthermore, the DMV evaluates high-risk drivers for driving competency and takes corrective actions against the driving privilege of drivers who demonstrate safety risks.

Additionally, the DMV issues titles and registers all automobiles, motorcycles, trailers, and vessels, as well as commercial vehicles used for both interstate and intrastate commerce. In 2013, almost 32 million total vehicles were registered with the Department.

To protect consumers, the DMV licenses and regulates occupations and businesses related to the manufacture, transport, sale, and disposal of vehicles, including: vehicle manufacturers, dealers, registration services, salespersons, transporters, and dismantlers. In addition, the DMV regulates all occupations and businesses related to driving and traffic schools. The purpose of the DMV’s oversight in these areas is to ensure that consumers are dealing with reputable individuals and receiving the product that is represented to them.

Finally, the New Motor Vehicle Board, a program within the DMV, operates in a quasi-judicial capacity to resolve disputes between franchised dealers and manufacturers/distributors of new motor vehicles (including motorcycles and

recreational vehicles) and attempts, through the Consumer Mediation Services Program, to resolve disputes between consumers and new motor vehicle dealers and/or manufacturers or distributors.

2 Autonomous Vehicles Regulations

The California Legislature has given the DMV an express statutory delegation of rulemaking authority to regulate the operation of autonomous vehicles on public roads. Senate Bill 1298 (SB 1298) enacted California Vehicle Code §38750, which requires the Department to adopt regulations by January 1, 2015, setting forth requirements for the submission of evidence of insurance, an application approval process for testing and the general operation of autonomous vehicles on public roads, as well as vehicle safety requirements.

2.1 California's Approach

Traditionally, motor vehicle safety standards have been set at the federal level, usually by the National Highway Traffic Safety Administration (NHTSA). Although NHTSA issued a preliminary statement of policy concerning automated vehicles in May 2013, Federal Motor Vehicle Safety Standards (FMVSS) specific to autonomous vehicles had not been developed by the time the DMV initiated its work on autonomous vehicles regulations. This marked the first time that California regulations regarding automotive technologies were developed prior to federal standards. As such, one of the Department's first actions was to establish relationships with governmental, academic, and industry stakeholders in order to gain insights into the capabilities, limitations, and viability of autonomous vehicle technology.

The DMV identified key federal and state stakeholders that needed to be engaged in the regulations development process and formed a statewide steering committee comprised of representatives from the: California State Transportation Agency; California Highway Patrol; California Department of Insurance; California Department of Transportation; California Office of Traffic Safety; DMV; and NHTSA. Meeting on a regular basis, the committee served as an advisory panel and provided input from their respective areas, ensuring that law enforcement, insurance, road infrastructure, and traffic safety-related issues be considered throughout the regulations development process. In addition, higher level autonomous vehicle risks were identified to be broader public policy issues. For example, what are the traffic safety implications for Driving Under the Influence (DUI) laws? What happens if an autonomous vehicle requires the driver to take control and the driver is impaired and unable to assume responsibility for the vehicle? These and other issues continue to be discussed and vetted through the committee.

The Department sought the expertise of researchers and academic institutions with specialized knowledge and expertise in autonomous technologies. One such entity is the Partners for Advanced Transportation Technology (PATH) administered by the Institute of Transportation Studies (ITS) at the University of California, Berkeley. PATH has over 25 years of research experience on large-scale technical innovations for transportation and was contracted by DMV to provide guidance to the Department on possible requirements to include in regulations, including testing, performance, and safety standards necessary to ensure public safety as autonomous vehicles are operated on California roads.

DMV also established relationships with automobile manufacturers, automotive component companies, and trade organizations. With research and development of many autonomous vehicle programs occurring in California's Silicon Valley, the Department met with entities directly engaged in the development of autonomous vehicle technology. These discussions provided the Department with insight into the capabilities, differences, and more importantly, limitations of the technology. In addition, the Department gained an understanding of the relative timeframe of the availability and viability of the technology to California consumers.

Through these conversations with governmental, academic, and industry stakeholders, the Department gained two key insights regarding the development and potential benefits of autonomous vehicles. First, DMV developed a broad-based understanding that autonomous vehicle technology is advancing quickly and constantly evolving. While ten years ago, the concept of a self-driving vehicle may have seemed like science fiction, autonomous vehicle technology is developing at a rapid pace. Several manufacturers are offering NHTSA Level 2 (combined function automation) autonomous vehicle technology in model year 2014 vehicles. Most manufacturers have publicly announced their plans to develop and deploy a NHTSA Level 3 (limited self-driving automation) vehicle within the next three to seven years. Other manufacturers have indicated an end goal of producing a NHTSA Level 4 (full self-driving automation) vehicle within the next decade.¹ With this perspective that manufacturers may produce autonomous vehicles with varying capabilities and on different timelines, DMV understood the need for regulations that could encompass a range of autonomous technology capabilities and limitations.

Secondly, the DMV gained a more refined perspective on the potential traffic safety benefits that could result from the deployment of autonomous vehicles. In 2011, there were an estimated 5,338,000 police-reported traffic crashes, in which 32,367 people were killed and 2,217,000 people were injured [2]. Distracted drivers were involved in 10 % of fatal crashes, and 17 % of injury crashes were reported as distraction-affected crashes [3]. Having a vehicle on the road that

¹ NHTSA's preliminary policy statement on automated vehicles defines Level 2 as involving the automation of at least two primary control functions designed to work in unison to relieve the driver of control of those functions. Level 3 enables the driver to cede full control of all safety-critical functions under certain conditions, but the driver is expected to be available for occasional control. Level 4 is designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip [1].

drives as well, or even better, than a human operator presents an opportunity to prevent a significant number of collisions and ultimately enhance the safety of the motoring public. With a keen understanding of the possible safety, mobility, and environmental benefits of autonomous vehicles, the Department is focused on developing regulations that will both support continued innovations in autonomous vehicle technology, while at the same time ensuring public safety.

2.2 California Rulemaking Process

All regulatory, or rulemaking, proceedings must comply with the requirements of the California Administrative Procedures Act (APA).² The APA requires that any rulemaking that involves complex proposals shall include public discussions with parties who would be subject to the regulations prior to the start of the formal rulemaking process³; consequently, the Department held several public workshops soliciting input from interested parties prior to initiating the formal rulemaking proceedings. Those workshops allowed representatives from the automobile, insurance, and computer software industries, as well as consumer representatives, to provide input to the Department prior to the notice of a formal regulatory proposal.

When a set of regulations has been drafted, the Department is required to: give the public notice of the proposed regulatory action⁴; issue the complete text of the proposed regulation with an initial statement of reasons for the proposal⁵; give interested parties an opportunity to comment on the proposal and respond to the comments in writing⁶; and, to submit the summary and response with the proposed regulatory text to the California Office of Administrative Law (OAL).⁷ OAL is charged with reviewing all rulemaking packages for compliance with the requirements of the APA.⁸ Upon a determination that a proposed regulation complies with the standards of the APA,⁹ OAL is required to approve the adoption of the proposal.¹⁰ OAL's primary task in reviewing a regulatory proposal is to determine that the proposal does not alter, amend, enlarge, or impair the scope of the enabling statute.¹¹

The adoption of a regulation necessarily involves an interpretation of the enabling statute by the agency proposing the regulation. The California Supreme Court has

² Calif. Gov. Code §§11340 *et seq.*

³ Calif. Gov. Code §11346.5.

⁴ Calif. Gov. Code §11346.4.

⁵ Calif. Gov. Code §11346.2.

⁶ Calif. Gov. Code §11346.8.

⁷ Calif. Gov. Code §11347.3.

⁸ Calif. Gov. Code §11349.1.

⁹ The standards listed in Calif. Gov. Code §11349.1 are: necessity, authority, clarity, consistency, reference, and nonduplication.

¹⁰ Calif. Gov. Code §11349.3.

¹¹ Calif. Gov. Code §11342.2.

stated that the fundamental principle of statutory interpretation is “the ascertainment of legislative intent so that the purpose of the law may be effectuated” [*People ex rel. Younger v. Superior Court* (1976) 16 Cal.3d 30, 40 (127 Cal.Rptr. 122, 544 P.2d 1322).] SB 1298 includes uncodified Legislative findings which provide reliable insight on the intent of the Legislature. “Although such statements in an uncodified section do not confer power, determine rights, or enlarge the scope of a measure, they properly may be utilized as an aid in construing a statute.” [*Carter v. California Department of Veterans Affairs* (2006) 38 Cal.4th 914, 925; 44 Cal.Rptr.3d 223].

The Legislative findings in the uncodified portion of SB 1298 supporting the enactment of California Vehicle Code §38750 states:

- (c) The State of California, which presently does not prohibit or specifically regulate the operation of autonomous vehicles, desires to encourage the current and future development, testing, and operation of autonomous vehicles on the public roads of the state. The state seeks to avoid interrupting these activities while at the same time creating appropriate rules intended to ensure that the testing and operation of autonomous vehicles in the state are conducted in a safe manner.
- (d) Toward that end, the Legislature finds it appropriate to authorize the establishment of specific safety requirements for the testing and operation of autonomous vehicles, and to require that future testing and operation of autonomous vehicles in the state comply with those requirements.

In drafting the regulations required by California Vehicle Code §38750, the Department has been guided by the expressed Legislative intent that the Department promulgate regulations that avoid interfering with the testing of autonomous vehicle on public roads, while at the same time ensuring that testing and post-testing deployment do not endanger public safety.

2.3 Regulatory Actions

California Vehicle Code §38750 established two phases of deployment of autonomous vehicles: first, testing by the manufacturer; and, second, non-testing operation. The Department implemented the autonomous vehicle regulations in two separate regulatory actions in the order specified in §38750. The first regulatory action addressed the requirements for the testing of vehicles by autonomous vehicle manufacturers¹²; including the financial responsibility requirements, the manufacturer application and permit process, accident reporting, autonomous vehicle test driver qualifications, vehicle identification and registration requirements, and disposal of prior test vehicles. The second regulatory action will implement the requirements for the operation of autonomous vehicles in a non-testing environment.

¹² Calif. Veh. Code §38750 (a)(5) defines the manufacturer of autonomous vehicles as the original vehicle manufacturer that produces a completed vehicle with autonomous technology or a person who converts an originally manufactured vehicle by installing autonomous technology.

2.3.1 Testing Regulations

In the first phase of deployment, the testing phase, an autonomous vehicle can be operated on public roads by a driver holding the proper class of license if: it is being operated solely by employees, contractors, or designees of the manufacturer; a test driver is seated in the driver's seat ready to take immediate control of the vehicle; and, before the start of testing, the manufacturer submitted evidence of insurance in the amount of \$5 million in a form and manner required by the Department pursuant to regulations that the Department has been given authority to adopt.¹³ The Department's first set of regulations established a permit application process which requires that manufacturers: submit evidence of insurance, describe the training program required for autonomous vehicle test drivers, identify the employees, contractors and designees who will be designated test drivers, require a list of the vehicles that will be tested on public roads, and require that accident or collision reports be submitted to that Department.

One of the prominent legal issues in discussions about the operation of autonomous vehicles on public roads centers on the determination of fault and liability when an autonomous vehicle is involved in an accident. The California Legislature determined that instead of California's mandatory minimum limits of financial responsibility as specified in California Vehicle Code §16056 (\$15,000 for injury or death of any one person in any one accident, \$30,000 for injury or death of two or more people, and \$5,000 for damage to property),¹⁴ a manufacturer must be able to establish proof of financial responsibility in the amount of \$5 million.

The Department's regulations will not be able to resolve the liability issues as its authority is limited by the language of California Vehicle Code §38750 to specifying the manner in which manufacturers can demonstrate they have the requisite amount of insurance. The Department is not given authority to regulate at-fault determinations. In fact, authority to promulgate regulations for the determination of fault in motor vehicle accidents is vested in the California Insurance Commissioner.¹⁵ Once the testing phase is complete and autonomous vehicles can be operated by people not employed by the manufacturer,¹⁶ California Vehicle Code §38750 (c)(3) still requires the manufacturer to maintain the \$5 million

¹³ Calif. Veh. Code §38750 (b).

¹⁴ The minimum liability insurance limits specified in §16056 is applicable only to private passenger vehicles.

¹⁵ California Insurance Code §1861.025 sets forth the eligibility criteria for the purchase of a good driver discount automobile insurance policy and specifies that a person who in the past 3 years was "principally at fault" in a motor vehicle accident is not eligible for such a policy. Subdivision(b)(3) of that section states, "The commissioner shall adopt regulations setting guidelines to be used by insurers for the determination of fault" for accidents involving damage to property, personal injury or death.

¹⁶ The requirement that the vehicle be operated solely by employees or designees of the manufacturer only apply to the testing phase [see §38750 (b)(1)].

proof of insurance. In addition to this manufacturers' insurance requirement, existing law requires that the owner/driver of the vehicle maintain the statutory minimum limits of financial responsibility coverage.

2.3.2 Non-testing Deployment

The second regulatory action will implement the requirements for the operation of autonomous vehicles in a non-testing environment, including an additional application containing certifications by the manufacturer that: the vehicle can be easily engaged or disengaged by the driver; the vehicle has a visual indication that the technology is engaged; the vehicle can alert the driver when there is a failure of the autonomous technology that either requires the driver to take control of the vehicle or enables the vehicle to come to a complete stop if the driver is unable to take control; the driver can take control of the vehicle in multiple manners; the autonomous technology meets FMVSS or other safety standards required by state and federal law and regulations; the technology does not make inoperative any FMVSS or applicable state or federal safety requirements; the vehicle is capable of storing sensor data at least 30 seconds before a collision, in a read only format; the vehicle has been tested in compliance with the regulations adopted by the Department; and, the manufacturer will maintain proof of financial responsibility in the amount of \$5 million.¹⁷

The certifications required for the non-testing deployment of autonomous vehicles on public roads include a certification that the "autonomous vehicles' autonomous technology meets FMVSS for the vehicle's model year...".¹⁸ This requirement could be read to prohibit the operation of vehicles outside of testing because a manufacturer cannot certify that the "autonomous technology" meets FMVSS. Currently there are no FMVSS for "autonomous technology." The NHTSA policy statement issued in May 2013, states "NHTSA is responsible for developing, setting, and enforcing Federal Motor Vehicle Safety Standards and regulations for motor vehicles and motor vehicle equipment... As NHTSA's research and experience develop, NHTSA will determine whether it should encourage and/or require application of the most promising crash avoidance technologies..." (National Highway Traffic Safety Administration, *Preliminary Statement of Policy Concerning Automated Vehicles*, May 2013, page 2.)¹⁹ The policy statement clearly points out that NHTSA is responsible for developing

¹⁷ Calif. Veh. Code §38750 (c).

¹⁸ Calif. Veh. Code §38750 (c)(1)(E).

¹⁹ NHTSA cautions that states should refrain from establishing safety standards stating that it "does not recommend that states attempt to establish safety standards for self-driving vehicle technologies... in light of the rapid evolution and wide variations in self-driving technologies, we do not believe that detailed regulation of these technologies is feasible at this time at the federal or state level... until NHTSA has developed vehicle safety standards pertinent to self-driving technologies, states may want to ensure that self-driving test vehicles in their state adhere to certain basic principles." (Id at page 12–13, emphasis added.)

safety standards for autonomous technology and that NHTSA does not believe that it is feasible to develop regulations for that technology at this time; consequently NHTSA has yet to develop FMVSS for “autonomous technology.”

Absent federal regulations establishing the safety standards for autonomous technology, the Department’s ability to require a certification that the autonomous technology itself meets safety standards will have to rest on its statutory authority to require a certification that the technology meets “all other applicable safety and performance standards set forth in state and federal law and the regulations promulgated pursuant to those laws,”²⁰ consequently the Department will have to rely on any state laws establishing safety standards for such technology.

2.3.3 Fully Autonomous Operation

California Vehicle Code §38750 (e)(2) requires the Department to notify the California Legislature if it receives an application from a manufacturer seeking to deploy autonomous vehicles capable of operating without the presence of a driver in the vehicle. This requirement is necessary as there are many current California state laws that are drafted to require a driver be present in the vehicle. For example: California Vehicle Code §16025 requires drivers involved in accidents exchange information; California Vehicle Code §16028 specifies that on demand of a police officer, the driver of a vehicle must produce evidence of financial responsibility; California Vehicle Code §§20001 and 20003 require the driver of any vehicle involved in an accident, resulting in injury to a person or damage to property, to stop and provide their name and residence address to the owner of the property, the person injured, or a police officer; California Vehicle Code §15620 prohibits a parent, legal guardian, or other responsible person from leaving a child under 6 years of age in a vehicle without supervision, when the engine is running or the keys are in the ignition, or both; California Vehicle Code §23123 prohibits talking on a cell phone while driving a vehicle; and, California Vehicle Code §23123.5 prohibits texting or using an electronic wireless communication device while driving. While this list is not exhaustive, it is an example of the law changes that must occur before the concept of a fully autonomous vehicle operating on public roads without a situationally aware driver can become reality.

3 Conclusions

From the “horseless carriage” of one hundred years ago to the future where a car drives itself, motor vehicles’ capabilities and technology have developed and continue to develop at an increasingly rapid pace. Input from governmental, academic,

²⁰ Calif. Veh. Code §38759 (c)(1)(E).

industry, and consumer advocacy stakeholders will be critical as the California DMV develops regulations for autonomous vehicles by January 1, 2015. In addition, the Department will continue to monitor advancements in the technology and revise the regulations accordingly.

References

1. National Highway Traffic Safety Administration (2013) Preliminary statement of policy concerning automated vehicles, May 2013, p 5
2. National Highway Traffic Safety Administration (2011) Overview traffic safety fact sheet, Apr 2013
3. National Highway Traffic Safety Administration (2011) Distracted driving traffic safety fact sheet, Apr 2013