

California Department of Insurance

Informational Hearing on Autonomous Vehicle Insurance Issues

Background Paper

September 15, 2014

I. The California Department of Insurance's Interest in Autonomous Vehicles

The California Department of Insurance (CDI) recognizes that autonomous vehicle (AV) technology is an emergent and rapidly developing field that both offers tremendous benefits and poses substantial challenges. This is as true in the insurance realm as it is for society as a whole.

CDI's primary objective regarding AVs is to ensure that an appropriate insurance product is available to cover these vehicles as soon as they are available to the public.

To this end, CDI's September 15, 2014 informational hearing will focus on questions directly related to CDI's role as a state insurance regulator. Panels will concentrate on (1) providing a broad overview of AV development, including when AVs might be available to the public and predictions for the rate of AV penetration into the vehicle fleet and (2) "short term" and "long term" AV insurance issues, including product availability, type, and rating and how AVs best fit into Proposition 103, California's system for regulating property and casualty insurance rates.

This briefing paper provides background information to frame the discussion of AV insurance issues, including proposed taxonomies for defining levels of autonomy and an overview of California law relating to AVs and insurance.

II. Defining "Autonomous Vehicle" and Associated Terms

Before discussing AV issues, it is useful to clarify the meaning of "autonomous vehicle" and related terms.

AV technology exists on a spectrum between limited, function-specific automation and full automation where a vehicle is capable of operating without a human driver. In the midrange of this spectrum are technologies such as collision avoidance systems, adaptive cruise control, lane keeping systems, and self-parking technology that allow a vehicle to assist and make decisions for human drivers.

During the informational hearing, CDI will consider AV technologies across this continuum rather than focusing exclusively on the semi-autonomous technologies currently on the road or the truly driverless vehicles that may someday exist.

Some potentially useful definitions include those set forth by the National Highway Traffic Safety Administration and California's Legislature. Although no static taxonomy can perfectly capture the ever-shifting spectrum of AV technology, the definitions below may offer a helpful baseline for discussion.

A. NHTSA Levels of Vehicle Automation

As summarized below, the National Highway Traffic Safety Administration (NHTSA) has segmented vehicle automation into five levels to help clarify the continuum from vehicles with no automated control systems (Level 0) through fully automated vehicles that may require no driver at all (Level 4).¹

- **Level 0 (no automation):** The human driver is in complete and sole control of the primary vehicle controls (brake, steering, throttle, and motive power) at all times and is solely responsible for monitoring the roadway and for safe operation of all vehicle controls.
- **Level 1 (function-specific automation):** One function is automated; or if multiple functions are automated, they operate independently from each other. The human driver has overall control and is solely responsible for safe operation, but the vehicle may have limited authority over a primary control.
- **Level 2 (combined-function automation):** At least two primary control functions (such as steering and acceleration) are automated and designed to work in unison. The driver can cede active primary control in limited situations, but must remain constantly attentive and ready to take control at all times and on short notice.
- **Level 3 (limited self-driving automation):** All safety-critical driving functions are sufficiently automated that during certain conditions the human driver can safely engage in other activities. The vehicle signals when the human driver needs to reengage, so the driver is not expected to constantly monitor the roadway while driving.
- **Level 4 (full self-driving automation):** The vehicle can perform all safety-critical driving functions and monitor roadway conditions for an entire trip. A human driver is not expected to be available for control at any time during the trip.

B. California AV Definitions

In California, Senate Bill 1298 (Chapter 570, Statutes of 2012; codified at Vehicle Code section 38750) established California-specific AV definitions. California's AV legislation contemplates vehicle automation at or near NHTSA Levels 3 or 4:

- **Autonomous technology:** Technology that has the capability to drive a vehicle without active physical control or monitoring by a human operator.²
- **Autonomous vehicle:** Any vehicle equipped with autonomous technology that has been integrated into that vehicle. An autonomous vehicle does not include a vehicle that is equipped with one or more collision avoidance systems, such as electronic blind spot assistance, automated emergency braking systems, park assist, adaptive cruise control, lane keep assist, lane departure warning, and traffic jam and queuing assist, that are not capable of driving the vehicle without the active control or monitoring of a human operator.³

¹ National Highway Traffic Safety Administration, Preliminary Statement of Policy Concerning Autonomous Vehicles (2013) pp. 4-5.

² Veh. Code section 38750(a)(1).

³ Veh. Code section 38750(a)(2).

California's AV legislation also defines what constitutes an "operator" and a "manufacturer" of AV technology:

- **Operator of an autonomous vehicle:** The person who is seated in the driver's seat, or if there is no person in the driver's seat, causes the autonomous technology to engage.⁴
- **Manufacturer of autonomous technology:** The person that originally manufactures a vehicle and equips autonomous technology on an originally completed vehicle or, in the case of a vehicle not originally equipped with autonomous technology by the manufacturer, the person that modifies the vehicle by installing autonomous technology to convert it to an autonomous vehicle after the vehicle was originally manufactured.⁵

III. Legal Landscape for AVs in California

A. SB 1298 and DMV Rulemaking

In addition to providing the AV definitions outlined above, Senate Bill 1298 officially legalized AVs on California's public roads. SB 1298 addresses both manufacturer testing and public operation of AVs and requires the California Department of Motor Vehicles (DMV) to adopt regulations for both by January 1, 2015.

DMV adopted its **manufacturer testing** regulations on May 19, 2014.⁶ They become effective September 16, 2014. To obtain a permit to test an AV on public roads, a manufacturer must provide to DMV proof of financial responsibility in the amount of \$5 million in the form of an instrument of insurance,⁷ a surety bond,⁸ or a certificate of self-insurance.⁹

DMV is currently developing regulations for the **post-testing public deployment** of AVs.¹⁰ These regulations will establish the requirements that manufacturers must meet to certify that their AV has been successfully tested, meets certain safety requirements, and is ready for the general public to operate on public roads. DMV plans to adopt these regulations by late December 2014. The deployment regulations could go into effect as soon as 120 days after DMV adoption.¹¹

SB 1298 authorizes DMV to impose additional requirements for AVs capable of operating without a driver, or to require the presence of a driver if it finds one necessary for safe operation.¹²

⁴ Veh. Code section 38750(a)(4).

⁵ Veh. Code section 38750(a)(5).

⁶ Cal. Code Regs., title 13, section 227.00 et seq.

⁷ Cal. Code Regs., title 13, section 227.08.

⁸ Cal. Code Regs., title 13, section 227.10.

⁹ Cal. Code Regs., title 13, section 227.14.

¹⁰ California Department of Motor Vehicles, Autonomous Vehicles in California: Deployment of Autonomous Vehicles for Public Operation <<https://www.dmv.ca.gov/vr/autonomous/auto.htm>> [as of September 9, 2014].

¹¹ Veh. Code section 38750(f): "Nothing in this division shall limit or expand the existing authority to operate autonomous vehicles on public roads, until 120 days after the department adopts the regulations required by paragraph (1) of subdivision (d)."

¹² Veh. Code section 38750(e)(2).

Under SB 1298, DMV must also notify the Legislature when a manufacturer seeks approval for an application to operate a driverless vehicle and when DMV approves it. The approval cannot take effect for at least 180 days after the application is submitted.¹³

Depending on DMV and Legislature decisions and timelines, a manufacturer could conceivably apply for and receive approval for public operation of a driverless AV by late 2015.

Although such a short timeframe may be unlikely, CDI encourages insurers to consider and prepare for every possibility. To this end, at the informational hearing CDI will welcome comments on whether currently existing insurance models could accommodate truly driverless AVs in the very near future.

Representatives from DMV will participate in the informational hearing, and CDI welcomes their input on whether or when DMV will contemplate allowing AVs to operate without a licensed driver behind the wheel.

B. Proposition 103 and the Regulation of Property and Casualty Insurance Rates

California's system for regulating property and casualty insurance rates may pose unique issues as AV technology evolves.

In California, most property and casualty insurance rates, including those for private passenger auto (PPA), are subject to the provisions of Proposition 103, a 1988 voter initiative measure that created a new article in the Insurance Code providing for the reduction and control of insurance rates.¹⁴

Under Proposition 103, rates must be approved by the Commissioner prior to use and may not be excessive, inadequate, or unfairly discriminatory.¹⁵ Proposition 103, and CDI's implementing regulations, provide detailed rate review guidelines, procedures, and mechanisms for consumer participation.¹⁶

Legislative amendments to Proposition 103 must "further its purposes" and require either a statute passed in each house by a two-thirds vote or a statute approved by the electorate.¹⁷

Although Proposition 103 sets rating parameters for most property and casualty lines in California, it imposes particularly detailed requirements for private passenger auto.¹⁸ As

¹³ Veh. Code section 38750(e)(2).

¹⁴ See Ins. Code section 1861.01 et seq. Proposition 103 governs all insurance on risks or operations in California except those specifically excluded. Excluded lines include reinsurance, life insurance, marine (as distinguished from inland marine) insurance, title insurance, disability insurance, workers' compensation insurance and related insurance of employers for injuries or deaths of employees in the course of employment, and insurance transacted by county mutual fire insurers or county mutual fire reinsurers. (Ins. Code sections 1851 and 1861.13.)

¹⁵ Ins. Code sections 1861.01(c) and 1861.05(a).

¹⁶ See Ins. Code section 1861.01 et seq.; Cal. Code Regs., title 10, section 2641.1 et seq.

¹⁷ Prop. 103 section 8(b).

¹⁸ Proposition 103's PPA provisions apply to auto insurance policies as set forth in Insurance Code section 660(a). (Ins. Code section 1861.02(a).) Under section 660(a): "**Policy**" means an **automobile liability, automobile physical damage, or automobile collision policy**, or any combination thereof, delivered or issued for delivery in this state, insuring a single individual or individuals residing in the same household, as named insured, and under which the insured vehicles therein designated are of the following types only: (1) **A motor vehicle of the private passenger or station wagon type that is not used as a public or livery conveyance for passengers, nor rented to others;** or (2) Any other four-wheel motor vehicle with a load capacity of 1,500 pounds or less; provided, however, that this

discussed in more detail below, Proposition 103 makes individual driver characteristics, particularly driver safety record, paramount in rating auto insurance. This system, where good drivers pay less for auto insurance, may be in tension with an increasingly automated vehicle fleet where the individual characteristics of human drivers are less predictive of risk.

Given Proposition 103's driver-focused PPA provisions, an important threshold question is whether AVs will continue to be insured under PPA as technology evolves.

In the future, "drivers" of fully autonomous vehicles may have no control over the details of driving. Accidents would stem from manufacturing or technology failures beyond the driver's control. In such a situation, AVs may be insured under another line entirely. For example, AV manufacturers could insure AVs under their commercial products liability coverage.¹⁹ Under such a framework, rates would still be subject to the protections of Proposition 103, but Proposition 103's auto provisions would not apply.²⁰

To the extent AV technology is incrementally incorporated into privately-owned personal vehicles, AVs will likely stay under Proposition 103's PPA framework. As long as this is the case, stakeholders will need to reconcile AVs with Proposition 103's PPA mandates, such as the auto rating factor and good driver discount policy provisions discussed below.

1. Mandatory and Optional Auto Rating Factors

Under Proposition 103's PPA framework, individual driver characteristics are critical. PPA insurance rates must be based in decreasing order of importance on:

1. The **insured's driving safety record**;
2. The **number of miles he or she drives annually**;
3. The number of **years of driving experience the insured has had**, and
4. Those **other factors** that the Commissioner may adopt by regulation and that have a substantial relationship to the risk of loss.²¹

Insurers must give the first three factors above (the "**Mandatory Factors**") more weight than the factors the Commissioner adopts by regulation (the "**Optional Factors**"). Insurers can choose whether and which of the Optional Factors to use in their class plans, but they must use each of the Mandatory Factors.

Notably, the First and Third Mandatory Factors—driving safety record and years driving experience—may not correlate to risk in a hypothetical future where a vehicle's software, not the vehicle's human driver, is responsible for a crash.

chapter shall not apply (i) to any policy issued under an automobile assigned risk plan, or (ii) to any policy insuring more than four automobiles, or (iii) to any policy covering garage, automobile sales agency, repair shop, service station, or public parking place operation hazards; or (3) A motorcycle."

¹⁹ Assuming the continuance of a personal ownership model, AV owners might still need to purchase individual liability policies to cover "gaps" for accidents not resulting from the AV technology (such as if the owner did not properly maintain the vehicle).

²⁰ Financial protection for fully driverless AVs might also come in part in the form of manufacturer or technology warranties. However, a conventional warranty, in which a manufacturer or developer guarantees to replace or repair a defective product, might not provide coverage for damage to others or for damage to the vehicle caused by outside sources. Thus, there would likely still be a place for insurance coverage regulated under Proposition 103.

²¹ Ins. Code section 1861.02(a).

Insurers can use the Optional Factors to take vehicle automation into consideration. However, under current regulations each Optional Factor must weigh less than the Third Mandatory Factor.²²

California Code of Regulations section 2632.5(d) sets out the current Optional Factors.²³ Of the sixteen Optional Factors, the First (**type of vehicle**); Second (**vehicle performance capabilities**); and Eighth (**vehicle characteristics, including engine size, safety and protective devices, damageability, repairability, and theft deterrent devices**) seem best suited to address the potential safety benefits of autonomous and semi-autonomous technology.

CDI will invite comment on whether the current Optional Factors and weighting methodology are appropriate to address the safety benefits of AV technology in vehicles today, and whether they will be appropriate to accommodate AV technologies of the future. CDI will solicit input on how PPA insurers currently address semi-autonomous features like adaptive cruise control, lane assist, parking assist, accident avoidance, and driver fatigue detection. CDI will also solicit input on how insurers might handle AV technologies of the future, such as aftermarket products that would allow the consumer to retrofit a vehicle with AV technology.

The hearing will explore whether amendments to law or regulation will be needed to accommodate AVs with a licensed driver behind the wheel. Arguably, so long as a licensed driver must be in the driver's seat and ready to take control of an AV, Proposition 103's framework requiring insurers to take into account driver safety record and years driving experience will be workable, although perhaps not perfectly reflective of risk.

The hearing will also explore what action, if any, CDI should take regarding the rating factor framework if or when AVs reach the stage where a licensed driver is no longer required for safe and legal operation on public roads.

2. Good Driver Discount and "Take All Comers" Provision

Under Proposition 103's Good Driver Discount (GDD) provisions, an insurer may not refuse to sell a policy to a qualified Good Driver and must offer the Good Driver a 20% discount on rates:

- (1) Every person who meets the criteria of Section 1861.025 shall be qualified to purchase a Good Driver Discount policy from the insurer of his or her choice. An insurer shall not refuse to offer and sell a Good Driver Discount policy to any person who meets the standards of this subdivision.
- (2) The rate charged for a Good Driver Discount policy shall comply with subdivision (a) and shall be at least 20% below the rate the insured would otherwise have been charged

²² Cal. Code Regs., title 10, section 2632.8.

²³ The sixteen current Optional Factors are as follows: (1) Type of vehicle; (2) Vehicle performance capabilities, including alterations made subsequent to original manufacture; (3) Type of use of vehicle (pleasure only, commute, business, farm, commute mileage, etc.); (4) Percentage use of the vehicle by the rated driver; (5) Multi-vehicle households; (6) Academic standing of the rated driver; (7) Completion of driver training or defensive driving courses by the rated driver; (8) Vehicle characteristics, including engine size, safety and protective devices, damageability, repairability, and theft deterrent devices; (9) Gender of the rated driver; (10) Marital status of the rated driver; (11) Persistency [length of time with the insurer]; (12) Non-smoker; (13) Secondary Driver Characteristics; (14) Multi-policies with the same, or an affiliated, company; (15) Relative claims frequency [grouped by territory]; (16) Relative claims severity [grouped by territory]. (Cal. Code Regs., title 10, section 2632.5(d).)

for the same coverage. Rates for Good Driver Discount policies shall be approved pursuant to this article.²⁴

The insurer must offer the Good Driver, at the discounted rate, both a minimum liability policy and a policy that contains comprehensive or collision coverage in addition to minimum liability coverage.²⁵

The GDD requirements apply to everyone who qualifies as a Good Driver, regardless of the type of vehicle the Good Driver operates. This raises the question of whether Proposition 103's "take all comers" provision for Good Drivers would require an insurer to write an AV (even a driverless one) for a qualifying Good Driver.

Whether someone qualifies as a Good Driver depends on his or her driving record. The GDD system takes into account violation points drivers receive for accidents for which they are "principally at fault" and for convictions for violations of the Vehicle Code.²⁶

It is unclear how violation points will be awarded in instances where AV technology carries some or all responsibility for an accident or Vehicle Code violation.

It is also unclear how the concept of a "Good Driver" would translate to a driverless AV. Here again, as vehicles become increasingly automated, an individual's driving record may no longer bear a strong relationship to risk.

CDI invites comment on these topics.

C. Use of AV-Collected Data

AVs are sometimes accompanied by concerns regarding who will be allowed to access the data AVs collect and how this data might be used. Insurance-specific issues associated with data use include (1) the use of AV-collected data for rating and underwriting and (2) the use of AV Event Data Recorder (EDR) data for determining fault following a collision.

CDI regulations proscribe the use of **AV-data for rating purposes**. In regulations implementing the Second Mandatory Factor (annual miles driven), CDI limits how insurers may use information collected by a technological device:

- An insurer shall **only** use a technological device to collect information for determining actual miles driven under the Second Mandatory Factor.
- An insurer shall **not** use a technological device to collect or store information about the **location** of the insured vehicle.²⁷

Regarding use of **EDR data following collisions**, SB 1298 requires AVs to capture and store autonomous technology sensor data for at least 30 seconds before a collision occurs while the AV is operating in autonomous mode. The data is to be captured and stored in a read-only

²⁴ Ins. Code section 1861.02(b).

²⁵ Cal. Code Regs., title 10, section 2632.14.

²⁶ See Ins. Code section 1861.025.

²⁷ Cal. Code Regs., title 10, section 2632.5(c)(2)(F)(i)(5).

format so that the data is retained by an external device capable of downloading and storing the data. The data shall be preserved for three years after the date of the collision.²⁸

Under SB 1298, a manufacturer of AV technology installed on a vehicle shall provide a written disclosure to the AV purchaser that describes what information is collected by the autonomous technology.²⁹

Although some of the important issues associated with AV data collection are beyond CDI's jurisdiction, CDI invites comments on those data collection issues that overlap with CDI's role as a state insurance regulator.

D. Liability Coverage for AVs

California's AV legislation requires that a manufacturer of AV technology keep \$5 million coverage in place during both the testing³⁰ and public operation³¹ phases.

Minimum liability requirements for private passenger vehicles in California are as follows:

- \$15,000 for injury/death to one person.
- \$30,000 for injury/death to more than one person.
- \$5,000 for damage to property.³²

CDI invites comment on whether these standard liability requirements (combined with the manufacturer's coverage) are sufficient for AVs, or whether AVs pose risks such that additional liability coverage should be required.

IV. Conclusion

Although it is difficult to predict how AV technology—and society's relationship to it—will develop over time, it is clear that some form of coverage will remain necessary to protect against the risks associated with these vehicles.

In the short term, CDI endeavors to ensure that an AV insurance product will be available in some form within existing insurance frameworks. In the longer term, CDI will look at whether larger structural changes are needed to accommodate the technology.

Because insurance products will likely need to evolve as AV technology does, CDI views its initial informational hearing as the first step in an ongoing dialogue with stakeholders and the public.

²⁸ Veh. Code section 38750(c)(1)(G).

²⁹ Veh. Code section 38750(h).

³⁰ Veh. Code section 38750(b)(3).

³¹ Veh. Code section 38750(c)(3).

³² Ins. Code section 11580.1; Veh. Code section 17151(a).