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THE FAST AND FURIOUSLY APPROACHING NEED FOR LEGAL REGULATION OF AUTONOMOUS DRIVING

Seth Bruneel¹

I. INTRODUCTION

People often daydream of a utopian future with flying cars navigating themselves from place to place. While the flying car remains a distant dream, the self-driving car is coming quick. Mercedes-Benz has announced that its 2017 E-Class will be the first production sedan licensed to drive itself.² Multiple other companies are in the testing stage on their autonomous vehicle programs, with test vehicles independently navigating roads along everyday human drivers.

One of the companies driving the automotive race is Freightliner, a semi-truck manufacturer. Freightliner has built a semi-autonomous truck capable of navigating the highways of Nevada. This truck obtained its own license after passing road and safety tests conducted over 10,000 miles of driving. The big rig was required to show driving proficiency just as you or I would have to in order to obtain a driver's license. However, this prototype is dependent upon a human driver to successfully get it from point A to point B. The semi-autonomous system is "responsible for maintaining legal speed, staying in the selected lane, keeping a safe braking distance from other vehicles, and slowing or stopping the vehicle based on

1 Seth Bruneel will graduate from Brigham Young University in April 2016 with a degree in Electrical Engineering. He plans on attending law school in Fall 2016. He would like to thank editors Ian Hatch and Sydney Walker for all their contributions.

2 N.Y. TIMES, Jan. 20, 2016, at A5.

traffic and road conditions.”³ This leaves the responsibility of entering and exiting the highways, handling inclement weather, driving on local roads, and docking for loading and unloading in the hands of the human driver. The advances made by Freightliner are considerable, but it has yet to reach complete and total autonomy.

Audi is another company that has made great strides towards this goal. Audi demonstrated its self-driving capabilities by having one of its cars drive itself from San Francisco to Las Vegas for the 2015 auto show.⁴ In addition to car companies, technology giants such as Apple are developing self-driving cars. However, in anticipation of these self-driving cars comes the need to address practical and legal considerations. For example, who is responsible for an accident caused by a car that is driving itself? Is the passenger of an autonomous vehicle liable for a traffic violation if the car does not stop at a red light? Answers to legal questions like these must be in place in order for autonomous vehicles to safely and comfortably be integrated into the daily commute alongside traditional cars.

The necessary legislation will come as laws react to new technologies. Historically, legal regulation often resulted from accidents. Examples include the numerous warnings on everyday products. McDonald’s labels coffee cups as “Hot.” Blow dryers contain warning tags against their use in wet conditions. Unfortunately, these warnings exist because someone spilled coffee in their lap not knowing it was hot,⁵ or thought they could start drying their hair while still in the shower. Another such warning is the usage of seatbelts while driving. Prior to the advent of the seatbelt and the legal requirement, thousands perished in automobile accidents. It took many years

3 *Freightliner Inspiration Truck Revealed at Hoover Dam*, <http://www.freightlinerinspiration.com/newsroom/press/inspiration-truck-unveiled/>

4 Aaron Mamiit, *CES 2015: How did Audi’s Self-Driving Car Travel 550 Miles from San Francisco to Las Vegas?*, Tech Times (January 8, 2015, 9:50 AM), <http://www.techtimes.com/articles/25327/20150108/ces-2015-how-did-audis-self-driving-car-travel-550-miles-from-san-francisco-to-las-vegas.htm>

5 *Liebeck v. McDonald’s Restaurants, P.T.S., Inc.*, No. D-202 CV-93-02419, 1995 WL 360309 (Bernalillo County, N.M. Dist. Ct. August 18, 1994).

of research for the importance of seatbelts to be discovered, after which laws were passed requiring both manufacturers to build cars with seatbelts and drivers to wear them. If this reactionary method were applied to creating regulations for autonomous vehicles it could prove disastrous.

Harm and headache could be avoided if we learn from examples like those described above and take a precautionary approach to autonomous legislation. Currently, policymakers plan to require a capable, licensed operator to be ready to take over driving responsibilities from the autonomous car at anytime.⁶ This is a logical precaution. However, this potential legislation must be expanded further to include a process for assigning fault in the event of an accident when a vehicle involved was operating in autonomous mode. A system needs to be in place where the burden of proof lies with the manufacturer.

II. BACKGROUND

As autonomous cars continue to emerge in the automobile market, there remain concerns surrounding the necessary technology and the required regulation. Autonomous cars on the road are still in the testing phase and are not yet available to the general public. Therefore, these cars are currently owned and operated by their respective manufacturers. This helps to delay some of the major concerns other non-autonomous car drivers have concerning interacting with these road ‘robots.’ However, the manufacturer and owner will soon be two separate parties, which could complicate assigning liability.

Google is one such developer making great advances towards automotive autonomy. The media and enthusiasts have clearly documented their progress as test cars roam around the Bay area in California. Even with safety as the principal concern to Google, there have been minor accidents on public roads involving autonomous

6 Andrew Del-Colle, *The 12 Most Important Questions About Self-Driving Cars*, Popular Mechanics (Oct. 8, 2013), <http://www.popularmechanics.com/cars/a9541/the-12-most-important-questions-about-self-driving-cars-16016418/>

vehicles. As of September 2, 2015 Google has reported sixteen crashes involving vehicles from its test fleet.⁷ During testing, Google is willing to accept both responsibility and liability if their car is found to be the cause of an accident. Of these sixteen accidents, all can be attributed to human error. For example, in one of the accidents, a Google employee was driving a test vehicle (not in autonomous mode), and caused an accident. In the other fifteen accidents, fault was attributed to the other driver. The autopilot driving these cars, therefore, retains its perfect driving record. This demonstrates that when operated in autonomous mode, self-driving cars can be safer than most human drivers. Based on this evidence, autonomous developers are confident that an accident resulting from a poor decision made by the software will be rare and thus are willing to accept responsibility.

While there is a lack of precedence in this area regarding cars that can drive themselves, it is helpful to consider the precedence established in the area of property. By considering the cars as property, parallels can be drawn with other property that has autonomous capabilities. During the 1800s, slaves were seen as commodities. Slaves were considered property but they could think and act on their own. The legal standing of slaves was central to *Wright v. Weatherly* (1835).⁸ It was debated whether or not an owner was vicariously liable for wrongs committed by his property.⁹ Precedent was ultimately set that slave owners were liable for the actions of their property. The property—the slaves—had independent minds but the owner still had ultimate responsibility for his slaves' actions because the owner was primarily responsible for training the slaves on proper behavior.

Another area where owners are held responsible for property, but cannot always control the property, concerns pet ownership—specifically of wild animals. “A possessor of a wild animal is subject

7 Matt Richtel, *Driverless Car's Nemesis? Drivers*, N.Y. Times, Sept. 2, 2015 at A1 (Continued on Page B6).

8 *Wright v. Weatherly*, 15 Tenn. (7 Year.) 367 (1835).

9 Jacob I. Corre, *Thinking Property at Memphis: An Application of Watson*, 68 Chi. -Kent L. Rev. 1373, (1993).

to liability to another for harm done by the animal to the other, his persons, land or chattels.”¹⁰ Once again, the owner is financially responsible. This view of ownership flows logically and could serve as precedence to self-driving. When autonomous mode is activated, the manufacturer then becomes the possessor of the wild animal and assumes the liability for that “animal.” Since owners will not be controlling the vehicle at all times, there will be times when the decision-making is left to the ‘mind’ of the car. The manufacturer is responsible for deciding how the car thinks and reacts and therefore should be held responsible for any damage done by the decision-making of the vehicle.

III. REASSURANCE IN THE TECHNOLOGY

Manufacturers have already stepped up to take responsibility for their vehicles. In a televised episode of *60 Minutes*, Mercedes-Benz stated that if their test autonomous cars were to be involved in an accident they would not only take the blame, but also accept financial liability.¹¹ This shows the confidence and ownership that Mercedes stakes in their achievements. Other autonomous automakers share similar views in accepting responsibility for their autonomous vehicles. These manufacturers claim that autonomously driven vehicles will be safer than human-driven vehicles because unlike people, autonomously driven vehicles “can continuously monitor all sides of the vehicle, can react almost instantaneously, and are impervious to distraction.”¹² There are cars on the road today that already react to objects in the path of a vehicle and will even stop the vehicle without any action from the driver. This technology and others like it have contributed to lower fatality rates in accidents involving vehicles equipped with these safety developments. A study conducted

10 Bruce A. Levin, *Lions & Lionesses, Tiger & Tigresses, Bears & ... Other Animals: Sellers' Liability for Dangerous Animals*, 58 Notre Dame L. Rev. 545, (1983).

11 *60 Minutes*, (CBS television broadcast Oct. 4, 2015).

12 Andrew Del-Colle, *The 12 Most Important Questions About Self-Driving Cars*, Popular Mechanics (Oct. 8, 2013).

by the Insurance Institute for Highway Safety (IIHS) found that the chances of the driver of a new vehicle dying in crash had fallen by more than a third over the last 3 years. The IIHS credits the lower death rate “to the adoption of electronic stability control, which has reduced the risk of rollovers, and to side airbags and structural changes that improve occupant safety.”¹³ New vehicles are less likely to be involved in accidents because of the new, more advanced technologies they are adopting.

Increased technology leads to increased safety and lower accident rates. Another survey, conducted by KPMG, supports the claims of the IIHS. KPMG found that the accident frequency per vehicle per year was down (in comparison to previous years) to .043 in 2013 and .042 in 2014.¹⁴ This means that of all cars manufactured in 2013, an average of 4.3% of all vehicles of the same make and model will be involved in an accident each year. The average is predicted to continue to decline steadily into the future as the goal of full autonomy is realized. Experts estimate the accident frequency could drop by eighty percent in the future.¹⁵ Clearly safety is on the rise because human error is becoming diminishing from the driving equation. The IIHS survey reports nine car models that had zero fatalities per million.¹⁶ This correlation shows that as more control is delegated to technology, driving becomes safer.

One such technology is vehicle-to-vehicle (V2V) communication. These communication systems use short-range radio to effectively link automobiles on the road. Each automobile is able to send its location to other automobiles on the road and receive the location of other cars as well. This provides the car with a 360 degree-view of

13 *Self-driving Cars and Insurance*, INSURANCE INFORMATION INSTITUTE (Feb. 2015), <http://www.iii.org/issue-update/self-driving-cars-and-insurance>.

14 AUTOMOBILE INSURANCE IN THE ERA OF AUTONOMOUS VEHICLES, 6 (2015).

15 *id.* at 5

16 *Self-driving Cars and Insurance*, INSURANCE INFORMATION INSTITUTE (Feb. 2015), <http://www.iii.org/issue-update/self-driving-cars-and-insurance>.

its immediate surroundings. The V2V link allows cars to see things that human drivers physically cannot see, giving the artificially intelligent driver an advantage. This advantage will be a big selling point for customers whose primary concern is safety. This will lead to a greater number of autonomously capable vehicles on the road, increasing the need for their regulation.

The Department of Transportation estimates that seventy-six percent of all accidents on the road could be prevented with the use of V2V systems.¹⁷ Integrating these systems into self-driving cars allows them to make more informed and quicker decisions than human drivers, resulting in safer driving. While the technology-controlled vehicles will be safer, there is no way to prevent 100% of accidents. It is in the rare circumstances when an accident does occur that the law (and upcoming legal action) needs to be clear and definitive.

While the integration of V2V and other new technologies into new cars promises greater safety, there are many who worry about the security of the vehicle. Currently there is little to no security blocking access to the computer systems used in an autonomous vehicle and once inside there is no security between different systems with the vehicle. This was evidenced by Andy Greenberg, a senior writer for Wired Magazine, who agreed to drive a car down the freeway as part of an experiment where hackers took control of his vehicle. The hackers were not only able to control the vehicle through internet connection but they were able to deny Andy, the driver, any control of the functions of the vehicle. Ultimately the car crashed into a ditch and Andy was able to walk away frightened but unharmed.¹⁸

Examples like these demonstrate the potential for outside attacks on this technology. As more pieces of a vehicle are computerized, the greater the amount for potentially dangerous control an outside party could have. The amount of harm that could be done if someone

17 *Self-driving Cars and Insurance*, INSURANCE INFORMATION INSTITUTE (Feb. 2015), <http://www.iii.org/issue-update/self-driving-cars-and-insurance>.

18 Andy Greenberg, *Hackers Remotely Kill a Jeep on the Highway- With Me in it*, WIRED (July 21, 2015 6:00 AM), <http://www.wired.com/2015/07/hackers-remotely-kill-jeep-highway/>.

is able to hijack the autonomous driving systems is alarming. This shows cyber security of modern vehicles is an issue that cannot be ignored, but for purposes of this paper, it suffices to say that the hijacking of a car is defined as a criminal activity and would place all liability for an accident upon those committing the crime. In these instances, our proposed legislation would not apply but rather the crime would be investigated in the current system for handling such matters.

IV. WHAT DOES THE LAW SAY ABOUT CARS THAT DRIVE THEMSELVES?

The reality of autonomous vehicles is quickly approaching and yet most states have done little in the form of creating legislation to govern their use. As of October 2015, only six states and the District of Columbia have enacted legislation concerning vehicles with autonomous capabilities.¹⁹ Nevada was the first state with legislation that authorized the operation of autonomous vehicles. This legislation set forth the rules that would allow Freightliner to obtain a license for the autonomous semi-truck.

Nevada Administrative Code Chapter 482A (NAC-482A) defines an autonomous vehicle as any vehicle “enabled with artificial intelligence and technology that allows the vehicle to carry out all the mechanical operations of driving without the active control or continuous monitoring of a natural person.”²⁰ The NAC-482A also defines the operator of the vehicle as the person who engages the autonomous mode. These definitions allow the state of Nevada to exclude operators of self-driving vehicles from punishments connected with operating wireless communication technologies behind the

19 AUTONOMOUS | SELF-DRIVING VEHICLES LEGISLATION, <http://www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx> (last visited Nov. 22, 2015).

20 NEVADA ADMINISTRATIVE CODE CHAPTER 482A - AUTONOMOUS VEHICLES, <http://www.leg.state.nv.us/NAC/NAC-482A.html> (last visited Nov. 22, 2015).

wheel²¹ because they are not actively driving the vehicle. Rather, the artificial intelligence and technology is responsible for the decision-making, excluding the driver temporarily from the responsibilities of driving. This assumption begins to answer to the question of liability in an autonomous accident. The liability is assigned based on decision-making; if the artificial intelligence was engaged at the time of an accident then the technology (and thereby the manufacturer) is liable for the accident. While Nevada is taking the most proactive approach to legislature concerning self-driving vehicles, other states are waiting to react to the capabilities of the new types of vehicles.

In fact, laws similar to those of Nevada are absent in most other states. The absence of laws pertaining to self-driving vehicles in most other states does not mean they are not permitted, but rather that they are not expressly allowed.²² While the legality of autonomous vehicles and regulations regarding them are still unclear, automakers will continue development with the expectations that the law legalize the technologies used in development and that regulations will require a licensed human driver to be in a position to take control of the vehicle at any time.²³ Alex Davies, a writer for *Wired* magazine, expressed the concerns of the automotive industry when he said, “Everyone in this game *wants* rules, so they know the guidelines they’re playing under, from an early stage.”²⁴ This demonstrates the need for balance between innovation and regulation. Automakers need to know what they are allowed to do, while regulators need to know what self-driving vehicles are capable of. The

21 AUTONOMOUS | SELF-DRIVING VEHICLES LEGISLATION, <http://www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx> (last visited Nov. 22, 2015).

22 ARE SELF-DRIVING CARS LEGAL?, <http://www.hg.org/article.asp?id=31687> (last visited Nov. 22, 2015).

23 Andrew Del-Colle, *The 12 Most Important Questions About Self-Driving Cars*, *Popular Mechanics* (Oct. 8, 2013), <http://www.popularmechanics.com/cars/a9541/the-12-most-important-questions-about-self-driving-cars-16016418/>

24 Alex Davies, *Self-Driving Cars Are Legal, But Real Rules Would Be Nice*, *WIRED* (May 15, 2015, 7:00 AM), <http://www.wired.com/2015/05/self-driving-cars-legal-real-rules-nice/>.

two parties need to progress concurrently so that regulation does not stifle innovation and so that innovation does not run amuck in the absence of regulation.

V. EFFECTS ON AUTO INSURANCE

The expected higher purchase cost of autonomous vehicles²⁵ is accompanied by an expectation of higher auto insurance premiums. Insurance premiums for traditional vehicles are calculated based upon the individual, their propensity for safe driving, personal driving history, and the vehicle to be insured.²⁶ While the vehicle cost will increase, the propensity for safe driving will greatly increase. Auto insurance providers have indicated that they expect the safer driving will hold more weight than vehicle cost, resulting in an overall decrease in premiums.²⁷ The same survey also indicated that seventy-four percent of the insurance industry admitted that they are currently unprepared for driverless vehicles.²⁸ The lack of preparation in the auto insurance industry is attributed to lack of knowledge of the developments and also a belief that policies concerning autonomous vehicles will not be necessary in the next decade.

While autonomously driven vehicles will greatly reduce the number of crashes, they will not completely eliminate accidents. It is in these rare instances that a system needs to be in place that will best serve consumers, auto manufacturers, and auto insurance providers. The consumers need protection from liability where they have little or no control. They trust that the manufacturer has designed and tested the vehicle to meet safety expectations. As stated

25 As priced on Tesla's website a new 2016 Tesla Model S P90D equipped with autopilot and no other available options cash price is \$90,500 (Nov. 2015). <https://my.teslamotors.com/models/design>

26 Robert Cordray, *What Autonomous Cars Mean for Insurance Companies*, DIGITALIST MAG. (July 23, 2015), <http://www.digitalistmag.com/industries/insurance/2015/07/23/autonomous-care-mean-insurance-03122421>

27 AUTOMOBILE INSURANCE IN THE ERA OF AUTONOMOUS VEHICLES, 16 (2015).

28 *id.* at 29

previously, the liability is assigned based on decision-making. This also excludes insurance companies from liability because they are not actively involved in the decisions made while driving. This leaves the liability to the manufacturer. They are responsible for the actions of the vehicle and should assume any financial responsibility resulting from poor decision-making.

While placing liability on the manufacturer may seem unfair, the argument does not automatically place the blame for any accident on the automaker. There are still other parties, such as the human driver, who might take control of the car (and thereby liability) if an accident were to occur. The claim simply places the burden of proof on the manufacturer. This ensures that automakers sufficiently research, develop, and test the autonomous technologies to the point where they have the confidence of Mercedes-Benz²⁹ and the proven track record of Google.³⁰ Legal action has already been taken that protects these manufacturers when their technology is modified by third parties after production.³¹ These actions can simply be extended to protect automakers in the event that negligence or insufficient maintenance on the part of an owner, dealer, or transporter was the primary cause of an accident.

One example would be the owner's neglect of the tires. Driving with worn out tires in autonomous mode would not affect the decision making of the car but could still result in an accident if the car were unable to grip properly the surface of the road. In such a case the negligent driver would be responsible for the accident rather than the computer. Another situation where the manufacturer would not be at fault is when maintenance is performed by someone not trained and licensed by the manufacturer. When this third party performs any work on the vehicle and, as a result, the vehicle fails to perform properly, then the liability would not rest with the manufacturer.

29 *60 Minutes*, (CBS television broadcast Oct. 4, 2015).

30 Matt Richtel, *Driverless Car's Nemesis? Drivers*, N.Y. Times, Sept. 2, 2015 at A1 (Continued on Page B6).

31 AUTONOMOUS | SELF-DRIVING VEHICLES LEGISLATION, <http://www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx> (last visited Nov. 22, 2015).

Currently, the process of filing after an accident is quite extensive and relies heavily on human memory in the face of a dramatic experience. When an accident occurs, after any necessary medical attention is provided, insurance information is exchanged, an accident is documented by responding police, and insurance claims are eventually filed.³² The detail and information included help to ensure claims are processed quickly and smoothly. As it stands, the information submitted includes eyewitness accounts and photographs. This information can provide helpful insight into the cause of an accident but at the same time is easily influenced by personal points of view and perceptions.

Autonomous vehicles help streamline the process in the case of an accident. One of the requirements of autonomous vehicles as stated in NAC-482A.190 includes the provision that the vehicle has a separate mechanism in addition to, and separate from, any other mechanism required by law, to capture and store the autonomous technology sensor data for at least 30 seconds before a collision occurs between the autonomous vehicle and another vehicle, object or natural person while the vehicle is operating in autonomous mode. The autonomous technology sensor data must be captured and stored in a read-only format by the mechanism so that the data is retained until extracted from the mechanism by an external device capable of downloading and storing the data. Such data must be preserved for 3 years after the date of the collision.³³

This preserved data allows for a streamlined process in which the actual event can be documented by a camera within the car. This decreases the chances of bias and human error being involved. By placing the burden of proof with the automakers a huge advantage is presented for all parties concerned after an accident.

This information brings accuracy and conclusiveness in the case of accidents. This information would protect automakers when their

32 4 STEPS TO FOLLOW AFTER A CAR ACCIDENT, <https://www.all-state.com/tools-and-resources/car-insurance/in-case-of-a-car-accident.aspx> (last visited Nov. 23, 2015).

33 NEVADA ADMINISTRATIVE CODE CHAPTER 482A - AUTONOMOUS VEHICLES, <http://www.leg.state.nv.us/NAC/NAC-482A.html> (last visited Nov. 22, 2015).

technology is not at fault. One example would be when an operator activates the autonomous mode but sets the desired speed of the vehicle above the legal limit. In this situation manufacturers and insurance providers would likely agree that the operator is at fault as they made the decision to exceed the speed limit. Another situation where an operator can be held at fault is when the autonomous driver is activated in a situation when it should not be used. In a law report by the University of Washington Law School, the authors propose that until reliability is proven, autonomous driving should be prohibited in situations of extreme weather including rain, fog, and high crosswinds.³⁴ If an operator were to activate the autonomous capabilities of a vehicle under prohibited conditions, the liability for any ensuing accident would be that of the operator.

V. CONCLUSION

Self-driving cars are a quickly approaching eventuality that many are looking forward to, but that few are preparing for. Some states have begun drafting legislation that will govern the licensing, safety, and operational requirements. Yet, little is being done to answer the questions of consumers, auto manufacturers, and insurance providers concerning liability in the event of an accident. All parties involved look forward to the safety benefits these computer-driven vehicles will offer. However, they do accept the reality that it is not possible to avoid all accidents. Therefore, in the event of an accident involving a self-driving vehicle in autonomous mode, the law needs to dictate who is responsible. The burden of proof will lie with the manufacturer as they control the vehicle's decision making.

34 Autonomous Vehicle Team, *Autonomous Vehicle Law Report and Recommendations to the ULC*, U. OF WASH., 7 (2014), <https://www.law.washington.edu/Clinics/technology/Reports/AutonomousVehicle.pdf>

