

Strict Liability: Imagining a Legal Framework for Autonomous Vehicles

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I. OVERVIEW

On May 7, 2016, Joshua Brown tragically died when his Tesla Model S car collided with a tractor-trailer making a left turn across traffic on a highway in Florida.¹ At the time of impact, Mr. Brown's car

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1. Will Oremus, *The Tesla Autopilot Crash Victim Was Apparently Watching a Movie When He Died*, SLATE (July 1, 2016, 7:43 PM), http://www.slate.com/blogs/moneybox/2016/07/01/tesla_autopilot_crash_victim_joshua_brown_was_watching_a_movie_when_he_died.html; Sam Levin & Nicky Woolf, *Tesla Driver Killed While Using Autopilot Was Watching Harry*

was controlled by Autopilot, which malfunctioned after its computer system got confused by sensing the bright sky.² The Autopilot is Tesla's version of a driver assistance system, which allows a "driver" to sit in the driver's seat of the vehicle as the car moves independently from a human operator.³

In January 2017, eight months after the accident, federal automotive safety policymakers determined that there were no defects in the Tesla Autopilot system and that there was no need for a recall of the system.⁴ In fact, according to a supplemental investigative report, the Autopilot system warned Mr. Brown that he should grab hold of the steering wheel seven times before Mr. Brown's fatal collision.⁵ Bryan Thomas, a spokesman for the National Highway Traffic Safety Administration (NHTSA) explained that there were some traffic situations that autopilots and braking systems are not able to address because the requisite technology has not been developed yet, and therefore this crash was part of the learning curve for the autonomous vehicle (AV) industry.⁶ Despite the alerts, Autopilot technology is merely a warning system, not a total accident elimination program.⁷ This creates a perplexing problem: cars using Autopilot or other similar autonomous features are still dispersed among other regular, exclusively human-operated, cars on the roadways, resulting in serious hazard and liability concerns. Are they more dangerous than regular vehicles? And, if so, should a higher liability standard be imposed upon AV manufacturers?

The purpose of this Comment is to suggest a strict liability framework for courts to use when AV cases arise. First, this Comment will explain what AVs are, how they operate, and some challenges AVs face moving forward. Second, this Comment will address why negligence is not a high enough standard and will instead propose the

Potter, Witness Says, GUARDIAN (July 1, 2016, 1:43 PM), <http://www.theguardian.com/technology/2016/jul/01/tesla-driver-killed-autopilot-self-driving-car-harry-potter>.

2. *Self Driving Cars and Insurance*, INS. INFO. INST. (July 2016), <http://www.iii.org/issue-update/self-driving-cars-and-insurance>.

3. Neal E. Boudette, *Tesla Upgrades Autopilot in Cars on the Road*, N.Y. TIMES (Sept. 23, 2016), http://www.nytimes.com/2016/09/24/business/tesla-upgrades-autopilot-in-cars-on-the-road.html?_r=0. Some current AV laws allow an AV to be operated without a human in the driver's seat. See *infra* notes 46-48.

4. Neal E. Boudette, *Tesla's Self Driving System Cleared in Deadly Crash*, N.Y. TIMES, (Jan. 19, 2017), <http://www.nytimes.com/2017/01/19/business/tesla-model-s-autopilot-fatal-crash.html>.

5. David Shepardson, *Man Killed in Tesla 'Autopilot' Crash Got Numerous Warnings*, REUTERS (June 19, 2017, 4:36 PM), <http://www.reuters.com/article/us-tesla-crash/tesla-driver-in-fatal-autopilot-crash-got-numerous-warnings-u-s-government-idUSKBN19A2XC>.

6. Boudette, *supra* note 4.

7. See *generally* Shepardson, *supra* note 5.

“dangerous instrumentality doctrine” as a possible solution. Ultimately, this Comment will argue that, while AVs are not dangerous instrumentalities, they should still be held to a strict liability standard. Last, this Comment will propose that AVs should be part of the strict liability standard by comparing them to aircrafts. In sum, the goal of this discussion is to suggest a framework for which courts could use when determining liability in AV accidents.

II. WHAT ARE AUTONOMOUS VEHICLES?

AVs are a form of robot that are capable of, through the use of a computer, making decisions about some or all of the vehicle’s movement with little to no human intervention.⁸ Through this process, the hope is that AVs will reduce accidents, make driving more efficient and enjoyable, and eventually lead to eliminating humans from playing any role in the driving process.⁹ However, AVs in their current stage are far from perfect.

A. *Autonomous Vehicle Technology*

AVs are able to travel without the intervention of a human operator by using a combination of GPS, LIDAR, radar sensors, ultrasound sensors, cameras, vehicle-to-vehicle technology, and vehicle-to-infrastructure technology.¹⁰ In essence, the AV’s computer takes all of the information it has collected through these processes and plans the vehicle’s next movement almost instantaneously.¹¹ The computer then simultaneously builds an “internal live representation of all of the objects

8. See Harry Surden & Mary-Anne Williams, *Technological Opacity, Predictability, and Self-Driving Cars*, 38 CARDOZO L. REV. 121, 132 (2016). A robot can be defined by the following five characteristics test:

(1) size; (2) mobility; (3) connectivity, in the sense that the machine can receive and transmit information; (4) “autonomy” to respond to outside input by independently engaging in physical motions; and (5) “intelligence,” which refers to the rate at which the machine can receive, evaluate, use, and transmit information, and the extent, if any, to which it can learn from experience and use this learning in determining future responses.

F. Patrick Hubbard, *“Sophisticated Robots”*: *Balancing Liability, Regulation, and Innovation*, 66 FLA. L. REV. 1803, 1807 (2014).

9. See generally Kevin Funkhouser, *Paving the Road Ahead: Autonomous Vehicles, Products Liability, and the Need for a New Approach*, 2013 UTAH L. REV. 437, 451 (2013).

10. NAT’L COUNCIL ON DISABILITY, SELF-DRIVING CARS: MAPPING ACCESS TO A TECHNOLOGY REVOLUTION 15 (Nov. 2, 2015) [hereinafter DISABILITY REPORT], http://www.ncd.gov/sites/default/files/NCD_AutomatedVehiclesReport_508-PDF.pdf. GPS stands for global positioning system. LIDAR stands for light detection and ranging and incorporates an elaborate system of laser and sensor to function.

11. Surden & Williams, *supra* note 8, at 147.

immediately around the vehicle” to decide what the vehicle will do next.¹²

AVs “learn” by a process commonly referred to as “machine learning.”¹³ In this scheme, an AV’s computer learns rules by encountering examples, not by a human programming the computer with a specific code.¹⁴ Since driving is so complicated and involves so many variables, to avoid accidents, an AV’s computer must learn by encountering countless maneuvers and tasks.¹⁵ The risk of hazard never is fully reduced because of the infinite scenarios a vehicle may face, and thus accidents will still inevitably occur.¹⁶

There are various levels of autonomy as defined by the Society of Automotive Engineers (SAE).¹⁷ Autonomous vehicles are classified by a five-level system according to the SAE International system. Accordingly:

- At SAE Level 0, the human driver does everything;
- At SAE Level 1, an automated system on the vehicle can *sometimes assist* the human driver conduct *some* parts of the driving task;
- At SAE Level 2, an automated system on the vehicle can actually conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task;
- At SAE Level 3, an automated system can both actually conduct some parts of the driving task and monitor the driving environment in *some instances*, but the human driver must be ready to take back control when the automated system request;
- At SAE Level 4, an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions; and

12. *Id.* Objects include, but are not limited to, other vehicles, pedestrians, bicycles, static objects, traffic patterns, traffic flow, and traffic rules.

13. *Id.*

14. *Id.* at 147-48.

15. *Id.* at 147.

16. In theory, once there is an AV infrastructure consisting of an intricately connected network of fully autonomous vehicles in place, accidents would be eliminated. *See also Hands Off: The Future of Self-Driving Cars: Hearing on S. 114-16 Before the S. Comm. on Commerce, Sci., & Transp.*, 114th Cong. 13 (2016) [hereinafter *Hearings*] (statement of Dr. Chris Urmson, Director, Self Driving Cars, Google(x)).

17. SAE INT’L, AUTOMATED DRIVING: LEVELS OF DRIVING AUTOMATION ARE DEFINED IN THE NEW SAE INTERNATIONAL STANDARD J3016 (2014), http://www.sae.org/misc/pdfs/automated_driving.pdf.

- At SAE Level 5, the automated system can perform all driving tasks, under all conditions that a human driver could perform them.¹⁸

Because of the current and near-future advancement in technology, this Comment will only discuss partially autonomous vehicles (excluding Level 5). Partially autonomous vehicles are ones that still require some sort of human intervention when operating in order to prevent an accident regardless of whether a human operator is in the driver's seat of the vehicle.¹⁹

B. Crash Statistics

In 2015 alone, 35,092 people died in fatal car crashes on U.S. roadways.²⁰ Car crashes are the leading cause of death in the United States.²¹ The invention of the AV marks the next frontier in driving and driver safety and could prove to be “one of the greatest safety advances in decades.”²² Car manufacturers in particular hope that one day AVs will control the roadways, making driving a safer activity.²³ However, the technology still has a long way to go. For instance, Nissan reported that human intervention in AVs was required once every 247 miles in 2016 as compared to every 14 miles in 2015, showing a small step in the right direction, but that accidents still frequently occur.²⁴

18. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP'T OF TRANSP., FEDERAL AUTOMATED VEHICLES POLICY 9-10 (Sept. 2016) (emphasis omitted) [hereinafter NHTSA REPORT], <http://www.transportation.gov/sites/dot.gov/files/docs/AV%20policy%20guidance%20PDF.pdf>. In addition, the Department of Transportation (DOT):

draws a distinction between Levels 0-2 and 3-5 based on whether the human operator or the automated system is primarily responsible for monitoring the driving environment. Throughout this Policy the term “highly automated vehicle” (HAV) represents SAE Levels 3-5 vehicles with automated systems that *are responsible for monitoring the driving environment*.

Id.

19. Surden & Williams, *supra* note 8, at 133.

20. *General Statistics*, INS. INST. FOR HIGHWAY SAFETY & HIGHWAY LOSS DATA INST. (Nov. 2016), <http://www.iihs.org/iihs/topics/t/general-statistics/fatalityfacts/overview-of-fatality-facts>.

21. HOUSE AUTONOMY VEHICLE TECH. STUDY COMM., FINAL AUTONOMOUS VEHICLE COMMITTEE REPORT, 3 (Ga. 2014) [hereinafter GEORGIA REPORT], http://www.house.ga.gov/Documents/CommitteeDocuments/2014/Autonomous_Vehicles/Final%20Autonomous%20Vehicle%20Committee%20Report.pdf.

22. Funkhouser, *supra* note 9, at 451 (citing Sebastian Thrun, *What We're Driving at*, GOOGLE OFFICIAL BLOG (Oct. 9, 2010, 5:46 PM), <http://www.googleblog.blogspot.com/2010/10/what-were-driving-at.html>).

23. *Id.*

24. Alex Davies, *Numbers Don't Lie, Self-Driving Cars Are Getting Good*, WIRED (Feb. 1, 2017, 5:14 PM), <http://www.wired.com/2017/02/california-dmv-autonomous-car-disengagement/>.

By some estimations, it takes up to seventeen seconds for a human operator to fully take back the controls of an AV.²⁵ In many instances, this means that a human operator cannot safely regain controls to prevent accidents.²⁶ Accidents can occur in less than a second. Comparatively, a driver of an ordinary car relies on instincts and perception of the road to avoid accidents. That driver might slam on the breaks, swerve, or accelerate quickly in order to avoid a collision. If a human operator of an AV is required to retake controls of the AV, by the time he or she overrides the computer and decides how to avoid an accident, it is already too late. Thus, if a human operator cannot take back the controls in time, cars are “acting” on their own and pose a major hazard to other drivers (especially those who are operating regular vehicles), as well as pedestrians, cyclists, or any other obstacles that may appear on the road.²⁷ Yet, AVs themselves cannot be sued, and if they are responsible for accidents, or the blame for an accident is shifted to them from passive human operators, how will liability be assessed?

Public mistrust and hesitation about AVs safety and the speed at which they will be user-ready is very prevalent. For instance, at a recent conference, 500 AV experts were asked if and when they would “trust a fully robotic car to take their children to school. More than one in two responded 2030 at the very earliest, one in five said not until 2040, and roughly [one] in [ten] said never.”²⁸

C. *Car Manufacturers vs. Legislative Reality*

A well-established system for assessing blame and fault for human-operated automotive accidents currently exists. However, no easy solution exists or is available for state legislatures or courts to deal with the problem of accident aftermath involving AVs. AVs are used in such a limited capacity right now, compared to regular car usage, that legislatures are not likely to fully address these issues now or in the near

25. *Hearings, supra* note 16 (statement of Dr. Chris Urmsen, Director, Self Driving Cars, Google(x) citing NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., HUMAN FACTORS EVALUATION OF LEVEL 2 AND LEVEL 3 AUTOMATED DRIVING CONCEPTS (Aug. 2015)).

26. *See id.*

27. *See* Surden & Williams, *supra* note 8, at 173.

28. DISABILITY REPORT, *supra* note 10, at 15 (citing Lee Gomes, *Urban Jungle a Tough Challenge for Google's Autonomous Cars*, MIT TECH. REV. (July 24, 2014), <http://www.technologyreview.com/news/529466/urban-jungle-a-tough-challenge-for-googles-autonomous-cars/>). Another study conducted in 2016 by AAA reported that only one in five American drivers would “trust” a self-driving car. *Hearings, supra* note 16, at 22 (statement of Glen W. De Vos, Vice President, Global Engineering and Services, Delphi Automotive).

future.²⁹ Uncertainty remains. Both Ford and BMW have announced that fully autonomous vehicles most likely will not be ready until 2021.³⁰ Even so, 2021 seems like a lofty goal to some. Car manufacturers have yet to properly teach AVs to traverse certain weather conditions and certain scenarios where it may be necessarily safer for an AV to break the law (even though this would contradict how AVs are programmed to act).³¹ However, the Insurance Institute for Highway Safety (IIHS) predicts there will be 3.5 million AVs by 2025 and 4.5 million AVs by 2030.³² In addition, the IIHS added that these AVs would not be fully autonomous.³³ This shows a rapid increase in production and thus an increasing need for establishing laws.

D. *The Uncertainty of Safety Precautions and State Legislation*

In practice, AVs are much different than ordinary cars. Safety precautions in AVs have not been sufficiently proven and still are quite unpredictable. For instance, Waymo, Google's AV branch and one of the pioneers in the AV industry, boasts that its AVs have driven over 1.4 million miles as of March 2016.³⁴ Yet, RAND Corporation, a nonprofit institution dedicated to research and market analysis that helps shape policy and decision making, cautions that in order to "verify self-driving cars are as safe as human drivers, 275 million miles must be driven fatality free."³⁵

Driving 1.4 million miles seems like a considerable amount since it would take the average individual driver about 108 years to put the same

29. As of March 2017, there are no reported legal decisions involving AVs.

30. Jamie Condliffe, *2021 May Be the Year of the Fully Autonomous Vehicle*, MIT TECH. REV. (Aug. 17, 2016), <http://www.technologyreview.com/s/602196/2021-may-be-the-year-of-the-fully-autonomous-car/> (showing that Ford and BMW both predict fully autonomous vehicles to be ready by then; however, other major car manufacturers, such as Volvo and Mercedes Benz, have not announced a release date).

31. Rachael Metz, *Ford CEO Explains Why It's Hard To Build Self Driving Cars*, MIT TECH. REV. (Jan. 7, 2016), <http://www.technologyreview.com/s/545266/ford-ceo-explains-why-its-hard-to-build-self-driving-cars/>.

32. *Self Driving Cars and Insurance*, *supra* note 2.

33. *Id.*

34. *Hearings*, *supra* note 16, at 11 (statement of Dr. Chris Urmson, Director, Self Driving Cars, Google(x)). Waymo recently estimated Google's AVs have logged over 2 million miles driven as of March 2017. See *Journey*, WAYMO, <http://waymo.com/journey/> (last visited Apr. 1, 2017).

35. *Hearings*, *supra* note 16, at 30 (statement of Mary Cummings, Director, Humans and Autonomy Laboratory, Duke University); see RAND, <http://www.rand.org> (last visited Mar. 28, 2017).

distance on his or her car.³⁶ But to put this statistic in perspective, New York City cab drivers drive a combined 1.4 million miles in just over a day.³⁷ This confirms the drastic difference between AV use and ordinary car use, since ordinary cars are driving millions more miles every day than AVs, and how rare AVs are comparatively. Furthermore, in California, only 180 AVs are on its roadways.³⁸ This figure is miniscule compared to the over 24.4 million registered cars in California.³⁹ Car manufacturers, such as Google, have a financial incentive to show AVs are more ubiquitous than they really are and to boast about misleading progress.⁴⁰ The data shows AVs are far from mainstream on the roadways and are largely untested.

Nevertheless, state lawmakers have begun to attempt to tackle AV problems through legislation. Currently, thirty-four states promote legislation relating to AVs.⁴¹ Twenty states introduced legislation relating to AVs in 2016 alone.⁴² California, Florida, Michigan, Nevada, North Dakota, and the District of Columbia are the only jurisdictions to allow AVs on their roads.⁴³ On the federal level, the NHTSA has modernized its policy on AVs in attempts to increase their safe use during the fast improvement in technology.⁴⁴ The rapid uptick indicates just how fast the technology is changing and the need for laws to modernize in order to keep pace.

36. See *Hearings*, *supra* note 16, at 13 (statement of Dr. Chris Urmson, Director, Self Driving Cars, Google(x)) (showing that the average American puts about 13,000 miles on his or her car per year).

37. *Id.* at 28. In 2015, Americans drove over 3.1 trillion miles. Press Release, U.S. Dep't of Transp., U.S. Driving Tops 3.1 Trillion Miles in 2015, New Federal Data Shows (Feb. 22, 2016), <http://www.fhwa.dot.gov/pressroom/fhwa1607.cfm>.

38. Tim Bradshaw, *Self-Driving Car Numbers Double on California Roadways*, FIN. TIMES (Mar. 9, 2017, 5:14 PM), <http://www.ft.com/content/4377b4c0-0479-11e7-aa5b-6bb07f5c8e12>. Statistics indicate that this number is growing exponentially.

39. STATE OF CAL. DEP'T OF MOTOR VEHICLES, STATISTICS FOR PUBLICATION: JANUARY THROUGH DECEMBER 2016 (Mar. 2017), <http://www.dmv.ca.gov/portal/wcm/connect/5aa16cd3-39a5-402f-9453-0d353706cc9a/official.pdf?MOD=AJPERES>.

40. See *generally Hearings*, *supra* note 16.

41. *Autonomous Vehicles / Self-Driving Vehicles Enacted Legislation*, NAT'L CONF. ST. LEGISLATURES (Feb. 21, 2017), <http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx>.

42. *Id.*

43. See *id.* A total of twenty states, plus the District of Columbia, have passed legislation relating to autonomous vehicles. These states are Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Louisiana, Michigan, New York, Nevada, North Carolina, North Dakota, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, and Vermont. *Self Driving Cars and Insurance*, *supra* note 2.

44. *Self Driving Cars and Insurance*, *supra* note 2. The NHTSA also stated that they are planning on unveiling a plan to deal with fully autonomous vehicles but have not unveiled it yet.

State legislation also exemplifies the abundance of caution states take towards AVs. Commentators note, “[E]xisting laws do not directly address the determination of liability in a collision involving an autonomous car.”⁴⁵ While each state has its own unique way of allowing AV technology, much of the substantive content is consistent among the states that have enacted legislation.⁴⁶ Each state imposes strict provisions as to how AVs are allowed to operate, who can operate them, and conditions that are required for proper operation.⁴⁷ For instance, operators must be licensed drivers and must be employed as part of the car manufacturers’ team.⁴⁸ In other words, a person cannot simply walk into a car dealership, purchase an AV, and have it drive him or her home.⁴⁹ States have a long road ahead of them to figure out the best way to deal with AVs.

In September 2017, legislation broke through on the federal level.⁵⁰ The House of Representatives orally passed the SELF DRIVE Act, an initiative promoting consumer safety, AV safety standards, and technology development.⁵¹ While a small step, the Act is a positive step for AV advancement and acceptance into the mainstream.

III. PROPOSING A STRICT LIABILITY STANDARD: ARE AUTONOMOUS VEHICLES A DANGEROUS INSTRUMENTALITY?

One of the central foundations to a car accident is the age-old question—who is at fault? Generally, when an ordinary driver gets in a car accident, the accident is caused by human error.⁵² Out of all car

45. Sophia H. Duffy & Jamie Patrick Hopkins, *Sit, Stay, Drive: The Future of Autonomous Car Liability*, 16 SMU SCI. & TECH. L. REV. 453, 455 (2013) (citing Gary E. Marchant & Rachel A. Lindor, *The Coming Collision Between Autonomous Vehicles and the Liability System*, 52 SANTA CLARA L. REV. 1321, 1322 (2012)).

46. See generally Assemb. B. 1592, 2015-2016 Sess. (Cal. 2016); H.B. 7027, 2016 Leg. (Fla. 2016); S.B. 995, 98th Leg., Reg. Sess. (Mich. 2016); S.B. 996, 98th Leg., Reg. Sess. (Mich. 2016); S.B. 313, 2013 Leg., 77th Sess. (Nev. 2013); S.B. 1298, 2011-2012 Sess. (Cal. 2012); B. 19-931, 2012 Sess. (D.C. 2012); H.B. 1207, 2012 Sess. (Fla. 2012); Assemb. B. 511, 2011 Leg., 76th Sess. (Nev. 2012).

47. See Assemb. B. 1592; H.B. 7027; S.B. 995; S.B. 996; S.B. 313; S.B. 1298; B. 19-931; H.B. 1207; Assemb. B. 511.

48. S.B. 1298; H.B. 1207; cf. B. 19-931 (enacted as D.C. Act 19-643 without a formal requirement of the AV operator/driver being under the car manufacturer’s umbrella).

49. This scenario is what the landscape could look like when fully autonomous cars become the norm and they are fully integrated.

50. See generally Cecilia Kang, *Self-Driving Cars’ Prospects Rise with Vote by House*, N.Y. TIMES (Sept. 6, 2017), <http://www.nytimes.com/2017/09/06/technology/self-driving-cars-prospects-rise-with-vote-by-congress.html>.

51. *Id.*; see H.R. 3388, 115th Cong. (2017) (as passed by House of Representatives, Sept. 6, 2017).

52. See *Hearings*, *supra* note 16, at 13.

crashes that occur, an astonishing 94% can be traced back to human error.⁵³ In a car accident, the injured party may bring suit for negligence.⁵⁴ For an injured party to prevail, he or she must prove (1) duty, (2) breach, (3) cause, and (4) damages.⁵⁵ Presumably, when an accident occurs involving an AV, the same negligence elements apply to the operators/passengers in charge of the AVs. However, AVs are more complicated, and the rules surrounding them remain uncharted. There is a need for a more thorough form of liability.

A. *The Dangerous Instrumentality Approach*

Perhaps one answer to these challenges is to impose a higher class of liability for AVs.⁵⁶ Under the law of negligence, some activities are held to a higher standard known as strict liability.⁵⁷ Strict liability is a standard set in which individuals must exercise “the utmost care to prevent the harm” and includes activities such as operating dangerous instruments.⁵⁸ Strict liability is accepted in various forms in different jurisdictions. However, strict liability remains the minority approach among jurisdictions, and what constitutes strict liability varies from jurisdiction to jurisdiction.⁵⁹ A special subset of strict liability addresses instruments that are so dangerous, they must be subject to strict liability.

Courts routinely apply a balancing test to potentially dangerous instrumentalities. Generally, if an instrument (or activity) fits the factors, courts may find strict liability.⁶⁰ To determine whether an activity may be

53. NHTSA REPORT, *supra* note 18, at 6.

54. *See Negligence*, LEGAL INFO. INST. (2017), <http://www.law.cornell.edu/wex/negligence>.

55. *Id.*

56. For the sake of this Comment and argument, I am assuming that there are still regular vehicles, pedestrians, and obstacles on the road with AVs. Further, this Comment is based on the current state of AVs and the state of AVs in the next several years, not a state where AVs are the only vehicles on the road and are all connected to each other by an elaborate network. In addition, injured parties in AVs may also have other causes of action. These include but are not limited to negligence claims against the AV manufacturer, products liability claims, and products defect claims. This Comment will not address these causes of action.

57. RESTATEMENT (SECOND) OF TORTS § 519 (AM. LAW INST. 1977). For purposes of this Comment, this is the general definition I will use. The *Restatement Third of Torts* is silent on “abnormal dangerous activities,” and this Comment will not discuss it. *See generally* RESTATEMENT (THIRD) OF TORTS (AM. LAW INST. 2009).

58. RESTATEMENT (SECOND) OF TORTS § 519(1). Strict liability also applies to abnormally dangerous activities. Some examples of types of abnormally dangerous activities include keeping explosives in a dangerous place, keeping water in a dangerous place, or releasing poisonous gas into the atmosphere. *Id.* § 519 Reporter’s note.

59. *See generally* Nolan & Ursin, *infra* note 93 (outlining the various ways individual state have adopted sections 519 and 520).

60. *See* RESTATEMENT (SECOND) OF TORTS § 520.

subject to strict liability for being too dangerous, the following factors are taken into consideration:

- (a) [the] existence of a high degree of risk of some harm to the person . . . ;
- (b) [the] likelihood that the harm that results from it will be great;
- (c) [the] inability to eliminate the risk by the exercise of reasonable care;
- (d) [the] extent to which the activity is not a matter of common usage;
- (e) [the] inappropriateness of the activity to the place where it is carried on; and
- (f) [the] extent to which its value to the community is outweighed by its dangerous attributes.⁶¹

To be abnormally dangerous, and hence considered a dangerous instrumentality, all of the factors do not have to be satisfied.⁶² Courts apply the relevant factors to decide whether the doctrine applies on a case-by-case basis.⁶³ Further, these sorts of activities must create “a danger of physical harm to others” and be abnormal or unusual.⁶⁴ Some activities, such as operating a common car, have become such common occurrences that even when they pose a risk of serious harm, they are still not abnormally dangerous instruments.⁶⁵ Should AVs be considered “abnormally dangerous” instruments?⁶⁶

AVs are not similar to traditional examples that meet the test for dangerous instrumentalities in case law. In *Smith v. Lockheed Propulsion Co.*, the court ruled that the dangerous instrumentality doctrine should be applied after the defendant test-fired a solid rocket motor that caused seismic vibrations because of the severe danger it imposed.⁶⁷ Likewise, the *Siegler v. Kuhlman* court applied the dangerous instrumentality doctrine after a woman was killed in a “gasoline explosion when her car encountered a pool of thousands of gallons of spilled gasoline.”⁶⁸ The court reasoned that hauling gasoline at a high speed was an extremely dangerous activity that posed a risk to others.⁶⁹

61. *Id.*

62. *Id.*

63. *See id.*

64. *Id.* cmt. f.

65. *Id.* cmt. i. *But see* Page v. Collette, 44 R.I. 26 (R.I. 1921) (finding that an uncontrollable car became a dangerous instrumentality).

66. However, some vehicles are considered so unusual and difficult to safely control that they are considered dangerous instrumentalities.

67. *Smith v. Lockheed Propulsion Co.*, 247 Cal. App. 2d 774, 791-92 (Ca. Ct. App. 1967).

68. *Siegler v. Kuhlman*, 502 P.2d 1181, 1182 (Wash. 1972).

69. *Id.* at 1185-86. The court also noted,

In contrast, however, courts are “almost unanimous in holding” that automobiles are not dangerous instrumentalities.⁷⁰

B. Autonomous Vehicles Are Not Dangerous Instrumentalities: The Lesson of Ordinary Cars and Liability Insurance

An AV is not an inherently dangerous object and fails the dangerous instrumentality factors. Even though accidents will still occur, by definition, AVs are intended to make driving safer.⁷¹ Intuitively, operating an AV is not a dangerous activity like testing a rocket or driving a gasoline tanker at a high speed. Rather, on its face, AV liability should be approached like automobile liability as case law suggests.⁷² They act in similar ways on the road (albeit the way their movement is controlled is different), and they are capable of causing the same amount of damage to other motorists, pedestrians, or bystanders as an ordinary car would in a crash. However, AVs should be treated differently than ordinary cars.

Because AV technology is so advanced and intricate, answering why AVs are different than ordinary cars and how a court would rule when faced with an AV case is difficult to determine.⁷³ A few examples offer some guidance. First, courts apply the dangerous instrumentality standard more frequently the more unusual and hazardous an activity is.⁷⁴ Second, a committee in the Georgia House of Representatives provides one perspective on the strict liability standard in an AV context.⁷⁵ They caution that holding human drivers/operators of AVs to this sort of strict liability standard would “commercialize automated vehicles quickly” because AV operators are tasked with needing to take over the AV controls quickly to prevent an accident.⁷⁶

[E]ven the most prudent and careful motorist, coming unexpectedly and without warning upon this gasoline pool and vapor, could have driven into it and ignited a holocaust without knowledge of the danger and without leaving a trace of what happened to set off the explosion and light the searing flames.

Id. at 1186.

70. *Dangerous Instrumentality Doctrine as Applied to the Automobile*, 16 A.L.R. 270 (originally published in 1922). *But cf.* *S. Cotton Oil v. Anderson*, 80 Fla. 441 (Fla. 1920) (holding that an automobile was a dangerous instrumentality when operated on a public highway).

71. *See* Funkhouser, *supra* note 9, at 451.

72. *See generally supra* notes 69-70 and accompanying text.

73. Hubbard, *supra* note 8, at 1833.

74. This is shown through the comments and notes as provided in the Restatement. *See generally* RESTATEMENT (SECOND) OF TORTS (AM. LAW INST. 1977).

75. GEORGIA REPORT, *supra* note 21, at 4. As alluded to, as of March 2017, Georgia has not passed legislation allowing AVs on its roads.

76. *Id.*

Third, and most significantly, in states where AV legislation exists, legislatures have instituted much higher liability minimums as compared to ordinary cars.⁷⁷ Most state legislatures with enacted AV laws require operators to be covered by a \$5,000,000 insurance policy in order to be able to operate an AV.⁷⁸ Michigan has enacted even stricter laws by requiring operators to carry a \$10,000,000 policy.⁷⁹ By forcing manufacturers to carry such large insurance policies for AV operators, state legislatures are signaling that operating an AV is a hazardous and unpredictable activity. Operators must be held to higher safety and caution standards than ordinary drivers. The Georgia House of Representatives has suggested an approach similar to Florida's AV insurance requirement for when it enacts AV legislation itself.⁸⁰ On some level, states must think that AVs pose a higher risk of danger than ordinary cars and thus require much higher insurance coverage as a result.

Even states with relaxed AV minimum coverages, namely California and Florida, have enacted heightened restrictions for AVs.⁸¹ While recognizing AV technological improvements from increased testing, these states no longer require a human operator to be in the "driver's seat" when the vehicle is operating autonomously.⁸² At the same time, eliminating a human in the driver's seat makes AVs "inherently . . . 'uncontrollable'" because the human operator cannot take back the controls if something goes wrong.⁸³ However, California requires this special set of AVs to maintain a speed of less than 35 MPH at all times.⁸⁴ This points to California's reluctance to fully accept AV safety. Slowly, states are recognizing that AV technology is getting better and making driving safer.⁸⁵ In sum, states are still extremely cautious and fearful of AV safety. Although AVs do not meet the test for dangerous instrumentalities, they are still perceived by states as hazardous and thus should be held to a higher liability standard.

77. See generally Assemb. B. 1592, 2015-2016 Sess. (Cal. 2016); H.B. 7027, 2016 Leg. (Fla. 2016).

78. See S.B. 1298, 2011-2012 Sess. (Cal. 2012); H.B. 1207 (Fla. 2012); cf. B. 19-931, 2012 Sess. (D.C. 2012).

79. S.B. 995, 98th Leg., Reg. Sess. (Mich. 2016).

80. GEORGIA REPORT, *supra* note 21, at 4 (citing H.B. 1207 (Fla. 2012)).

81. See generally Assemb. B. 1592; H.B. 7027.

82. See Assemb. B. 1592; H.B. 7027.

83. Duffy & Hopkins, *supra* note 45, at 460.

84. Assemb. B. 1592.

85. These sorts of changes in legislation are steps in the right direction for the AV industry.

IV. THE SOLUTION: STRICT LIABILITY AS A LOGICAL APPROACH

As this Comment discusses, AVs are more hazardous than ordinary cars. Likewise, state legislatures have not made sense of what to do about them, so they have adopted strict standards as a remedy for the potential danger they can cause. A viable solution is as follows: courts should apply a strict liability approach as a buffer against all the unknowns surrounding AVs. This approach follows the path courts took for airplanes when they were first introduced into the mainstream.

A. *Strict Liability Cases*

AVs should be considered part of the special exception within strict liability provided for courts dealing with the advent of airplanes. This is a much more logical framework under which AVs should fall.⁸⁶ The concept of strict liability originates in old English law following the *Rylands v. Fletcher* decision.⁸⁷ In *Rylands*, the defendant owned a mill and reservoir on land.⁸⁸ Mining shafts lay beneath the reservoir.⁸⁹ When the reservoir was filled, the mine shafts burst, flooding plaintiff's nearby coal mines.⁹⁰ Plaintiff ultimately prevailed under a newly constructed strict liability theory.⁹¹ This newfound strict liability theory was embodied in Justice Blackburn's famous conclusion from the Court of Exchequer decision:

[T]he person who for his own purposes brings on his lands and collects and keeps there anything likely to do mischief if it escapes, must keep it in at his peril, and, if he does not do so, is primâ facie answerable for all the damage which is the natural consequence of its escape.⁹²

In other words, a person takes a big chance owning a hazardous material, and that person bears the risk of it injuring another or another's land. If it causes injury, that person is liable.

86. Another likely connection between AVs and strict liability is in the products liability context. See Andrew M. Brown, *Blame It on the Machines: How Autonomous Vehicles Will Impact Allocation of Liability Insurance and the Resulting Impact on the Legal Community*, 95 N.C. L. REV. ADDENDUM 29, 43-47 (2016). This Comment will not address these issues.

87. *Rylands v. Fletcher*, [1868] 3 LR HL 330 (Eng.).

88. *Id.* at 331.

89. *Id.* at 331-32.

90. *Id.* at 332.

91. *Id.* at 340.

92. *Id.* at 339 (quoting *Fletcher v. Rylands*, [1866] 1 LR Exch. 265 at 279 (Eng.)).

Scholars noted that this early rule did not catch on quickly in U.S. courts.⁹³ Instead, they argue that it remained dormant until the 1970s with a few carve-outs along the way.⁹⁴ One carve out, strict liability for ground damage caused by aircraft, offers a salient point of comparison.⁹⁵

The Restatement asserts a strict liability carve out for ground damage caused by aircraft.⁹⁶ As of 1977, Restatement framers from the American Law Institute (ALI) felt that

aviation ha[d] not yet reached the stage of development where the risks of accidental physical harm to persons or to land or to chattels on the ground is properly to be borne by those who suffer the harm, rather than the industry itself.⁹⁷

Further, the ALI scholars also say that there are still very few people, relatively to the general population, who participate in aviation activities.⁹⁸ Thus, the Restatement takes the approach that if a new, unique, and relatively unexplored industry causes damage or injury, then that particular industry is subject to strict liability. However, this approach is met with confusion by courts that have been reluctant to accept the strict liability approach.⁹⁹

For instance, New York, both on the state and federal level, initially accepted strict liability for aviation but now rejects it.¹⁰⁰ In *Cristi v. Civil*

93. Virginia E. Nolan & Edmund Ursin, *The Revitalization of Hazardous Activity Strict Liability*, 65 N.C. L. REV. 257, 261 (1987). Often the theory of trespass is cited as part of the rationale for this type of strict liability. This Comment does not address it.

94. See generally *id.* at 261-74, 285-93. It is important to note that the *Restatement Second of Torts*, one of the primary points of comparison, was finalized in 1977. Another strict liability carve out that many states have made is for dog bites. Some argue that existing dog bite strict liability statutes are closely analogous to potential AV liability statutes. See Duffy & Hopkins, *supra* note 45, at 467-73.

95. The *Restatement First of Torts* noted that “aviation in its present stage of development is ultrahazardous.” RESTATEMENT (FIRST) OF TORTS § 520 cmt. b (AM. LAW INST. 1939).

96. According to the *Restatement Second of Torts*,

If physical harm to land or to persons or chattels on the ground is caused by the ascent, descent or flight of aircraft, or by the dropping or falling of an object from the aircraft,

- (a) the operator of the aircraft is subject to liability for the harm, even though he has exercised the utmost care to prevent it, and
- (b) the owner of the aircraft is subject to similar liability if he has authorized or permitted the operation.

RESTATEMENT (SECOND) OF TORTS § 520 A (AM. LAW INST. 1977).

97. *Id.* at cmt. c.

98. *Id.* at cmt. d.

99. Nolan & Ursin, *supra* note 93, at 305.

100. See *Cristi v. Civil Air Patrol*, 53 Misc. 2d 289 (N.Y. Civ. Ct. 1967) (outlining a brief history of aviation strict liability law). See generally *Rochester Gas & Elec. Corp. v. Dunlop*, 148 Misc. 849 (N.Y. Civ. Ct. 1933) (holding absolute liability applied after an airplane struck and electric transmission tower); *Margosian v. U.S. Airlines*, 127 F. Supp. 464 (D. N.Y. 1955); *Hahn v. U.S. Airlines*, 127 F. Supp. 950 (D. N.Y. 1954); but see generally *Wood v. United Airlines*, 32

Air Patrol, the court stated in dicta that “[t]echnological advances and development, . . . have dissipated the universal early fears that flying was an ultrahazardous occupation.”¹⁰¹ Mississippi followed a similar approach.¹⁰² In *T.L. Brunt v. Chicago Mill & Lumber Co.*, the court noted that twenty-one states had adopted a strict liability approach in some way but have deviated considerably from the original strict liability approach.¹⁰³ The court added that aviation “fixes a greater degree of responsibility” because airplanes require a greater degree of care than an “instrumentality which is incapable of inflicting serious injury” but ultimately rejected this higher standard for aviation in favor of simple negligence.¹⁰⁴

Yet, some courts still apply strict liability for aviation cases.¹⁰⁵ In *Parcell v. United States*, two Air Force planes crashed into a hill, killing both pilots, destroying the planes, and damaging property surrounding the crash site.¹⁰⁶ As the United States District Court for the Southern District of West Virginia toyed with a *res ipsa loquitur* theory to determine the cause of the crash, it ultimately held the defendant liable under a strict liability standard, regardless of the real reason for the crash.¹⁰⁷

B. *Why Strict Liability? Autonomous Vehicles Are More Like Airplanes Than Regular Cars*

Rules like compulsory insurance plans for individual drivers point toward the need for a strict liability approach.¹⁰⁸ The theory is that strict liability should apply due to loss spreading and fairness to pedestrians or other motorists who are injured by hazardous activity.¹⁰⁹ As of March 2017, all states except New Hampshire require some form of liability insurance for ordinary drivers.¹¹⁰ Thus, drivers are aware that they are

Misc. 2d 955 (1961), *aff'd*, 16 A.D.2d 659 (N.Y. Civ. Ct. 1962) (rejecting the use of strict liability for aviation cases).

101. *Cristi*, 53 Misc. 2d at 291.

102. *See* T.L. Brunt v. Chi. Mill & Lumber Co., 243 Miss. 607, 613 (Miss. 1962).

103. *Id.* at 613.

104. *Id.* at 613-14. Similarly, California courts also apply simple negligence to aviation. *See* Boyd v. White, 128 Cal. App. 2d 64, 98 (Cal. Ct. App. 1954); S. Cal. Edison v. Coleman, 150 Cal. App. 2d Supp. 829, 831 (Cal. Ct. App. 1957).

105. *See* Parcell v. United States, 104 F. Supp. 110, 113 (S.D. W. Va. 1951).

106. *Id.* at 111-12.

107. *Id.* at 115.

108. Nolan & Ursin, *supra* note 93, at 295.

109. *Id.*

110. *Compulsory Auto/Uninsured Motorists*, INS. INFO. INST. (Mar. 2017), <http://www.iii.org/issue-update/compulsory-auto-uninsured-motorists>.

paying for coverage, and if they do not drive safely, their rates will increase.¹¹¹ In theory, AV operators would then be hyperaware of their insurance coverage since the insurance requirement is so high.¹¹² Some groups, such as the RAND Corporation, have proposed a centralized system for AV insurance.¹¹³ Others argue that the burden will fall on the car manufacturer to defend against liability, just like an airplane manufacturer would if there was an airplane crash.¹¹⁴

AVs should be treated more like airplanes than automobiles. Like airplanes travelling on autopilot, AV operators need to be on high alert.¹¹⁵ One agency even argues that

while a pilot and a driver both need to be able to make split-second decisions, there are likely to be fewer times when this skill is called upon in a plane than in a car and, in addition, the pilot is highly trained in how to interact with the automated system.¹¹⁶

In a regular car, a human driver is free to react as soon as he or she senses a hazard or problem. The driver is fully responsible for controlling the vehicle. The same is true for an aircraft pilot. For instance there are federal regulations requiring the pilot to manually control the aircraft on takeoff and when it reaches an altitude of 500 feet of landing.¹¹⁷ Even when the plane flies on autopilot, the pilot is next to the controls and has sufficient time to retake the reins of the plane if necessary.¹¹⁸ An AV is different in that operators have little time to override the computer system on an AV that operates solely on its own. The danger of an AV goes even further because there are many more obstacles for an AV to navigate. A human operating an AV would have to intervene much more frequently than an airplane pilot. Courts should take note of this risk.

111. *See id.*

112. *See* Nolan & Ursin, *supra* note 93 (discussing states' insurance policy requirements).

113. *Self Driving Cars and Insurance*, *supra* note 2.

114. *Id.*; *see* Nolan & Ursin, *supra* note 93, at 295.

115. *See Self Driving Cars and Insurance*, *supra* note 2.

116. *Id.*

117. Federal regulations require the pilot to manually control the aircraft on takeoff and when it reaches an altitude of 500 feet of landing. *See* 14 C.F.R. § 121.579 (2017).

118. *Self Driving Cars and Insurance*, *supra* note 2.

C. *Why Autonomous Vehicles Should Be Applied Like the Strict Liability Framework of Early Aviation*

As of March 2017, there have been no reported decisions involving AVs.¹¹⁹ Apply AVs to the aviation legal scheme, and we find that AVs are indeed a fitting analogy to aviation. The same fears that the Restatement authors had about aviation can be applied in two ways.¹²⁰ First, state legislatures are overly cautious and tend to place a fair amount of regulations on the use of AVs.¹²¹ Second, the number of people operating AVs as compared to the number of people operating cars in general is very small and therefore applies to a small cohort.¹²²

Perhaps the most telling reason for holding AVs to a strict liability standard is a comparison some commentators have made between aviation and ordinary automobiles. While automobiles have never been open to strict liability principles, “more lives [are] lost per passenger mile in automobile accidents than in airplane accidents.”¹²³ Like well-established principles in favor of strict liability for the hazardousness of aviation:

Automobiles also involve great potential for hazardousness The automobile fails the commercial hazard test, but the airplane clearly meets it. Hazards associated with the automobile are precisely those to which individual citizens routinely expose themselves and others as part of their everyday activities. In contrast, the aircraft, with its potential to crash into and destroy homes and workplaces, creates risks of harm unlike those routinely created by individual citizens as part of their everyday activities.¹²⁴

The court in *Siegler* shed some light on this too, noting that people on the ground have “no place to hide from falling aircrafts,” and those people are unable to change their location to minimize the risk.¹²⁵ Although AVs are not capable of causing widespread damage, they are not foolproof and inevitably will cause accidents. The accidents are unpredictable and often the operator cannot be blamed. By imposing strict liability, courts

119. Courts would decide strict liability of AVs on a case by case basis, so how one court would decide strict liability is not determinative of how all courts will rule. Nolan & Ursin, *supra* note 93, at 293. This Comment only addresses a hypothetical scenario.

120. See Nolan & Ursin, *supra* note 93, at 295.

121. See *id.*

122. See Bradshaw, *supra* note 38.

123. See *supra* RESTATEMENT (SECOND) OF TORTS § 520 cmt. i (AM. LAW INST. 1977); Nolan & Ursin, *supra* note 93, at 305 (quoting C. GREGORY, H. KALVEN & R. EPSTEIN, CASES AND MATERIALS ON TORTS 502 (3d ed. 1977)).

124. Nolan & Ursin, *supra* note 93, at 306.

125. *Siegler v. Kuhlman*, 502 P.2d 1181, 1887 (Wash. 1972).

would show car manufacturers that if they make any type of mistake, they will be liable, no matter what, under strict liability.

AVs mark a huge technological advancement in the automobile industry and will someday revolutionize the way ordinary people travel in the way airplanes did. Courts may apply the same scrutiny to AVs as they did to planes because courts will be just as cautious about new technology and the risks they pose.

V. CONCLUSION

The advent of AVs will eventually revolutionize how people travel. AVs will give people more free time, as well as allow the elderly and persons with disabilities to get around worry-free.¹²⁶ However, states are just starting to enact legislation that allows AVs on their roadways. This legislation is overly protective and cautious. Moreover, having an intricate network of AVs is still a long way away, and for the near future state legislatures will have to continue with caution.

At the same time, AVs are becoming part of the fabric of everyday life. Uber, for instance, has recently launched a driverless option for when an ordinary person requests a vehicle in select cities.¹²⁷ Accidents are inevitable; people will be hurt or killed, and courts need an effective way of finding fault. Courts should apply a strict liability standard because it keeps car manufacturers accountable and keeps AV operators in check if they do not take the necessary precautions.

Like the treatment of airplanes, courts should be hesitant about what this new technology is capable of and who is to blame for accidents. AVs should be held to the same strict liability standard. Court precedents have reflected this cautious trend before. AV crashes are especially unpredictable since they are specially programmed to follow the rules of the road and to avoid crashes. AVs will have to learn how to deal with

126. See generally DISABILITY REPORT, *supra* note 10.

127. Andrew J. Hawkins, *Uber's Self-Driving Cars Are Now Picking Up Passengers in Arizona*, VERGE (Feb. 21, 2017, 1:55 PM), <http://www.theverge.com/2017/2/21/14687346/uber-self-driving-car-arizona-pilot-ducey-california>; see Robert Siegel & Art Silverman, *Pittsburgh Offers Driving Lessons for Uber's Autonomous Cars*, NPR: ALL TECH CONSIDERED (Apr. 3, 2017, 4:02 PM), <http://www.npr.org/sections/alltechconsidered/2017/04/03/522099560/pittsburgh-offers-driving-lessons-for-ubers-autonomous-cars>. Lyft has recently announced a plan to institute a self-driving car program too. Mike Isaac, *Lyft To Develop Self-Driving Car Technology in Silicon Valley Facility*, N.Y. TIMES (July 21, 2017, 5:29 PM), <http://www.nytimes.com/2017/07/21/technology/lyft-self-driving-car-technology.html>.

unpredictable weather and how to deal with another driver waving it on to make a turn in front of his car.¹²⁸ Thus, AVs qualify as a hazardous activity for which the courts have traditionally reserved strict liability.¹²⁹ Imposing strict liability is the most logical solution to aid safety on the roads and promote more responsibility on AV operators and car manufacturers.

128. See Metz, *supra* note 31; Hearings, *supra* note 16, at 26-28 (statement by Mary Cummings, Director, Humans and Autonomy Laboratory, Duke University).

129. Nolan & Ursin, *supra* note 93, at 297.