

Blame It on the Machines: How Autonomous Vehicles Will Impact Allocation of Liability Insurance and the Resulting Impact on the Legal Community*

INTRODUCTION

The notion of a driverless car transcends generations, ever since the American people became fascinated with the idea during a time when optimism was at a premium. The 1939 New York World's Fair featured an exhibit named "The World of Tomorrow" to which millions came to see a glimpse into the future.¹ One particular exhibit by General Motors displayed "abundant sunshine, fresh air [and] fine green parkways" with cars that could drive themselves.² In today's popular culture, a vision of the future imagines a similar element of automation, with driverless cars serving as an integral element of that vision. Science fiction movies set in the not-so-distant future feature artificial intelligence, sleek design, and a swath of autonomous vehicles carrying passengers going about their daily business.³ Now it seems that this long-awaited vision may be coming sooner than anticipated, as Google has developed a series of prototype autonomous vehicles⁴ that have now logged over one million self-driven miles.⁵

Dampening the enthusiasm for the new technology is a growing concern that the invention has outpaced its legal framework.⁶ The concern came to fruition in July 2015 when a regular car collided with

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1. Ben Cosgrove, *'The World of Tomorrow': Scenes From the 1939 New York World's Fair*, TIME (Apr. 29, 2014), <http://time.com/3879706/1939-new-york-worlds-fair-photos/> [<https://perma.cc/6Y4S-3LNG>].

2. Tom Vanderbilt, *Autonomous Cars Through the Ages*, WIRED (Feb. 6, 2012, 6:30 AM), <http://www.wired.com/2012/02/autonomous-vehicle-history/> [<http://perma.cc/FJ47-6EHV>].

3. See, e.g., I, ROBOT (20th Century Fox 2004).

4. *Google Self-Driving Car Project: FAQ*, GOOGLE, <https://www.google.com/selfdrivingcar/faq/#q3> [<http://perma.cc/ZJ27-Y6L3>].

5. *Google Self-Driving Car Project*, GOOGLE, <https://www.google.com/selfdrivingcar/> [<http://perma.cc/D2B5-ULL5>].

6. See, e.g., Claire Cain Miller, *When Driverless Cars Break the Law*, N.Y. TIMES (May 13, 2014), http://www.nytimes.com/2014/05/14/upshot/when-driverless-cars-break-the-law.html?_r=2 [<https://perma.cc/J2MQ-4PAR>]; Chris Nichols, *Liability Could Be Roadblock for Driverless Cars*, SAN DIEGO UNION-TRIB. (Oct. 30, 2014, 4:31 PM), <http://www.sandiegouniontribune.com/news/2013/Oct/30/liability-driverless-car-transovation-google/> [<http://perma.cc/MB82-BTKK>].

Google's autonomous vehicle, causing minor injuries to the three Google employee passengers.⁷ This scenario raises the question of who pays for the costs of an accident when a fully autonomous vehicle collides with another object.

State legislatures have been slow to create statutory frameworks to regulate this new form of transportation. At least one legal scholar has proposed that autonomous vehicles are already legal in the United States without the adoption of statutes explicitly allowing for the use of such cars.⁸ Furthermore, the National Highway Traffic Safety Administration ("NHTSA") has begun to prepare for the legal challenges posed by autonomous vehicles. NHTSA, an agency within United States Department of Transportation, sets and enforces safety performance standards for motor vehicles and motor vehicle equipment.⁹ NHTSA, in a letter to Google,¹⁰ stated that it "will interpret 'driver' in the context of Google's described motor vehicle design as referring to the [self-driving system], and not to any of the vehicle occupants."¹¹ If NHTSA's letter indicates a changing interpretation that "drivers" of autonomous vehicles are actually the

7. The accident occurred when a self-driven vehicle stopped in a line of traffic at a stoplight, and a manually driven vehicle failed to stop at the line of traffic and rear-ended the self-driven vehicle. *Google Driverless Car Involved in First Injury-Causing Accident*, CBS NEWS (July 17, 2015, 10:30 AM), <http://www.cbsnews.com/news/google-driverless-car-involved-in-first-injury-causing-accident/> [<http://perma.cc/68ME-XEWF>].

8. See generally Bryant Walker Smith, *Automated Vehicles Are Probably Legal in the United States*, 1 TEX. A&M L. REV. 411 (2014) (discussing how current state statutes do not prohibit the implementation of driverless cars and with careful drafting may encourage the adoption of such vehicles).

9. *Who We Are and What We Do*, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., <http://www.nhtsa.gov/About+NHTSA/Who+We+Are+and+What+We+Do> [<https://perma.cc/EVQ6-AW9L>].

10. NHTSA letters represent the opinion of the agency on a question presented. *NHTSA's Interpretation File Search*, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., <http://isearch.nhtsa.gov> [<http://perma.cc/FXL2-7R6S>]. However, these letters only represent the opinion of the chief counsel as to the presented situation, which may not apply to a later incident and can be superseded by subsequent standards and regulations propagated by NHTSA. *Id.*

11. Nat'l Highway Traffic Safety Admin., Open Letter on Federal Motor Vehicle Safety Standards (Feb. 4, 2016), <http://isearch.nhtsa.gov/files/Google%20-%20compiled%20response%20to%2012%20Nov%20%2015%20interp%20request%20-%204%20Feb%2016%20final.htm> [<http://perma.cc/85UF-KSQR>]; see also David Shepardson & Paul Lienert, *In Boost to Self-Driving Cars, U.S. Tells Google Computers Can Qualify as Drivers*, REUTERS (Feb. 10, 2016, 1:14 PM), <http://www.reuters.com/article/us-alphabet-autos-selfdriving-exclusive-idUSKCN0VJ00H> [<http://perma.cc/3HWR-B6T4>]. NHTSA sent this letter as a response to Google's request for interpretation of a number of provisions in the Federal Motor Vehicle Safety Standards with respect to Google's design for a fully autonomous motor vehicle. Nat'l Highway Traffic Safety Admin., *supra*.

vehicles themselves, then a new question arises: who should bear the liability when the driver is the self-driving system crashes?

This Recent Development will look at the automotive liability landscape through two lenses: (1) the common law fault-based litigation approach and (2) the no-fault liability insurance scheme.¹² Further, this Recent Development will analyze how each type of insurance scheme currently in place could apply to autonomous vehicles, while also determining which insurance scheme is most appropriate to adequately compensate plaintiffs in claims related to fully autonomous vehicles. Finally, this Recent Development argues that strict liability should be imposed on the manufacturer of an autonomous vehicle, due to the passive nature of the owner's usage of the vehicle, the complexity of the driverless system, and the ability to spread losses and encourage research and development by the vehicle manufacturer.

Discussion proceeds in three parts. Part I provides background on autonomous vehicles and describes the various levels of automation prescribed by NHTSA—ranging from level zero (no automation) to level four (complete automation). Part II breaks down the difference in automobile liability insurance by describing the traditional tort system and the less prevalent no-fault system. Furthermore, Part II will also analyze how the shift will affect legal strategies and available defenses under each tort regime. Additionally, Part II will discuss the likely impact autonomous vehicles may have on these schemes based on the recent NHTSA statement that a “driver” of an autonomous vehicle is the computer system itself.¹³ Part III argues that liability should be imputed to manufacturers of autonomous vehicles and computer systems due to the passive nature of the vehicle owners. Lastly, Part III considers the potential impact of this shift, especially with regards to the tort goals of cost-spreading and deterrence and explains how a strict liability scheme will best accomplish those goals.

I. BACKGROUND ON AUTONOMOUS VEHICLES

While the concept may seem farfetched, automated vehicles have been in development for quite some time. Currently, most cars have some level of automation ranging from typical safety features to

12. As of November 2015, twelve states, as well as Puerto Rico, that have some form of no-fault automotive insurance laws. See *What Is No-Fault Insurance and What Does it Cover?*, ALLSTATE (Nov. 2015), <https://www.allstate.com/tools-and-resources/car-insurance/no-fault-insurance-cover.aspx> [<https://perma.cc/GGV3-DRXC>].

13. Nat'l Highway Traffic Safety Admin., *supra* note 11.

advanced luxury options. Some of the newer features include antilock brake systems (“ABS”),¹⁴ traction control systems,¹⁵ and electronic stability control (“ESC”) systems.¹⁶ ESC works by automatically applying the brakes to a specific wheel to control the car’s speed and direction upon detection that the vehicle is spinning out of control.¹⁷ Many luxury vehicles now come with automated parallel parking which uses surround cameras to locate and steer into a spot large enough to park the vehicle while the driver operates the accelerator and brake pedals.¹⁸

A key element in each of the aforementioned systems is that the system is not a complete substitution for a human driver. In recognition of the continuum from human control to complete automation, NHTSA created a system to define the level of automation in a system ranging from level zero, representing no automation, to level four, representing complete automation.¹⁹ Periphery systems such as ESC, or ABS are considered level one, or function-specific automation.²⁰ At this level, “[t]he driver has overall control, and is solely responsible for safe operation, but can choose to cede limited authority over a primary control.”²¹ Beyond level one automation is level two, which is defined as “Combined Function Automation.”²² This level automates at least two control functions of

14. See *Anti-lock Brake System*, TOYOTA, http://www.toyota-global.com/innovation/safety_technology/safety_technology/technology_file/active/ [https://perma.cc/F8QF-KDPX]. ABS detects sudden braking by monitoring the speed of each wheel, and upon sudden braking the system will release braking pressure to prevent the wheels from locking up while enhancing steering control. *Id.*

15. See *Traction Control and Validation Test*, NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., <http://www.nhtsa.gov/cars/problems/Equipment/TractionControl/pages/3TractionSystems.htm> [https://perma.cc/4RMP-CXXM]. Automatic Traction Control Systems utilize the wheel speed sensors from Anti-Lock Braking Systems to determine whether there is a low friction surface or the vehicle is skidding to prevent a loss of stability or control. *Id.*

16. ESC is standard equipment on all new vehicle models as of 2012. *Electronic Stability Control to be Standard by 2012*, CONSUMER REPORTS (Feb. 2011), <http://www.consumerreports.org/cro/cars/new-cars/news/2006/nhtsa-proposal-to-make-esc-standard-on-all-cars-9-06/overview/nhtsa-proposal-to-make-esc-standard-on-all-cars-9-06.htm> [http://perma.cc/39P5-YNM8].

17. *Electronic Stability Control*, SAFECAR.GOV, <http://www.safercar.gov/Vehicle+Shoppers/Rollover/Electronic+Stability+Control> [http://perma.cc/Y663-VQF6].

18. James R. Healey & Kelsey Mays, *Which Cars Park Themselves Best? Challenge Results*, USA TODAY (Dec. 6, 2012, 1:06 AM), <http://www.usatoday.com/story/money/cars/2012/12/06/self-parking-cars-challenge/1743199/> [https://perma.cc/4MFD-PVBW].

19. *Preliminary Statement of Policy Concerning Automated Vehicles*, NAT’L HIGHWAY TRAFFIC SAFETY ADMIN. 4, https://www.nhtsa.gov/staticfiles/rulemaking/pdf/Automated_Vehicles_Policy.pdf [https://perma.cc/YC55-2HF2].

20. *Id.*

21. *Id.*

22. *Id.* at 5.

the vehicle; for example, when “adaptive cruise control [is used] in combination with lane centering.”²³ The majority of driverless systems both on automobiles and mass transit²⁴ meet or exceed level three, or “Limited Self-Driving Automation.”²⁵ At this level of automation, the driver can “cede full control of all safety-critical functions under certain traffic or environmental conditions” while also being able to transition back into control when coming to an area such as an active construction site.²⁶ The final stage and main consideration of this Recent Development is level four, or “Full Self-Driving Automation,” in which the driver provides the destination or navigation input while relinquishing control of the vehicle during the trip.²⁷

Although level one technology has existed since the early 1970s,²⁸ it is reasonable to expect that producing a level four vehicle would require significant research and development, in addition to road testing. In a very rudimentary sense, autonomous vehicles work through either a vehicle-to-vehicle (“V2V”) or a vehicle-to-infrastructure (“V2I”) system.²⁹ In a V2V system, a vehicle warns other vehicles of its presence through short-range radio devices.³⁰ Conversely, in a V2I system, a vehicle “talks” wirelessly with a grid system that updates multiple vehicles on its grid regarding car placement and traffic light patterns.³¹

Currently, there are ten companies that are approved by the California Department of Motor Vehicles (“DMV”) to test

23. *Id.*

24. *What is Metro Automation?*, OBSERVATORY OF AUTOMATED METROS (2013), <http://metroautomation.org/automation-essentials/> [<https://perma.cc/MGT5-YTDF>].

25. *See Preliminary Statement of Policy Concerning Automated Vehicles*, *supra* note 19, at 5.

26. *Id.*

27. *Id.*

28. The first anti-lock braking system for an automobile launched in 1970, and Mercedes-Benz produced a second generation system in 1978. *Mercedes-Benz and the Invention of the Anti-Lock Braking System: ABS, Ready for Production in 1978*, DAIMLER (July 1, 2008), <https://media.daimler.com/dcmedia/0-921-657486-1-803841-1-0-1-0-0-0-0-614318-0-1-0-0-0-0-0.html> [<https://perma.cc/T25Y-WYNY>].

29. Christopher B. Dolan, *Self-Driving Cars and the Bumpy Road Ahead*, AM. ASS’N FOR JUSTICE (Feb. 2016), <https://www.justice.org/what-we-do/enhance-practice-law/publications/trial-magazine/self-driving-cars-and-bumpy-road-ahead> [<http://perma.cc/P29R-FW7N>].

30. *Id.*

31. The V2I system works by creating an infrastructure in which vehicles, intersections, and road conditions are logged on a grid system. *Id.* That grid system is currently under analysis in Arizona, California, Florida, Michigan, Minnesota, New York, and Virginia. *Id.*

autonomous vehicles in the state, one of which is Google.³² The tech company began work on its project in 2009.³³ Google autonomous vehicles currently operate without V2V and V2I communication and instead rely on current mapping and sensor technology to determine the car's location relative to the road and to objects around the car to avoid collisions.³⁴

Google's fleet of autonomous vehicles has amassed over one million self-driven miles.³⁵ By using sensors to guide the vehicle while removing the pedals and steering wheels, Google has created a prototypical version of a level four automated vehicle.³⁶ Preliminary research regarding the vehicles has been largely positive and Google has reported only eleven minor accidents thus far.³⁷ While there have been some accidents, Google has explained that "human error by the drivers of the non-autonomous cars is, on the surface, causing accidents."³⁸ For example, in at least one incident, an automated vehicle inched forward and subsequently applied the brakes to avoid an oncoming car, while the human-driven vehicle behind was encouraged forward by the automated vehicle and rear-ended the automated car when it quickly stopped.³⁹

While it was inevitable that the research and development phase would incur minor accidents like the one described above, the legal rubber hit the road on February 23, 2016 when one of Google's autonomous vehicles collided with a bus in California. Google noted in a statement that the company must "bear some responsibility," marking the first collision in which the manufacturer of an autonomous vehicle bore at least some degree of fault.⁴⁰ While Google may have resolved the immediate problem by accepting fault, this accident prompted one more question in the minds of legal

32. Natasha Lomas, *Driverless Car Accident Reports Make Unhappy Reading for Humans*, TECHCRUNCH (Oct. 9, 2015), <http://techcrunch.com/2015/10/09/dont-blame-the-robot-drivers/#.pp7ntwf:uzsj> [<http://perma.cc/FG5U-2JH8>]. Other such companies include Volkswagen Group of America, Mercedes Benz, Delphi Automotive, Tesla Motors, Bosch, Nissan, Cruise Automation, BMW, and Honda. *Id.*

33. *Google Self-Driving Car Project: On the Road*, GOOGLE, <https://www.google.com/selfdrivingcar/where/> [<http://perma.cc/3YRD-2L6X>].

34. *Google Self-Driving Car Project: How It Works*, GOOGLE, <https://www.google.com/selfdrivingcar/how/> [<http://perma.cc/SW8H-29XR>].

35. *Google Self-Driving Car Project*, *supra* note 5.

36. *Google Self-Driving Car Project: How It Works*, *supra* note 34.

37. *See* Lomas, *supra* note 32.

38. *Id.*

39. *Id.*

40. David Shephardson, *Google Says it Bears 'Some Responsibility' After Self-Driving Car Hit Bus*, REUTERS (Feb. 29, 2016, 6:31 PM), <http://www.reuters.com/article/us-google-selfdrivingcar-idUSKCN0W22DG> [<https://perma.cc/A4DC-WH23>].

scholars. Specifically, how would the courts proceed if Google was unwilling to accept fault?

II. THE CURRENT AUTOMOTIVE ACCIDENT LIABILITY SYSTEMS

Collectively, states use two methods of determining liability following an automobile accident. Thirty-eight states use a traditional tort-based system centered on alleging fault or negligence.⁴¹ The remaining twelve have adopted a no-fault based insurance system that provides a statutorily defined amount that an insurance company will pay out for damages incurred in an automobile accident without determining legal fault.⁴² This Part argues that a traditional tort-liability insurance system, rather than a no-fault system, better incentivizes a manufacturer to produce a safer autonomous vehicle. This approach also places fault with the party that has the resources and technological capacity to improve safety and reduce accidents.

A. *The Traditional Tort-Liability Insurance System*

Under the modern fault-based tort litigation system, a driver is judged by the same objective standard used in most tort cases, which requires that the driver behave in the same manner as an ordinary, reasonably prudent person when behind the wheel.⁴³ To prevail, the plaintiff bears the burden of showing not only that the driver breached the duty of ordinary care to the plaintiff, but that the breach was the legal cause⁴⁴ of the plaintiff's injury, and that the plaintiff suffered damages as a result of the injury.⁴⁵ The contributory negligence doctrine, which applies in Alabama,⁴⁶ North Carolina,⁴⁷ Maryland,⁴⁸ Virginia,⁴⁹ and the District of Columbia,⁵⁰ allows a

41. *No-Fault Insurance and Fault Insurance*, DMV.ORG, <http://www.dmv.org/insurance/fault-and-no-fault-insurance.php> [<https://perma.cc/8DST-P5MA>].

42. *See No-Fault Auto Insurance*, *supra* note 12.

43. *See, e.g.*, *Brown v. Kendall*, 60 Mass. (6 Cush.) 292, 296 (1850) (asserting the proposition that a defendant may be held to a standard of reasonable care, meaning the "kind and degree of care which prudent and cautious men would use").

44. *See, e.g.*, RESTATEMENT (SECOND) OF TORTS § 431 (AM. LAW INST. 1965) ("The actor's negligent conduct is a legal cause of harm to another if (a) his conduct is a substantial factor in bringing about the harm, and (b) there is no rule relieving the actor from liability because of the manner in which his negligence has resulted in harm."); WILLIAM B. HALE, HANDBOOK ON THE LAW OF TORTS 44 (1896).

45. H. GERALD CHAPIN, HANDBOOK ON THE LAW OF TORTS 501 (1917).

46. *Williams v. Delta Int'l Mach. Corp.*, 619 So. 2d 1330, 1333 (Ala. 1993).

47. N.C. GEN. STAT. § 99B-4(3) (2015).

48. *Bd. of Cty Comm'rs v. Bell Atlantic-Maryland, Inc.*, 695 A.2d 171, 181 (Md. 1997).

49. *Baskett v. Banks*, 45 S.E.2d 173, 177 (Va. 1947).

50. *Wingfield v. People's Drug Store*, 379 A.2d 685, 687 (D.C. 1994).

defendant to completely bar plaintiff's recovery upon a showing that the plaintiff was at least minimally negligent or that the defendant did not breach the duty of reasonable care.⁵¹ The states operating under the traditional torts regime that reject contributory negligence allow a defendant to use evidence of the plaintiff's negligence to reduce the amount of the award through the comparative negligence doctrine.⁵² This defense bars the plaintiff's recovery if the plaintiff was more than fifty percent at fault, or lessens the plaintiff's recovery by the amount of fault allocable to that plaintiff.⁵³ The subjective nature of the comparative fault determination, and related uncertainty, has led some states to adopt a new system of insurance that took fault out of the equation.

B. A Newer Approach: The No-Fault Insurance System

No-fault automotive insurance arose as a response to the alleged pitfalls of fault-based liability insurance.⁵⁴ Initial fault-based liability statutes had two clear problems: (1) since fault-based liability insurance was geared to protect all drivers, the amount of coverage was typically low and a low percentage of drivers met the statutory minimum of liability coverage; and (2) if proof of fault failed, then there was no protection to the insured motorist.⁵⁵ One of the original proposals for a no-fault liability scheme came from Professors Robert E. Keeton and Jeffrey O'Connell.⁵⁶ The Keeton-O'Connell scheme was called a "basic protection" plan and was based on loss insurance under which the victim claims against the insurance company covering the insured's own car.⁵⁷ This coverage applied regardless of fault.⁵⁸ The plan called for coverage up to \$10,000 of reasonable expenses and also included a partial-tort exemption.⁵⁹ Under the

51. *Clark v. Roberts*, 263 N.C. 336, 343, 139 S.E.2d 593, 597 (1965) ("Every person having the capacity to exercise ordinary care for his own safety against injury is required by law to do so, and if he fails to exercise such care, and such failure, concurring and cooperating with the actionable negligence of defendant contributes to the injury complained of, he is guilty of contributory negligence.").

52. *See, e.g., Li v. Yellow Cab Co.*, 532 P.2d 1226, 1243 (Cal. 1975) (abolishing the legal doctrine of contributory negligence to adopt the doctrine of comparative negligence in the state of California).

53. *Id.* at 1242.

54. *See* W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS 603 (5th ed. 1984).

55. *See id.*

56. *Id.* at 606.

57. *Id.*

58. *Id.*

59. *Id.*

provision, unless the damages for pain and suffering exceeded \$5,000 or personal damages exceeded \$10,000 then basic protection coverage replaced a cause of action for a tort suit.⁶⁰ For example, if Vehicle A runs into Vehicle B, causing damage personal damages of \$8,000 and pain and suffering of \$2,000, then Vehicle B does not have a cause of action against Vehicle A and insurance would pay the damages regardless of fault. However, if damages for pain and suffering to Vehicle B exceed \$5,000, such damages exceed the cap for the partial-tort exemption, and Vehicle A's insurance will not cover those damages.

This plan provided the basic tenets of no-fault automotive insurance as it is known today. Currently, the term "no-fault" applies only to the state laws that both provide for the payment of no-fault first-party benefits and restrict the right to sue, known as the "limited tort" option.⁶¹ Furthermore, most no-fault laws prohibit the victim from suing the other driver for noneconomic damages, further limiting recovery in these states.⁶² As the liability scheme gained popularity, up to "26 states had passed some form of no-fault insurance, including three states that offered drivers a choice between no-fault and tort insurance" by 1976.⁶³ However, over time political support for no-fault liability insurance has waned as insurance premiums in no-fault states have risen due to high medical costs and a greater number of applicable claims.⁶⁴

C. *Crashing the System: How Autonomous Vehicles Will Affect These Schemes*

In considering the potential effects of a shift to a products liability framework with respect to automotive liability insurance litigation, it is likely that the traditional tort-system states and no-fault liability states will see varying results. Autonomous vehicles will probably have the greatest effect in two different scenarios: (1) where an individual acts as plaintiff, perhaps as an injured pedestrian or

60. *Id.*

61. *See No-Fault Auto Insurance, supra* note 12.

62. *See* LAURA ZAKARAS, RAND, WHAT HAPPENED TO NO-FAULT AUTOMOBILE INSURANCE?, http://www.rand.org/content/dam/rand/pubs/research_briefs/2010/RAND_RB9505.pdf [<http://perma.cc/6MMR-9TAN>].

63. *Id.*

64. In 2004, premiums under no-fault liability schemes were fifty percent higher than those under tort liability schemes. *Id.* In states that repealed no-fault legislation, including Colorado, Connecticut, and Georgia, the price of liability premiums dropped dramatically. *Id.*

passenger, and brings a claim against a manufacturer and (2) where a manufacturer brings a claim against another manufacturer.

1. Individual Acting as Plaintiff

The majority of claims involving fully autonomous vehicles will likely be brought as design defect claims. Such claims assert that a flaw in the computer software or algorithm, which guides the car, caused the accident.⁶⁵ In such a situation, the design defect claim will involve a reasonableness analysis similar to the traditional tort system, as design defect claims are meant to achieve the same objectives as liability predicated on negligence.⁶⁶ With regard to defenses asserted to insulate the defendant from liability, a defendant may still claim contributory or comparative negligence. However, the inquiry will turn upon whether the plaintiff's behavior contributed to the injury, either through abnormal use or failure to discover a defect through reasonable inquiry.⁶⁷ Given that automobile accidents between manually driven vehicles are often due to human error,⁶⁸ resolution of claims via the court system will typically require a showing of a breach of the ordinary care standard as described earlier.⁶⁹ Adapting that system to autonomous vehicles should be fairly similar to the current tort-based system of liability regardless of whether a strict liability or design defect claim is brought, given that a showing of fault will determine which party will bear the costs of the collision.

While the doctrinal shift to a products liability framework should be fairly smooth in traditional tort-based states, the shift in no-fault states could be more jarring. Unless a comparable no-fault statutory scheme is erected for autonomous vehicles, or the same principles are applied to the "driver" system as defined by the NHTSA,⁷⁰ then there

65. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 (AM. LAW INST. 1997). It is not difficult to imagine a scenario in which two competing autonomous vehicle manufacturers with different proprietary computer systems collide, and a court must determine whether a reasonable alternative design was available to either of the vehicles.

66. See *id.* at cmt. d.

67. See, e.g., *Dallison v. Sears, Roebuck & Co.*, 313 F.2d 343, 345 (10th Cir. 1962) (asserting that a woman smoking in bed after taking a sleeping pill constituted negligence on the plaintiff's part barring her from recovering against the manufacturer of a nightgown that caught fire); Dix W. Noel, *Defective Products: Abnormal Use, Contributory Negligence, and Assumption of Risk*, 25 VAND. L. REV. 93, 95–106 (1972).

68. See Bryant Walker Smith, *Human Error as a Cause of Vehicle Crashes*, THE CTR. FOR INTERNET AND SOC'Y (Dec. 28, 2013, 3:15 PM), <http://cyberlaw.stanford.edu/blog/2013/12/human-error-cause-vehicle-crashes> [https://perma.cc/52KH-V2HR].

69. See *supra* Section II.A.

70. See Shepardson & Lienert, *supra* note 11.

will be some showing of fault under a products liability framework, whether it is under a strict liability or negligence standard. Barring a settlement, courts applying a products liability approach will have to determine the reasonableness of the design⁷¹ or adequacy of the warning.⁷² This would conflict with the goals of state legislatures that adopted no-fault automotive insurance schemes seeking to avoid court involvement and streamline the process of allocating damages following an automobile accident.⁷³

2. Manufacturer v. Manufacturer

The second scenario arises when an accident between two autonomous vehicles occurs and a manufacturer consequently brings a claim against another manufacturer to recover for damages to the vehicle. While it may seem strange for a large manufacturer to be involved in such an array of disputes, the sheer magnitude of potential liability would likely demand such an approach. In a letter to Google, NHTSA stated that for purposes of a level four automated vehicle, the self-driving system and software will be considered the driver, rather than any of the vehicle's occupants.⁷⁴ Such a designation would be groundbreaking because it would allow the development of autonomous vehicles without drafting separate legislation in each state,⁷⁵ instead substituting the software as the "driver" for the purposes of existing legislation and allow many more autonomous vehicles to get on the roads quickly.

Assuming that the self-driving system will be considered the driver,⁷⁶ it is possible that one self-driving system will be pitted against a separate self-driving system to determine liability and indemnify the owners of those vehicles. To avoid such widespread liability exposure for manufacturers, practitioners have suggested

71. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) (AM. LAW INST. 1998).

72. *Id.* § 2(c).

73. See ZAKARAS, *supra* note 62.

74. See Shepardson & Lienert, *supra* note 11.

75. Currently, sixteen states have proposed legislation discussing autonomous vehicles, while Nevada, California, Florida, Michigan, North Dakota, Tennessee, and Washington D.C. have passed legislation relating to autonomous vehicles. See *Autonomous/Self-Driving Vehicles Legislation*, NATIONAL CONFERENCE OF STATE LEGISLATURES (July 1, 2016), <http://www.ncsl.org/research/transportation/autonomous-vehicles-legislation.aspx> [<http://perma.cc/Z6MA-YQZL>].

76. It is worthwhile to recognize that states such as California have suggested additional legislation that would require a steering wheel and a licensed driver in all self-driving cars. See CAL. VEH. CODE § 38750(4) (West 2015) (defining "operator" of a driverless vehicle as the person seated in the driver's seat).

either a resurgence of no-fault liability for manufacturers,⁷⁷ or the imposition of strict liability on owners.⁷⁸ There are two separate levels of analysis and several questions regarding a situation in which two autonomous vehicles collide. First, there is a question as to which party should bear the responsibility of obtaining insurance for the purpose of paying damages in the claim. After determining whether that responsibility should lie with the manufacturer or the owner of a autonomous vehicle, the next question is whether fault should be proven through a traditional negligence standard, a no-fault insurance scheme as implemented by a minority of states, or through a strict liability standard in which the reasonable care of the manufacturer is not determinative in allocating fault.⁷⁹ To best spread losses and encourage development of a safer product, manufacturers should be held strictly liable for damage caused by the utilization of an autonomous vehicle.

III. THE PROPOSED FRAMEWORK: MANUFACTURER STRICT LIABILITY BEST ACHIEVES TORT GOALS

Determining liability in an autonomous vehicle collision requires consideration as to whom to allocate the fault in the event of an accident, as well as the method by which to determine fault. This Part argues that the manufacturer is in a better position to assume loss and design a safer product to prevent future injury, and that strict liability is the best method to determine fault by streamlining litigation and incentivizing improvements through research and development.

A. *Allocate Liability to the Manufacturer*

Some legal scholars anticipate the proliferation of autonomous vehicles will result in a shift in liability from the human driver to the autonomous vehicle manufacturer.⁸⁰ By placing liability with the

77. See Sarah Croft, *Who Will be Liable for Driverless Cars?*, AUTOMOTIVELAND (July 29, 2013), <http://www.automotiveworld.com/analysis/comment-who-will-be-liable-for-driverless-cars/> [http://perma.cc/E2P3-A2HU].

78. Sophia H. Duffy & Jamie P. Hopkins, *Sit, Stay, Drive: The Future of Autonomous Car Liability*, 16 SMU SCI. & TECH. L. REV. 453, 467–71 (2013) (analogizing a strict liability system in which owners of autonomous cars that injure another are strictly liable in a scheme similar to owners of dogs that injure another). *But see* Jeffrey K. Gurney, Recent Development, *Sue My Car Not Me: Products Liability and Accidents Involving Autonomous Vehicles*, 2013 U. ILL. J.L. TECH. & POL'Y 247, 252 (2013) (proposing that the liability scheme for driverless vehicles should hold the manufacturers liable as the “drivers” of autonomous vehicles).

79. RESTATEMENT (SECOND) OF TORTS § 402A cmt. a (AM. LAW INST. 1965).

80. See JAMES M. ANDERSON ET AL., RAND, AUTONOMOUS VEHICLE TECHNOLOGY: A GUIDE FOR POLICYMAKERS 115, (2016), <http://www.rand.org/content>

manufacturer, the threat of litigation creates a natural incentive to create a safer product while allocating the cost to the party that has the ability to design around future incidents.⁸¹

The less desirable alternative is to hold the owners of automated vehicles liable.⁸² A strict liability standard would function similar to a products liability claim, essentially holding the owner liable regardless of whether due care was exercised in operation of the autonomous vehicle.⁸³ Thus, rather than placing the onus on manufacturers to obtain insurance to pay for claims relating to a collision, the owner of an autonomous vehicle would have to purchase insurance that would pay for damages in the event of an accident, irrespective of fault.⁸⁴ While this would reduce manufacturers' liability exposure, it would also discourage consumers from purchasing autonomous vehicles due to the increased cost of ownership. Legal and insurance claims relating to autonomous vehicles could be costlier, largely due to additional sensors and software that guide the vehicle.⁸⁵ Each of these considerations supports the conclusion that liability should rest with the manufacturer.

B. Imposing Strict Liability

A Brookings Institution report proposed the principles of products liability that will be the guideposts for dispute resolution regarding autonomous vehicle based claims.⁸⁶ Depending on jurisdiction, a plaintiff may assert a products liability claim under the theory of strict liability, manufacturing defect, design defect, or failure to provide adequate warning.

This Recent Development argues allocating fault by imposing strict liability on manufacturers is the best option to achieve optimal

/dam/rand/pubs/research_reports/RR400/RR443-2/RAND_RR443-2.pdf [https://perma.cc/AK6N-CRXN].

81. See John Villasenor, *Products Liability and Driverless Cars: Issues and Guiding Principles for Legislation*, BROOKINGS (Apr. 24, 2014), <https://www.brookings.edu/research/products-liability-and-driverless-cars-issues-and-guiding-principles-for-legislation/> [http://perma.cc/K6CQ-YV6T].

82. For a complete discussion on strict liability for autonomous car owners, see Duffy & Hopkins, *supra* note 78, at 471–79.

83. *Id.* at 472.

84. *Id.* at 476.

85. See TODD LITMAN, VICTORIA TRANSP. POLICY INST., AUTONOMOUS VEHICLE IMPLEMENTATION PREDICTIONS 5, (Sept. 1, 2016), <http://www.vtpi.org/avip.pdf> [https://perma.cc/G5FV-JTM8] (stating that currently, computer systems and sensors necessary to guide the vehicle would cost tens of thousands of dollars, although they will likely decrease in cost upon mass production).

86. Villasenor, *supra* note 81.

deterrence and loss-spreading in the case of autonomous vehicles. According to the *Restatement (Second) of Torts*, in certain situations, strict liability will be predicated on whether the product is deemed unreasonably dangerous.⁸⁷ In recent years, scholars have doubted the wisdom of holding manufacturers strictly liable in other industries,⁸⁸ stating that the compensation rationale has led to an erosion of principles of personal responsibility.⁸⁹ However, unlike a situation in which a plaintiff knowingly selects a product that is less safe and subsequently sues the manufacturer for injury,⁹⁰ the average driver of an autonomous vehicle would not have the requisite control over the vehicle or software to make the car safer. Rather, the manufacturer is in a better position to understand the various systems and risks associated with those computer systems.⁹¹

Professor Howard A. Latin observed a situation such as this while analyzing how different theories of tort liability achieve various tort objectives.⁹² To best define the appropriate theory of tort liability given varying levels of manufacturer and consumer knowledge, Professor Latin uses a matrix to evaluate how to allocate loss between the injured and the party at fault, as well as “high-attention risk”⁹³ and “low-attention risk.”⁹⁴ In a situation in which there are high-attention risks for the party at fault and low-attention risks for the injured, the preferable theory is strict liability for the party at fault.⁹⁵ Such a result makes sense both logically and equitably; in the situation of an autonomous vehicle, the individual is no longer a driver, but becomes a passenger while the driver that controls the movement of the vehicle is the computer system designed by the

87. Whether the seller has exercised all possible care in the preparation and sale of the product is irrelevant to the determination of liability under this section. RESTATEMENT (SECOND) OF TORTS § 402A (AM. LAW INST. 1965).

88. William A. Worthington, *The “Citadel” Revisited: Strict Tort Liability and the Policy of Law*, 36 S. TEX. L. REV. 227, 244–252 (1995).

89. *Id.* at 262.

90. *See id.* at 271.

91. Also, it is arguably unreasonable to require that every purchaser of an autonomous vehicle have a background in computer programming or software design without greatly restricting the pool of potential consumers.

92. *See* Howard A. Latin, *Problem-Solving Behavior and Theories of Tort Liability*, 73 CALIF. L. REV. 677, 696–97 (1985).

93. High-attention risk describes an accident in which the actor is able to most effectively minimize cost, and that actor understands “material risks and applicable liability doctrines, [and] must pay attention to risks and legal rules while engaged in risky conduct.” *Id.* at 697.

94. Low-attention risk describes a situation in which one of the conditions pertinent to a high-attention risk is not present. *Id.*

95. *Id.*

manufacturer.⁹⁶ Given the complexity of the sensor system and the passive nature of the owner of the autonomous vehicle, the manufacturer is in a better position to respond to liability costs by creating a safer supply of autonomous vehicles. Alternatively, placing liability in the hands of the owner will not encourage less risky behavior; it will simply discourage consumers from purchasing the vehicles.

With regards to loss-spreading, by asserting a strict liability scheme for manufacturers, litigation costs should decrease⁹⁷ and out-of-court settlements should increase. In addition, accident frequency could decrease by as much as 80% by 2040 according to a 2015 study by KPMG.⁹⁸ This number is not surprising given the estimate that 90% of motor vehicle crashes are caused at least in part by human error.⁹⁹ Furthermore, the KPMG study predicts that the automotive insurance losses could shrink from \$145 billion in 2013 to \$86 billion by 2040 due to increased safety features.¹⁰⁰

Finally, some in the legal community recognize the potential litigation from implementing such a vast technological change. The American Association for Justice decried the suggestion of implementing a no-fault insurance scheme for manufacturers as a chilling force on safety development and stated that “[i]t is important to ensure that manufacturers and their products are held up to the scrutiny of the product-specific, strict liability system.”¹⁰¹

Arguably, assigning the loss to the manufacturer will slow production of autonomous vehicles due to high costs of products liability insurance.¹⁰² Furthermore, scholars have suggested that the high costs of products liability litigation offset loss-spreading and compensation advantages.¹⁰³ However, even with changing to a strict liability scheme, decreased accident rates due to integrated

96. See *Preliminary Statement of Policy Concerning Automated Vehicles*, *supra* note 19, at 5.

97. See *Latin*, *supra* note 92, at 715.

98. Assuming that fully autonomous vehicles are available and integrated at that point. See JERRY ALBRIGHT ET AL., KPMG, AUTOMOBILE INSURANCE IN THE ERA OF AUTONOMOUS VEHICLES 5 (June 2015), <https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/automobile-insurance-in-the-era-of-autonomous-vehicles-survey-results-june-2015.pdf> [<https://perma.cc/4C5Y-S99K>].

99. See *Smith*, *supra* note 68.

100. See *ALBRIGHT ET AL.*, *supra* note 98, at 5, 9.

101. See *Dolan*, *supra* note 29.

102. See *Worthington*, *supra* note 88, at 249 (claiming that \$80 billion annually was directly attributable to litigation costs which increased insurance premiums for manufacturers).

103. *Id.* at 250–52.

autonomous vehicle systems¹⁰⁴ should significantly mitigate the potential increase in manufacturer production costs.

C. Strict Liability Is Preferable to Traditional Negligence and No-Fault Schemes

For the reasons mentioned above, imposing strict liability on the manufacturer best effectuates traditional tort goals and ensures a safer product for the consumer.¹⁰⁵ Under the theoretical purposes of no-fault liability insurance, it would be simple to assume that the scheme would lower costs of litigation by creating a streamlined, predictable system to settle disputes.¹⁰⁶ However, according to a twenty-year study by the RAND Institute for Civil Justice, “liability premiums have been consistently higher in no-fault states, and the gap has widened over time. By 2004, premiums under no-fault were 50 percent higher than those under tort.”¹⁰⁷ Additionally, the study found that medical costs in no-fault states were nearly double that of traditional tort liability states.¹⁰⁸ A key component of this discrepancy is that health insurers in traditional tort states have “sophisticated techniques for managing medical care to minimize costs” while automotive insurers with less medical expertise serve as medical insurers in no-fault states.¹⁰⁹ Furthermore, since a no-fault claim by nature does not absolve an innocent party of fault, policyholders of no-fault liability insurance have found that a previous no-fault claim significantly raises premiums.¹¹⁰

The traditional negligence standard also seems less attractive. In applying a traditional negligence standard, a manufacturer could avoid accident liability by showing the computer system displayed ordinary care in executing any road-going maneuver.¹¹¹ Furthermore, a manufacturer may avoid liability by asserting that there was not an economically feasible “reasonable alternative design” that would

104. See ALBRIGHT ET AL., *supra* note 98, at 5.

105. See *supra* Sections III.A.–III.B.

106. See ZAKARAS, *supra* note 62.

107. *Id.* Also note that these results persist “even after partially controlling for other factors that may influence these costs, such as climate, the road system, and density of the population.” *Id.*

108. *Id.*

109. *Id.*

110. Christopher Menon, *No-fault Claims Adding 30% to Car Insurance, AA Finds*, THE GUARDIAN (Apr. 16, 2014, 9:47 AM), <http://www.theguardian.com/money/2014/apr/16/no-fault-claims-car-insurance-aa> [https://perma.cc/82S3-BVSG] (finding that one no-fault claim raised premiums on average by 30% and two or more non-fault claims raised premiums by 10–50%).

111. See *Brown v. Kendall*, 60 Mass. (6 Cush.) 292, 296 (1850).

significantly or entirely prevent the injury suffered by the plaintiff.¹¹² However, upon adopting the traditional negligence system, there remains a practical and moral problem relating to the manufacturer's ability to account for, and allow injury to occur.

The classic Learned Hand¹¹³ formulation states there are three essential factors in determining liability for negligence: "the likelihood that his conduct will injure others, taken with the seriousness of the injury if it happens, and balanced against the interest which he must sacrifice to avoid the risk."¹¹⁴ The formula may be roughly approximated as saying that "[t]he loss lies on the injured victim unless the injurer knew or should have known, at the time he or she acted, that accident avoidance by him or her was cheaper than the cost of the accident."¹¹⁵ Applying this formula to a manufacturer of autonomous vehicles, that manufacturer will inevitably encounter a situation in which the cost of developing a new autonomous vehicle system to avoid such an accident exceeds the likelihood of an accident multiplied by the damages incurred by an injury to plaintiff. In such a situation, theoretically the manufacturer would not face liability for the claim under a traditional negligence framework, effectively limiting the incentive for a manufacturer to research and develop a safer method while subsidizing the new technology at the expense of injured plaintiffs.

That is not to say that there is no merit to the application of a negligence standard to autonomous vehicles. To the contrary, courts have applied a negligence standard to determine the "crashworthiness" of manually driven vehicles.¹¹⁶ With regards to the crashworthiness test, courts have determined that in instances in which a manufacturer is aware of the risks proposed by a given design

112. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) (AM. LAW INST. 1998).

113. Judge Learned Hand's consideration of mathematics and cost-benefit analysis to determine a party's negligence, as later stated in *United States v. Carroll Towing Co.*, 159 F.2d 169 (1947), has had a lasting effect on both legal and economic analysis of liability rules. See Allan M. Feldman & Jeonghyun Kim, *The Hand Rule and United States v. Carroll Towing Co. Reconsidered*, 7 AM. LAW & ECON. REV. 523, 523–25 (2005).

114. See *Conway v. O'Brien*, 111 F.2d 611, 612 (2d Cir. 1940), *rev'd*, 312 U.S. 492 (1941).

115. Guido Calabresi & Alvin K. Klevorick, *Four Tests for Liability in Torts*, 14 J. LEGAL STUD. 585, 587 (1985).

116. "[C]rashworthiness' means the protection a passenger motor vehicle gives its passengers against personal injury or death from a motor vehicle accident . . ." 49 U.S.C. § 32301(2) (2012); *Larsen v. Gen. Motors Corp.*, 391 F.2d 495, 502 (8th Cir. 1968).

as well as the availability of an alternative design, strict liability is a preferable standard to judge a design defect claim.¹¹⁷

D. Impact on the Legal Profession

Although it may seem intuitively simple to apply products liability principles like strict liability to autonomous vehicles,¹¹⁸ questions remain as to how the shift in legal framework will affect insurance and production costs, as well as the legal market. By looking at no-fault automotive insurance as a case study, a shift to strict liability alone will not necessarily cause a decrease in legal work.¹¹⁹ To the contrary, a Rand Institute study noted that rates of attorney utilization with traditional tort and no-fault tort states have largely converged over time.¹²⁰ However, the availability of work in personal liability insurance will shift, as it is highly likely that personal automotive claims will shrink significantly as autonomous cars are integrated.¹²¹ Furthermore, evidence supports that there may be a sizeable decrease in claims related to traffic-related incidents given the predicted decline in accident frequency.¹²² According to NHTSA, legal costs relating to police-reported crashes totaled nearly \$9.6 billion in 2010.¹²³ While the social benefits of autonomous cars may be significant,¹²⁴ the loss to the legal market may be sizeable as well.

117. See *Brooks v. Beech Aircraft Corp.*, 902 P.2d 54, 59–63 (N.M. 1995) (discussing how strict liability better serves the policy considerations of loss-spreading, plaintiff protection, and general fairness in the case of a manufacturer that is aware of a design's foreseeable risks).

118. It has been proposed that the principles of products liability will adapt to the new technology in the same way that the principles have adapted in the past with new technology such as electronic stability control, automatic braking, and other autonomous devices. See ZAKARAS, *supra* note 62.

119. Molly Sinclair & Ed Bruske, *No-Fault Law Seen Working*, WASH. POST (Oct. 7, 1984), <https://www.washingtonpost.com/archive/local/1984/10/07/no-fault-law-seen-working/4dd5eb21-63f8-43e8-9922-0fac1ef0233d/> [<https://perma.cc/8HL7-Q8UV>] (“Rather than drying up their business as predicted, they said, the law has caused many clients to come to them with new problems.”).

120. See ZAKARAS, *supra* note 62.

121. The personal automotive sector is predicted to shrink from \$125 billion to less than \$50 billion in loss coverage. See ALBRIGHT ET AL., *supra* note 98, at 9.

122. See *supra* note 98 and accompanying text.

123. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., REP. NO. DOT HS 812 013, THE ECONOMICS AND SOCIETAL IMPACT OF MOTOR VEHICLE CRASHES, 2010 (REVISED) 15 (2015), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013> [<https://perma.cc/H5FW-WA5C>].

124. See Kyle Colonna, Note, *Autonomous Cars and Tort Liability*, 4 CASE W. RES. J.L. TECH. & THE INTERNET 81, 111–14 (2012), for a discussion of the social utility of autonomous cars.

CONCLUSION

Creative minds have contemplated a future where a person can get in a vehicle, type in a destination, and enjoy the ride. It is only fair then that legal minds have been hard at work contemplating what happens when that ride goes awry. While much ink has been spilled discussing the legality of autonomous vehicles as well as the use of products liability as the framework for claims relating to those vehicles, typical tort principles do not provide the answer. When two autonomous vehicles collide, the human “driver” of a manual vehicle is now a blameless passenger. A shift to a liability system in which the manufacturer of the autonomous vehicle is strictly liable properly incentivizes research and development by manufacturers. A strict liability system also places the cost of adapting to the new autonomous vehicle technology with the party ablest to insulate via loss-spreading.

After considering the passive nature of the owner of an autonomous vehicle, placing liability with that owner will do nothing to incentivize an autonomous vehicle manufacturer to create a safer product. Furthermore, that manufacturer is in the best position to spread the losses through internalizing costs, which eventually will dissipate through a gradual decrease in accident frequency. Holding manufacturers to a strict liability standard is the best method to usher in a new era of transportation technology while satisfying the goals of tort law and ensuring consumer safety.

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^{**} I would like to thank Professor Richard Saver for his guidance and feedback in the creation of this Recent Development. I would also like to thank the staff and board of the *North Carolina Law Review* for the considerable time and effort put into reviewing my Recent Development, with special thanks to Brian Liebman and Caleb Johnson for their individual contributions to this Recent Development. Finally, I would like to thank my family for their support and interest in my legal education.