

COMPENSATION AT THE CROSSROADS: AUTONOMOUS
VEHICLES & ALTERNATIVE VICTIM COMPENSATION
SCHEMES

TRACY HRESKO PEARL*

ABSTRACT

Fully autonomous vehicles will become available to consumers within the next five to seven years. Experts predict that these vehicles will be drastically safer than their human-driven counterparts and will save thousands of lives each year in the United States alone. However, crashes will still occur, and when they do, they will raise unique and troubling issues about liability and fault that both negligence and products liability jurisprudence are not yet well-suited to handle.

Whether the civil justice system can adjudicate autonomous vehicle crash cases fairly and efficiently impacts (a) whether manufacturers can afford to produce these vehicles or whether the cost and magnitude of litigation surrounding them will destroy their market, (b) whether consumers will adopt this new technology, and (c) the rate at which they will be willing and able to do so. These issues, in turn, have an impact on how many lives can be saved on U.S. roads each year. It is thus imperative to design a method of compensating victims, protecting manufacturers, and giving courts time and space to develop jurisprudence applicable to this technology if we wish to

* Professor of Law, Texas Tech University School of Law. J.D., Boston College Law School, 2006; M.Sc., Comparative Social Policy, Oxford University, 2003; A.B., Public Policy, Duke University, 2002. I am grateful to my research assistant, Taylor Smith, for her excellent work, and to Michele Thaetig for her eye for detail. Many thanks also to Professors M. Alexander Pearl, Kyle Velte, Catherine Christopher, and Kristin Moore, and to Associate Dean Alyson Outenreath. This Article was made possible by a generous grant from the Texas Tech University School of Law.

reap the profound benefits that fully autonomous vehicles stand to offer.

Although filing a lawsuit in the civil justice system will always be an option for victims of autonomous vehicle crashes, a specially designed, no-fault victim compensation fund offers a sensible way to address the issues identified above and to resolve these cases in a faster and less costly manner. While the use of victim compensation funds is a fairly recent phenomenon in the United States, these funds have been used with great success in a variety of situations and could be used successfully here.

In the model proposed in this paper, an autonomous vehicle crash victim compensation fund would be administered by the National Highway Traffic Safety Administration (NHTSA) and financed by a tax levied on the sale of all fully autonomous vehicles. Victims who wish to seek compensation from the fund would be able to do so via a simple claim form and an agreement to waive their right to sue. Manufacturers, in turn, would be required to participate in a data-sharing and design improvement program as a condition of receiving protection from the fund. This program would both assist NHTSA in gathering the information it needs to regulate autonomous vehicles and reduce the likelihood that a victim compensation fund would undermine manufacturer incentives to improve the safety of their vehicles. Participation by both victims and manufacturers would be voluntary, but the benefits of entering the fund would likely induce high levels of participation from both.

TABLE OF CONTENTS

INTRODUCTION	1830
I. BACKGROUND	1835
<i>A. Levels of Automation</i>	1836
<i>B. Consumer Adoption</i>	1839
<i>C. Advantages of Autonomous Vehicles</i>	1841
<i>D. Risks Associated with Autonomous Vehicles</i>	1845
II. LIABILITY AND COMPENSATION MODELS.	1849
<i>A. The Tort System</i>	1851
1. <i>Advantages of the Tort System</i>	1852
2. <i>Drawbacks of the Tort System</i>	1853
<i>B. Victim Compensation Funds</i>	1857
1. <i>Advantages of Victim Compensation Funds</i>	1858
2. <i>Disadvantages of Victim Compensation Funds</i>	1861
<i>C. Finding a Venue for Autonomous Vehicle Crash Cases</i>	1863
III. CATEGORIZING VICTIM COMPENSATION FUNDS	1866
<i>A. Quasi-Judicial Funds</i>	1867
<i>B. Non-Judicial Funds</i>	1870
1. <i>Public Funds</i>	1870
2. <i>Private Funds</i>	1872
3. <i>Charitable Funds</i>	1874
IV. A FUND FOR AUTONOMOUS VEHICLE CAR CRASH VICTIMS	1876
<i>A. Proposed Coverage Limitation</i>	1878
<i>B. Proposed Source of Funding</i>	1879
<i>C. Proposed Administrator</i>	1882
<i>D. Proposed Participation Requirements</i>	1883
1. <i>Victim Participation Requirements</i>	1883
2. <i>Vehicle Manufacturer Participation Requirements</i>	1885
<i>E. The Private Insurance Overlay</i>	1888
CONCLUSION	1889

“America is at a historic turning point for automotive travel. Motor vehicles and drivers’ relationships with them are likely to change significantly in the next ten to twenty years, perhaps more than they have changed in the last one hundred years.”

—National Highway Traffic Safety Administration, 2013¹

INTRODUCTION

On February 14, 2016, a white Lexus SUV drove down El Camino Real in Mountain View, California.² After signaling that it wished to turn right, the Lexus moved into the far right lane just before the intersection of El Camino Real and Castro Street.³ However, sandbags situated around a storm drain blocked the car’s path and forced it to stop.⁴ The vehicles in the other lanes were stopped at a red light, so the Lexus had to wait until the light changed and the traffic flow resumed before attempting to inch out around the sandbags and into the left lane.⁵

At first glance, this driving scenario falls far short of being exciting, novel, or even particularly interesting. Most drivers likely encounter similar situations on a weekly or perhaps even daily basis, and handle them adeptly without much thought or anxiety. Rogue garbage cans that must be avoided on residential streets, construction equipment or barriers that block portions of highways, and cars parallel parked too far from the curb are all part of the American Driver’s day-to-day landscape. Yet, the sandbags and the Lexus situation was profoundly different. It was a sea change in that landscape. The Lexus was driving itself.⁶

1. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., PRELIMINARY STATEMENT OF POLICY CONCERNING AUTOMATED VEHICLES 1 (2013), http://www.nhtsa.gov/staticfiles/rulemaking/pdf/Automated_Vehicles_Policy.pdf [<https://perma.cc/3H32-8TYL>].

2. STATE OF CAL. DEP’T OF MOTOR VEHICLES, REPORT OF TRAFFIC ACCIDENT INVOLVING AN AUTONOMOUS VEHICLE (2016), <https://www.dmv.ca.gov/portal/wcm/connect/3946fbb8-e04e-4d52-8f80-b33948df34b2/Google+Auto+LLC+02.14.16.pdf?MOD=AJPERES> [<https://perma.cc/CD77-JDHG>].

3. *Id.*

4. *Id.*

5. *Id.*

6. *Id.*

Like a human driver, the Lexus had to decide when it was safe to move the vehicle into the left lane to travel around the sandbags.⁷ Its algorithms dictated that the vehicle wait for several nearby vehicles to pass before making its attempt.⁸ Unfortunately, the car's algorithms misjudged the traffic flow: as the vehicle reentered the left lane, it sideswiped a public transit bus.⁹ Fortunately, no humans were injured.¹⁰ Both vehicles were traveling slowly at the moment of impact, so the consequences were fairly nominal.¹¹ The Lexus sustained damage to its front fender, left front wheel, and driver's side sensors.¹² The bus escaped with even less damage.¹³

Google, the designer of the autonomous Lexus, quickly claimed "some" responsibility.¹⁴ "[I]f our car hadn't moved there wouldn't have been a collision," its monthly report stated.¹⁵ Google also seemed to believe, however, that the vehicle's mistake had not been particularly egregious. The (human) Google employee who was monitoring—but not controlling—the Lexus at the moment of the crash noted that he had seen "the bus approaching in the left side mirror but believed the bus would stop or slow to allow the Google [autonomous vehicle] to continue."¹⁶ If the human monitor also misjudged the situation, perhaps the autonomous vehicle's failure was not particularly troublesome.

Regardless of whether poor programming or merely a minor and unavoidable blip on Google's otherwise impressive safety record caused this fender bender,¹⁷ this incident highlights the arrival of a new and profoundly novel legal issue: who should be liable (if anyone) and how should victims be compensated (if at all) when autonomous vehicles cause injury? Although the Lexus and the bus

7. *See id.*

8. *See id.*

9. *Id.*

10. *Id.*

11. *Id.*

12. *Id.*

13. *See id.*

14. Alex Davies, *Google's Self-Driving Car Caused Its First Crash*, WIRED (Feb. 29, 2016, 2:04 PM), <https://www.wired.com/2016/02/googles-self-driving-car-may-caused-first-crash/> [<https://perma.cc/X2KX-EVF7>].

15. *Id.*

16. *Id.*

17. At the time of the accident, Google's autonomous vehicles had traveled over a million miles without causing an accident. *Id.*

case did not result in litigation, we should expect such cases to arise and to do so at any moment. Semi-autonomous (partially driverless) cars are already available to consumers and on U.S. roads,¹⁸ and fully autonomous ones continue to be tested on public roads in preparation for arrival on the consumer market within the next five years (if not significantly sooner).¹⁹ As many legal scholars have wondered: is the American legal system ready?²⁰

The answer to this question has implications far beyond the resolution of individual autonomous vehicle crash cases. Whether the American legal system can handle these cases fairly and efficiently implicates (1) the likelihood that consumers will adopt this new technology, and (2) the rate at which they will (or will not) do so. These implications should concern law and policy makers immensely. If autonomous cars stand to drastically reduce the number of fatalities and injuries on U.S. roadways—and virtually every scholar believes that they will²¹—then failing to establish a functional adjudication and compensation process risks stymieing adoption of this technology and leaving more Americans at risk of dying at the hands of human drivers.

The problem, of course, is that autonomous vehicles pose “a plethora of new and unique legal issues, which will need to be analyzed to facilitate the adequate transition of this new technology to the marketplace.”²² Chief among these are the legal implications of automation itself. Given that, as one scholar has said, “[t]he entire

18. Andrew Connor, *Semi-Autonomous Cars Bring the Self-Driving Car Closer to Reality*, GEAR PATROL (Oct. 23, 2015), <http://gearpatrol.com/2015/10/23/semi-autonomous-cars-bring-self-driving-car-closer-reality/> [<https://perma.cc/2YE7-RS2T>].

19. Samuel Gibbs, *Google's Self-Driving Car: How Does It Work and When Can We Drive One?*, GUARDIAN (May 29, 2014, 12:11 PM), <https://www.theguardian.com/technology/2014/may/28/google-self-driving-car-how-does-it-work> [<https://perma.cc/X5TE-KM3H>]; Mike Murphy, *Coming in 2021: A Self-Driving Ford Car with No Steering Wheels or Pedals*, QUARTZ (Aug. 16, 2016), <https://qz.com/759643/ford-self-driving-car-2012-no-steering-wheels-or-pedals-or-handover-function/> [<https://perma.cc/E95V-PNWC>].

20. See, e.g., Sophia H. Duffy & Jamie Patrick Hopkins, *Sit, Stay, Drive: The Future of Autonomous Car Liability*, 16 SMU SCI. & TECH. L. REV. 453, 454-55 (2013); Neal Katyal, *Disruptive Technologies and the Law*, 102 GEO. L.J. 1685, 1689 (2014); Jeremy Levy, *No Need to Reinvent the Wheel: Why Existing Liability Law Does Not Need to Be Preemptively Altered to Cope with the Debut of the Driverless Car*, 9 J. BUS. ENTREPRENEURSHIP & L. 355, 365 (2016); Kyle Colonna, Note, *Autonomous Cars and Tort Liability: Why the Market Will “Drive” Autonomous Cars Out of the Marketplace*, 4 CASE W. RES. J.L. TECH. & INTERNET 81, 117 (2012).

21. See, e.g., Katyal, *supra* note 20, at 1688.

22. See Levy, *supra* note 20, at 357.

history of human laws has assumed that people make decisions,”²³ handing those decisions over to an algorithm places lawyers and judges into a situation in which “[w]e currently have no legal framework for ... liability.”²⁴ Worse yet, the development of automated vehicles is already far ahead of the development of the law in this area, and automated vehicle technology continues to advance at rates that can often seem exponential.²⁵ We are thus in a situation in which we need to develop jurisprudence in and around a technology that challenges many of American jurisprudence’s most fundamental assumptions. We must do so, moreover, extraordinarily quickly or risk hampering innovation and slowing adoption of a technology that will likely save tens of thousands of lives each year in the United States alone.²⁶ In short, the stakes are extremely high and the time extremely limited.

In this Article, I explore the liability issues posed by accidents involving autonomous vehicles and propose a way in which we can both compensate injured victims while also creating time and space for the civil justice system to develop a robust jurisprudence in and around the use and development of these vehicles. It is my belief that funneling autonomous vehicle crash cases into a specially designed, no-fault, quasi-judicial victim compensation fund is a sensible way to do so. Such a fund could both protect autonomous car designers and manufacturers from high levels of uncertainty about their exposure to liability and assure consumers that they will be compensated fairly and quickly if an autonomous vehicle harms them.²⁷ Although it is not my intention to wholly replace the tort system in cases involving autonomous technologies (and certainly not my intention for this Article to serve as a referendum on the value of the tort system as a whole), my hope is that my proposed stop-gap solution will give courts “breathing room” to adapt products liability law to the brave new world of automation and artificial intelligence while simultaneously offering victims

23. JOHN FRANK WEAVER, *ROBOTS ARE PEOPLE TOO: HOW SIRI, GOOGLE CAR, AND ARTIFICIAL INTELLIGENCE WILL FORCE US TO CHANGE OUR LAWS* 56 (2014).

24. See Katyal, *supra* note 20, at 1689.

25. John Markoff, *Google Cars Can Drive Themselves, in Traffic*, N.Y. TIMES (Oct. 9, 2010), <http://www.nytimes.com/2010/10/10/science/10google.html> [<https://perma.cc/8YLW-LGRX>].

26. Katyal, *supra* note 20, at 1688.

27. See *infra* Part II.C.

and manufacturers greater confidence that autonomous vehicle crash cases can be handled fairly and efficiently if and when they occur.²⁸

The National Vaccine Injury Compensation Program (NVICP) provides an excellent example of the type of quasi-judicial compensation fund that could be well-suited for autonomous vehicle crash cases.²⁹ Although victim compensation funds in the United States have taken various forms—ranging from the federally funded and publicly administered September 11th Victim Compensation Fund³⁰ to the privately funded and privately administered Deepwater Horizon Oil Spill Trust³¹—the NVICP's quasi-judicial setup, non-adversarial process, and reliable funding mechanism make it a better model for adjudicating autonomous vehicle crash cases.³² Additionally, as discussed at length in this Article, although the NVICP has its shortcomings, it has a far better and more extensive track record than many of the other types of victim compensation funds created and administered over the last several decades in the United States, and thus appears more likely to succeed in a context such as this one.³³

In Part I of this Article, I describe the development of autonomous vehicles in the United States, the way in which the federal government has chosen to categorize them, and the benefits and advantages they offer to consumers over human-driven vehicles. In Part II, I explore and analyze the two courses that the United States could take in handling autonomous vehicle crash cases: (1) sending them through the existing civil justice system and applying existing products liability and negligence jurisprudence, or (2) creating a victim compensation fund to handle them. In Part III, I explore the numerous victim compensation fund design options: quasi-judicial, public, private, and charitable. In Part IV, I propose a

28. See *infra* Part II.C.

29. See *infra* notes 230-33 and accompanying text.

30. See *September 11th Victim Compensation Fund*, SEPTEMBER 11TH VICTIM COMP. FUND, <https://www.vcf.gov/> [<https://perma.cc/T2FT-X7K2>].

31. See BDO CONSULTING, INDEPENDENT EVALUATION OF THE GULF COAST CLAIMS FACILITY 3 (2012), http://media.nola.com/2010_gulf_oil_spill/other/BDO%20Executive%20Summary.pdf [<https://perma.cc/BG24-LQ3P>].

32. See *infra* notes 233-43 and accompanying text.

33. See *infra* notes 243-44 and accompanying text.

model victim compensation fund for injuries arising from the use of autonomous vehicles based on the NVICP, propose a mechanism for funding, and propose a series of requirements for both manufacturers and victims who wish to participate in the fund.

I. BACKGROUND

The National Highway Traffic Safety Administration (NHTSA) defines autonomous vehicles as “those in which at least some aspects of a safety-critical control function (for example, steering, throttle, or braking) occur without direct driver input.”³⁴ In plain English, this simply means that the vehicle does not require a human driver to operate it or navigate in the way that a driver must do so in a non-autonomous vehicle.³⁵ Instead, the vehicle uses some combination of “cameras, radar systems, lasers (for example, LIDAR), and Global Positioning System (GPS) units” to gather information about the environment and make decisions about when and how to steer, accelerate, and brake.³⁶ Autonomous vehicles may also eventually use vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) modes of communication to make such decisions, though these technologies are still in early development.³⁷ Both now and in the future, however, autonomous vehicles are and will continue to be “hybrid[s] between vehicles and computers.”³⁸ At base, they are nothing more than extremely complex algorithms being applied to a mode of transportation that has existed for over a hundred years—although this in itself is a remarkable and society-altering feat.³⁹

34. See NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1, at 3.

35. See Kyle L. Barringer, Comment, *Code Bound and Down ... A Long Way to Go and a Short Time to Get There: Autonomous Vehicle Legislation in Illinois*, 38 S. ILL. U. L.J. 121, 122 (2013).

36. *Id.* at 123.

37. *See id.*

38. Duffy & Hopkins, *supra* note 20, at 455.

39. See NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1, at 1.

A. *Levels of Automation*

In an attempt to describe the varying (and increasing) levels of automation in vehicles, NHTSA adopted a six-level measurement of automation in its 2016 Federal Automated Vehicles Policy (FAVP).⁴⁰ Based on measurements created by SAE International, a professional association of automotive engineers, the levels of automation are an attempt to provide “common terminology for automated driving,” and to highlight crucial distinctions such as the distinction between semi-autonomous and fully autonomous vehicles.⁴¹ The levels are as follows:

Level 0: Level 0 vehicles are those without any form of automation. In these vehicles, “[t]he driver is in complete and sole control of the primary vehicle controls (brake, steering, throttle, and motive power) at all times, and is solely responsible for monitoring the roadway and for safe operation of all vehicle controls.”⁴² Level 0 vehicles include cars without cruise control or more modern features like electronic stability control.

Level 1: Level 1 vehicles have “[f]unction-specific [a]utomation.”⁴³ The driver still maintains “overall control, ... but can choose to cede limited authority over a primary control (as in adaptive cruise control),” or the vehicle itself may “assume limited authority over a primary control (as in electronic stability control).”⁴⁴ In either scenario, though, the driver must maintain some level of physical control and constant vigilance over the vehicle as a whole.⁴⁵ In Level 1 vehicles, in short, “there is no combination of vehicle control systems working in unison that enables the driver to be disengaged from physically operating the vehicle by having his or her hands off the steering

40. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., FEDERAL AUTOMATED VEHICLES POLICY 9 (2016) [hereinafter FAVP], <https://www.transportation.gov/sites/dot.gov/files/docs/AV%20policy%20guidance%20PDF.pdf> [<https://perma.cc/M4X2-NPYX>].

41. SAE INTERNATIONAL, AUTOMATED DRIVING: LEVELS OF DRIVING AUTOMATION ARE DEFINED IN NEW SAE INTERNATIONAL STANDARD J3016 1 (2016), https://www.sae.org/binaries/content/assets/cm/content/news/press-releases/pathway-to-autonomy/automated_driving.pdf [<https://perma.cc/EJ4T-WUHF>].

42. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1, at 4.

43. *Id.*

44. *Id.*

45. *Id.*

wheel AND feet off the pedals at the same time.”⁴⁶ A vehicle with cruise control is an example of a Level 1 vehicle.⁴⁷

Level 2: Level 2 vehicles have “[c]ombined [f]unction [a]utomation,” meaning that they have “at least two primary control functions designed to work in unison to relieve the driver of control of those functions.”⁴⁸ In a Level 2 vehicle, unlike a Level 1 vehicle, a driver could have his or her hands both off the wheel *and* off the pedals.⁴⁹ However, “[t]he driver is still responsible for monitoring the roadway and safe operation and is expected to be available for control at all times and on short notice.”⁵⁰ The 2017 Tesla Model S with Autopilot functionality is an example of a Level 2 vehicle.⁵¹

Level 3: Level 3 vehicles have “[l]imited [s]elf-[d]riving automation.”⁵² They “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 requests.”⁵³ As I have described in my earlier work, “[t]he key difference between a Level 2 and a Level 3 vehicle is the level of monitoring required by the human driver. In Level 3 vehicles, the driver need only be available for ‘occasional control’: when the vehicle signals to the driver that he or she must reassume control due to, for instance, changes in the traffic or weather patterns near the vehicle.”⁵⁴ However, in Level 2 vehicles, “a human must monitor the vehicle at all times, as the vehicle’s ability to detect what is happening in the environment around it is much more limited.”⁵⁵ Level 3 vehicles are not yet available to consumers, although experts predict that they will be available by 2020.⁵⁶

46. *Id.*

47. *Id.*

48. *Id.* at 5.

49. *Id.*

50. *Id.*

51. See Connor, *supra* note 18.

52. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1, at 5.

53. See FAVP, *supra* note 40, at 9.

54. Tracy Hresko Pearl, *Hands on the Wheel: A Call for Greater Regulation of Semi-Autonomous Cars*, 93 IND. L.J. 713, 718 (2018).

55. *Id.*

56. See Connor, *supra* note 18.

Level 4: Level 4 vehicles have high automation. They “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.”⁵⁷ The difference between a Level 3 and a Level 4 car is that the driver need not be available to resume control of the vehicle, and thus could presumably sleep, work, and/or sit away from the driver’s seat.⁵⁸ However, Level 4 vehicles may have limitations on the situations in which they can be utilized safely. They may, for instance, be unsafe to operate in certain types of extreme weather, on highways with significant amounts of construction, or on poorly marked roads.⁵⁹ Level 4 vehicles are not yet available to consumers, although they are being tested on public roads in numerous states.⁶⁰

Level 5: Level 5 vehicles have full automation in that “the automated system can perform all driving tasks, under all conditions that a human driver could perform them.”⁶¹ A human driver need never be available to either supervise or control the vehicle, and the vehicle can operate in all weather and road conditions.⁶² In fact, these vehicles may have no mechanism to allow a human driver to take control even if he or she wanted to do so.⁶³ Level 5 vehicles are still in development.⁶⁴

As of early 2018, consumers in the United States have the option to purchase Level 0, 1, or 2 vehicles, with Level 3 vehicles expected to come to market soon and Level 4 vehicles likely not far behind them.⁶⁵ Although some commentators and journalists have asserted that Level 4 and 5 vehicles are significantly further off than we

57. FAVP, *supra* note 40, at 9.

58. See NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1, at 5.

59. See FAVP, *supra* note 40, at 9.

60. See Marcus E. Johnson, *The Drive for Autonomous Vehicles: Idaho’s Race to Catch Up*, 59 ADVOCATE 28, 29 (2016).

61. FAVP, *supra* note 40, at 9.

62. See Pearl, *supra* note 54, at 719.

63. See Justin Pritchard, *How Can People Safely Take Control from a Self-Driving Car?*, ASSOCIATED PRESS (Nov. 30, 2015, 12:29 PM), <https://www.dailyherald.com/article/20151130/business/311309977> [https://perma.cc/6Z2J-XX66].

64. See Pearl, *supra* note 54, at 720.

65. Paul Ingrassia et al., *How Google Is Shaping the Rules of the Driverless Road*, REUTERS (Apr. 26, 2016, 12:30 PM), <http://www.reuters.com/investigates/special-report/autos-driverless/> [https://perma.cc/SBT9-AGXT].

have predicted,⁶⁶ if anything, “[s]elf-driving technology has developed far faster than experts envisioned when Google started developing it in 2009.”⁶⁷ This history has led numerous experts to argue that the reverse is likely true: that Level 4 and 5 vehicles will arrive on the market far *sooner* than we expect.⁶⁸ Indeed, most automotive companies that are developing Level 4 and 5 vehicles are currently predicting that their fully autonomous models will be available by 2020.⁶⁹ Even NHTSA has said that “the rapid development of emerging automation technologies means that partially and fully automated vehicles are nearing the point at which widespread deployment is feasible.”⁷⁰

B. Consumer Adoption

While it is unclear how many Level 2 vehicles are currently on U.S. roads, as of 2018, the number is likely in the low hundreds of thousands.⁷¹ Experts predict, however, that the number of people driving automobiles with some level of automation will likely rise sharply in the coming years.⁷² A 2014 IHS Automotive study, for

66. Matt Burgess, *When Does a Car Become Truly Autonomous? Levels of Self-Driving Technology Explained*, WIRED (Apr. 21, 2017), <http://www.wired.co.uk/article/autonomous-car-levels-sae-ranking> [https://perma.cc/UPQ4-6K56].

67. See Ingrassia et al., *supra* note 65.

68. See Brad E. Haas, *Autonomous Vehicles May Impact Legal Profession*, LAW. J. (Oct. 2, 2015), <http://www.marshall Dennehey.com/media/pdf-articles/O%20383%20by%20B.%20Haas%20%2810.02.15%29%20Journal%20Allegheny%20County%20Bar.pdf> [https://perma.cc/9LEC-E9P9] (“While there remains a plethora of legal and social issues that must be dealt with in this field, many experts predict that a world of driverless vehicles may be closer than many people realize.”); Patrick Lin, *The Ethics of Saving Lives with Autonomous Cars Is Far Murkier Than You Think*, WIRED (July 30, 2013, 6:30 AM), <http://www.wired.com/2013/07/the-surprising-ethics-of-robot-cars> [https://perma.cc/V8S7-T6DM] (“We can see ‘robot’ or automated cars (what others have called ‘autonomous cars’, ‘driverless cars’, etc.), coming in our rear-view mirror, and they are closer than they appear.”).

69. Trefis Team, *General Motors Inching Closer to Self-Driving Cars*, FORBES (Mar. 16, 2016, 8:38 AM), <https://www.forbes.com/sites/greatspeculations/2016/03/16/general-motors-inching-closer-to-self-driving-cars/#42c57053f35a> [https://perma.cc/PYK9-DBPD].

70. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., DOT/NHTSA POLICY STATEMENT CONCERNING AUTOMATED VEHICLES 2016 UPDATE TO PRELIMINARY STATEMENT OF POLICY CONCERNING AUTOMATED VEHICLES 1 (2016), http://www.aamva.org/NHTSADOTAutVehPolicyUpdate_Jan2016/ [https://perma.cc/ZF6V-S27G].

71. See Pearl, *supra* note 54, at 719.

72. See Noah Buhayar & Peter Robison, *Can the Insurance Industry Survive Driverless Cars?*, BLOOMBERG BUSINESSWEEK (July 30, 2015, 5:00 AM), <http://www.bloomberg.com/news/>

example, projected that there will be over 50 million self-driving cars on U.S. roads by 2035, and that “nearly all of the vehicles in use are likely to be self-driving cars or self-driving commercial vehicles sometime after 2050.”⁷³ And ten years before that study, a different scholar posited that 75 percent of the vehicles on the road will be fully autonomous by 2040.⁷⁴ Other experts predict that, in less than twenty years, somewhere between 25 and “75 percent of the vehicles sold worldwide will have some degree of autonomous capability.”⁷⁵

While the United States will presumably reach a point, at some time decades in the future, in which every vehicle on the road has Level 5 automation, the interim years will see an interesting diversity of autonomous, semi-autonomous, and non-autonomous vehicles driving in and around each other. The reasons for this automobile diversity will be two-fold. First, tech companies and automobile manufacturers are developing fully automated cars at differing rates. Traditional automobile manufacturers are taking what has been deemed a “gradualist” approach, increasing the level of automation in their cars somewhat slowly over time to give consumers an opportunity to adapt slowly to such changes in their vehicles.⁷⁶ Tech companies and Ford, however, are taking an “all-in” approach to automation and do not intend to release any automated vehicles until they have Level 4 or 5 autonomous capabilities.⁷⁷ Autonomous vehicles ranging from Level 2s to Level 5s will thus enter the consumer market at different times and at different rates

articles/2015-07-30/can-the-insurance-industry-survive-driverless-cars- [https://perma.cc/Z5SA-LWL2]; John Villasenor, *Products Liability and Driverless Cars: Issues and Guiding Principles for Legislation*, BROOKINGS (Apr. 2014), https://www.brookings.edu/wp-content/uploads/2016/06/Products_Liability_and_Driverless_Cars.pdf [https://perma.cc/Q848-6EVL].

73. See Villasenor, *supra* note 72, at 18 (quoting Press Release, IHS, Self-Driving Cars Moving into the Industry’s Driver’s Seat (Jan. 2, 2014), http://press.ihs.com/press-release/automotive/self-driving-cars-moving-industrys-drivers-seat) [https://perma.cc/4NVG-RQRD].

74. Andrew R. Swanson, Comment, “Somebody Grab the Wheel!”: *State Autonomous Vehicle Legislation and the Road to a National Regime*, 97 MARQ. L. REV. 1085, 1094 (2014).

75. Compare Richard C. Balough, *Are Your Clients Ready for the Impact of Driverless Cars?*, BUS. L. TODAY (May 2016), https://www.americanbar.org/publications/blt/2016/05/03_balough.html [https://perma.cc/75TF-VDXK] (projecting that 75 percent of all vehicles sold by 2035 will have some autonomous capability), with Buhayar & Robison, *supra* note 72 (projecting a 25 percent market share).

76. Pearl, *supra* note 54, at 720-21.

77. *Id.* at 721.

depending on their manufacturers. It is possible, for instance, that Toyota will just be releasing Level 2 or 3 vehicle models during the same year that Ford releases Level 4 models.

Second, consumers will likely adopt autonomous vehicles at differing rates depending on some combination of (1) their comfort level with autonomous vehicles (recent polling data shows that significant numbers of Americans have fears about the safety of driverless cars),⁷⁸ (2) their commitment to staying behind the wheel themselves (out of fear, love of driving, resistance to change, etcetera),⁷⁹ and (3) whether they have the means to purchase a new vehicle and/or one with autonomous capacities.⁸⁰ Even now, in 2018, these forces have combined to create a diversity of vehicles on U.S. roads. Many people are still driving Level 0 cars without cruise control capabilities while others have rushed to adopt newer vehicles with Level 2 capabilities, such as Tesla's Model S with Autopilot⁸¹ or Cadillac's CT6 with Super Cruise.⁸² This variety of cars on the road will likely continue and intensify over the coming ten to fifteen years. Presumably, at some point, we will have cars of all six levels of automation on U.S. roads.

C. Advantages of Autonomous Vehicles

Autonomous vehicles offer a panoply of advantages over human-driven vehicles. Adoption of these vehicles in the United States "could translate into real-life improvements by," among other things, "reducing the fear of car crashes, increasing productivity by relieving congestion for busy commuters, and providing continued

78. See Tom Krisher & Justin Pritchard, *Autonomous Cars Aren't Perfect, But How Safe Must They Be?*, ASSOCIATED PRESS (Mar. 17, 2016), <https://www.apnews.com/dea92cb3481247a692be3a5d99f85e23> [<https://perma.cc/67QU-78DJ>].

79. Jamie L. LaReau, *Movement Rises to Keep Humans, Not Robots, in the Driver's Seat*, DETROIT FREE PRESS (Oct. 16, 2018, 6:00 AM), <https://www.freep.com/story/money/cars/general-motors/2018/10/16/fighting-keep-humans-not-robots-drivers/1601286002/> [<https://perma.cc/ZESM-HPUP>].

80. Chuck Tannert, *Will You Ever Be Able to Afford a Self-Driving Car?*, FAST COMPANY (Jan. 13, 2014), <https://www.fastcompany.com/3025722/will-you-ever-be-able-to-afford-a-self-driving-car> [<https://perma.cc/VCV2-V838>].

81. *Full Self-Driving Hardware on All Cars*, TESLA, <https://www.tesla.com/autopilot> [<https://perma.cc/52QJ-2QDJ>].

82. *Giving You the Freedom to Go Hands-Free*, CADILLAC, <http://www.cadillac.com/world-of-cadillac/innovation/super-cruise> [<https://perma.cc/M9RD-VRCP>].

mobility for elderly persons who would otherwise be apprehensive about their ability to drive safely.”⁸³ They also offer improved transportation accessibility to people with disabilities,⁸⁴ will likely be far more fuel efficient than human-driven cars,⁸⁵ and “could double the capacity of roads by allowing cars to drive more safely while closer together.”⁸⁶ All of these benefits have led scholars to conclude that autonomous vehicles are “poised to be the next great transformative transportation technology,” having “a significant impact on how we live, work, and use our time” while also addressing “many enduring social needs.”⁸⁷

Enhanced motor vehicle safety, however, is overwhelmingly the largest benefit that autonomous vehicles stand to offer.⁸⁸ Former U.S. Department of Transportation Secretary Anthony Foxx, for instance, has stated that he believes consumer adoption of autonomous vehicles could “dramatically reduce injuries and fatalities, perhaps by as much as 80 percent.”⁸⁹ Other experts have predicted that “if 10 percent of vehicles in use were autonomous vehicles, 1,100 fewer people would die in car accidents [per year],” and that “[w]ith 90 [percent] penetration, the [United States] would save 21,700 lives and have 4.2 million fewer crashes per year.”⁹⁰

These predictions are stunning and significant, particularly in light of how many deaths and injuries motor vehicle accidents cause in the United States each year. In 2015, more than 35,000 people were killed, and over 2.4 million people were injured on U.S. roads.⁹¹ Traffic accident fatalities rose in 2016 to over 37,400,⁹² one

83. Frank Douma & Sarah Aue Palodichuk, *Criminal Liability Issues Created by Autonomous Vehicles*, 52 SANTA CLARA L. REV. 1157, 1158 (2012).

84. See FAVP, *supra* note 40, at 12.

85. Bryant Walker Smith, *Managing Autonomous Transportation Demand*, 52 SANTA CLARA L. REV. 1401, 1410 (2012).

86. See Markoff, *supra* note 25.

87. Leili Fatehi & Frank Douma, *Autonomous Vehicles: The Legal and Policy Road Ahead*, 16 MINN. J.L. SCI. & TECH. 615, 617 (2015).

88. Jeffrey K. Gurney, *Driving into the Unknown: Examining the Crossroads of Criminal Law and Autonomous Vehicles*, 5 WAKE FOREST J.L. & POL'Y 393, 402 (2015).

89. Pete Bigelow, *Coolness Aside, Self-Driving Focus Should Be on Safety*, CAR & DRIVER (July 20, 2016, 10:00 AM), <https://www.caranddriver.com/news/anthony-foxx-coolness-aside-self-driving-focus-should-be-on-safety> [<https://perma.cc/ES64-3EHM>].

90. Gurney, *supra* note 88, at 402.

91. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., NATIONAL STATISTICS (2018) [hereinafter NHTSA STATISTICS], <https://cdan.nhtsa.gov/tsftables/National%20Statistics.pdf> [<https://>

of the largest upticks in almost fifty years.⁹³ The cost of these traffic accidents to the U.S. economy is staggering: more than \$240 billion per year.⁹⁴ Those numbers are almost entirely our fault. Research studies consistently conclude that human drivers are, by far, the leading cause of traffic accidents—accounting for nearly 94 percent of them.⁹⁵ The reasons are varied. Drunk driving accounts for over 30 percent of all motor vehicle fatalities.⁹⁶ Distracted driving is also a significant problem, accounting for 10 percent of motor vehicle fatalities.⁹⁷ One study revealed that seven in ten American drivers said “that as a result of being distracted while driving, they have slammed their brakes or swerved to avoid an accident, missed a traffic signal, or actually caused an accident.”⁹⁸ Beyond drunk and distracted driving, human drivers can also cause accidents due to “inadequate surveillance, excessive speed, incorrect assumptions, misjudgments, illegal maneuvers, overcompensation, poor directional control, and simply falling asleep.”⁹⁹

By their very nature, autonomous vehicles can eliminate nearly all of those causes of motor vehicle accidents. They cannot drive drunk, distracted, or drowsy.¹⁰⁰ But they can process far more data far more quickly than a human driver. One journalist explains:

perma.cc/VJ4F-6CW7].

92. *Id.*

93. Peter Kurdock, *Statement from NHTSA Public Meeting on Federal Automated Vehicles Policy*, ADVOCATES FOR HIGHWAY & AUTO SAFETY (Nov. 10, 2016), <http://saferoads.org/2016/11/10/2182/> [<https://perma.cc/S86W-RABU>].

94. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *TRAFFIC SAFETY FACTS 2016* (2016), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812554> [<https://perma.cc/V68R-KBAR>].

95. Carrie Schroll, Note, *Splitting the Bill: Creating a National Car Insurance Fund to Pay for Accidents in Autonomous Vehicles*, 109 NW. U. L. REV. 803, 805 (2015).

96. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., 2014 CRASH DATA KEY FINDINGS (2015) [hereinafter *NHTSA CRASH DATA*], <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812219> [<https://perma.cc/KYE9-FP6K>].

97. *See id.*

98. *New Allstate Survey Shows Americans Think They Are Great Drivers—Habits Tell a Different Story*, ALLSTATE INS. CO. (Aug. 2, 2011, 1:00 AM), <https://www.prnewswire.com/news-releases/new-allstate-survey-shows-americans-think-they-are-great-drivers---habits-tell-a-different-story-126563103> [<https://perma.cc/NHL9-TKZG>].

99. Bryant Walker Smith, *Automated Driving and Product Liability*, 2017 MICH. ST. L. REV. 1, 12 (citation omitted).

100. Burkhard Bilger, *Auto Correct: Has the Self-Driving Car at Last Arrived?*, NEW YORKER (Nov. 25, 2013), <https://www.newyorker.com/magazine/2013/11/25/auto-correct> [<https://perma.cc/NWM6-LFNZ>].

I don't care how good of a driver you are (or you think you are): [an autonomous] car, being for all practical purposes a robot, can digest a huge amount of data and make a decision about the best course of action to take in approximately the same amount of time it takes for you to move your foot from the gas to the brake. Our brains just don't work fast enough to keep up, and if something goes wrong, your car will be vastly better than you are at keeping you (and your passengers) from harm.¹⁰¹

Indeed, the Level 4 autonomous vehicle that Google (now Waymo) has been testing has a laser on its roof with 64 beams that spin around ten times per second, "scanning 1.3 million points in concentric waves that began eight feet from the car."¹⁰² These lasers can detect a 14-inch object from roughly 160 feet away.¹⁰³ Humans, by contrast, have significantly more limited powers of vision and perception and have significantly slower reaction times.¹⁰⁴

Additionally, both (1) motor vehicle laws and regulations and (2) market demand will almost certainly require that fully autonomous Level 4 or 5 vehicles be significantly safer than human-driven ones *before* they can come to market. As one scholar predicts:

Safer performance is likely to be a social if not a legal prerequisite to market introduction. In informal comments, NHTSA's administrator has suggested that automated driving should be at least twice as safe as conventional driving.... If these sentiments reflect the eventual expectations of regulators, developers, and consumers, then automated driving will not be a

101. Evan Ackerman, *Study: Intelligent Cars Could Boost Highway Capacity by 273%*, IEEE SPECTRUM (Sept. 4, 2012, 2:42 PM), <http://spectrum.ieee.org/automaton/robotics/artificial-intelligence/intelligent-cars-could-boost-highway-capacity-by-273> [<https://perma.cc/DT56-XGDC>].

102. See Advait Berde, *Google's Waymo and the Science Behind Autonomous Vehicles*, MONEYCONTROL (Feb. 28, 2019, 9:08 AM), <https://www.moneycontrol.com/news/technology/auto/googles-waymo-and-the-science-behind-autonomous-vehicles-3588351.html> [<https://perma.cc/5UPR-ZX4H>]; Bilger, *supra* note 100.

103. Bilger, *supra* note 100.

104. See Aarian Marshall, *Puny Humans Still See the World Better than Self-Driving Cars*, WIRED (Aug. 5, 2017, 7:00 AM), <https://www.wired.com/story/self-driving-cars-perception-humans/> [<https://perma.cc/48F2-3UJV>] (arguing that human drivers are presently better than autonomous cars, but acknowledging that autonomous driving technology has already surpassed the human driver's processing speeds and continues to improve in other areas).

commercial reality unless and until it is in fact safer than conventional driving.¹⁰⁵

In the meantime, humans, as a group, are unlikely to get any better at driving (and recent motor vehicle crash data suggests they may be getting worse).¹⁰⁶ Thus, any significant improvements in the safety of Level 0 or 1 human-controlled vehicles will almost certainly not offset the safety gains offered by Level 4 or 5 autonomous vehicles.

In short, highly automated vehicles stand to “drastically reduce the carnage of road accidents and the colossal medical costs associated with them.”¹⁰⁷ Reducing the number of motor vehicle crashes will, in turn, relieve “the enormous emotional toll on families” and lessen “related societal costs—lives lost, hospital stays, days of work missed, and property damage—that total in the hundreds of billions of dollars each year.”¹⁰⁸ These overwhelming safety gains, combined with autonomous vehicles’ other benefits discussed above, should be at the forefront of public consciousness when contemplating whether and how to introduce and integrate highly autonomous vehicles onto U.S. roads. The stakes are exceptionally high: poorly regulating and/or mishandling the transition from human-driven vehicles to autonomous ones carries with it the risk of reducing the number of lives these vehicles can save.

D. Risks Associated with Autonomous Vehicles

In addition to the significant benefits they offer with regard to safety, productivity, and accessibility, autonomous vehicles also bring with them a number of risks. Some of these risks only pertain to certain levels of automation, whereas others are of concern at all levels. Acknowledging all of these risks, however, is a critical step

105. See Smith, *supra* note 99, at 15.

106. See NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., 2016 FATAL MOTOR VEHICLE CRASHES: OVERVIEW 1-2 (2017), <https://www.nhtsa.gov/press-releases/usdot-releases-2016-fatal-traffic-crash-data> [<https://perma.cc/26RH-EG76>].

107. *Look, No Hands*, ECONOMIST (Apr. 20, 2013), <https://www.economist.com/news/special-report/21576224-one-day-every-car-may-come-invisible-chauffeur-look-no-hands> [<https://perma.cc/E47C-SDWR>].

108. See NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1.

in designing laws, regulations, and compensation systems pertaining to these vehicles and promoting motor vehicle safety through innovation. Three risks, in particular, are worth noting.

First, as I have written about at length in my earlier work, Level 2 and 3 vehicles (often referred to as “semi-autonomous vehicles”) depend on human supervision and/or human intervention in ways that are highly troubling and likely unreliable.¹⁰⁹ To wit:

Despite the fact that semi-autonomous vehicles rely on continuous human supervision to operate safely, a growing body of research demonstrates that the drivers of Level 2 vehicles are prone to distraction. In at least one instance, this has had deadly consequences. Furthermore, an even more troubling set of studies suggests that both drivers and sellers of Level 2 vehicles do not have a strong understanding of the limitations of the semi-autonomous features of their cars and are thus at risk of failing to intervene and retake control of the vehicle when necessary.¹¹⁰

Level 3 vehicles are likely to present much the same problem when they become available to consumers: they will rely on human drivers to retake control in certain scenarios, but it is questionable how safely and effectively human drivers will be able to do so given their tendency to become distracted while driving semi-autonomous vehicles.¹¹¹ This issue is so significant that some autonomous vehicle manufacturers have chosen to forego development of Level 2 and 3 vehicles entirely in favor of Level 4 and 5 vehicles that they believe will be safer.¹¹² Both Ford and Waymo, for instance, do not believe “a quick handoff from machine to human is feasible” and thus have focused their development efforts on more heavily automated vehicles.¹¹³

109. See Pearl, *supra* note 54, at 731-37.

110. *Id.* at 755.

111. Noah J. Goodall, *Machine Ethics & Automated Vehicles*, in ROAD VEHICLE AUTOMATION 93, 97-98 (Gereon Meyer & Sven Beiker eds., 2014), <http://people.virginia.edu/~njg2q/machineethics.pdf> [<https://perma.cc/3TRB-CJ7H>].

112. Alex Davies, *Ford's Skipping the Trickiest Thing About Self-Driving Cars*, WIRED (Nov. 10, 2015, 7:00 AM), <https://www.wired.com/2015/11/ford-self-driving-car-plan-google/> [<https://perma.cc/5GW6-VKWA>].

113. See Ingrassia et al., *supra* note 65.

Second, although autonomous vehicles may significantly reduce the number of accidents caused by human driver error, “faulty technology or errors in the computer software [of these vehicles] may cause many accidents.”¹¹⁴ Two scholars explain:

Serious accidents could be caused by glitches, viruses, network failures, and programming errors that commonly afflict computer-run devices. This danger is very real; car manufacturer Toyota recently settled a class action lawsuit stemming from personal injuries and property damages caused by the malfunction of autonomous acceleration systems in certain models that caused the cars to rapidly and uncontrollably accelerate and crash. While these cars were not completely autonomous, these lawsuits serve as a harbinger of the types of computer problems and injuries that can occur with autonomous cars.¹¹⁵

Another scholar states more succinctly: “surprises abound on roads as well as in software.”¹¹⁶ Although automation-related glitches are not novel, human drivers in Level 1 or 2 vehicles have at least some chance to intervene successfully before an accident happens if software malfunctions.¹¹⁷ In Level 4 or 5 vehicles, human drivers may not have that opportunity. For instance, Google’s Level 4 prototype lacks a steering wheel and pedals.¹¹⁸ For highly automated vehicles, software reliability is thus much more deeply intertwined with the vehicle’s safety than it is for low- or no-autonomy vehicles.

Third, scholars, journalists, and policymakers have raised concerns about third parties hacking into autonomous vehicles’ computer systems, assuming control, and then using the vehicles to

114. Colonna, *supra* note 20, at 116.

115. See Duffy & Hopkins, *supra* note 20, at 456 (footnotes omitted).

116. See Smith, *supra* note 99, at 18.

117. See *State v. Baker*, 571 P.2d 65, 69 (Kan. Ct. App. 1977); *State v. Paekin*, 257 A.2d 120, 121 (N.J. Sup. Ct. App. Div. 1969).

118. Pritchard, *supra* note 63.

achieve nefarious or deadly purposes.¹¹⁹ Unfortunately, there is already precedent for such activity:

In July of 2015, a hacker by the name of Samy Kamkar demonstrated for *Wired* magazine how a \$100 device of his own devising could hack any of the automated features of the GM OnStar system. Controlling it through an iOS or Android smart phone app called “GM RemoteLink,” he was able to access the car’s controls, including locating the vehicle, unlocking it, and starting its ignition.... With [numerous] automakers developing various levels of autonomous vehicles, and with some autonomous driver assistance systems already having reached the roadways such as BMW’s ConnectedDrive, it is an easy second step to start taking control of the systems from similar wireless hacks. While GM, and others, have already shored up various flaws in their system, the inventiveness of hackers has proven that even the best defenses are accessible over time.¹²⁰

However, fears about hacking may be “overblown,” according to other scholars who point out that “car hacking is already possible for the vast majority of cars on the roads today.”¹²¹ Additionally, both manufacturers (which “have powerful reputational incentives at stake here”) and engineers are actively working to eliminate security vulnerabilities in autonomous vehicles,¹²² and “NHTSA has initiated research on vehicle cybersecurity, with the goal of developing an initial baseline set of requirements.”¹²³ Although hacking is at least a potential risk for automated vehicles, it appears to be a somewhat unlikely one.

Autonomous vehicles thus stand to offer significant benefits to U.S. citizens and to introduce new and heightened forms of risk onto U.S. roadways. On balance, however, most scholars appear to agree

119. See, e.g., Douma & Palodichuk, *supra* note 83, at 1164-65; Levy, *supra* note 20, at 385-86; Smith, *supra* note 99, at 19; *Self-Driving Car Guidelines: Not Enough Protection for Consumers*, CONSUMER REP. (Sept. 20, 2016), <http://www.consumerreports.org/self-driving-cars/self-driving-car-guidelines-not-enough-protection-for-consumers/> [<https://perma.cc/9PZ6-PY7P>].

120. See Levy, *supra* note 20, at 385-86 (footnotes omitted).

121. Adam Thierer & Ryan Hagemann, *Removing Roadblocks to Intelligent Vehicles and Driverless Cars*, 5 WAKE FOREST J.L. & POL'Y 339, 375 (2015).

122. *Id.* at 377.

123. See NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 1, at 7.

that “the substantial social utility of autonomous cars” outweighs those risks.¹²⁴ If so, law and policymakers are faced with a high-stakes quandary: how to regulate “autonomous vehicle technology in a safe, efficient, and timely manner” to address the risks that it poses while also promoting its development and adoption by consumers.¹²⁵ Moreover, they must address this technology extraordinarily quickly given its development rate or risk “slower adoption of these systems, which could lead to crash injuries that could have been prevented.”¹²⁶

II. LIABILITY AND COMPENSATION MODELS

One of the most significant questions that lawmakers and policymakers must address is the avenue and jurisprudence through which autonomous vehicle crash victims should be compensated.¹²⁷ Indeed, since current laws and regulations surrounding automobile accident liability assume that a human driver controlled the vehicle when the accident occurred, “existing laws do not directly address the determination of liability in a collision involving an autonomous car.”¹²⁸ “Although existing vehicle and computer laws contain *some* legal tenants that can be applied ..., they do not provide courts with a comprehensive body of law to determine and assess liability.”¹²⁹

The general public, however, is focused on who will be held liable if and when autonomous vehicles cause injuries and wonder about “how [the] law can bring order to an uncertain future.”¹³⁰ The early assumptions seem to be that the injured parties will be in an adverse posture to the autonomous technology developers and manufacturers and that this conflict will play out via traditional products liability litigation:

[I]f the human variable [is] completely removed and [a] car’s autonomous technology cause[s] the crash, the injured person

124. See Colonna, *supra* note 20, at 84-85.

125. See Swanson, *supra* note 74, at 1096.

126. See Smith, *supra* note 99, at 6.

127. See Katyal, *supra* note 20, at 1689.

128. See Duffy & Hopkins, *supra* note 20, at 455.

129. *Id.* (emphasis added).

130. See Smith, *supra* note 99, at 3.

would sue the developer or manufacturer of the technology on a products or strict liability theory. As a result, autonomous car and technology manufacturers will be responsible for more claims under products and strict liability.

As with other developing technologies, there will be technical issues that need to be addressed. The technology will inevitably cause accidents. Based on how courts currently analyze analogous autonomous technologies, it is reasonable to anticipate that courts will apply products and strict liability to the manufacturers of autonomous cars when the car is the sole cause of damage.¹³¹

However, given the relatively underdeveloped jurisprudence surrounding liability for autonomous technologies and the fact that autonomous vehicle cases have not yet begun arising with any regularity, it would be unwise to allow these assumptions to circumscribe the options that we contemplate as we prepare for these cases. Instead, we should give careful thought to all viable options and choose the avenue best suited to balance both victims' compensation needs and the needs to promote innovation and adoption of this technology.

In designing and establishing a route through which autonomous vehicle crash victims could obtain compensation, the two most basic options are (1) require victims to file traditional lawsuits via the civil justice system, and/or (2) give victims the option to pursue relief via an alternative compensation scheme. Stated in the most simplified way possible, these options are, essentially, "tort system" and "not tort system." Though the "not tort system" option may seem virtually limitless, the reality in the United States is that this option has typically meant a victim compensation fund of some sort (although, as explained at length below, those funds have varied in type and form). Both options—the traditional tort system and a victim compensation fund approach—have advantages and drawbacks.

131. See Colonna, *supra* note 20, at 117 (footnotes omitted); see also Smith, *supra* note 99, at 71.

A. *The Tort System*

The American tort system's structure and inner workings should be familiar to anyone with legal training. Its fundamental purposes are to compensate innocent parties, shift the loss to responsible parties, and deter wrongful conduct that creates an unreasonable injury risk to others.¹³² In short, tort law is a way for an injured person to attempt to shift the cost of harm to another person or entity who has erred in some legally cognizable way.¹³³ Tort liability may be rooted in intentional conduct, negligent conduct, or strict liability.¹³⁴

A plaintiff, or injured party, files a complaint that states a cause of action with a court of jurisdiction to initiate a civil tort action.¹³⁵ The complaint must request relief or damages from the defendant and outline the legal and factual reasons why the defendant is responsible for the plaintiff's injury.¹³⁶ After service of process, the defendant has a specified time in which to answer the lawsuit.¹³⁷ Once the complaint and answer have been filed with the court, attorneys for both sides may consider filing motions to dismiss.¹³⁸ The parties then begin the discovery process, during which they exchange information and documents related to the claims made in the complaint and defenses asserted in the answer.¹³⁹

The few tort actions that are not resolved prior to trial are commonly tried before juries which constitute fact finders. At trial, the plaintiff presents evidence first, and then the defendant has an opportunity to offer any evidence it wishes to present.¹⁴⁰ The plaintiff has the burden of proving his or her case by a preponderance of the

132. 1 STUART M. SPEISER ET AL., *THE AMERICAN LAW OF TORTS* § 1:3 (2013).

133. Eric Baime, *Fundamentals of Tort Law*, NAT'L JURIS. U. <https://nationalparalegal.edu/FundamentalsTortLaw.aspx> [<https://perma.cc/U9BL-HY75>].

134. *Id.*

135. *See* FED. R. CIV. P. 3.

136. 4 CHARLES ALAN WRIGHT ET AL., *FEDERAL PRACTICE & PROCEDURE* § 1052 (4th ed.) (database updated Sept. 2018), Westlaw FPP1052.

137. FED. R. CIV. P. 12(a)(1)(A).

138. 5 CHARLES ALAN WRIGHT ET AL., *FEDERAL PRACTICE & PROCEDURE* § 1190 (3d ed.) (database updated Sept. 2018), Westlaw FPP1190.

139. *See* FED. R. CIV. P. 26(a)(1)(A), (a)(2)(A)-(C).

140. 20 CHARLES ALAN WRIGHT & MARY KAY KANE, *FEDERAL PRACTICE & PROCEDURE: FEDERAL PRACTICE DESKBOOK* § 99 (database updated Apr. 2018), Westlaw FPPDeskbook99.

evidence, meaning that it is more likely than not that the plaintiff's claims are true.¹⁴¹ Once both sides have presented their case, the judge or jury decides the outcome.¹⁴² If the judge enters a judgment in favor of the defendant, the defendant is released from liability for the plaintiff's claims, and the plaintiff receives no compensation.¹⁴³ If the judge or jury finds for the plaintiff, the defendant is found to be liable and the court will award damages and/or some other form of restitution.¹⁴⁴ If the losing party believes the outcome was legally incorrect, they may file an appeal.¹⁴⁵ An appellate court may dismiss the appeal, hear and affirm the judgment, reverse it, or send it back to the trial court with instructions to correct legal errors.¹⁴⁶

1. Advantages of the Tort System

The tort system has two primary advantages over victim compensation funds. First, unlike victim compensation funds, the civil justice system in which tort claims are litigated is both a well-established and highly stable institution.¹⁴⁷ As one scholar notes, despite the fact that technology has changed over time, the civil justice system at the federal, state, and local levels has been handling tort claims successfully “[f]or more than two centuries.”¹⁴⁸ Citizens thus presumably have some understanding of—if not how it operates precisely—its existence and the most basic aspects of its inner workings.¹⁴⁹ The system does not need to undergo any institutional or procedural changes to accommodate autonomous vehicle crash cases; although, as noted below, there may be other significant issues.¹⁵⁰

141. 2 RESTATEMENT (SECOND) OF TORTS § 433b (AM. LAW INST. 1965).

142. 10 WRIGHT ET AL., *supra* note 138, § 2651, Westlaw FPP2651.

143. 11 WRIGHT ET AL., *supra* note 138, § 2781, Westlaw FPP2781.

144. 10 WRIGHT ET AL., *supra* note 138, § 2651, Westlaw FPP2651.

145. FED. R. APP. P. 3, 36.

146. *See* FED. R. APP. P. 36.

147. F. Patrick Hubbard, “*Sophisticated Robots*”: *Balancing Liability, Regulation, and Innovation*, 66 FLA. L. REV. 1803, 1811-12 (2014).

148. *Id.* at 1811.

149. Ralph Nader, *Tort Law: The Muscle of Justice*, HUFFINGTON POST (Apr. 4, 2015, 2:51 PM), https://www.huffingtonpost.com/ralph-nader/tort-law-the-muscle-of-ju_b_6598538.html [<https://perma.cc/C3FW-7GMN>].

150. *See infra* Part II.A.2.

Second, although scholars debate whether it would be inapposite in autonomous vehicle crash cases, a robust body of products liability jurisprudence already exists in the United States and could potentially provide an avenue of compensation for autonomous vehicle crash victims.¹⁵¹ Products liability dates back to Roman times and “is a specialized area of law that imposes liability upon manufacturers or suppliers of goods.”¹⁵² Manufacturers can be liable for manufacturing defects (where a product deviates from its intended design), design defects (where a safer and cost-effective design alternative exists), and warning defects (where the manufacturer has failed to provide information that consumers need to use the product safely).¹⁵³

In theory, products liability law should “deter manufacturers from selling products that are not reasonably safe without deterring these manufacturers from selling useful products that *are* reasonably safe. The regime’s actual impacts on safety and innovation, unfortunately, are unclear and contested.”¹⁵⁴ On the one hand, the potential of having to pay damages as a result of a successful products liability claim may incentivize manufacturers and designers “to ensure that [autonomous vehicle] systems are responsibly deployed and continually improved.”¹⁵⁵ On the other, products liability claims could mean that “manufacturers of autonomous technology and cars [may] incur more liability than they are currently accustomed,” and thus that “some form of mitigation” may be necessary in order to prevent the exposure to liability from driving manufacturers out of the market entirely.¹⁵⁶

2. Drawbacks of the Tort System

The tort system’s drawbacks in the context of autonomous vehicle crash cases appear to be more significant than its advantages. First, litigating a case in the civil justice system is typically an expensive,

151. See Smith, *supra* note 99, at 4-5; Orly Ravid, Note, *Don't Sue Me, I Was Just Lawfully Texting & Drunk When My Autonomous Car Crashed into You*, 44 SW. L. REV. 175, 199 (2014).

152. Colonna, *supra* note 20, at 105.

153. *Id.* at 105-07.

154. See Smith, *supra* note 99, at 4-5 (emphasis added) (footnotes omitted).

155. *Id.* at 5.

156. See Colonna, *supra* note 20, at 117.

time-consuming, and unpredictable process.¹⁵⁷ In recent years, the civil justice system has experienced an increase in the number of cases filed while simultaneously growing “at too slow a rate to keep up with this increase.”¹⁵⁸ This failure to increase the tort system’s size to accommodate the influx of cases has meant that the system has “lost its ability to adequately handle and resolve these disputes in a timely and reasonable manner.”¹⁵⁹ Additionally, the cost to litigate these cases is often excessive:

[L]awsuits cost a lot of money (figures vary based on complexity of the case); even if costs are not out-of-pocket for plaintiffs, but recoupable after a win, plaintiffs often only recover half of the sums paid by the defendant. It is common knowledge that plaintiffs sometimes recover even less, such as forty or thirty percent. This seems a gratuitous price for injured plaintiffs to pay.¹⁶⁰

These issues are likely to be particularly acute in autonomous vehicle crash cases given the litigation’s novelty and the complex discovery that will almost certainly need to take place.

Second, as alluded to above, while a robust body of products liability jurisprudence and tort law may already exist,¹⁶¹ cases involving autonomous vehicles—and nearly all other forms of automated or artificial intelligence-governed consumer goods—raise novel liability questions that these sources of law may not be well-equipped to handle.¹⁶² As one scholar points out, “[t]he current legal system logically aligns with the cause of most accidents: human error.”¹⁶³ This is particularly true of motor vehicle laws, nearly all of which presume that a human being is the driver.¹⁶⁴ Liability regimes will thus have to change fairly significantly to accommodate

157. See Ravid, *supra* note 151, at 200.

158. Michael Tsur, *ADR—Appropriate Disaster Recovery*, 9 CARDOZO J. CONFLICT RESOL. 371, 372 (2008).

159. *Id.*

160. Ravid, *supra* note 151, at 200 (footnote omitted).

161. See *supra* notes 151-53 and accompanying text.

162. See Douma & Palodichuk, *supra* note 83, at 1158; Gurney, *supra* note 88, at 442; Smith, *supra* note 99, at 2.

163. See Schroll, *supra* note 95, at 812.

164. See Markoff, *supra* note 25.

the realities of this type of technology.¹⁶⁵ Even the most basic issues will need careful thought:

The major problem with autonomous vehicles is that it is unclear who, if anyone, is actually involved with the “driving.” If no one is driving the vehicle, who should bear ultimate responsibility if something goes wrong? Is the “driver” of an autonomous vehicle like the engineer of a train or pilot of an aircraft on “autopilot,” or is she simply a passenger, with little or no control of the vehicle’s behavior?¹⁶⁶

Even if the legal system feels comfortable placing liability on manufacturers or programmers rather than human users of autonomous vehicles, the complexity of these vehicles means that courts will still have difficult questions to answer:

[W]hat if the autonomous or semi-autonomous vehicle is a Mercedes-Benz using a hypothetical Google geolocation product and it crashes into a barrier while headed for an off-ramp because it misjudged its location? Is fault attributed to Mercedes (acting on the information), or Google (providing the information), or the driver for not correcting for the error?¹⁶⁷

Thus, even if products liability and other types of tort law can adapt to this technology successfully—and there are many reasons to feel confident that they eventually will—making these changes will likely take decades of careful thought, deliberation, and experimentation.¹⁶⁸ In the meantime, as the technology outpaces the jurisprudence, years of uncertainty and problematic or nonsensical verdicts are likely to be side effects of this process.¹⁶⁹

Third, exposure to “product liability always looms as an obstacle to innovation in the auto industry.”¹⁷⁰ If autonomous vehicle manufacturers face ongoing litigation from disgruntled consumers,

165. See Douma & Palodichuk, *supra* note 83, at 1158.

166. *Id.* at 1160.

167. Tom Vanderbilt, *Navigating the Legality of Autonomous Vehicles*, WIRED (Feb. 7, 2012, 6:35 AM), <http://www.wired.com/2012/02/autonomous-vehicle-legality/> [<https://perma.cc/S6PL-JHV4>].

168. See Levy, *supra* note 20, at 358-59.

169. See Markoff, *supra* note 25.

170. Vanderbilt, *supra* note 167.

are compelled to pay to defend against these claims, and, in some percentage of those cases, have to pay money damages, manufacturers could pass those costs on to consumers via higher vehicle prices.¹⁷¹ This, in turn, “could lead to slower adoption of these systems, which could lead to crash injuries that could have been prevented by these systems.”¹⁷² Even “liability uncertainty[—]lack of confidence about the actual product liability costs that a company will incur”—can create significant issues.¹⁷³ One scholar explains:

If an automated driving developer is unable to confidently predict its liability costs, it may either delay deployment of its system or conservatively price that system to account for the possibility of high liability costs. Similarly, insurers may decline to cover that developer or the would-be buyers of its system, or they may demand higher premiums to do so.¹⁷⁴

In those situations, the same consequences could occur: slower adoption of autonomous vehicles and missed prevention of crash injuries.¹⁷⁵ In theory, significant exposure to liability could also stall the market almost entirely, a situation that has happened before in other markets as discussed below.¹⁷⁶

Thus, while the tort system is well established, stable, and has a highly developed body of law that could be adapted to autonomous vehicle crash cases, it is likely to experience significant growing pains in adapting to these cases. These changes will introduce uncertainty and liability exposure to an industry that is still largely in its early stages. This uncertainty may slow down innovation and consumer adoption of this technology. In sum:

While products and strict liability will not act as an impregnable barrier to entry, it will probably hinder the introduction of autonomous cars into the marketplace. And while autonomous

171. See Smith, *supra* note 99, at 6.

172. *Id.*

173. *Id.*

174. *Id.*

175. *Id.*

176. See *National Vaccine Injury Compensation Program*, HEALTH RES. & SERVS. ADMIN. [hereinafter NVICP], <https://www.hrsa.gov/vaccine-compensation/index.html> [<https://perma.cc/5HAW-TK5U>]; *infra* notes 218-19 and accompanying text.

cars will eliminate many tort claims against drivers due to their increased safety and efficiency, the number of products and strict liability claims against the manufacturers of autonomous cars likely will increase upon introducing autonomous cars into the marketplace.¹⁷⁷

If this is true, the tort system may not be the best way to compensate autonomous crash victims, particularly in the early years of autonomous vehicles' development and adoption, and thus other compensation schemes are worth exploring.

B. Victim Compensation Funds

Victim compensation funds are fairly new innovations in the American legal system.¹⁷⁸ Historically, “dispute resolution was primarily handled by the sovereign legal system, be it local, municipal, regional, national, federal, or international.”¹⁷⁹ In the twentieth century, however, various governmental entities sought alternatives to litigation in a variety of fairly discrete situations, hoping to prevent an influx of certain cases into the court system, to prop up failing industries, or to give victims a quicker and less adversarial process to obtain compensation for their injuries.¹⁸⁰ Victim compensation funds were often the alternative selected.¹⁸¹ Although these funds have had varying levels of success, they have been used with increasing frequency—particularly in “post-disaster situations.”¹⁸²

Victim compensation funds “exist in parallel to” the tort system.¹⁸³ They typically offer victims a fairly quick guaranteed payout from a fund established to compensate victims of a particular type.¹⁸⁴ In exchange, these victims waive their right to pursue litigation.¹⁸⁵

177. See Colonna, *supra* note 20, at 114 (footnotes omitted).

178. See Tsur, *supra* note 158, at 372.

179. *Id.* at 371.

180. See Paul Heaton et al., *Victim Compensation Funds and Tort Litigation Following Incidents of Mass Violence*, 63 *BUFF. L. REV.* 1263, 1263 (2015).

181. See *id.* at 1264.

182. Joan Flocks & James Davies, *The Deepwater Horizon Disaster Compensation Process as Corrective Justice: Views from the Ground Up*, 84 *MISS. L.J.* 1, 37 (2014).

183. Heaton et al., *supra* note 180, at 1264.

184. Gillian K. Hadfield, *Framing the Choice Between Cash and the Courthouse: Experiences with the 9/11 Victim Compensation Fund*, 42 *LAW & SOC'Y REV.* 645, 645-46 (2008).

185. *Id.*

Given that litigation can be complex and expensive, and that litigation results are typically uncertain, this option can be incredibly appealing.¹⁸⁶

Indeed, research reveals that a victim compensation fund's existence "can play an important role in shaping [victim] decisions" about whether "to pursue litigation in the wake of a tragedy."¹⁸⁷ In particular, research shows that litigation is less likely in situations in which a fund offers an alternative pathway to receiving compensation, but that some portion of the victim population will still opt to pursue conventional lawsuits.¹⁸⁸ The number of victims willing to opt into a fund appears to be closely tied—not surprisingly—to the amount of compensation that the fund offers, and how closely that amount mirrors the amount of compensation that would be available to the victim if they brought suit in the tort system and won.¹⁸⁹

Although scholars still debate the relative merits of victim compensation funds vis-à-vis the tort system, the popularity of these funds in recent years suggests they are likely to remain an appealing option when responding to large scale disasters and mass tort situations.¹⁹⁰ These funds, however, will never entirely replace the tort system and may not be appropriate responses to particular types of incidents or injuries.¹⁹¹ A brief analysis of their major advantages and drawbacks—with the caveat that there is significant variation in these funds and thus these issues may be stronger or weaker in *particular* funds—reveals why.

1. Advantages of Victim Compensation Funds

The primary advantages of victim compensation funds over the tort system are threefold. First, victim compensation funds offer significantly more flexibility than the tort system because they can be tailored to the particular needs of a given set of cases.¹⁹² In fact,

186. *Id.*

187. Heaton et al., *supra* note 180, at 1265-66.

188. *Id.*

189. *Id.* at 1279-81.

190. *See id.* at 1263-64.

191. *See id.* at 1264-65.

192. Francis E. McGovern, *The What and Why of Claims Resolution Facilities*, 57 STAN. L. REV. 1361, 1375 (2005).

several scholars have noted that “[f]lexibility and the ability to tailor the variables to address the particular situation” are the keys to forming a successful and appealing fund.¹⁹³ Fund administrators may decide—among other things—to what extent statutory provisions that would otherwise apply in the tort system will or will not guide the fund on how victims must request compensation, what equations and factors will be utilized and considered in determining compensation awards, and whether compensation decisions are appealable (and, if so, to whom those decisions should be appealed).¹⁹⁴ This flexibility, in turn, can reduce the cost and burden placed on both victims and administrators in submitting and evaluating claims.

Second, victim compensation funds are typically faster and more efficient than the tort system. For example, the victim compensation fund created in the wake of the 2007 Minnesota I-35W bridge collapse disaster guaranteed that all claims would “be decided upon and distributed within 120 days of being filed. This was undoubtedly *years* faster than the time required to take a claim to its conclusion through the tort system.”¹⁹⁵ The speed of the process also guaranteed “that any award[s] would be received by the victims quickly, alleviating the time and worry of trying to collect a judgment through the tort system.”¹⁹⁶

Victim compensation funds can operate with such expediency for several reasons:

By aggregating cases, [victim compensation funds] can compensate huge numbers of claimants more quickly than the tort system. Litigation tends to move more slowly. The process of developing the case and scheduling hearings and trials in courts with crowded dockets may result in a multi-year process (not including appeals). An administrative system, on the other hand, may be able to develop a compensation program in a

193. Flocks & Davies, *supra* note 182, at 37.

194. See George W. Conk, *Diving into the Wreck: BP and Kenneth Feinberg's Gulf Coast Gambit*, 17 ROGER WILLIAMS U. L. REV. 137, 156 (2012).

195. Mike Steenson & Joseph Michael Sayler, *The Legacy of the 9/11 Fund and the Minnesota I-35W Bridge-Collapse Fund: Creating a Template for Compensating Victims of Future Mass-Tort Catastrophes*, 35 WM. MITCHELL L. REV. 524, 544 (2009) (emphasis added) (footnote omitted).

196. *Id.*

matter of weeks. While it may take a significant amount of time for parties to develop the criteria and guidelines for an administrative program, once the program is established, the claims facility should be able to evaluate thousands or tens of thousands of claims in a matter of months.¹⁹⁷

Although some victim compensation funds may have operated more slowly than others, even the “slower” compensation funds appear to have operated faster than the tort system. Many claimants, for example, complained about “long delays” in the Deepwater Horizon Disaster Oil Spill Trust, a victim compensation fund established in the wake of the catastrophic 2010 oil spill in the Gulf of Mexico.¹⁹⁸ Those “delays,” however, amounted to mere months, rather than the years it would likely take to litigate such claims in the tort system.¹⁹⁹

Third, victims who file claims with victim compensation funds typically incur fewer costs than those who choose to litigate their claims in the tort system. For instance, the September 11th Victim Compensation Fund almost entirely eliminated any costs associated with filing a claim:

While fees for any legal matter can be extremely costly, these costs were largely absent for claimants entering the [September 11th] Fund, thereby, making it a much more attractive alternative than the tort system. The Fund was constructed so that claimants would have little trouble representing themselves pro se. But, if claimants wanted assistance, it was provided pro bono or at greatly reduced rates.²⁰⁰

Victim compensation funds can ensure that more money winds up in the pockets of victims because they drastically reduce—if not outright eliminate—attorneys fees and court costs.²⁰¹

197. Deborah E. Greenspan & Matthew A. Neuburger, *Settle or Sue? The Use and Structure of Alternative Compensation Programs in the Mass Claims Context*, 17 ROGER WILLIAMS U. L. REV. 97, 110 (2012) (footnotes omitted).

198. Flocks & Davies, *supra* note 182, at 26-27.

199. *Id.*

200. Steenson & Saylor, *supra* note 195, at 548 (emphasis omitted) (footnotes omitted).

201. Patrick Hall, Comment, *The Return of King Solomon: The Gulf Coast Claims Facility from the Perspective of the 9/11 Fund*, 1 ARIZ. J. ENVTL. L. & POL'Y 1, 2 (2010), https://www.americanbar.org/content/dam/aba/publications/nr_newsletters/eltt/201104_eltt.pdf

2. *Disadvantages of Victim Compensation Funds*

Victim compensation funds' major disadvantages are also threefold. First, unlike the tort system, which is well established, victim compensation funds must be created anew each time they are utilized.²⁰² Although new funds may be modeled on prior or preexisting funds, unique disasters and novel situations require the creation of new funds without much of a blueprint.²⁰³ In these situations, funds—and their structures, operating procedures, and policies—must be created largely from scratch, an enormous and time-consuming task.²⁰⁴ Additionally, even in situations in which there *are* helpful precedents for a new fund, each new fund must be funded, staffed, advertised to victims, and housed, all of which can take significant time, expense, and effort.²⁰⁵ When smaller, but important, administrative obligations are added to the list—determining whether and how document retention will occur, creating computer networks, developing and implementing confidentiality policies, et cetera—creating a new fund can begin to seem like an overwhelming burden, particularly when compared to the fairly low administrative costs of litigating a lawsuit in the tort system.

Second, victim compensation funds may undermine transparency. Because these funds typically utilize a non-adversarial, nonpublic approach to compensating victims, those victims are unable to pursue discovery and/or air issues in a public forum. For example:

After the terrorist attacks of Sept[ember] 11, 2001, scores of victims' family members decided to pursue lawsuits in federal court, bypassing a dedicated compensation fund in order to seek not only millions of dollars in damages, but also answers and accountability.

Many had wanted to compel a public soul-searching, and to have the airlines and others reveal in court how their policies and actions might have allowed 19 armed hijackers to pass

[<https://perma.cc/E8U4-G8SQ>].

202. See Steenson & Sayler, *supra* note 195, at 531.

203. *Id.*

204. See *id.* at 528-29.

205. *Id.*

through airport security, board planes and carry out the attacks.²⁰⁶

The victim compensation fund that had been established for 9/11 victims had no mechanism for those victims to pursue and obtain this information in discovery, nor a way to bring this information to public attention even if they had access to it.²⁰⁷ In fairness to victim compensation funds, however, there is also no guarantee that this will occur via litigation, either. In the September 11th lawsuits, almost all of the victims settled and thus lost the opportunity to promote airline accountability in a public setting.²⁰⁸

Third, victim compensation funds typically do not provide a public forum in which victims can air grievances, an issue that is often extremely important to victims.²⁰⁹ One scholar explains the concept in the context of the September 11th Victim Compensation Fund's failure to give claimants a greater opportunity to speak:

A benefit of hearings and one of the key reasons they encourage people to feel fairly treated is that they offer participants what social scientists call "voice." When people are allowed voice—when they can speak up and are listened to—they tend to react positively.... Voice is so important that it can powerfully influence satisfaction in a positive direction even in situations in which claimants are not allowed to speak until after a decision has been made. The September 11th Fund regulations make virtually no allowance for voice. Efficient paper processes that avoid hearings are at the heart of the machinery. No one is instructed to take the time to listen to the victims. No time is set aside for stories of loss or the value of what is gone.²¹⁰

206. Benjamin Weiser, *Judge in 9/11 Suits Feels No Regret That None Ever Went to Trial*, N.Y. TIMES (Sept. 9, 2016), <https://www.nytimes.com/2016/09/10/nyregion/judge-in-9-11-suits-feels-no-regret-that-none-ever-went-to-trial.html> [<https://perma.cc/Q9AD-RC42>].

207. *See id.*

208. *Id.*

209. *See* Tracy Hresko, *Restoration and Relief: Procedural Justice and the September 11th Victim Compensation Fund*, 42 GONZ. L. REV. 95, 131 (2006).

210. Stephan Landsman, *A Chance to Be Heard: Thoughts About Schedules, Caps, and Collateral Source Deductions in the September 11th Victim Compensation Fund*, 53 DEPAUL L. REV. 393, 409-10 (2003) (footnote omitted).

Funds often overlook the importance of the opportunity to be heard by focusing almost exclusively on providing victims with compensation. In contrast, the tort system can and often does provide victims that opportunity via the filing of motions, the taking and giving of depositions, and the ability to testify in open court both during trial and—if successful—during the remedies phase of the litigation.²¹¹

C. *Finding a Venue for Autonomous Vehicle Crash Cases*

Given the advantages and drawbacks discussed above, which venue (if either) is likely to be the most appropriate and efficient one for autonomous vehicle crash cases? Assuming (as we should) that autonomous vehicle crash victims will always have the option to pursue conventional litigation, the question may be even simpler: Given that these victims will *always* have access to the tort system, does it make sense to create a victim compensation fund as an alternative pathway for receiving compensation? I strongly believe that the answer is “yes” for several reasons.

To start, as discussed at length above, there is likely to be a lengthy multi-year—if not multi-decade—time period during which courts struggle to develop and/or adapt negligence and products liability jurisprudence to autonomous vehicles.²¹² The issues surrounding duty, breach, and causation are incredibly complex and fairly novel,²¹³ and so it is likely that there will be some degree of trial and error (no pun intended) and jurisprudential inconsistency among jurisdictions before the law becomes more settled. This means that autonomous vehicle crash victims will face even higher degrees of uncertainty than normal when seeking compensation via conventional litigation in the tort system. This, in turn, could deter consumers from purchasing and using these vehicles.

Creating a victim compensation fund could provide consumers—and citizens in general—with greater assurance that they will be compensated if an autonomous vehicle injures them. Victim compensation funds, by their very nature, need not experience the same jurisprudential growing pains that the tort system may suffer when

211. *See id.* at 411.

212. *See supra* notes 162-69 and accompanying text.

213. *See supra* Part II.A.

faced with a novel form of injury.²¹⁴ The funds can begin issuing compensation extremely quickly via a particular calculation method or algorithm, and pay out to claimants much more predictably and reliably than the tort system ever could.²¹⁵ Thus, a victim compensation fund could serve as an extremely useful stop-gap compensation method for victims until the jurisprudence in this area is better developed. Moreover, if popular with victims, it could provide a long-term alternative to litigation.

Next, for many of the same reasons, creating a victim compensation fund could offer significant protection to autonomous vehicle manufacturers and developers, promote innovation, and shore up the market for these vehicles. In the absence of such a fund, manufacturers and developers experience much the same uncertainty as do consumers, but with regard to exposure to liability.²¹⁶ This uncertain exposure to liability may severely hinder the introduction of autonomous vehicles to the market and their long-term viability.²¹⁷ Indeed, the biotechnology industry in the United States experienced something very similar in the 1980s. An article from that time period explained:

One of the foremost obstacles faced by firms attempting to market biotechnological products is the cost of insuring their products against product liability claims. Product liability insurance costs in the United States have risen dramatically to keep up with increased legal claims....

Dramatically increased premiums for product liability insurance [in turn] are forcing some manufacturers out of business.... Companies are holding back product introductions, restricting the use of certain products, or even withdrawing from markets in order to avoid costs imposed by the U.S. product liability system....

Insurance costs are excessive in the biotechnology industry because judicial treatment of biotechnology products is uncertain and potentially very harsh. Uncertainty arises from the fact that the U.S. biotechnology industry has not yet been tested in terms of product liability lawsuits, probably due to the relatively

214. *See supra* notes 192-94 and accompanying text.

215. Steenson & Sayler, *supra* note 195, at 544-45.

216. Colonna, *supra* note 20, at 114.

217. *Id.*

small number of commercially viable biotechnology products marketed to date.²¹⁸

Uncertain exposure to liability thus creates two major potential issues: (1) it can drive up insurance costs, forcing businesses to pass on those costs to consumers via higher prices, making their products less affordable and driving down demand, or (2) in extreme cases, it may make a given product uninsurable and shut down the market altogether.²¹⁹

Establishing a victim compensation fund could create significantly more “breathing room” for manufacturers and developers. By offering autonomous vehicle crash victims a quick and reliable way to obtain compensation in exchange for waiving their right to sue, a fund could reduce the number of lawsuits filed in the tort system, drive down manufacturers’ and developers’ liability exposure, and lower insurance costs.²²⁰ This would allow the autonomous vehicle market to grow in parallel with the development of autonomous vehicle laws and jurisprudence rather than making the industry’s development contingent upon resolving thorny liability issues—a resolution that will likely take decades.

Lastly, since a fund provides consumers greater assurance that they will be compensated quickly if injured and provides manufacturers with less exposure to liability, a victim compensation fund could protect the autonomous vehicle market, promote highway safety, and secure the numerous other benefits that autonomous

218. Michael D. Stovsky, Comment, *Product Liability Barriers to the Commercialization of Biotechnology: Improving the Competitiveness of the U.S. Biotechnology Industry*, 6 HIGH TECH. L.J. 363, 373-74 (1991).

219. Robert G. Berger, *The Impact of Tort Law Development on Insurance: The Availability/Affordability Crisis and Its Potential Solutions*, 37 AM. U.L. REV. 285, 300 (1988) (“The viability of insurance is predicated in large part on two factors: a high degree of predictability as to the magnitude of risk and effective independence among the individuals or entities at risk. When one or both of these critical factors is adversely affected the viability of insurance as an effective risk-spreading mechanism is adversely impacted: when the insurer cannot predict the magnitude of risk, it becomes that much harder to underwrite the risk. Accordingly, if the insurer is to ensure its own economic position, it must choose either to increase premiums significantly to cover the expectation of an unknown and potentially much higher degree of exposure, or withdraw from the particular market altogether. Specifically, the ‘law of large numbers’ no longer functions properly when the magnitude and quantity of risk among those potentially compensable cannot be accurately predicted in advance of policies being written.” (footnotes omitted)).

220. See Heaton et al., *supra* note 180, at 1265-66.

vehicles provide.²²¹ Failing to create a victim compensation fund, however, could have the opposite effect and undermine or—in a worst case scenario—destroy a market still in its early stages. The costs would be profound and measured in human lives lost that could have been saved.²²²

A victim compensation fund thus offers a solution to the current and growing gap between technology and the law. The law simply cannot keep up with the blistering pace of this technology, a lag that brings with it fairly significant consequences.²²³ One observer notes:

It took 100 years to enact laws that widely spread the benefits of the Industrial Revolution to a prosperous middle class.... We don't get 100 years any more. We have 20-30 years, tops, before the next big technological advance comes along. If we don't sufficiently address [artificial intelligence and technology] when we can, its benefits might never fully enrich the middle class.²²⁴

In the case of autonomous vehicles, that last sentence might properly be amended to read, “its benefits might never fully save the tens of thousands of lives per year that they could.” In short, the stakes are too high and the uncertainties too great to leave autonomous vehicle crash cases to the tort system alone.

III. CATEGORIZING VICTIM COMPENSATION FUNDS

Victim compensation funds come in many shapes and sizes and can vary significantly in how they are structured, funded, and administered.²²⁵ In my observation, however, they tend to fall into one of four broad categories: (1) quasi-judicial funds, and, within a larger category of non-judicial funds, (2) public funds, (3) private funds, and (4) charitable funds. Figure 1 shows this breakdown:

221. See Colonna, *supra* note 20, at 84.

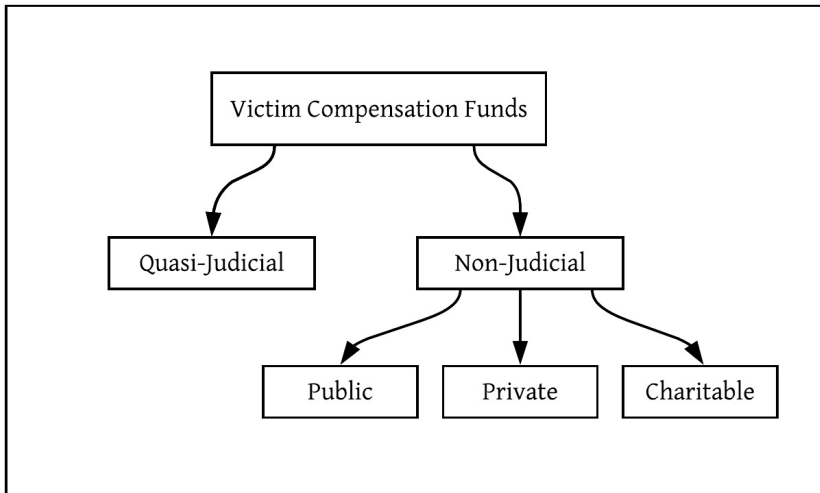
222. See *supra* notes 89-103 and accompanying text (discussing automobile fatalities).

223. See Gurney, *supra* note 88, at 442.

224. WEAVER, *supra* note 23, at 184.

225. See Linda S. Mullenix, *Prometheus Unbound: The Gulf Coast Claims Facility as a Means for Resolving Mass Tort Claims—A Fund Too Far*, 71 LA. L. REV. 819, 825 (2011).

Figure 1



A brief explanation and illustration of each of these categories is helpful to finding a workable model for an autonomous vehicle victim compensation fund. Even though the situations giving rise to victim compensation funds “will be a unique combination of ... factors,” certain similarities between them “can determine the type of justice and process that should follow.”²²⁶

A. *Quasi-Judicial Funds*

Judicial systems or federal agencies administer quasi-judicial victim compensation funds outside of the traditional, adversarial litigation context. Taxes or fines levied on particular categories of goods, people, or entities typically finance these funds.²²⁷ State crime victim compensation funds are one type of quasi-judicial fund,

226. Flocks & Davies, *supra* note 182, at 36.

227. See Njeri Mathis Rutledge, *Looking a Gift Horse in the Mouth — The Underutilization of Crime Victim Compensation Funds by Domestic Violence Victims*, 19 DUKE J. GENDER L. & POLY 223, 230 (2011); Regina Moreland, *Commentary, The Potential Impact of Cedillo for Vaccine-Related Autism Cases*, 29 J. LEGAL MED. 363, 368-69 (2008).

as they are funded by “fines, penalties, and forfeitures” issued in criminal cases which are subject to judicial oversight.²²⁸ Similarly, the Radiation Exposure Compensation Act (RECA) is a quasi-judicial fund which seeks to compensate victims of above-ground atomic testing in the mid-twentieth century and is administered by the U.S. Department of Justice.²²⁹ The NVICP, however, is arguably the most famous example and provides a helpful illustration of this type of fund.

The NVICP is designed to compensate victims of injuries caused by vaccines.²³⁰ Although vaccines are important to public health and save lives by preventing disease, a very small percentage of vaccine recipients will experience a severe adverse reaction that may cause short-term or/and long-term injuries or side effects.²³¹ When that occurs, the NVICP may issue financial compensation to the injured party if they file a claim with the Fund and are found to have been injured by a NVICP-covered vaccine.²³²

The Court of Federal Claims administers the NVICP, and a small excise tax on all doses of NVICP-covered vaccines finances the Fund.²³³ The Fund was established after a number of vaccine manufacturers neared financial ruin from lawsuits filed against them and threatened to stop producing vaccines altogether, raising significant concerns about a potential nationwide childhood vaccine shortage.²³⁴ Concerned that this shortage would lead to a revival of preventable diseases, lawmakers established the fund to compensate all injuries incurred after September 30, 1988.²³⁵ Persons eligible to make claims and receive compensation from the NVICP include any individual vaccinated in the United States, citizens vaccinated outside of the United States while serving abroad as a military service member or a federal government employee, or any

228. See Rutledge, *supra* note 227, at 230; *Crime Victims' Compensation Fund*, 73 TEX. B.J. 614, 614 (2010).

229. Radiation Exposure Compensation Act, Pub. L. No. 101-426, 104 Stat. 920 (1990) (codified as amended at 42 U.S.C. § 2210 (2006)); see also Peter H. Meyers, *Fixing the Flaws in the Federal Vaccine Injury Compensation Program*, 63 ADMIN. L. REV. 785, 817 (2011).

230. NVICP, *supra* note 176.

231. *Id.*

232. *Id.*

233. Moreland, *supra* note 227, at 368-69.

234. See NVICP, *supra* note 176.

235. U.S. Tax Rep. ¶ 95,104 (2018).

dependent of a citizen who was vaccinated outside of the United States.²³⁶

“To commence a claim under the compensation program, a claimant must file a petition with the Court of Federal Claims.”²³⁷ The claimant must identify “the vaccine that allegedly caused the injury, [state] where [the vaccine] was administered,” and provide some explanation of “the nature of the ... injuries.”²³⁸ “The court then forwards the petition to a special master, who reviews the petition, considers evidence, and issues a ruling on the merits of the claim.”²³⁹ The claimant qualifies for compensation when she

prove[s] that the vaccine caused the condition or that an injury found on the Vaccine Injury Table occurred. [This] table lists specific injuries or conditions and time frames within which the reactions must occur after the vaccine injection. It is [thus] a legal mechanism for defining complex medical conditions and allows a statutory “presumption of causation.”²⁴⁰

The NVICP’s review process is considered both no-fault and non-adversarial, but claimants may choose to have legal representation.²⁴¹ Although vaccine injury sufferers must initially file a claim with the NVICP rather than pursue a lawsuit in the tort system, if the petitioner is unhappy with the outcome of their claim or does not successfully obtain compensation from the fund, then she has the right to file suit in civil court.²⁴² Most scholars view this as an effective way to balance vaccine manufacturers’ desire to avoid crippling amounts of liability exposure with the needs of individuals harmed by vaccines to obtain compensation in a far more predictable way than pursuing suit in the tort system:

236. *Id.*

237. Efthimios Parasidis, *Recalibrating Vaccination Laws*, 97 B.U. L. REV. 2153, 2211 (2017).

238. *Id.*

239. *Id.*

240. Karin Schumacher, Note, *Informed Consent: Should It Be Extended to Vaccinations?*, 22 T. JEFFERSON L. REV. 89, 110 (1999).

241. NVICP, *supra* note 176.

242. Schumacher, *supra* note 240, at 110.

[V]accine claims are few and if pursued as product liability claims, the plaintiffs' prospects were highly uncertain. If lawsuits had been filed in the tort system, few would have been paid because product liability law accepts an adequate warning as a defense to liability. The vaccine compensation program is best understood as a way to encourage citizens to accept the risk of vaccine-related injury, while relieving the burdens and risks of tort liability from manufacturers of drugs with generally irreducible side-effects.²⁴³

In the three decades since its creation, over 12,000 claims have been filed with the Fund, suggesting that its goals have—at least in part—been realized.²⁴⁴

B. Non-Judicial Funds

Non-judicial victim compensation funds are those administered wholly outside of the justice system by either another governmental entity, a corporation, or a charity.²⁴⁵ These funds have a wide array of financing sources and can vary significantly in both size and scope.²⁴⁶ A brief analysis of each type of non-judicial fund reveals their general characteristics.

1. Public Funds

Public victim compensation funds are those both funded—at least in part—and administered by the government (or a special master acting with government authority). One example of a public victim compensation fund is the Federal Black Lung Benefits Program. Tax revenue and employers of Black Lung sufferers finance the Fund, and the Department of Labor and the Social Security Administration administer it.²⁴⁷ A more well-known example is the September 11th Victim Compensation Fund, which perhaps best illustrates a public fund's key characteristics.

243. Conk, *supra* note 194, at 149 (footnote omitted).

244. *Id.*

245. *See infra* notes 247-83 and accompanying text.

246. *See infra* notes 247-89 and accompanying text.

247. Allen R. Prunty & Mark E. Solomons, *The Federal Black Lung Program: Its Evolution and Current Issues*, 91 W. VA. L. REV. 665, 670, 683-84 (1989).

Created just eleven days after the attacks of September 11, 2001, Congress established this Fund via the Air Transportation Safety and System Stabilization Act to protect the airline industry from what lawmakers feared would be devastating repercussions and lawsuits.²⁴⁸ Congress designed the Fund to provide generous compensation to families and surviving victims who voluntarily waived their right to sue in favor of filing a claim with the Fund.²⁴⁹ Although the Fund provided a no-fault alternative to tort litigation against the involved airlines, it restricted compensation awards to any individual (or relative of a deceased person) who suffered physical injuries or was killed as a result of the terrorist attacks.²⁵⁰ The Fund excluded individuals who did not suffer some discernible physical harm or death.²⁵¹

The United States Attorney General appointed a Special Master, Kenneth Feinberg, to be responsible for all aspects of the Fund's administration.²⁵² The Special Master was responsible for drafting the Fund's rules and regulations, creating the claimant's application forms, and making decisions with regard to the amounts of compensation awarded.²⁵³ Because the legislation authorized "a virtual 'blank check'" to make all necessary payments to the September 11th victims, the Special Master had unlimited funding.²⁵⁴ The Act "require[d] the Special Master to complete a review of [each] application for compensation, make a determination of the award, and then provide written notice to the claimant of the decision" within 120 days from the date of a claimant's application.²⁵⁵ Payment had to be remitted no more than 20 days later.²⁵⁶ The Special Master's compensation decisions were not subject to judicial review and were final.²⁵⁷

248. Heaton et al., *supra* note 180, at 1263; see William Angelley, *The September 11th Victim Compensation Fund*, 65 TEX. B.J. 34, 34 (2002).

249. See Angelley, *supra* note 248, at 34.

250. *Id.*

251. See Cynthia C. Lebow, *Understanding the September 11th Victim Compensation Fund: The Proper Response or a Dangerous Precedent?*, 1 ANN.2002 ATLA-CLE 243 (2002).

252. See Angelley, *supra* note 248, at 34.

253. *Id.*

254. Lebow, *supra* note 251, at 243.

255. *Id.*

256. Angelley, *supra* note 248, at 34.

257. *Id.*

Although the line between quasi-judicial and public funds can become blurred in some instances, the primary difference between the two categories is that the federal government finances public funds in whole or in part whereas excise taxes or the parties that would be in a defensive posture in a traditional lawsuit finance quasi-judicial funds.

2. *Private Funds*

Private organizations, such as corporations, administer and finance private funds. This is the smallest category of the four victim compensation funds, and there is only one fund fitting the description as of early 2019: the Gulf Coast Claims Facility (GCCF). This Fund was created in the aftermath of the 2010 Deepwater Horizon oil spill in the Gulf of Mexico.²⁵⁸ This kind of fund also raises the most questions and, according to at least one scholar, “illustrates an extreme and seemingly lawless expansion of the [victim compensation] fund approach to resolving mass claims.”²⁵⁹ Private victim compensation funds raise significant ethical concerns because (1) the fund creator and administrator in this model may also be the party at fault and (2) these funds may not be subject to judicial or governmental oversight.²⁶⁰ One scholar argues:

[T]he Gulf Coast Claims Facility represents an unnoticed incremental trend toward the lawless, private resolution of mass claims. This resolution (in the case of the GCCF) was created by a culpable defendant, unbounded by legal norms, and administered by a heroic “special master” with limitless unreviewable discretion, who also is in the employ of the malefactor. Whatever else may be argued on behalf of the GCCF, this cannot be a good development.²⁶¹

A brief description of the GCCF’s development and administration reveals some of the sources of this concern.

258. See Mullenix, *supra* note 225, at 819, 821.

259. *Id.* at 912.

260. *Id.* at 823.

261. *Id.*

British Petroleum (BP), as a responsible party for the Deepwater Horizon oil spill, established the GCCF in June 2010 to compensate impacted parties for damages as a result of the spill.²⁶² BP established the Fund pursuant to an informal agreement with the Obama administration.²⁶³ In addition to establishing the GCCF, BP agreed to be the Fund's sole financier via a \$20 billion escrow account, and to hire and pay someone to administer the Fund.²⁶⁴

GCCF's purpose was to give impacted parties a means to resolve their claims against BP in what was supposed to be a fair, efficient, and timely manner.²⁶⁵ Persons eligible to make compensation claims were individuals or businesses who, as a result of the spill: (1) experienced a loss of income or earning capacity, subsistence loss, and/or net loss of profits or earnings, (2) incurred removal and cleanup costs for their own property, and/or (3) suffered physical injury or death.²⁶⁶

The GCCF began considering claims on August 23, 2010.²⁶⁷ The protocol allowed claimants to "obtain emergency advance payments, or payments designed to cover a six-month period of loss."²⁶⁸ Final claims were also allowed to be presented to the GCCF at any time.²⁶⁹ However, final claims required a liability release "whereby in exchange for payment, claimants [agreed to] forgo the rights to pursue further oil-spill related claims or legal action against BP and other potentially responsible parties."²⁷⁰

Under the Protocol for Interim and Final Claims, the GCCF had ninety days to decide "whether to make an interim or final payment to a claimant."²⁷¹ Claimants had the option to reject an interim or final payment determination and either present their claim to the

262. See Luther Strange & Kenneth Feinberg, *Perspectives on the Gulf Coast Claims Facility*, TRENDS, May/June 2011, at 8.

263. *Id.*

264. *Id.*

265. *Id.*

266. See *File a Claim*, GULF COAST ECOSYSTEM RESTORATION COUNCIL, <https://www.restorethegulf.gov/file-claim> [<https://perma.cc/78EW-63BF>].

267. See Mary Samuels, *Overview of the Gulf Coast Claims Facility*, ENVTL. LITIG. & TOXIC TORTS COMM. NEWSL. 13 (Apr. 2011), https://www.americanbar.org/content/dam/aba/publications/nr_newsletters/eltt/201104_eltt.pdf [<https://perma.cc/7DJR-ZLXK>].

268. *Id.*

269. *Id.*

270. *Id.*

271. *Id.* at 14.

National Pollution Fund Center or commence an action in court.²⁷² “The protocol also include[d] an appeal process.”²⁷³ As a result of the Deepwater Horizon Oil Spill in the Gulf Coast, “BP paid out more than \$6.2 billion to over 220,000 claims through” the GCCF.²⁷⁴

Although a cursory glance at the GCCF may lead one to believe that this fund is much like the others discussed above, deeper analysis reveals a number of significant issues:

To begin, it is difficult to discern the legal authorization for the fund, other than vague references to the [Oil Pollution Act]. The GCCF was not created as a mechanism to implement a contested class action settlement, nor did Congress authorize creation of this fund. Thus, the GCCF has not been subject to the scrutiny that have accompanied a class action settlement or congressional oversight.

Moreover, it is difficult to characterize exactly what the GCCF is and what legal status this entity has, if any. [The fund’s hired administrator] has described the GCCF as a “compact,” while federal Judge Barbier has described the GCCF as a “hybrid.” The GCCF is a largely private claims-adjusting facility acting in an ad hoc fashion, run by a culpable party’s retained autocrat.²⁷⁵

Thus, although the GCCF represents the first example of a private fund in the United States, it is a highly controversial fund and one that has been subject to such significant criticism that it is questionable whether this victim compensation fund category is a viable long-term option.

3. Charitable Funds

Charitable victim compensation funds are those financed by private donations, typically collected in response to significant local tragedies, set up to distribute those donations to victims equitably.²⁷⁶ Unlike the other types of funds discussed above, charitable funds are not created as alternatives to litigation, but simply as an

272. *See id.*

273. *Id.*

274. Heaton et al., *supra* note 180, at 1264 (citation omitted).

275. Mullenix, *supra* note 225, at 912 (footnotes omitted).

276. *See* Steenson & Sayler, *supra* note 195, at 525.

effort to minimize the administrative and logistical burdens associated with disbursing charitable donations to those in need. The Minnesota I-35W Bridge Collapse Fund is one example of a charitable fund.²⁷⁷ The Hokie Spirit Memorial Fund (HSMF) is a more famous one.

The HSMF was created in the wake of the April 16, 2007 Virginia Tech shooting that claimed the lives of thirty-two victims and left scores of faculty and students injured.²⁷⁸ In response to the thousands of donations after the shooting, the Virginia Tech School Foundation established the “Hokie Spirit Memorial Fund” to provide monetary compensation to victims.²⁷⁹ This \$7.5 million fund was entirely privately funded, and was designed to be allocated “to the victims and their families pursuant to a proposed Victims Assistance Program Protocol.”²⁸⁰ The protocol outlined the terms and conditions of eligibility for victims and the levels of compensation.²⁸¹ Both survivors of the shooting and the families of the murder victims were qualified to receive cash payments.²⁸² Claimants also had the option to donate the compensation to which they were entitled to a charitable organization to fund scholarships at the University.²⁸³

Unlike the other compensation fund categories which use basic tort law as a reference when calculating an individual’s eligibility for compensation, the HSMF allocated “flat payments of \$180,000 to each of the thirty-two families who lost a loved one on April 16.”²⁸⁴ The Fund made “no attempt to ... value distinctions among the dead.”²⁸⁵ The payments for those who were physically injured during the shooting were tied directly to the number of days each individual spent at the hospital.²⁸⁶ Hospitalization was viewed as an unbiased measure of payment with students and faculty who were

277. *See id.* at 526-27.

278. *See* Kenneth R. Feinberg, *Compensating the Victims of Catastrophe: The Virginia Tech Victims Assistance Program*, 93 VA. L. REV. BRIEF 181, 181 (2007).

279. *See* Heaton et al., *supra* note 180, at 1263-64.

280. *See* Feinberg, *supra* note 278, at 181.

281. *Id.*

282. *See* FEDERAL TAX COORDINATOR ¶ J-1297 (2d ed. 2018), Westlaw FTC ¶ J-1297.

283. *See id.*

284. Feinberg, *supra* note 278, at 184.

285. *Id.*

286. *Id.*

hospitalized for more than three days, but fewer than ten days, to receive a flat payment of \$40,000, plus free tuition.²⁸⁷ “Two students [who were] hospitalized more than ten days receive[d] \$90,000 each and free tuition.”²⁸⁸ “The Fund’s administrator ha[d] no discretion to vary this payment schedule.”²⁸⁹

IV. A FUND FOR AUTONOMOUS VEHICLE CAR CRASH VICTIMS

If a victim compensation fund is to (1) reduce the autonomous vehicle manufacturers’ and designers’ liability uncertainty and liability exposure, (2) provide assurance to consumers that they will be compensated quickly and fairly if an autonomous vehicle injures them, and thus (3) increase the chances that society will fully reap the benefits of autonomous vehicles, then the fund must be designed and administered carefully and with an eye towards the unique and complex issues that this technology poses. One must first determine which of the victim compensation fund models explored above provides the best template for an autonomous vehicle crash fund, and then thoughtfully tailor the fund’s specifics to address the most likely industry, consumer, and government regulator concerns.²⁹⁰

Of the four victim compensation fund models that could be used, both the charitable fund model and the private fund model can be quickly eliminated as options. The charitable fund’s financing is simply inapposite and too limited in scope to be used to address the complex issues posed by autonomous vehicles.²⁹¹ Adopting a private fund model would likely be just as problematic. Unlike the GCCF, multiple potential defendants—all motor vehicle manufacturers who produce autonomous vehicles—would need an autonomous vehicle crash fund’s protection, meaning that either (1) each individual manufacturer would have to finance and administer their own private fund, or (2) vehicle manufacturers would have to work together to finance and administer a joint private fund (which would

287. *Id.*

288. *Id.*

289. *Id.*

290. See Flocks & Davies, *supra* note 182, at 36; Smith, *supra* note 99, at 74; Steenson & Saylor, *supra* note 195, at 597-98.

291. See *supra* notes 276-77 and accompanying text.

be unprecedented in the United States).²⁹² Both consumers and policymakers would likely view either situation with a great deal of skepticism—and rightly so. As the GCCF exhibited, the private fund model presents efficiency, transparency, and conflict of interest issues.²⁹³ The public might also have strong and reasonable concerns about whether such a fund would disincentivize autonomous vehicle manufacturers from improving their products and keep important product safety and defect information hidden from public scrutiny.²⁹⁴

Of the two remaining models—quasi-judicial and public—a quasi-judicial model is the far more appropriate option for one primary reason: the federal government has little reason, political or otherwise, to fund an autonomous vehicle crash fund. Although the government certainly has an interest in reducing highway crash fatalities and injuries, the United States does not face a sudden or significant crisis in and around highway safety and/or consumer adoption of autonomous vehicles such that the government would likely feel compelled to finance an autonomous vehicle crash fund.²⁹⁵ This situation is thus fundamentally different than the one that the federal government faced immediately prior to the formation of the September 11th Victim Compensation Fund.²⁹⁶ After the September 11th attacks, the airline industry risked total collapse at worst, and a drastic rise in insurance premiums and a loss of business at best.²⁹⁷ The government needed to quickly act to prevent the industry's devastation.²⁹⁸ The same is not true here. Currently, automobiles are a \$1.84 trillion market in the United States,²⁹⁹ and autonomous vehicles are projected to be an "\$87 billion opportunity in 2030."³⁰⁰ Thus the government has little reason to create a public fund, and so a funding mechanism akin to the kind used in quasi-judicial funds seems far more appropriate in this context.

292. See *supra* notes 262-75 and accompanying text.

293. See Mullenix, *supra* note 225, at 841-43.

294. See Hall, *supra* note 201.

295. See Gurney, *supra* note 88, at 419-20.

296. See Hresko, *supra* note 209, at 98-99.

297. See *id.*

298. *Id.* at 99.

299. See Levy, *supra* note 20, at 357.

300. Trefis Team, *supra* note 69.

However, for reasons discussed at greater length below, the federal government seems far better situated to administer an autonomous vehicle crash fund than a court—which is unlikely to have particularly extensive knowledge about autonomous vehicles.³⁰¹ One government agency in particular, the NHTSA seems better qualified to serve this role than, say, the Court of Federal Claims, which administers the NVICP.³⁰² Assuming, therefore, that a quasi-judicial fund administered by NHTSA is the most appropriate autonomous vehicle crash fund model, five critical aspects of the fund must be determined: (1) basic coverage limitations, (2) funding source, (3) administrator, (4) participation requirements for autonomous vehicle manufacturers and victims, and (5) the impact of the fund on private automobile insurance claims.³⁰³

A. Proposed Coverage Limitations

An autonomous vehicle crash fund should only be accessible to Level 4 and 5 vehicle crash victims. The fund should not cover Level 2 and 3 crash victims because driver inattention or error is more likely to cause these incidents than problems with the vehicle itself.³⁰⁴ Compensating victims for injuries obtained in such accidents would mean compensating victims for a human driver's mistake rather than by the kind of product liability issue that the fund is intended to cover.³⁰⁵ Covering semi-autonomous crashes would also risk bankrupting the fund fairly quickly, as experts believe that semi-autonomous vehicles are significantly less safe than their fully autonomous counterparts, and thus far more likely to be involved in accidents.³⁰⁶

Additionally, an autonomous car crash fund should only cover human injuries and fatalities. Although car accidents also cause a great deal of property damage, particularly to other vehicles, covering property damage would risk both bankrupting the fund and

301. See *infra* notes 319-25 and accompanying text.

302. Moreland, *supra* note 227, at 368.

303. See Flocks & Davies, *supra* note 182, at 36.

304. See Pearl, *supra* note 54, at 731-37.

305. See discussion *supra* Part I.A. (describing automation degrees in the various levels of automation).

306. See Ingrassia et al., *supra* note 65; Pritchard, *supra* note 63.

overwhelming it with far more claims than it could possibly process.³⁰⁷ Moreover, property damage typically falls well within the private automobile insurance coverage that every state requires automobile owners to purchase, and thus there is little need for a victim compensation fund to provide greater access to relief.³⁰⁸ If, at some point in the future, the number of motor vehicle accidents on United States roads falls by such a significant amount that the private automobile insurance market collapses, then the fund could reconsider its coverage of property damage. Initially, however, limiting the fund to injury or fatality compensation claims seems wise.

B. Proposed Source of Funding

Much like the NVICP which is funded by a small tax on every covered vaccine administered to a patient, a sales tax on every Level 4 or 5 autonomous vehicle should finance an autonomous vehicle crash fund. Indeed, “[s]ince autonomous cars will very likely benefit society as a whole, as well as benefiting the users and the manufacturers,” requiring both manufacturers and consumers to pay into the fund “would be a very manageable win/win, pro-market and pro-consumer solution for all involved.”³⁰⁹ Under this approach, both the new autonomous vehicle purchaser and seller would pay a tax that would be deposited into the fund.

Calculating a reasonable tax amount—one that would ensure that the fund was adequately financed while not overly burdening manufacturers or consumers—is difficult and highly dependent on many factors: (1) the number of autonomous vehicles likely to be sold in a given year, (2) the likelihood of an autonomous vehicle causing an injury or fatality, and (3) the average cost of such injuries and fatalities. These are all numbers, moreover, that are likely to change over time, particularly as autonomous vehicles improve and

307. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., DOT HS No. 812013, THE ECONOMIC AND SOCIAL IMPACT OF MOTOR VEHICLE CRASHES, 2010 (REVISED) 2 (2015), [hereinafter NHTSA CRASH IMPACT DATA] <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013> [<https://perma.cc/683K-AQVZ>].

308. See Schroll, *supra* note 95, at 813.

309. Ravid, *supra* note 151, at 205.

increase in market share.³¹⁰ An extremely speculative, rough, and preliminary set of calculations suggests that, based on current data and projections, a total tax of less than \$1,000 per autonomous vehicle sold—shared equally by the seller and the purchaser—would be sufficient and reasonable. This estimate is based on the following set of assumptions:

- (1) In recent years, the United States has averaged roughly 35,000 fatal car crashes per year,³¹¹ with an average cost of \$1.4 million per fatality, for a total annual cost of \$49 billion.³¹²
- (2) In recent years, the United States has averaged roughly 2.4 million car crash-related injuries per year.³¹³ Calculating the average cost of injury-causing automobile crashes is exceedingly difficult given the large variety of injuries which can occur. However, according to one recent NHTSA report, roughly 97 percent of all injury-causing crashes cause only mild to moderate injuries (described as Maximum Abbreviated Injury Scale Level 0-2 injuries) with an average cost of roughly \$7,000 per injury, for a total annual cost of \$14.4 billion.³¹⁴
- (3) Experts predict that fully autonomous vehicles will reduce the number of accidents in the United States by 94 percent because the technology eliminates the opportunity for human error.³¹⁵

Assuming a 94 percent reduction rate in fatality-causing accidents, one can predict that Level 4 and 5 autonomous vehicles will cause roughly 1,050 fatal accidents per year. Assuming that the average cost of \$1.4 million per fatality remains the same, this would yield a total annual cost of \$1.47 billion.

Additionally, assuming a 94 percent reduction rate in injury-causing accidents, one could predict that Level 4 and 5 autonomous vehicles will be involved in roughly 72,000 injury-causing accidents per year. Assuming that the average cost of \$7,000 per accident

310. See Schroll, *supra* note 95, at 823-24.

311. See NHTSA STATISTICS, *supra* note 91.

312. See NHTSA CRASH IMPACT DATA, *supra* note 307, at 14.

313. See NHTSA STATISTICS, *supra* note 91.

314. See NHTSA CRASH IMPACT DATA, *supra* note 307, at 12-15.

315. Schroll, *supra* note 95, at 805.

remains the same, this would yield a total annual cost of \$504 million.

These back-of-the-envelope calculations—and, again, I stress their exceedingly rough nature—suggest that an autonomous vehicle crash fund may have to pay out somewhere around \$2 billion per year to claimants, assuming both that (1) every injury and fatality are eligible for compensation from the fund, and (2) every injury and fatality results in a claim against the fund. Since one recent report suggests that 7.4 million autonomous vehicles will be sold in the United States each year by 2040, a total tax of only \$270 per vehicle sold (divided between consumer and manufacturer) would be enough to cover the fund's annual payouts.³¹⁶ At a significantly smaller market share, say 2.5 million in 2020, a total tax of \$800 per vehicle would still be sufficient. Even if the fund's annual average payout is significantly higher than I have estimated, a total tax of between \$1,000 and \$1,500 would still more than likely cover those costs. These estimated tax amounts are not exorbitant, particularly if the tax is shared between consumers and manufacturers.³¹⁷

Thus, even under a fairly pessimistic view of the number of autonomous vehicle crashes that will likely occur per year in the United States, a tax equivalent to less than 2 percent of the average total price of a new autonomous vehicle (\$1,500 or less in 2018 dollars)³¹⁸ should be sufficient to finance an autonomous vehicle crash fund. As autonomous vehicle safety improves and the number of autonomous vehicles sold per year increases, moreover, it is likely that the tax per vehicle required to keep the fund fully financed could drop into the very low hundreds of dollars per vehicle sold.

316. See Press Release, IHS Markit, Autonomous Vehicle Sales to Surpass 33 Million Annually in 2040, Enabling New Autonomous Mobility in More Than 26 Percent of New Car Sales, IHS Markit Says (Jan. 2, 2018), <http://news.ihsmarket.com/press-release/automotive/autonomous-vehicle-sales-surpass-33-million-annually-2040-enabling-new-auto> [<https://perma.cc/S4G7-LUWH>].

317. Obviously, manufacturers would likely pass their portion of the tax on to consumers by raising the price of their vehicles, but even if the total tax of \$1,000 or less is borne by consumers in some form or another, I would still argue that it is not excessive, representing as it does less than 2 percent of the overall cost of a new vehicle, assuming average vehicle prices stay roughly the same. See *2018 Tesla Model S*, EDMONDS, <https://www.edmunds.com/tesla/model-s/2018/> [<https://perma.cc/47N7-LHJN>].

318. See *id.*

C. Proposed Administrator

NHTSA is the federal entity best suited to administer an autonomous vehicle crash fund because it is the federal agency “responsible for keeping people safe on America’s roadways.”³¹⁹ NHTSA does so by promulgating and “enforcing vehicle performance standards [by forming] partnerships with state and local governments.”³²⁰ NHTSA also seeks to reduce motor vehicle crashes and injuries by conducting research and data analysis on motor vehicle use and misuse and motor vehicle crashes, and “by setting the motor vehicle and highway safety agenda” for the country.³²¹

NHTSA is already issuing guidance with regard to autonomous vehicles. In September 2016, NHTSA released the *Federal Automated Vehicles Policy* in which it “sets out an ambitious approach to accelerate the [heavily autonomous vehicle (HAV)] revolution” by publishing “agency guidance ... in order to speed the delivery of an initial regulatory framework and best practices to guide manufacturers and other entities in the safe design, development, testing, and deployments of HAVs.”³²² It also requested cooperation and voluntary information-sharing from autonomous vehicle manufacturers.³²³ NHTSA thus understands the characteristics and issues surrounding autonomous vehicles and is well-positioned to “create particular requirements for what must be sent to them as part of filing a claim” with an autonomous vehicle crash fund.³²⁴ At least one scholar, though one who is proposing a different type of compensation scheme, agrees: “The money [for the fund] would be stored in a trust fund and overseen by a department created within NHTSA. Anyone who suffers damages from an AV accident would file a claim with NHTSA, who would review the claim and dole out payments.”³²⁵ The only other logical alternatives would be to

319. *About NHTSA*, NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., <https://www.nhtsa.gov/about-nhtsa> [<https://perma.cc/84KW-J78M>].

320. *See id.*

321. *NHTSA’s Mission*, NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., <https://www.nhtsa.gov/about-nhtsa/nhtsas-core-values> [<https://perma.cc/LQ2N-DJC3>].

322. FAVP, *supra* note 40, at 6.

323. *Id.* at 11, 15.

324. Schroll, *supra* note 95, at 824.

325. *Id.* at 823.

(1) place the fund under the U.S. Department of Transportation generally, (2) designate a special master to operate outside of any particular federal agency, or (3) create an entirely *sui generis* federal entity to be the administrator. None of these options, however, seem to offer any advantages over situating the fund within NHTSA and may instead have fairly numerous and extensive drawbacks.

D. Proposed Participation Requirements

In all victim compensation funds, “[t]he procedure to be utilized in determining who actually receives compensation and in what amounts is critical.”³²⁶ Similarly, fund designers must determine at the outset what fund participants must give up in exchange for participating in the fund.³²⁷ In an autonomous vehicle crash fund, victims and vehicle manufacturers should have to confront different trade-offs.

1. Victim Participation Requirements

All autonomous vehicle crash victims (or their estates) who wish to receive compensation should be required to initiate proceedings with the fund. Victims who intend to bypass the fund and pursue suit in the tort system should still be required to file a claim with the fund and receive a decision as to the compensation amount to which they would be entitled before being able to reject the fund option and pursue litigation. The NVICP has a similar set of requirements.³²⁸ Victims (or their estates) who choose to accept the fund’s decision and obtain fund compensation should be required to waive their right to pursue litigation against the autonomous vehicle manufacturer, designer, or programmer. Such liability waivers have been a standard feature of most other victim compensation funds and constitute one of the private industry’s primary incentives to support and participate in such compensation schemes.³²⁹

326. Steenson & Saylor, *supra* note 195, at 529.

327. *See id.* at 529-30.

328. *See* Lainie Rutkow et al., *Balancing Consumer and Industry Interests in Public Health: The National Vaccine Injury Compensation Program and Its Influence During the Last Two Decades*, 111 PENN. ST. L. REV. 681, 687 (2007).

329. *See* Angelley, *supra* note 248, at 34 (discussing the September 11th Victims

However, to the extent that these victims wish to pursue third-party tort actions against other entities who may have been partial causes of the relevant crash—say, human drivers, pedestrians, construction companies, et cetera—they should remain free to do so.³³⁰

Like the NVICP, filing a claim with the autonomous vehicle crash fund should be “nonadversarial and simple relative to [filing a claim in the] civil courts.”³³¹ The claimant should be required to file a petition setting forth a short and plain statement arguing why the claimant should be awarded compensation³³² and attach any supporting documentation—such as medical records—that would aid fund administrators in determining an appropriate award.³³³ Claimants should have the right to legal representation, but should not be required to retain an attorney. Like other funds, there should also be an internal appeals process.³³⁴

In exchange for waiving their right to sue autonomous vehicle manufacturers, designers, and programmers, victims should be entitled to receive compensation for “personal injury, loss of consortium, wrongful death, [and other standard forms of] economic loss” associated with their injury or death.³³⁵ Noneconomic losses, those associated with pain and suffering, emotional and psychological anguish, and other forms of hedonic damages are “highly intangible,” and thus far more “difficult to quantify.”³³⁶ Other funds have established presumed awards or placed caps on emotional damages to address this issue. For example, the September 11th Victim Compensation Fund has a presumed award of \$250,000 for emotional damages.³³⁷ The NVICP caps pain and suffering awards at an identical amount: \$250,000.³³⁸ Whether and at what amount an

Compensation Fund); Samuels, *supra* note 267, at 14 (discussing Gulf Coast Claims Facility); Schumacher, *supra* note 240, at 110 (discussing the NVICP).

330. See Steenson & Sayler, *supra* note 195, at 530.

331. Michael J. Donovan, Comment, *The Impact of “Hurricane” Hannah: The Government’s Decision to Compensate in One Girl’s Vaccine Injury Case Could Drastically Alter the Face of Public Health*, 50 JURIMETRICS J. 229, 232 (2010).

332. See 42 U.S.C. § 300aa-11 (2012).

333. See Schroll, *supra* note 95, at 824.

334. See Samuels, *supra* note 267, at 14.

335. Steenson & Sayler, *supra* note 195, at 529.

336. Hresko, *supra* note 209, at 102.

337. *Id.*

338. Rutkow et al., *supra* note 328, at 687.

autonomous vehicle crash fund should compensate noneconomic damages should be the product of careful deliberation amongst fund administrators about the fund's annual budget, the likely number of noneconomic damages claims each year, and the appropriate methodology to use in calculating such damages.

2. *Vehicle Manufacturer Participation Requirements*

Reduced liability uncertainty and exposure should benefit all vehicle manufacturers who pay sales tax on the sale of each Level 4 or 5 autonomous vehicle. As discussed above, autonomous vehicle crash victims should be required to file claims with the fund initially rather than filing suit in the tort system immediately.³³⁹ Since the fund is likely to be able to provide faster and more predictable compensation than the tort system, it is reasonable to expect that it would significantly reduce the number of lawsuits filed against autonomous vehicle manufacturers who choose to participate.³⁴⁰ The fund should (obviously) not protect manufacturers who refuse to participate. In that situation, a victim's only option would be to file a conventional tort claim.

In exchange for the protection offered by the fund, manufacturers should also be required to participate in a data-sharing and design improvement program administered by NHTSA. Such a program would greatly mitigate two significant issues: (1) the difficulty that NHTSA has had in gathering information and issuing timely guidance and regulations pertaining to autonomous vehicles, and (2) the risk that reduced exposure to liability might reduce manufacturer incentives to improve their vehicles' design and safety performance. A brief discussion of each demonstrates why.

First, NHTSA has had difficulty "keeping pace with the development and deployment of autonomous systems."³⁴¹ In large part, this has been due to both manufacturers' and designers' secrecy and to the technology's novelty.³⁴² As one Tesla Motors representative has

339. See *supra* note 332 and accompanying text.

340. See Conk, *supra* note 194, at 156; Steenson & Sayler, *supra* note 195, at 549.

341. *Tesla's Autopilot: Too Much Autonomy Too Soon*, CONSUMER REP. (July 14, 2016), <http://www.consumerreports.org/tesla/tesla-autopilot-too-much-autonomy-too-soon/> [<https://perma.cc/Z7SB-N4UQ>].

342. Letter from Matthew L. Schwall, Dir. of Field Performance Eng'g, Tesla Motors, Inc.,

observed, “NHTSA [has] had to ensure the safety of [heavily automated vehicles], avoid creating regulations that would slow the deployment of life-saving technology, all without NHTSA’s usual ability to observe the performance of technology prior to regulating it.”³⁴³ These are extremely difficult tasks at best, but likely impossible in the absence of manufacturer cooperation and data-sharing—a fact NHTSA itself stressed throughout the 2016 FAVP.³⁴⁴ Indeed, the FAVP itself is merely guidance for autonomous vehicle manufacturers rather than rulemaking,³⁴⁵ and there appear to be no consequences for failure to comply with it.³⁴⁶ Therefore, manufacturer cooperation and voluntary disclosures are vital to a successful, safe, and controlled release of fully autonomous vehicles into the consumer market and onto U.S. roads.

Making participation in a data-sharing and design improvement program a condition of participation in an autonomous vehicle crash fund offers a solution to this issue. For example, NHTSA could require fund participants to disclose all identified cyber vulnerabilities, install a particular security patch in all vehicles, or address a particular design concern within a certain timeframe. Rather than having to either (1) rely on manufacturers to voluntarily disclose design flaws and vulnerabilities out of a desire to act in good faith, or (2) engage in complex and administratively burdensome rulemaking, such a program would induce manufacturers to engage in a prescribed set of socially beneficial behaviors. Although participation in this program would always remain voluntary, the protection

to Nat’l Highway Traffic Safety Admin. (Nov. 22, 2016), <https://www.regulations.gov/contentStreamer?documentId=NHTSA-2016-0090-1051&attachmentNumber=1&contentType=pdf> [<https://perma.cc/G7NT-96F3>].

343. *Id.*

344. FAVP, *supra* note 40, at 15 (“To aid NHTSA in monitoring [heavily automated vehicles], the Agency will request that manufacturers and other entities voluntarily provide reports regarding how the Guidance has been followed.”); *id.* at 21-22 (“As with safety data, industry sharing on cybersecurity is important. Each industry member should not have to experience the same cyber vulnerabilities in order to learn from them.... To that end entities should report any and all discovered vulnerabilities from field incidents, internal testing, or external security research ... as soon as possible.”).

345. *Id.* at 6.

346. Letter from Stephen Selander, Selander Law Office, to Nathaniel Beuse, Assoc. Adm’r for Vehicle Safety Research, Nat’l Highway Traffic Safety Admin. (Nov. 22, 2016), <https://www.regulations.gov/contentStreamer?documentId=NHTSA-2016-0090-1114&attachmentNumber=1&contentType=pdf> [<https://perma.cc/D5YU-J82R>].

that the fund offered—through reduced liability uncertainty and exposure—would likely provide manufacturers an extremely strong incentive to join.

Second, many scholars argue that victim compensation funds may reduce manufacturer incentives to take precautions, and thus fail to provide optimal deterrence levels.³⁴⁷ Discussing the GCCF, for instance, one scholar worries: “If the Facility sets a precedent for relieving environmental marauders of full liability, it will not achieve optimal deterrence, and thus potentially open the door for future environmental disasters.”³⁴⁸ Here, the concern would be that reduced liability exposure would disincentivize autonomous vehicle manufacturers from continually reviewing and improving their vehicles’ safety features, designs, and algorithms. Again, however, making participation in a data-sharing and design improvement program a condition of participation in the fund would significantly reduce, if not entirely eliminate, this issue. Through such a program, NHTSA could identify safety issues, generate solutions, and induce manufacturers to implement them as a condition of continued participation in the fund.

E. The Private Insurance Overlay

Considering the interplay between a victim compensation fund and private insurance is an important part of any fund’s creation. Two issues, in particular, deserve attention and—in the case of an autonomous vehicle crash fund, are closely related: (1) treatment of collateral sources, and (2) subrogation and reimbursement.³⁴⁹ First:

One of the problems in defining the amount of compensation to which a victim is entitled to recover is the treatment of collateral

347. See, e.g., James A. Henderson, Jr., *The New Zealand Accident Compensation Reform*, 48 U. CHI. L. REV. 781, 794 (1981) (reviewing GEOFFREY PALMER, *COMPENSATION FOR INCAPACITY* (1979)) (“Generally, if actors are not required to pay a fair share of the costs of their activities, including the accident costs, they will tend to overengage in those activities whose costs they can most successfully escape from paying.”); Yaël Ronen, *Avoid or Compensate? Liability for Incidental Injury to Civilians Inflicted During Armed Conflict*, 42 VAND. J. TRANSNAT’L L. 181, 219 (2009) (“Moreover, like any insurance mechanism, a victim compensation fund provides a disincentive to take precautions.”).

348. Hall, *supra* note 201.

349. Steenson & Saylor, *supra* note 195, at 529-30.

sources. What sources to deduct from the fund will be a critical factor in determining the amount of compensation. Deductions could be required from a variety of sources, including health and life insurance, workers' compensation benefits, social security benefits, or even funds received by victims through charitable contributions.³⁵⁰

Here, private automobile insurance—among other sources—may compensate victims because it typically offers some coverage for bodily injuries and medical expenses.³⁵¹ Therefore, fund administrators must determine whether benefits received from such policies should count against any compensation to which a claimant might be entitled to receive from the fund.

Second, “[s]ubrogation and reimbursement are key factors in designing a compensation scheme.”³⁵² Subrogation is a particularly tricky issue in the autonomous vehicle crash fund context. Although twelve states have “pure” no-fault automobile insurance regimes,³⁵³ drivers in the remaining thirty-eight states are required to purchase a traditional liability automobile insurance policy.³⁵⁴ In those states, if a vehicle’s manufacturing or design defect injures the policyholder, then the insurance company “become[s] subrogated to all of the insured’s rights of recovery against the tortfeasor”; meaning that the insurance company has the right to pursue a tort claim against the vehicle’s manufacturer.³⁵⁵ These subrogation rights pose a problem for an autonomous vehicle crash fund. If, on the one hand, the subrogation rights of automobile insurance companies are *not* extinguished upon a claimant receiving compensation from the fund, insurance companies would still threaten autonomous vehicle manufacturers with liability uncertainty and exposure, thus largely undermining one of the fund’s major purposes. On the other hand, if the subrogation rights of insurance companies *are*, in fact,

350. *Id.* at 529.

351. John McGown, Jr., *Automobile Insurance Coverage*, *ADVOCATE*, Nov. 2002, at 28.

352. Steenson & Sayler, *supra* note 195, at 529.

353. J. Marshall Wolman & Saba B. Hashem, *Will Health Care Reform Hasten the Demise of No-Fault Insurance?*, *TORT SOURCE*, Spring 2012, at 6.

354. See Jeffrey O'Connell & Robert H. Joost, *Giving Motorists a Choice Between Fault and No-Fault Insurance*, 72 *VA. L. REV.* 61, 62 (1986).

355. J.A. Bock, Annotation, *Subrogation Rights of Insurer Under Medical Payments Provision of Automobile Insurance Policy*, 19 *A.L.R.3d* § 1054 (1968).

extinguished upon entry into the fund, autonomous vehicles drivers' automobile insurance premiums could increase dramatically (or insurance companies might refuse to write these policies altogether) as insurance companies would have no pathway to receive reimbursement from manufacturers.

The only sensible solution to this quandary is to compensate claimants in full for their injuries and to give automobile insurance companies the right to reimbursement from those awards based on any prior payouts to the claimant. This solution protects victims, automobile insurance companies, and autonomous vehicle manufacturers, and strikes a fair balance on this issue.

CONCLUSION

Fully autonomous, Level 4 and 5 vehicles will almost certainly become available to consumers within the next five to seven years.³⁵⁶ Experts predict that these vehicles will be drastically safer than their human-driven counterparts and will save thousands of lives each year in the United States alone.³⁵⁷ However, crashes will still occur, and when they do, they will raise unique and troubling issues about liability and fault. Negligence and product liability jurisprudence are not yet well-equipped to address issues involving automation and artificial intelligence.³⁵⁸ Indeed, application of current precedent and doctrine in these areas of the law could impair development and adoption of these technologies.

Furthermore, this gap between automated vehicle development and development in applicable law has created a great deal of uncertainty for both manufacturers and consumers. Manufacturers currently face a great deal of uncertainty with regard to liability exposure for fully autonomous vehicles crashes. Will they be liable for all such crashes? Only some? And what will the legal definition of fault be in these cases? Consumers face a related uncertainty: whether they will be compensated if they are injured or killed by an autonomous vehicle.

356. See Trefis Team, *supra* note 69.

357. See *supra* notes 127-31 and accompanying text.

358. See *supra* notes 170-76 and accompanying text.

The answers to these questions have implications far beyond the resolution of individual autonomous vehicle crash cases. Whether the civil justice system can adjudicate these cases fairly and efficiently impacts (1) whether manufacturers can afford to produce these vehicles or whether the cost and magnitude of litigation surrounding them will destroy their market, (2) whether consumers will adopt this new technology, and (3) the rate at which they will be willing and able to do so. These issues, in turn, have an effect on how many lives will be saved on U.S. roads each year by transitioning away from human-driven and towards fully autonomous vehicles. It is thus imperative to design an approach that compensates victims, protects manufacturers, and gives courts time and space to develop jurisprudence applicable to this technology if we wish to reap the profound benefits that fully autonomous vehicles have to offer.

Although victims will always have the option of filing a lawsuit in the civil justice system, a specially designed, no-fault victim compensation fund offers a sensible way to address the issues identified above and to resolve autonomous vehicle crash cases in a faster and less costly manner. Although the use of victim compensation funds is a fairly recent phenomenon in the United States, these funds have been used with great success in a variety of situations and will likely continue to be popular alternatives to the tort system.³⁵⁹ In recent years, four kinds of victim compensation funds, in particular, have been used: quasi-judicial, public, private, and charitable.

A quasi-judicial fund is likely the best model for an autonomous vehicle crash fund. Under this model, NHTSA would administer the victim compensation fund, and a sales tax levied on all Level 4 and 5 vehicles would finance the fund. Preliminary calculations suggest that a tax of less than \$1,000 per vehicle sold would be enough to finance the fund from year to year. Victims (or their estates) who wish to seek compensation from the fund should be able to do so via a simple claim form and non-adversarial process.³⁶⁰

To reduce the manufacturers' liability uncertainty and exposure, all autonomous vehicle crash victims who sought compensation

359. See Heaton et al., *supra* note 180, at 1263-64.

360. See *supra* Part IV.C.

would be required to file a claim with the fund and to receive compensation calculation to which they are eligible to receive. Only after receiving this calculation would they be permitted to file a traditional lawsuit in the tort system. Manufacturers, in turn, would be required to participate in a data-sharing and design improvement program as a condition of receiving the fund's protection. This program would both assist NHTSA in gathering the information it needs to regulate autonomous vehicles and reduce the likelihood that a victim compensation fund would reduce manufacturer incentives to improve the safety of their vehicles.³⁶¹

Automobile crashes kill over 35,000 people on U.S. roads each year and injure millions of others.³⁶² We are nearly at the point at which we will be able to reduce those fatalities and injuries by an overwhelming percentage. Whether we will be able to do so, however, depends upon our ability to adapt our society and our laws to autonomous vehicles. The stakes are high and the time we have is extremely limited. Botching our initial transition away from human-driven cars and towards driverless ones will cost human lives. A victim compensation fund, however, offers a way to ease this transition and make it smoother for both manufacturers and consumers alike. Given that the existing tort system will always remain a fallback option, there appear to be few reasons not to give a victim compensation fund a chance and many reasons to design and implement one before fully autonomous cars come to market.

361. *See supra* Part IV.D.2.

362. *See* NHTSA STATISTICS, *supra* note 91.

