

The Automation of Transportation: The Advent of Autonomous Driving Technology

Chris Costain*

INTRODUCTION

America is constantly moving forward. Since the mid-nineteenth century, America has cultivated homegrown technological innovations that have helped to make it a powerhouse in the global economy.¹ At the end of the eighteenth century, new manufacturing technologies found their home in New England, facilitating the development of transportation systems such as railroads and canals.² More than fourteen million immigrants came to America between 1860 and 1900, and the increase in human capital made the developments of the cotton mill, the steamboat, and the automobile attainable.³ All of this innovation and creation did not occur in a vacuum, as the federal government intervened to ensure things stayed on the straight-and-narrow by creating “industrial policy.”⁴ Studies show that America is not slowing down either, as it continues to stay at the forefront of scientific and technological research and

* J.D., New England Law | Boston (2021). B.A., English Language & Literature, Providence College (2015).

¹ Sarah Tran, *Expediting Innovation*, 36 HARV. ENVTL. L. REV. 123, 124 (2012); see *The Industrial Revolution in the United States: Teacher’s Guide*, LIBRARY OF CONG., <https://perma.cc/6JA4-TKQA> (last visited Nov. 28, 2021) [hereinafter *The Indus. Revolution in the United States*].

² *The Indus. Revolution in the United States*, *supra* note 1.

³ See *The Indus. Revolution in the United States*, *supra* note 1.

⁴ Steven C. Earl, Comment, *The Need for an American Industrial Policy*, 1993 BYU L. REV. 765, 766–68 (1993); see Robert B. Reich, *Why the U.S. Needs an Industrial Policy*, HARV. BUS. REV., Jan. 1982, <https://perma.cc/JQE6-WPGW> (describing industrial policy as a way to strengthen an economy by bolstering such industrial sectors, such as the automotive sector).

design.⁵

Perhaps the most important engineering and technological development during the late-nineteenth and early-twentieth centuries was the automobile.⁶ Few inventions in history have had a greater impact than the automobile, which shrunk Americans' perceptions of their cities and towns and bolstered the country's economy.⁷ Early iterations of the automobile were created by fledgling inventors in sheds behind their homes and were powered by steam or electricity, but there was limited infrastructure to support electric vehicles as electricity had not yet found its way into every corner of the country.⁸ It was only a matter of time before someone developed and deployed a more convenient version of the automobile for mass consumption.⁹

A number of American engineers developed gasoline-powered automobiles leading up to, and after, the turn of the twentieth century, but none enjoyed more success than Henry Ford, who founded his own firm in 1903 to create a low-cost motor vehicle suitable for the masses.¹⁰ Produced between 1908 and 1927, Ford's Model T was the company's most successful model, with more than fifteen million units sold during its production run.¹¹ The affordability of the Model T transformed American culture.¹² Suddenly, Americans could travel for leisure and experience their country like never before.¹³ The need for steel and glass in the construction of Ford's popular vehicles meant that those industries began producing materials at an unprecedented rate.¹⁴ The production of the Model T also benefited from the assembly line process, made popular during the Industrial Revolution, allowing Ford to lower the price of its vehicles.¹⁵

⁵ Nat'l Sci. Found., *Report Shows United States Leads in Science and Technology as China Rapidly Advances*, SCI. DAILY (Jan. 24, 2018), <https://perma.cc/NB9W-GJJ4>.

⁶ See generally David Blanke, *Rise of the Automobile*, TEACHING HIST., <https://perma.cc/GD5Y-6ZG2> (last visited Nov. 28, 2021).

⁷ Krista Doyle, *How the Invention of the Car Changed the World*, ACEABLE, <https://perma.cc/YAD5-LVRZ> (last visited Nov. 28, 2021).

⁸ See Cromer et al., *Automobile*, ENCYCLOPEDIA BRITANNICA, <https://perma.cc/UEU3-RN3Y> (last updated Nov. 2, 2021).

⁹ See Blanke, *supra* note 6.

¹⁰ See Cromer et al., *supra* note 8.

¹¹ *1926 Ford Model T Roadster*, NAT'L MUSEUM OF AM. HISTORY, <https://perma.cc/PKF7-64AE> (last visited Nov. 28, 2021).

¹² See Blanke, *supra* note 6.

¹³ Blanke, *supra* note 6.

¹⁴ See Blanke, *supra* note 6.

¹⁵ Austin Weber, *Ten Ways the Model T Changed the World*, ASSEMBLY (Sept. 2, 2008),

In many ways, the conception and production of the Model T can be seen as a microcosm of other technological and engineering developments in America, especially those particular to the automotive industry.¹⁶ America has been at the forefront of developing not only a mass-produced and affordable car, but also the technology that vehicles use to keep motorists safe, including airbags, seatbelts, and anti-lock braking systems.¹⁷ With each new development came legislation.¹⁸ Massachusetts must continue this trend and make diligent efforts to develop sensible legislation aimed at protecting its citizens while also promoting the development and widespread use of autonomous driving technology.¹⁹

Part I of this Note will discuss the history of the automobile generally in the United States and in Massachusetts, with a particular focus on the development of technology to mitigate accidents and the way in which legislation has applied to such technologies.²⁰ Part II of this Note will discuss why autonomous vehicle legislation is important to ensure public safety and how autonomous technology can be implemented in a way that allows Massachusetts to fully realize its benefits.²¹ Part III of this Note will argue that Massachusetts' Executive Order 572 is an insufficient first attempt to legislate the manufacturers and operators of vehicles that use autonomous driving technology, and that without stricter legislation, the public welfare of the people of the Commonwealth is at risk.²² Part IV of this Note will identify existing autonomous vehicle legislation in the United States and argue that it is incumbent upon the Commonwealth's legislature to enact effective legislation concerning the manufacture and operation of vehicles with autonomous driving technology.²³

<https://perma.cc/9B7B-RXTZ>.

¹⁶ See generally Blanke, *supra* note 6 ("The automobile proved to be a harbinger of modern, liberating technologies that provided individuals extensive new freedoms.").

¹⁷ See Blanke, *supra* note 6.

¹⁸ See Blanke, *supra* note 6.

¹⁹ See Dorothy J. Glancy, *Autonomous and Automated and Connected Cars—Oh My! First Generation Autonomous Cars in the Legal Ecosystem*, 16 MINN. J.L. SCI. & TECH. 619, 653 (2015).

²⁰ See *infra* Part I.

²¹ See *infra* Part II.

²² See *infra* Part III.

²³ See *infra* Part IV.

I. Background

A. *The Origin and Development of the National Highway Traffic Safety Administration*

A review of the current regulations promulgated by the National Highway Traffic Safety Administration (“NHTSA”) shows that the U.S. federal government plays a major role in regulating the operation of motor vehicles on American roadways.²⁴ NHTSA regulates everything from fuel economy standards to seat headrest dimensions and turn signals.²⁵ But NHTSA did not always legislate every minute detail of the auto industry, such as school bus passenger seating capacities and roof crush resistance rates.²⁶ The idea of regulating motorists on U.S. roadways only came about after Americans were confronted with shocking facts that they could not ignore.²⁷ In 1965, Ralph Nader opened his book *Unsafe at Any Speed: The Designed-In Dangers of the American Automobile* with the powerful line, “[f]or over a half century the automobile has brought death, injury, and the most inestimable sorrow and deprivation to millions of people.”²⁸ It did not take long for Nader’s words to draw the attention of the American public, who were consuming automobiles faster than ever before and were disturbed by glaring safety issues that automakers neglected to remedy.²⁹ Other publications that highlighted the number of motor-vehicle related fatalities made Americans rethink their widespread consumption of the automobile.³⁰

In September 1966, ten months after Nader’s book was published, President Lyndon B. Johnson signed the National Traffic and Motor Vehicle Safety Act (“the Act”), which required that automakers comply with strict

²⁴ *Laws and Regulations*, NHTSA: NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., <https://perma.cc/NC3B-UNT6> (last visited Nov. 28, 2021).

²⁵ *Id.*

²⁶ *See id.*

²⁷ *See* Christopher Jensen, *50 Years Ago, ‘Unsafe at Any Speed’ Shook the Auto World*, N.Y. TIMES (Nov. 26, 2015), <https://perma.cc/DY25-73F5>.

²⁸ RALPH NADER, *UNSAFE AT ANY SPEED: THE DESIGNED-IN DANGERS OF THE AMERICAN AUTOMOBILE 1* (1965).

²⁹ *See Automobile History*, HISTORY (APR. 26, 2010), <https://perma.cc/WW63-9JNQ>; *see also* Mathilde Carlier, *Number of Cars Sold in the U.S. 1951–2021*, STATISTA (Sept. 10, 2021), <https://perma.cc/2LTX-GGDR>.

³⁰ *See generally* ACCIDENTAL DEATH AND DISABILITY: THE NEGLECTED DISEASE OF MODERN SOCIETY, NAT’L ACAD. OF SCIENCES 8 (Nat’l Highway Traffic Safety Admin. 1997) (1966), <https://perma.cc/89RX-QMBR> (stating that in 1965, 49,000 deaths were due to motor vehicle accidents and that among accidental deaths, those caused by motor vehicles constitute the leading cause for all age groups under seventy-five).

safety standards.³¹ The Act passed without a single negative vote.³² NHTSA eventually grew out of the Act, which required that manufacturers of motor vehicles provide prompt notice to dealers, consumers, and the Secretary of Commerce of any safety-related product defect for the first time.³³ Instead of trying to regulate the behavior of drivers, the federal government aimed to ensure that manufacturers would adhere to safety guidelines in the design and construction of their vehicles so that accidents caused less trauma to passengers.³⁴ It was no surprise that manufacturers, who wanted to avoid costly engineering fixes, tried to convince the federal government that the onus to ensure safe driving rested with drivers.³⁵ Importantly, the Act focused not only on eliminating post-accident energy transfer, but also on promoting crash avoidance technologies to prevent harmful accidents altogether.³⁶ In light of the grim statistics showing motor vehicle-related deaths, automakers had the ability to put a halt to one of America's greatest public health crises of the twentieth century by engineering technology that would make accidents less deadly—but only if they were willing to invest time and money into safety technology instead of shiny chrome bumpers.³⁷

B. *Understanding Post-NHTSA Regulation Litigation*

It did not take long for litigation to ensue over the Act's regulations.³⁸ In *Automotive Parts & Accessories Ass'n v. Boyd*, the plaintiff brought a lawsuit fearing that the Act's regulation requiring that all new passenger cars be equipped with headrests from the factory would preclude the Association

³¹ Jensen, *supra* note 27; see National Traffic and Motor Vehicle Safety Act, Pub. L. No. 89-563, 80 Stat. 718 (1966) ("An Act to provide for a coordinated national safety program and establishment of safety standards for motor vehicles in interstate commerce to reduce accidents involving motor vehicles and to reduce the deaths and injuries occurring in such accidents.").

³² 112 CONG. REC. 14,256 (1966) (Senate vote); 112 CONG. REC. 19,669 (1966) (House of Representatives vote); *National Traffic and Motor Vehicle Safety Act*, THE ASS'N OF CENTERS FOR THE STUDY OF CONGRESS, <https://perma.cc/5APX-23ER> (last visited Nov. 28, 2021).

³³ *National Traffic and Motor Vehicle Safety Act*, *supra* note 32.

³⁴ Jerry L. Mashaw & David L. Harfst, *Regulation and Legal Culture: The Case of Motor Vehicle Safety*, 4 YALE J. ON REG. 257, 258-59 (1987).

³⁵ *Id.* at 261.

³⁶ *Id.* at 259. See generally Michael Paine, *What Happens to the Energy of a Moving Car When It Hits a Wall?*, NEWSIDENTIST (June 5, 2019), <https://perma.cc/K6LL-MPG6> (describing how a car acts like a compressed spring at the peak of energy displacement during a crash, bouncing off of a wall and dispersing energy to the occupants of the vehicle).

³⁷ Mashaw & Harfst, *supra* note 34, at 260-61.

³⁸ See Mashaw & Harfst, *supra* note 34, at 276.

from enjoying the profits from the sale of their aftermarket headrests.³⁹ The plaintiff further argued that the Act's headrest requirement would cause further injuries and deaths to passengers in the event that they struck their head on a corner of the restraint in an accident.⁴⁰ In a detailed opinion, Judge Carl McGowan of the District of Columbia Circuit Court of Appeals rejected all of the plaintiff's arguments and legitimized the Act's regulations with support from the judiciary.⁴¹ Judge McGowan's opinion also set out the standard of review that would be applied to the Act's regulations for the following years.⁴² First, the headrest regulation was analyzed to determine whether it was arbitrary or capricious, with a particular focus on the agency's reasoning process in promulgating the regulation.⁴³ Judge McGowan rejected the plaintiff's argument that the headrest regulation should be struck and that consumers should be able to select which aftermarket headrests they wanted in their vehicles, instead holding that the regulation was "reasonable and within the range of authority conveyed."⁴⁴ Judge McGowan further rejected the argument that factory-installed headrests would cause injury to passengers, deferring to the writers of the Act, who had to consider "many variables, and make 'trade-offs' between various desiderata in deciding upon a particular standard for auto safety."⁴⁵ Lastly, Judge McGowan held that the Act's regulation relating to headrests passed muster because it was incorporated by a concise and general statement outlining its purpose.⁴⁶ Judge McGowan's opinion outlined the analysis that would be applied to the Act's regulations and showed that the Act's regulations that involved less technology were supported by ample research and had already been in use for years, making them less likely to be annulled.⁴⁷

However, some of the regulations under the Act were not so ubiquitous.⁴⁸ In April 1971, once NHTSA had officially been formed, the

³⁹ *Automotive Parts & Accessories Ass'n v. Boyd*, 407 F.2d 330, 332 (D.C. Cir. 1968).

⁴⁰ *Id.* at 339, 342.

⁴¹ *Id.* at 342–43.

⁴² *Id.* at 343; see Mashaw & Harfst, *supra* note 34, at 276.

⁴³ See *Automotive Parts & Accessories Ass'n*, 407 F.2d at 338 ("The paramount objective is to see whether the agency, given an essentially legislative task to perform, has carried it out in a manner calculated to negate the dangers of arbitrariness and irrationality in the formulation of rules for general application in the future.").

⁴⁴ *Id.* at 339, 343.

⁴⁵ *Id.* at 342.

⁴⁶ *Id.* at 337–38.

⁴⁷ See Mashaw & Harfst, *supra* note 34, at 278–79.

⁴⁸ See, e.g., 49 C.F.R. § 571.117 (1972).

agency promulgated Standard 117 on retreaded tires.⁴⁹ Standard 117 set out performance standards for retreaded tires, which were expected to perform just as well as normal tires.⁵⁰ Predictably, tire retreading companies soon complained that Standard 117 would prove to be too restrictive on their businesses and would thereby erode profit margins.⁵¹ Standard 117 required retreaded tires to withstand extreme forces during endurance and high speed testing, which tire manufacturers found to be too burdensome, as retreaded tires failed 28% of the time on the endurance test and 17% of the time on the speed test.⁵² In *H & H Tire Co. v. U.S. Dep't of Transp.*, the plaintiff argued that NHTSA failed to test the retreaded tires for wear resistance before promulgating its standards for endurance and speed durability.⁵³ The court agreed.⁵⁴ Judge Wilbur Pell of the Seventh Circuit Court of Appeals critiqued NHTSA for “fail[ing] to evaluate reasonably the relevant, available data.”⁵⁵ The court further found that NHTSA had failed to actually test the retreaded tires and instead merely produced vague production specifications without analyzing their cost effectiveness or stating when the manufacturers should begin the production of the new tires.⁵⁶ Unlike the regulations at issue in *Automotive Parts & Accessories Ass'n v. Boyd*, which avoided fatality by arbitrariness and irrationality, NHTSA did not prevail in *H & H Tire Co. v. U.S. Dep't of Transp.* where it failed to rationally connect its regulation to its research.⁵⁷

The development of NHTSA safety regulations and litigation stemming from the new regulations did not end in the 1960s.⁵⁸ In 1976, NHTSA sued Ford seeking enforcement of a NHTSA Administrator's order determining

⁴⁹ *Id.*; see *National Highway Traffic Safety Administration*, FED. REG., <https://perma.cc/9YDE-ZG49> (last visited Nov. 28, 2021); see also Kevin M. McDonald, *Judicial Review of NHTSA-Ordered Recalls*, 47 WAYNE L. REV. 1301, 1306 (2001). See generally *How Does Retread Work*, TIRE RECAPPERS, <https://perma.cc/X29L-T5XZ> (last visited Nov. 28, 2021) (describing retreaded tires as affordable tires that have old tread removed and new tread “recapped” on the surface).

⁵⁰ See *How Does Retread Work*, *supra* note 49.

⁵¹ See *H & H Tire Co. v. U.S. Dep't of Transp.*, 471 F.2d 350, 353–54 (7th Cir. 1972).

⁵² *Id.* at 354.

⁵³ See *id.* at 352.

⁵⁴ *Id.* at 355–56.

⁵⁵ *Id.* at 355.

⁵⁶ See *id.* at 354–55 (“The deleterious economic effect on the industry of required compliance with Standard 117 might be permissible if retreads unquestionably were major safety hazards . . . [h]owever, it appears . . . that . . . tires in general, retreaded tires included, pose no significant safety problem.”).

⁵⁷ See Mashaw & Harfst, *supra* note 34, at 279–80.

⁵⁸ See McDonald, *supra* note 49, at 1322.

that Ford had engineered and installed on its vehicles defective windshield wipers, increasing the likelihood of a deadly collision caused by impaired vision.⁵⁹ In 1996, NHTSA sued Chrysler to force a recall of nearly 100,000 vehicles for faulty seat belt assemblies.⁶⁰ And in 2000, the Ford and Firestone Tire scandal erupted, resulting in a Congressional investigation into forty-six deaths and more than 300 injuries caused by Firestone tires that shredded on the highway.⁶¹

C. *The Law Pertaining to Technology and the Automobile*

As demonstrated by NHTSA's involvement in the industry, the law pertaining to automobiles and their operation on roadways is not impervious to technological developments, both related to the car and extraneous to its operation.⁶² The 1990s signaled the creation, implementation, and legislation of traction control systems that helped to keep vehicles on the road during inclement weather or sudden and aggressive maneuvering.⁶³ The 2000s saw the expansion of the cellular telephone, a technology extraneous to the automobile that required legislation to ensure the safety of motorists and pedestrians alike from distracted drivers.⁶⁴ Over the last five years, autonomous driving technology has flooded the industry and changed the way Americans travel.⁶⁵ The development of autonomous driving technology is a giant step forward for the automobile, even though it may not match up directly with mid-twentieth century America's predictions that we would be piloting hovercrafts by now.⁶⁶ With such sophisticated technology comes great

⁵⁹ United States v. Ford Motor Co., 453 F.Supp. 1240, 1241–42 (D.D.C. 1978).

⁶⁰ United States v. Chrysler Corp., 158 F.3d 1350, 1351 (D.D.C. 1998).

⁶¹ See Robert L. Simison, Karen Lundegaard, Norihiko Shirouzu & Jenny Heller, *How a Tire Problem Became a Crisis for Firestone, Ford*, WALL ST. J. (Aug. 10, 2000 11:59 PM EST), <https://perma.cc/7SPQ-SLW2>.

⁶² See Andrew Hard, *20 Car Technologies We're Thankful For (And a Little Spoiled by)*, DIGITAL TRENDS (Nov. 19, 2017), <https://perma.cc/SM8L-5UDF>; Chris Lisinski, *New Law Targets Cell Phone Use While Driving*, WICKED LOCAL (Nov. 27, 2019, 7:00 PM ET), <https://perma.cc/3Q2A-LRK2>.

⁶³ See *Traction Control*, BRAIN ON BOARD, <https://perma.cc/GV6N-CVKT> (last visited Nov. 28, 2021) (stating that primitive traction control systems were first used on high end luxury vehicles in the late 1980s).

⁶⁴ See *Texting and Driving Laws and Fines by State*, I DRIVE SAFELY, <https://perma.cc/EJ8J-EKP8> (last visited Nov. 8, 2021).

⁶⁵ See Ronan Glon & Stephen Edelstein, *The History of Self-Driving Cars*, DIGITAL TRENDS (July 31, 2020), <https://perma.cc/SG9D-79J9>.

⁶⁶ See Thom Dunn, *11 Ridiculous Future Predictions from the 1900 World's Fair—And 3 that Came*

responsibility for automakers, consumers, and legislators.⁶⁷ Videos of Tesla drivers sleeping behind the wheel of their cars while they travel down the highway shocked the conscience of the American public, not unlike the disbelief Americans experienced when faced with Nader's statistics on automobile-related deaths.⁶⁸ Autonomous vehicles make us question what the future has in store for American roadways.⁶⁹ These vehicles also make it evident that legislation is needed to make autonomous driving safer.⁷⁰ One of the ostensible benefits of autonomous vehicles—fewer collisions—cannot be fully realized if the drivers fail to operate them in accordance with manufacturer instructions, thereby causing more collisions.⁷¹

As our world becomes increasingly technologically focused, so have NHTSA's and state legislators' focuses with respect to driving laws.⁷² This change in focus is appropriate, as more than 3,000 Americans were killed in 2019 because of distracted driving.⁷³ Just as the law adapted to activities extraneous to the mechanics of the vehicle, such as talking on a cellular phone, new regulations have been enacted to regulate technologies that are directly related to the car itself.⁷⁴ Electronic stability control systems and

True, UPWORTHY (Aug. 10, 2016), <https://www.upworthy.com/11-ridiculous-future-predictions-from-the-1900-worlds-fair-and-3-that-came-true>.

⁶⁷ See *Distracted Driving: Cellphone Use*, NCSL: NAT'L CONFERENCE OF STATE LEGISLATURES (July 20, 2021), <https://perma.cc/QW75-EVTG> (describing the problematic reality that technology in vehicles distracts drivers from the task of driving).

⁶⁸ See Aaron Holmes, *Watch These Unsettling Videos of All the Times Tesla Autopilot Drivers Were Caught Asleep at the Wheel in 2019*, BUS. INSIDER (Dec. 2, 2019, 12:48 PM), <https://perma.cc/3T54-K3DN>; NADER, *supra* note 28, at 1.

⁶⁹ Lora Kolodny & Katie Schoolov, *Self-Driving Cars Were Supposed to Be Here Already—Here's Why They Aren't and When They Should Arrive*, CNBC (Nov. 30, 2019, 9:00 AM EST), <https://perma.cc/Y3QC-VY49>.

⁷⁰ Robert Hamparyan, *Five Ways Self-Driving Cars Will Change Our Laws*, BLOOMBERG LAW (Aug. 27, 2019, 4:00 AM), <https://perma.cc/WE5D-VFR9>.

⁷¹ See University of Exeter, *Public Blame Accidents on Drivers More Than Their Automated Cars When Both Make Mistakes*, SCI. DAILY (Oct. 28, 2019), <https://perma.cc/56GX-9ZXB>.

⁷² See *Distracted Driving*, MASS.GOV, <https://perma.cc/M8ZY-L9HU> (last visited Nov. 28, 2021).

⁷³ See *Distracted Driving*, NHTSA: NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., <https://perma.cc/4QEE-T3P8> (last visited Nov. 28, 2021) (defining distracted driving as activities that divert attention away from the road, including talking on the phone, text messaging, eating or drinking, and changing the radio station).

⁷⁴ See, e.g., 49 C.F.R. § 571.126 (2015); MASS. GEN. LAWS ANN. CH. 90, § 8M (West 2019) (outlining restrictions on the use of cell phones while driving by junior operators); Nathan Bomey, *Backup Cameras Now Required in New Cars in the U.S.*, USA TODAY (May 2, 2018, 8:14 AM ET), <https://perma.cc/YFG9-6LHE>.

backup cameras are technologies that are installed in vehicles by manufacturers that make driving safer for everybody.⁷⁵ Until NHTSA decides to enact a law regulating the use of technology while driving, states are at liberty to determine what the law ought to be.⁷⁶ There are myriad varieties of cell phone use laws in effect in various states.⁷⁷ The variety of traffic laws among states makes sense where population density and road type vary so greatly throughout our country.⁷⁸ Other legislation, such as NHTSA's backup camera mandate of 2018, was sensible legislation aimed at eliminating tragic accidents.⁷⁹ Legislative developments, such as the backup camera mandate, came to fruition relatively quickly.⁸⁰ Backup cameras became popular in luxury vehicles in the mid-2000s and slowly trickled their way down throughout the market over the following fifteen years.⁸¹ Cell phones plotted a similar trajectory.⁸² It follows that where some new technology is created that poses a risk of threatening the public welfare, in the case of the cell phone, or the possibility of saving lives, in the case of the backup camera, that NHTSA and state legislatures act quickly in regulating that technology and its users.⁸³

⁷⁵ See *Safety Tech in Cars Can Cut Backup Crashes by 78 Percent, Study Finds*, CBS NEWS (Feb. 22, 2018, 1:15 PM EST), <https://perma.cc/XKB4-XJCY>; see also *Automated Vehicles for Safety*, NHTSA: NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., <https://perma.cc/U6T8-F9VZ> (last visited Nov. 28, 2021).

⁷⁶ See generally *Cellphone Use Laws by State*, IIHS: INST. FOR HIGHWAY SAFETY, <https://perma.cc/YZ28-M8RF> (last updated Nov. 2021).

⁷⁷ See *id.*

⁷⁸ See MASS. GEN. LAWS ANN. CH. 90, § 17; *Driving Laws Vary from State to State*, DEFENSIVEDRIVING.COM (Aug. 26, 2011), <https://perma.cc/UQ9S-HLM8>; see also Glancy, *supra* note 19, at 653–54.

⁷⁹ See *Federal Motor Vehicle Safety Standard No. 111, Rear Visibility*, FED. REG., <https://perma.cc/873H-WT63> (last visited Nov. 28, 2021); see also Adam Bulger, *After His Son's Tragic Death, This Doctor Fought to Put Backup Cameras in Every Car*, KIDSANDCARS.ORG (May 14, 2018, 9:40 AM), <https://perma.cc/M2FT-ZKJD>.

⁸⁰ See Peter Gareffa, *What You Need to Know About Backup Cameras*, EDMUNDS (Nov. 8, 2018), <https://perma.cc/699W-ACGF>.

⁸¹ See *id.*

⁸² See generally Rahul Chowdhury, *Evolution of Mobile Phones: 1995 – 2012*, HONGKIAT, <https://perma.cc/JDG8-4K46> (last updated Dec. 31, 2014).

⁸³ See *Safety Tech in Cars Can Cut Backup Crashes by 78 Percent*, *supra* note 75; see also *Automated Vehicles for Safety*, *supra* note 75.

D. *Autonomous Driving Technology Aids*

Automaker Tesla was founded in 2003.⁸⁴ Its first vehicle, the Roadster, a two-seat sports car, was released in 2008, as a fully-electric vehicle propelled by an army of lithium-ion batteries.⁸⁵ The Roadster exemplified Tesla's mission to prove that electric vehicles that are friendly to the environment do not have to be boring to drive.⁸⁶ After the Roadster, Tesla moved on to family-hauling vehicles—first with the Model S, which hit showrooms in 2012, and later released the Model X, in 2015.⁸⁷ Tesla led the pack not only with engineering long-range lithium-ion batteries, but also with autonomous driving technology, which first debuted on the Model S in 2014.⁸⁸ Since then, autonomous driving technology gradually migrated from engineering schools around the country and made its way into our vehicles.⁸⁹ But like the advent of the cellular phone and its unseemly marriage with motor vehicles, which produced tragic results, the implementation and use of autonomous driving technology has not been without its growing pains.⁹⁰ Operator misuse and technological failure have caused tragic accidents that demand the immediate attention of NHTSA and state legislators.⁹¹ The first fatality involving self-driving technology came in May 2016 when Joshua Brown struck and passed beneath a tractor trailer in Williston, Florida.⁹² Tesla took Mr. Brown's tragic death as an opportunity to remind consumers that its Autopilot system is merely an "assist feature" that requires drivers to keep their hands on the steering wheel at all times.⁹³ Despite Tesla's half-hearted and untimely disclaimer, its operators have

⁸⁴ *About Tesla*, TESLA, <https://perma.cc/6PBT-YM3S> (last visited Nov. 28, 2021).

⁸⁵ *Id.*

⁸⁶ *Id.*; see Jayant Ganesan, *Why Is the Toyota Prius Hated on So Much?*, DRIVETRIBE, <https://perma.cc/95P5-L6WK> (last visited Nov. 28, 2021) (explaining that the Prius, while efficient and affordable, is a slow and uninspiring car to drive).

⁸⁷ See *About Tesla*, *supra* note 84.

⁸⁸ See Brittany Chang, *Every Major Change Tesla Has Made to the Model S Throughout the Years*, BUS. INSIDER (Aug. 24, 2019, 8:47 AM), <https://perma.cc/LK5M-PHDV>.

⁸⁹ BARUCH FEIGENBAUM, *AUTONOMOUS VEHICLES: A GUIDE FOR POLICYMAKERS 1* (2018), <https://perma.cc/PZ3C-WJB6>.

⁹⁰ See generally *Distracted Driving*, CDC, <https://perma.cc/7F3R-LJXC> (last visited Nov. 28, 2021); see also Holmes, *supra* note 68.

⁹¹ See Noah Manskar, *Tesla on 'Autopilot' Slams into Connecticut Police Cruiser*, N.Y. POST (Dec. 9, 2019, 12:25 PM), <https://perma.cc/76UA-PFF2>.

⁹² Neal E. Boudette, *Tesla's Self-Driving System Cleared in Deadly Crash*, N.Y. TIMES (Jan. 19, 2017), <https://perma.cc/AF5Y-YD6M>.

⁹³ See Electric Jen, *Ignoring Tesla Autopilot Warnings—What Happens?*, TESLARATI (Nov. 5, 2015), <https://perma.cc/NHL9-6EVG>.

devised ways to circumvent the requirement that they keep their hands on the steering wheel at all times.⁹⁴

Tesla's Autopilot system is just one type of autonomous driving technology.⁹⁵ In 2013, NHTSA developed levels of automation pertaining to the degree of autonomy offered by the different manufacturers' technologies.⁹⁶ Levels one and two are only partial automation systems that, under certain conditions, can provide assistance with steering, braking, and accelerating.⁹⁷ Levels three and four represent the highest forms of automation available on the market today and are capable of controlling the vehicle with minimal operator involvement or intervention.⁹⁸ This Note is concerned only with levels three and four as these forms of autonomous driving technology provide the greatest degree of automation currently in the market.⁹⁹ Furthermore, operators of vehicles with levels three and four autonomous driving technology are the most likely to intentionally misuse the technology by making their cars think that they have their hands on the wheel when they are actually distracted by their cell phone or simply taking a nap.¹⁰⁰

E. *Massachusetts Executive Order 572*

In October 2016, Massachusetts Governor Charlie Baker signed Executive Order 572 ("Order 572").¹⁰¹ Governor Baker's timely effort to enact legislation in the Commonwealth, like in other states, recognized the prevalence of autonomous vehicle technology on the roads.¹⁰² Like other

⁹⁴ See, e.g., Fred Lambert, *Tesla Autopilot 'Buddy' Hack to Avoid 'Nag' Relaunches as 'Phone Mount' to Get Around NHTSA Ban*, ELECTREK (Sept. 9, 2018, 2:31 PM PT), <https://perma.cc/3BCP-3GG5> (discussing how company 'Autopilot Buddy' continues to manufacture a weight that is designed to grasp a Tesla steering wheel, mimicking the touch of a human hand).

⁹⁵ See *Path to Autonomy: Self-Driving Car Levels 0 to 5 Explained*, CAR AND DRIVER (Oct. 3, 2017), <https://perma.cc/RM4G-T34H> [hereinafter *Path to Autonomy*] (describing and comparing various autonomous driving technologies from different automotive manufacturers).

⁹⁶ *Automated Vehicles for Safety*, *supra* note 75.

⁹⁷ *Path to Autonomy*, *supra* note 95.

⁹⁸ *Automated Vehicles for Safety*, *supra* note 75.

⁹⁹ See *Automated Vehicles for Safety*, *supra* note 75.

¹⁰⁰ Andrew Krok & Sean Szymkowski, *Amazon Still Sells Versions of the Dangerous Autopilot Buddy Tesla Accessory*, CNET (Aug. 30, 2021, 1:40 PM PT), <https://perma.cc/DNY6-AEKJ>.

¹⁰¹ To Promote the Testing and Deployment of Highly Automated Driving Technologies, Mass. Exec. Order No. 572 (Oct. 20, 2016), <https://perma.cc/BC84-655U> (last visited Nov. 30, 2021).

¹⁰² See *Autonomous Vehicle Laws*, IIHS: INST. FOR HIGHWAY SAFETY, <https://perma.cc/3KZE-8S8W> (last updated Nov. 2021).

states' executive orders, Order 572 promotes the testing and deployment of highly automated driving technologies.¹⁰³ The states enacted autonomous vehicle technology legislation, despite an absence in Congressional action, after repeated stalemates between a Republican-controlled House of Representatives and a Democrat-controlled Senate precluded forthcoming legislation by NHTSA.¹⁰⁴ Order 572 assumes an overly-optimistic forecast of autonomous vehicle technology, describing its ostensible benefits in detail without acknowledging its obvious and inherent dangers.¹⁰⁵ Order 572 further fails to assess liability in the event of a collision where an operator misuses autonomous driving technology or where a manufacturer's defect is to blame.¹⁰⁶ Instead of acknowledging the dangers of autonomous vehicle technology and recommending urgent legislation to limit the likelihood of deadly crashes caused by autonomous vehicle technology, Order 572 merely creates a "special working group on autonomous vehicles" for testing autonomous vehicle technology to ensure the "social benefits that may accrue" from it.¹⁰⁷

II. The Issue Being Addressed

While Order 572 carefully toes the line between incentivizing autonomous vehicle technology in Massachusetts and protecting the public welfare, it does too little to ensure that harsh penalties will be levied against operators of vehicles who abuse autonomous technology.¹⁰⁸ If the Massachusetts legislature hastily legislates autonomous driving, then there is a great risk of operator abuse and misuse of the feature, especially on Massachusetts' narrow and confusing roads.¹⁰⁹ Like Order 572, NHTSA's

¹⁰³ Mass. Exec. Order No. 572.

¹⁰⁴ See Andrew J. Hawkins, *Congress Takes Another Stab at Passing Self-Driving Car Legislation*, THE VERGE (July 28, 2019, 10:00 AM EDT), <https://perma.cc/4MLB-UNGD>; see also Justin T. Westbrook, *NTSB Calls Out Tesla, Apple and NHTSA Over Fatal Autopilot Crashes and Sloppy Regulating*, JALOPNIK (Feb. 25, 2020, 4:52 PM), <https://perma.cc/G857-SRFG>.

¹⁰⁵ See Mass. Exec. Order No. 572. See generally Tracy Hresko Pearl, *Fast & Furious: The Misregulation of Driverless Cars*, 73 N.Y.U. ANN. SURV. AM. L. 19, 20–21 (2017).

¹⁰⁶ See Mass. Exec. Order No. 572.

¹⁰⁷ *Id.*; see Michelle L.D. Hanlon, *Self-Driving Cars: Autonomous Technology That Needs a Designated Duty Passenger*, 22 BARRY L. REV. 1, 25 (2016) (calling for a "designated duty passenger law" to reduce accident-related deaths caused by faulty technology or misuse of technology).

¹⁰⁸ Compare Mass. Exec. Order No. 572, with CAL. VEH. CODE § 38750(d)(3) (West 2017) (stating that operators of autonomous vehicles who do not safely operate their vehicles may have their licenses revoked, suspended, or denied).

¹⁰⁹ See generally Martin Finucane, *Boston's Streets Do Go in All Sorts of Directions. These Charts*

outlook on the prospect of an America that fills its roads with autonomous vehicles is optimistic.¹¹⁰ NHTSA's webpage dedicated to self-driving technology describes autonomous vehicles as "helping to save lives and prevent injuries."¹¹¹ NHTSA would certainly be justified in closely regulating manufacturers of autonomous driving technology and operators of vehicles who use such technology because such regulation is within its range of authority and ample, credible research supports such regulation.¹¹² Tesla is not alone in feverishly engineering autonomous driving technology with the vision that the future is at its fingertips.¹¹³ Volvo purports that its IntelliSafe Assist autopilot system will change the world by reducing "driver strain in tedious driving situations" and by increasing safety margins.¹¹⁴ It takes only one simple Google search to locate countless collisions involving autonomous vehicles.¹¹⁵ It follows that Massachusetts' vested interest in avoiding tragedies ensures that as the prevalence of autonomous cars increases, drivers obey not only existing traffic laws, speed limits, and stop signs, but also laws specific to autonomous vehicles and operators.¹¹⁶ Furthermore, Massachusetts must not wait for federal legislation that may never come as the need for protection of its citizens is urgent.¹¹⁷

Prove It, BOS. GLOBE (July 12, 2018, 11:32 AM), <https://perma.cc/4L5V-C4R2> (describing Boston's confusing streets that owe their planning to the eighteenth century).

¹¹⁰ See *Automated Vehicles for Safety*, *supra* note 75.

¹¹¹ *Automated Vehicles for Safety*, *supra* note 75.

¹¹² See *Automotive Parts & Accessories Ass'n v. Boyd*, 407 F.2d 330, 342-43 (D.C. Cir. 1968).

¹¹³ See, e.g., *Innovating the Future of Driving. Again.*, CADILLAC, <https://perma.cc/TF2Q-2BXL> (last visited Nov. 30, 2021); *IntelliSafe Assist*, VOLVO, <https://perma.cc/74Z6-J5CY> (last visited Nov. 30, 2021).

¹¹⁴ *IntelliSafe Assist*, *supra* note 113.

¹¹⁵ See, e.g., Clifford Atiyeh, *NHTSA Looking into Fatal Tesla Model S Crash in California*, CAR AND DRIVER (Jan. 3, 2020), <https://perma.cc/BB7C-3FMD>; Bill Howard, *Another Tesla Crash, Another Investigation Into Autopilot*, EXTREME TECH (Dec. 17, 2019, 1:03 PM), <https://perma.cc/C8SA-626F>; Tom Krisher, *3 Crashes, 3 Deaths Raise Questions about Tesla's Autopilot*, ASSOCIATED PRESS (Jan. 3, 2020), <https://perma.cc/G3ML-TR74>.

¹¹⁶ See Glancy, *supra* note 19, at 654.

¹¹⁷ See Hawkins, *supra* note 104; see also David Butler, *Consumer Reports: Uber Crash Should Be 'A Wake-Up Call' for Companies Developing Self-Driving Cars, DOT, and State Governments*, CONSUMER REP. (Nov. 19, 2019), <https://perma.cc/G4EX-FX9G>.

ANALYSIS

III. Order 572 Is Too Broad in Scope and Does Not Obligate Operators to Use Extra Caution

There is no disputing that driving is a difficult task that demands the undivided attention of motorists who operate their vehicles on our roads.¹¹⁸ Even the most competent drivers may encounter situations while driving that no one could predict or safely avoid.¹¹⁹ It is reasonable to ask how we can then be comfortable with allowing autonomous driving technology to make critical decisions, such as protecting the vehicle's occupants or protecting pedestrians.¹²⁰ Framed in this way, the optimistic language of Order 572 fails to ensure that the autonomous driving technology that is to be tested on Massachusetts' roads is congruous with the safety of the general public.¹²¹ Governor Baker's Order 572 does not affirmatively obligate manufacturers of autonomous driving technology to maintain records of their testing procedures, including the details of accidents involving self-driving vehicles.¹²² Order 572 is facially concerned primarily with the deployment of autonomous driving technology as a means of "support[ing] innovation" in the sector.¹²³

The focus on reasonable and calculated legislation of autonomous driving technology takes a back seat to enticing manufacturers to enter the market where the special working group created by Order 572 is tasked only with "consider[ing] . . . changes to statutes or regulations" particular to the operation of autonomous vehicles.¹²⁴ The special working group created by Order 572, comprised of various officials, including the Secretary of Transportation and the Registrar of Motor Vehicles, is responsible for flooding the Commonwealth's roadways with vehicles equipped with

¹¹⁸ See *Ensuring Your Competence in Split Second Road Decisions*, DRIVEN AUTOS MAG. (Apr. 17, 2018), <https://perma.cc/FNM2-PBB8> (stating that split-second situational difficulties are common occurrences on roadways that drivers encounter).

¹¹⁹ See, e.g., NBC Washington Staff, *Beltway Driver Injured After Road Debris Goes Through Windshield*, *Official Says*, NBC WASH. (Nov. 26, 2019), <https://perma.cc/TWP5-Y96K>.

¹²⁰ See Steven M. Sweat, *The Moral Dilemma for Self-Driving Cars*, CAL. ACCIDENT ATT'YS BLOG (June 28, 2016), <https://perma.cc/DM6A-K2HW>; see also Hanlon, *supra* note 107, at 2.

¹²¹ See *To Promote the Testing and Deployment of Highly Automated Driving Technologies*, Mass. Exec. Order No. 572 (Oct. 20, 2016), <https://perma.cc/BC84-655U> (last visited Nov. 30, 2021).

¹²² See *id.*; see also CAL. VEH. CODE § 38750(G) (West 2017).

¹²³ See Mass. Exec. Order No. 572.

¹²⁴ See *id.*

autonomous driving technology and ensuring their “safe development.”¹²⁵ “Safe development” is a misnomer, as there is no requirement to collect data regarding technology malfunctions or accidents involving autonomous driving aids.¹²⁶ Furthermore, public safety is an afterthought of Order 572 where manufacturers of autonomous driving aids must only provide to the Commonwealth “information regarding the operators of any such vehicles, including a description of the training that the operators have been provided.”¹²⁷ Requiring manufacturers to provide other critical information, including driving record data that may indicate whether the operator is likely to be involved in a collision or drive recklessly based on past citations, is also notably missing from Order 572.¹²⁸

If Governor Baker enhances the language of Order 572 to affirmatively require that the special working group recommend substantive changes to the law particular to the operation of autonomous vehicles, he must look no further than other governors’ executive orders and other states’ statutes currently in effect.¹²⁹ In March 2018, Arizona Governor Douglas Doucey amended his executive order on the development of autonomous driving technology with the public welfare in mind, requiring that autonomous driving systems comply with existing state traffic and safety laws as well as other licensing and regulatory requirements.¹³⁰ Governor Doucey’s executive order also contains a definitions section that references existing definitions under Arizona state law for certain terms including “person,” “drive,” and “dynamic driving task.”¹³¹ By contrast, Governor Baker’s Order 572 fails to require the special working group to suggest new legislation or changes to existing Massachusetts’ traffic laws, stating that it will be interpreted “consistent with federal law and policy.”¹³² Governor Doucey’s executive order also takes into account the efficacy of autonomous driving technology with respect to the split-second decision making that is often required of drivers, thereby placing the burden on manufacturers to ensure the technology is capable of functioning at a high level in all situations.¹³³

¹²⁵ See *id.*

¹²⁶ See *id.*

¹²⁷ *Id.*

¹²⁸ See *id.*

¹²⁹ See Advancing Autonomous Vehicle Testing and Operating: Prioritizing Public Safety, Ariz. Exec. Order No. 2018-04 (Mar. 1, 2018), <https://perma.cc/M9DB-CV4B> (last visited Nov. 30, 2021).

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² Mass. Exec. Order No. 572; but see, e.g., NEV. REV. STAT. ANN. § 482A.100 (West 2017).

¹³³ Ariz. Exec. Order No. 2018-04 (describing one type of “dynamic driving task” as “object

The tasks of Governor Baker's special working group are only loosely tied to ensuring the safety of Massachusetts' motorists, as Order 572, on its face, primarily encourages manufacturers of autonomous vehicle technology to enter the Massachusetts market as a means to strengthen the economy.¹³⁴ An approach to autonomous vehicle technology appropriate for Massachusetts must be guided by caution that limits its use until its manufacturers can ensure that the technology can manage to make the correct decision in an emergency situation.¹³⁵ Otherwise, tragedy will be around every corner.¹³⁶

IV. Massachusetts Must Look to Existing State Laws to Create Its Own Statutory Provisions

Revisions to Order 572 must ensure not only that manufacturers of autonomous vehicle technology are held to the highest engineering standards, but also that operators of autonomous vehicles are held to higher standards of care while operating their vehicles.¹³⁷ In December 2016, NHTSA completed its investigation into a fatal car accident involving Tesla's Autopilot System, finding "no specific flaw in the technology and taking no action against the carmaker."¹³⁸ If the autonomous driving technology is found not to be at fault, then we must scrutinize operators who misuse the technology and cause deadly accidents.¹³⁹ Massachusetts' laws must recognize that when a vehicle is being operated using autonomous vehicle technology, instead of absolving its driver of liability for accidents, a heightened duty must be imposed on its driver for the safe operation of the vehicle.¹⁴⁰ Massachusetts law must require that autonomous vehicles clearly and conspicuously alert their operator when autonomous driving software

and event response execution"); see Kylie Stevens, *'My Head Hurts, but Most of All – My Heart Hurts:' Family of a Promising Teen Cyclist Recall the Heartwrenching Moment a Driver's Split-Second Decision Changed Their Lives Forever*, DAILY MAIL (Oct. 24, 2019, 2:18 AM EST), <https://perma.cc/HB77-FECQ>.

¹³⁴ See Mass. Exec. Order No. 572.

¹³⁵ See generally UNIV. OF WASH. TECH. POLICY LAB., DRIVERLESS SEATTLE (2017), <https://perma.cc/T3SA-5AYL>.

¹³⁶ See, e.g., Steve Dent, *Uber Self-Driving Car Involved in Fatal Crash Couldn't Detect Jaywalkers*, ENGADGET (Nov. 6, 2019), <https://perma.cc/L6SN-4CNM>; see also Hanlon, *supra* note 107, at 9–15.

¹³⁷ See generally Hanlon, *supra* note 107, at 17.

¹³⁸ Alan Ohnsman, *US Investigation of Deadly Tesla Autopilot Crash Finds No Defect*, FORBES (Jan. 19, 2017, 1:26 PM EST), <https://perma.cc/2YZD-44MJ>.

¹³⁹ See Sophia H. Duffy & Jamie Patrick Hopkins, *Sit, Stay, Drive: The Future of Autonomous Car Liability*, 16 SMU SCI. & TECH. L. REV. 453, 471 (2013).

¹⁴⁰ See Hanlon, *supra* note 107, at 17.

is engaged and available and, more importantly, when such software fails or is unavailable, so that operators cannot dispute whether they were using autonomous driving aids.¹⁴¹ Governor Baker must look no further than other states' statutes that comment on the liability of occupants in a motor vehicle while leading Massachusetts in enacting effective legislation.¹⁴²

A. *Florida's Passenger Duty Doctrine*

Like other states, Florida imposes a legal duty whenever a "human endeavor creates a generalized and foreseeable risk of harming others."¹⁴³ In *Roos v. Morrison*, the Florida District Court of Appeals recognized that where a person's conduct creates a foreseeable zone of risk, the person has a duty to either "lessen the risk or see that sufficient precautions are taken to protect others from the harm that the risk poses."¹⁴⁴ The Florida Supreme Court has posited that a person whose conduct creates a reasonably foreseeable risk is required to "exercise prudent foresight" where it is possible that other people may be injured.¹⁴⁵ This reasoning extends to purchasers of automobiles who drive their two ton rolling masses of metal on public roads, subjecting themselves, other motorists, and pedestrians to risk of injury or death, or a foreseeable zone of risk.¹⁴⁶ Florida did not hesitate to extend the doctrine of the foreseeability of risk to passengers in vehicles, noting "that certain circumstances can give rise to a duty on the part of a mere passenger to make reasonable attempts 'through suggestion, warning, protest or other means suitable to the occasion, to control the conduct of the driver.'"¹⁴⁷ The court clarified its passenger duty rule by holding that it applies only where the passenger knows or should know that the driver of the vehicle that the passenger is riding in is not operating the vehicle "compatible with the safety of his passenger."¹⁴⁸ While the *Roos* holding relating to a passenger's duty was not crafted under the framework of autonomous vehicle technology, it is nonetheless instructive when considering how a legislature

¹⁴¹ See UNIV. WASH. TECH. LAW AND PUB. POLICY CLINIC, AUTONOMOUS VEHICLE LAW REPORT AND RECOMMENDATIONS TO THE ULC BASED ON EXISTING STATE AV LAWS, THE ULC'S FINAL REPORT, AND OUR OWN CONCLUSIONS ABOUT WHAT CONSTITUTES A COMPLETE LAW 17-18 (2014), <https://perma.cc/CHV7-MQQT> [hereinafter AUTONOMOUS VEHICLE LAW REPORT].

¹⁴² See Hanlon, *supra* note 107, at 18.

¹⁴³ *McCain v. Florida Power Corp.*, 593 So. 2d 500, 503 (Fla. 1992).

¹⁴⁴ 913 So. 2d 59, 63 (Fla. Dist. Ct. App. 2005); see *Kaisner v. Kolb*, 543 So. 2d 732, 735 (Fla. 1989).

¹⁴⁵ *McCain*, 593 So. 2d at 503.

¹⁴⁶ See Hanlon, *supra* note 107, at 18.

¹⁴⁷ *Roos*, 913 So. 2d at 64 (quoting *Knudsen v. Hanlan*, 36 So. 2d 192, 194 (Fla. 1948)).

¹⁴⁸ *Id.* at 64.

might codify a system of laws particular to autonomous vehicle technology.¹⁴⁹

Once an operator of an autonomous vehicle utilizes the vehicle's autonomous technology, thereby relinquishing control over the speed and direction of the vehicle, the operator becomes a passenger free to read a book or enjoy a snack so long as the operator stays minimally involved in the task of driving by keeping one hand on the steering wheel.¹⁵⁰ It follows, then, that Florida's passenger duty doctrine would apply to operators of autonomous vehicles who become passengers by relinquishing control of their vehicles, subjecting them to a heightened duty to ensure that the driver of the vehicle, the technology, is operating the vehicle in a manner "compatible with the safety of his passenger."¹⁵¹ Application of this rule would cure issues flowing from the improper use of autonomous technology, including operators who sleep while their vehicles drive them down the highway, by placing an affirmative duty on them to ensure that their autonomous vehicles are being operated safely.¹⁵² Such a duty is an appropriate remedy that must be implemented until consumers are confident in the ability of autonomous vehicle technology to make split-second decisions on their behalf that may have dire consequences.¹⁵³ Although fully autonomous vehicles are not yet widespread on American roads, as evidenced by Order 572 and other states' executive orders authorizing only the testing of autonomous vehicle technology on roadways, it makes logical sense to implement such a duty now so that consumers are aware of the requirements of ownership of an autonomous vehicle.¹⁵⁴

B. *Pennsylvania's Sensible Legislation Related to Autonomous Driving Technology*

In June 2016, Pennsylvania Department of Transportation Secretary Leslie Richards launched the Pennsylvania Automated Vehicle Task Force

¹⁴⁹ See Hanlon, *supra* note 107, at 18–19.

¹⁵⁰ Joey Cheng, *A New Passenger Experience with Autonomous Vehicles*, VIA TECH., INC. (Aug. 12, 2019), <https://perma.cc/9WPZ-L3DN>.

¹⁵¹ See Hanlon, *supra* note 107, at 20–21 (quoting *Roos*, 913 So. 2d at 64).

¹⁵² See, e.g., Holmes, *supra* note 68; see also Hanlon, *supra* note 107, at 22.

¹⁵³ See Jennings Brown, *Tesla Autopilot Malfunction Caused Crash That Killed Apple Engineer, Lawsuit Alleges*, GIZMODO (May 1, 2019, 5:00 PM), <https://perma.cc/H5TB-JBSY>.

¹⁵⁴ See, e.g., To Promote the Testing and Deployment of Highly Automated Driving Technologies, Mass. Exec. Order No. 572 (Oct. 20, 2016), <https://perma.cc/BC84-655U> (last visited Nov. 30, 2021); see also Hanlon, *supra* note 107, at 21.

(“Task Force”).¹⁵⁵ Pennsylvania’s foray into autonomous vehicles was substantially more far-reaching than Order 572.¹⁵⁶ Pennsylvania constructed a “state-of-the-art training and testing facility” specifically for autonomous vehicle technology aimed at assessing the efficacy of self-driving cars in “traffic incident management” and work zones.¹⁵⁷ Pennsylvania also commissioned a one-year project to analyze the effect autonomous vehicle technology would have on state infrastructure over the next twenty years.¹⁵⁸ Involving its citizens in the burgeoning world of autonomous driving technology on its roadways, Pennsylvania created an interactive frequently-asked-questions section on its website that answers questions about autonomous vehicles.¹⁵⁹ Lastly, Pennsylvania posted on its Department of Transportation website a “Notice of Testing” application that autonomous driving testers must complete and submit prior to getting state approval.¹⁶⁰ The Notice of Testing requires that testers provide test driver biographical information, including whether they have completed enhanced driver training courses, and that test vehicles are equipped with data recorders in the event of a collision.¹⁶¹ Pennsylvania has clearly and seriously considered what it means to have vehicles equipped with autonomous driving technology operating on its roads, and these measures demonstrate that it has placed its citizens’ safety at the forefront of the discussion.¹⁶² Notably, none of these precautions are included in Order 572, but they must be if Massachusetts seeks to ensure the safety of the general public.¹⁶³

C. *Defining Key Statutory Terms and Revising Licensing Standards*

Implementation of a passenger duty for operators of autonomous vehicles must coincide with redefining key statutory terms currently in

¹⁵⁵ *AV Policy Task Force*, PA. DEP’T OF TRANSP., <https://perma.cc/WB8B-CYCY> (last visited Nov. 30, 2021).

¹⁵⁶ *See CAV Initiatives: PennSTART*, PA. DEP’T OF TRANSP., <https://perma.cc/FMY3-YTVA> (last visited Nov. 30, 2021).

¹⁵⁷ *See id.*

¹⁵⁸ *See id.*

¹⁵⁹ *Frequently Asked Questions*, PA. DEP’T OF TRANSP., <https://perma.cc/LW6Z-JS5E> (last visited Nov. 30, 2021).

¹⁶⁰ *AV Testing*, PA. DEP’T OF TRANSP., <https://perma.cc/9BLZ-VRU2> (last visited Nov. 30, 2021).

¹⁶¹ *Id.*

¹⁶² *See, e.g., id.*

¹⁶³ *To Promote the Testing and Deployment of Highly Automated Driving Technologies*, Mass. Exec. Order No. 572 (Oct. 20, 2016), <https://perma.cc/BC84-655U> (last visited Nov. 30, 2021).

effect with respect to the operation of motor vehicles.¹⁶⁴ Massachusetts must look to other jurisdictions in devising a set of statutory definitions particular to the operation of vehicles using autonomous technology.¹⁶⁵ Conspicuously, Massachusetts has no statutory definitions pertaining to autonomous vehicles or their operators.¹⁶⁶ Based on the definitions used by Nevada, California, and Florida, an appropriate definition of “autonomous vehicle” for Massachusetts would be “any vehicle equipped with autonomous driving technology that can drive the vehicle on which it is installed for any duration of time without the constant assistance of a human operator.”¹⁶⁷ Language such as “any duration of time” will sufficiently cover all levels of autonomous driving technology, from temporary autonomous aids to fully autonomous technologies.¹⁶⁸

California has also enacted a statutory provision requiring that test drivers of autonomous vehicles have clean driving records.¹⁶⁹ If test drivers of autonomous vehicles are required to have driving records with no at-fault accidents involving injury or death and with no convictions for driving under the influence of alcohol or drugs, then it reasonably follows that such restrictions must be placed on the consuming public until autonomous vehicle technology can function at a high enough level so that accidents are not possible.¹⁷⁰ California further left open the question of whether to require additional licensing on operators of autonomous vehicles.¹⁷¹ Where the task of driving has transformed so substantially that the standard Massachusetts permit and licensing tests are no longer useful tools in preparing drivers of autonomous vehicles for operation on Massachusetts roads, the state must revise licensing assessments.¹⁷² Massachusetts must revise its permit and

¹⁶⁴ See generally MASS. GEN. LAWS ANN. CH. 90, § 1 (West 2020) (providing definitions for terms including “operator,” “manufacturer,” and “motor vehicle”).

¹⁶⁵ See, e.g., NEV. REV. STAT. ANN. § 482A.030 (West 2017); CAL. VEH. CODE § 38750 (West 2017); FLA. STAT. ANN. § 316.003 (West 2019).

¹⁶⁶ See MASS. GEN. LAWS ANN. CH. 90, § 1.

¹⁶⁷ See NEV. REV. STAT. ANN. § 482A.030; CAL. VEH. CODE § 38750; FLA. STAT. ANN. § 316.003; see also AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141.

¹⁶⁸ *The 6 Levels of Vehicle Autonomy Explained*, SYNOPSIS, <https://perma.cc/2JG9-YCFD> (last visited Nov. 30, 2021). See generally *Path to Autonomy*, *supra* note 95 (describing the various levels of autonomous driving technology).

¹⁶⁹ See CAL. CODE REGS. TIT. 13, § 227.34 (2020).

¹⁷⁰ See *id.*; see also AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 9.

¹⁷¹ CAL. VEH. CODE § 38750(d)(3) (“The department may establish additional requirements . . . regarding . . . new license requirements for operators of autonomous vehicles . . .”).

¹⁷² See *Automated Vehicles for Safety*, *supra* note 75; see also, e.g., *Free MA RMV Diagnostic Test*

licensing tests by making assessments particular to the task of driving an autonomous vehicle, including the types of roads best suited to self-driving systems and whether driver involvement is required or not.¹⁷³ Drivers must also be required to certify that they have read the manufacturer's instructions regarding the operation of the autonomous driving system, as variety in the marketplace means no single test can encapsulate all systems.¹⁷⁴

Other statutory definitions must be added or changed to ensure that the public is protected from the dangers of autonomous vehicle technology.¹⁷⁵ Crash data recorders must become compulsory components of autonomous driving technology.¹⁷⁶ In California, autonomous vehicle manufacturers must install recorders that capture and store "autonomous technology sensor data" for at least thirty seconds before a collision between an autonomous vehicle and another vehicle, an object, or a person.¹⁷⁷ Such a technology will not only resolve legal disputes arising out of crashes involving autonomous vehicle technology, but will also provide answers as to the genesis of a crash and whether the technology used was faulty, or whether the driver is liable for the intentional or negligent misuse of the technology.¹⁷⁸ Such information would be invaluable to both Massachusetts and the manufacturers and would allow for further research and design to limit the likelihood of future accidents.¹⁷⁹

Massachusetts must also require that autonomous vehicles be in compliance with state laws regarding the operation of vehicles on state roadways.¹⁸⁰ These requirements include, generally, the ability to obey the posted speed limit at all times; to decipher traffic lights, road signs, and

2021, DRIVING TESTS, <https://perma.cc/KL79-38W5> (last visited Nov. 30, 2021).

¹⁷³ See Zvi Greenstein, *Creating A Driver's License Test for Self-Driving Cars*, NVIDIA (Oct. 10, 2018), <https://perma.cc/WUE7-KQBJ>.

¹⁷⁴ AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 19. See generally Doug Demuro, *7 Best Semi-Autonomous Systems Available Right Now*, AUTOTRADER (Jan. 432018, 7:00PM), <https://perma.cc/TT5L-XMED> (describing the differences between the various autonomous driving systems produced by each manufacturer).

¹⁷⁵ See AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 16–18.

¹⁷⁶ See generally *Event Data Recorder (EDR) for Automated Driving*, EUROPEAN ASS'N FOR ACCIDENT RESEARCH AND ANALYSIS (Sept. 19, 2017), <https://perma.cc/MZD3-W632> (describing an event data recorder as a technology that records material information relating to the operation of a vehicle that is useful when determining the cause of an accident).

¹⁷⁷ CAL. VEH. CODE § 38750(c)(1)(G) (West 2017).

¹⁷⁸ See AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 13.

¹⁷⁹ See AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 12–13.

¹⁸⁰ See generally AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141.

warning signals; to recognize and respond to turn signals indicated by other vehicles; to yield to pedestrians; and to activate the turn signals when appropriate.¹⁸¹ Where an autonomous vehicle fails to perform one of these functions and causes a collision of any type, the crash data recorder will be able to discern whether the crash was the result of a technological defect or operator misuse.¹⁸² Other roadway encounters that autonomous driving technology must be able to competently respond to include emergency service vehicles responding to calls, such as police cars and firetrucks, and impromptu construction work in which vehicles may need to suddenly stop or change lanes.¹⁸³

D. *Changes to the Auto Insurance Industry*

In many states in the United States, drivers are required to obtain an auto insurance policy before they may be licensed to operate their vehicle on that states' roadways.¹⁸⁴ Like all other types of insurance, higher risk insured policies are assessed higher premiums and higher deductibles to limit the likelihood and amount of money that the insurance company will have to contribute towards the resolution of a claim.¹⁸⁵ Typical high-risk auto insurance policies are written to insure teenage drivers, elderly drivers, drivers with poor credit or no credit, and drivers with storied driving records that include citations for speeding and road-rage and convictions for driving under the influence.¹⁸⁶ These drivers are seen as high-risk drivers who are likely to be involved in crashes or other costly insurance-related claims.¹⁸⁷ Some insurers even use technology to track their insured's driving

¹⁸¹ AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 14.

¹⁸² AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141, at 12-13; see Eric Loveday, *Watch Tesla Model S on Autopilot Hit Cement Divider: Video*, MOTOR 1 (Mar. 26, 2019, 9:40 AM ET), <https://perma.cc/U6UQ-872P>.

¹⁸³ See AUTONOMOUS VEHICLE LAW REPORT, *supra* note 141 at 14; see also Ira Boudway, *First Responders Work with Developers to 'Teach' Self-Driving Cars to Pull Over*, TRANSPORT TOPICS (Mar. 8, 2019, 11:30 AM EST), <https://perma.cc/S6YT-MF5K> (stating that Tesla's Autopilot autonomous driving technology is not equipped to detect and stop for emergency sirens but that the artificial intelligence industry is "motivated to find answers").

¹⁸⁴ See generally Mila Araujo, *Minimum Car Insurance Requirements by State*, THE BALANCE, <https://perma.cc/2Z3Y-8NJW> (last updated Oct. 7, 2021) (listing the states that make auto insurance policies compulsory and describing the different levels of coverage that are required).

¹⁸⁵ See generally *What Is High-Risk Insurance*, RAMSEY SOLUTIONS (Apr. 2, 2020) <https://perma.cc/WDT7-L3G2> (describing what a high-risk auto insurance policy may look like and how auto insurance companies assess high-risk policies).

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

habits, gathering information that can be used to adjust rates or even cancel coverage altogether if the results are troubling.¹⁸⁸ The history of serious crashes caused by vehicles using autonomous driving technology is problematic.¹⁸⁹ Based on the available data regarding the history of crashes and equipment malfunction involving autonomous driving technology, some insurers have increased rates for autonomous vehicles.¹⁹⁰

Massachusetts requires minimum auto insurance policies as a way of protecting its citizens from high-risk operators.¹⁹¹ Failure to maintain the minimum coverage permits Massachusetts state law enforcement officials to seize registration plates.¹⁹² Although Massachusetts' statutorily-required minimum auto insurance rates have remained the same since the 1980s, autonomous vehicle technology presents a substantial risk that is deserving of its own higher minimum requirements.¹⁹³ The auto insurance industry's response to the increase in autonomous driving-related crashes by raising premiums and deductibles is a clear signal to Massachusetts that it, too, must raise minimum insurance requirements for auto insurance policies on vehicles with levels three and four autonomous driving technology until accidents involving such technology are few and far between.¹⁹⁴

CONCLUSION

Autonomous driving technology is becoming more widespread in our neighborhoods. It is the way of the future. However, as it weaves its way into the fabric of our country, we must carefully monitor its development. Keeping American motorists and pedestrians safe must be the preeminent

¹⁸⁸ See generally Kristen Hall-Geisler, *How Do Those Car Insurance Tracking Devices Work?*, U.S. NEWS (Aug. 27, 2021), <https://perma.cc/H3YD-BULC> (stating that in 2013, Progressive began using data collected from in-car tracking devices to penalize insureds for dangerous driving habits, such as aggressive acceleration or braking).

¹⁸⁹ See, e.g., Howard, *supra* note 115; see also Westbrook, *supra* note 104 (describing the findings of a National Transportation Safety Board investigation into a Tesla crash in which the vehicle's autopilot system steered the car directly into a crash barrier on a highway off-ramp in California, killing the operator).

¹⁹⁰ See Katie Burke, *Tesla Owners Should Pay More for Insurance, AAA Says*, AUTOMOTIVE NEWS (June 4, 2017, 1:00 AM) <https://perma.cc/TLW6-PPXR> ("Teslas get into a lot of crashes and are costly to repair afterward.").

¹⁹¹ See Araujo, *supra* note 184. See generally MASS. GEN. LAWS ANN. CH. 90, § 34A-R (West 2020).

¹⁹² MASS. GEN. LAWS ANN. CH. 90, § 34P (West 2020).

¹⁹³ See Krisher, *supra* note 115.

¹⁹⁴ See Burke, *supra* note 190; see also *Automated Vehicles for Safety*, *supra* note 75.

concern as the technology grows and becomes ubiquitous over the next century. Until autonomous driving technology manufacturers can prove that their artificial intelligence can competently perform dynamic driving tasks, such as evading a deer leaping from the roadside at 60 miles-per-hour, Americans must be vigilant against hastily-crafted legislation that sacrifices their safety in exchange for the economic benefit of encouraging manufacturers to bolster their states' economies. Autonomous driving systems must be checked at the door. Operators must be assessed for their understanding of how their vehicles' self-driving systems work. Operators who intentionally or negligently misuse their vehicles' self-driving aids and cause accidents must be penalized under the law. Statutory amendments must be enacted specifically for autonomous vehicles consistent with other states, and minimum insurance rates must be adjusted under the law to reflect the increased risk of operating vehicles with autonomous driving technology. This important technology must move forward, but only as we responsibly allow.