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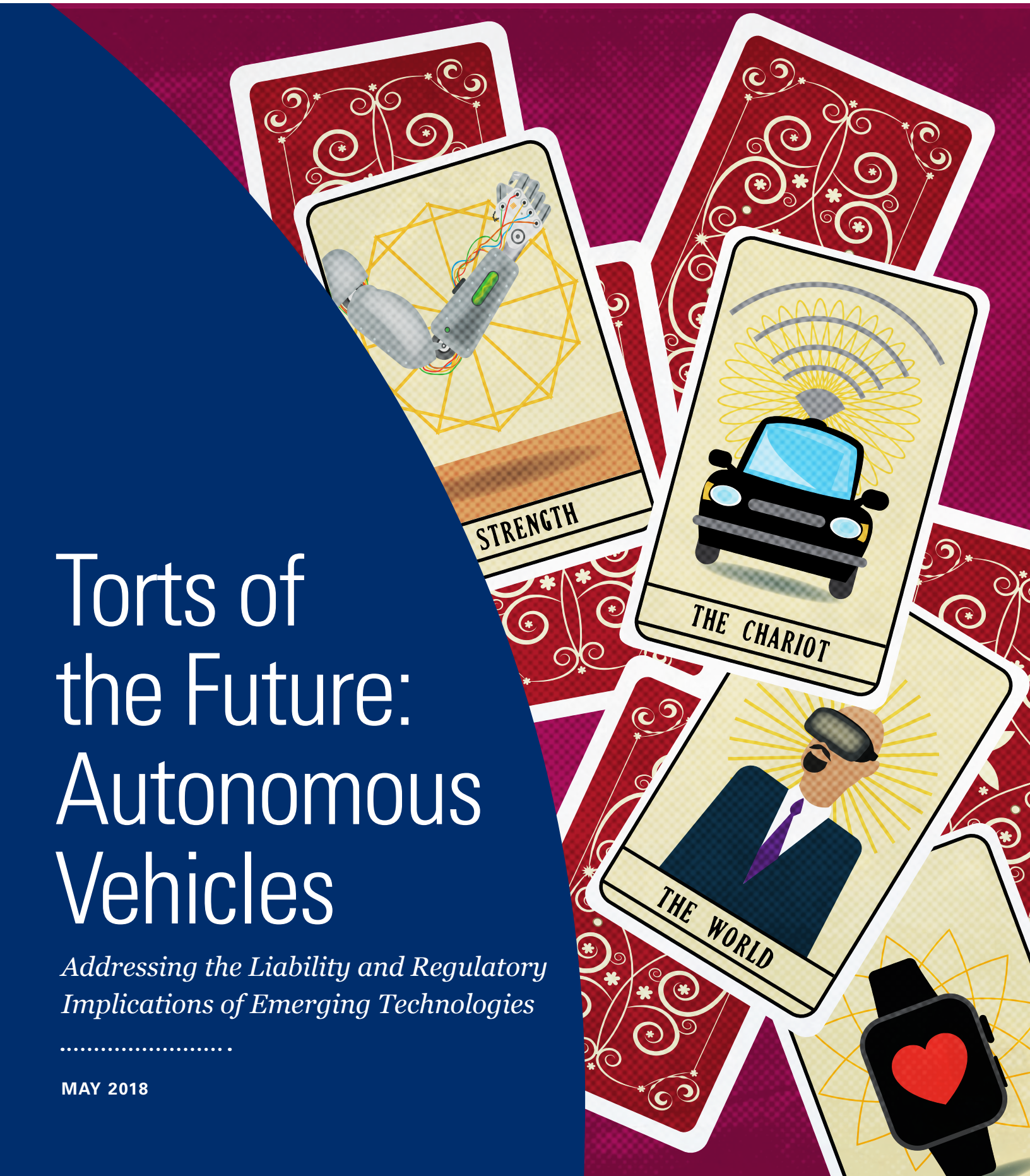

Torts of the Future: Autonomous Vehicles

Addressing the Liability and Regulatory Implications of Emerging Technologies

MAY 2018

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An Affiliate of the U.S. Chamber of Commerce

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Contents of this report are based on the autonomous vehicle sections of two papers previously released by the U.S. Chamber Institute for Legal Reform: Torts of the Future I (March 2017) and Torts of the Future II (April 2018).

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Autonomous Vehicles

Researchers estimate that autonomous vehicles can reduce accident rates by up to 90%,[1] which would save over 30,000 lives each year[2] and avoid millions of injuries on American roads. As General Motors Chairman Bob Lutz said, "The autonomous car doesn't drink, doesn't do drugs, doesn't text while driving, and doesn't get road rage. Autonomous cars don't race other autonomous cars, and they don't go to sleep."[3] But technology is not perfect. Though people may be much safer in an autonomous car than a traditional vehicle, it is still likely that accidents will occasionally occur due to a failure in technology, the human driver-car interface, maintenance, or other factors. There is a vigorous debate over how to fairly apportion liability in these situations without chilling life-saving technology.

The human health and safety benefits of autonomous vehicles (AVs), also known as driverless cars, are broadly hailed. A 2013 study by the Eno Center for Transportation found that if only 10% of the cars on the road were self-driving, 1,000 lives and $18 billion would be saved each year.[4] When 90% of the cars are autonomous, those numbers jump to 22,000 lives and $350 billion.[5] In a widely cited study on the auto insurance industry, audit company KPMG found that autonomous technology will reduce accident frequency by 80% by 2040.[6]

In addition, AVs are expected to have broader societal benefits, including easing traffic congestion, moving people to destinations more quickly, burning less fuel, and lowering emissions.[7] They also can provide mobility to seniors, people with vision problems, and others who cannot drive on their own.[8] It is widely expected that cities will be stocked with fleets of shared AVs and that people who spend long stretches of time on the road will be able to do so more efficiently. In short, AVs promise to fundamentally change the way

people get around. Auto travel will be significantly safer with benefits that ripple throughout society.

Autonomous Vehicle Technology

When people refer to autonomous vehicles, they are largely referring to technology that exists within each car that allows the car to read its surroundings and make driving decisions based on those readings. The Society of Automobile Engineers (SAE International) has developed a taxonomy and definitions for terms related to these systems that have become widely used. SAE identified six automation levels, from Level 0 (no automation) to Level 5 (full automation).[9]

A key distinction exists between SAE's Levels 2 and 3. Level 2 is called "partial automation," and the human driver remains responsible for monitoring the environment and performing key driving tasks. When a car reaches Level 3 automation, which SAE calls "conditional automation," the automated car performs all of the dynamic driving tasks, with the human driver acting as the fallback option.

As indicated, cars operating at Level 3 are equipped with computer mapping systems, radar, cameras, sensors and other technologies that allow them to read their environment, including the shape of the roads, traffic and driving conditions, and perform key dynamic driving tasks. Yet, these cars are not fully automated. They ultimately require human control and may have features, such as steering wheel sensors, that require the human driver to stay alert and engaged. It is anticipated that the automated features may work only when the driver's hands are on the wheel because the system anticipates the driver will take control of the car in certain situations.

Highly automated vehicles (Level 4), which in most environments are fully autonomous, are anticipated to be widely available by 2025.[10] Between 2025 and 2040, experts expect that vehicles will move toward Level 5—a "new normal" of integrated driving in which there is communication between vehicles and infrastructure and vehicles can operate without any driver present.[11]

Vehicle-to-vehicle communication (V2V) will rely on short-range radio devices to transmit vehicle speed, direction, braking and other key data points between vehicles. The benefit of this technology is that it will allow a car to "see" around corners and through traffic so that it can better anticipate when it needs to brake and avoid potential collisions. In early stages of automation, this information can be given to human drivers to make their own decisions. The National Highway Traffic Safety Administration (NHTSA), which is developing standards for V2V communication, estimates that this technology can eliminate 81% of all crashes.[12]

Congress has also funded NHTSA's research into vehicle-to-infrastructure communication (V2I) networks, whereby cars receive data from roadways and traffic lights. Such data may include bad weather conditions, the shape of the road and whether there are any steep curves ahead, the nature of any construction zones, and when lights are about to turn red. Rather

than accelerate through a yellow light, as many humans do, the car could anticipate the red light sooner and slow down more safely and comfortably.

The greatest safety gains will be made when all three of these technologies work together.

About 20 companies are developing self-driving cars, including traditional auto manufacturers, technology companies, and ride-sharing services.[13] Several of them have test cars on the road and are collecting data on the ability of the cars to properly read the environment and make the right driving decisions. Humans can repeat mistakes over and over again, but the goal for automated cars is to be programmed to learn from and not repeat mistakes.

Among the more well-known self-driving features is Tesla's "autopilot" technology, which is intended to guide drivers on highways. Waymo, which started as Google's AV project, announced in early 2018 that its vehicles have five million self-driven miles and simulated five billion miles of autonomous driving.[14] The ride-sharing service Uber began test-driving its autonomous cars in Pittsburgh in late 2016. Consumers have the option to choose an autonomous car, which has a driver ready to take control along with an engineer in the passenger seat. The Pennsylvania Insurance Department treats the cars' self-driving features in the same way it treats cruise control, meaning the human driver is fully responsible for accidents under a negligence standard. Uber announced that it has $1 million in third-party liability insurance and $5 million total coverage per incident.[15]

Major automakers, which have been incorporating elements of self-driving technology into cars, are also heavily investing in autonomous vehicle technology. In February 2017, Ford announced plans to invest $1 billion over the next five years in start-up company Argo AI, with a goal of producing self-driving cars for ride-sharing services by 2021.[16] General Motors made a similar investment in Cruise Automation and the ride services company Lyft. It is anticipated that ride-sharing services will be the way that most people will be introduced to autonomous vehicles.

With more AVs on the road interacting with other drivers and pedestrians, accidents are inevitable, whether as a result of the actions of people or imperfect technology. Such incidents will test whether the courts, policymakers, manufacturers and users of AVs respond to concerns without imposing unwarranted liability or regulation that significantly delays a technology that should ultimately make the roads safer by eliminating human error.

The Vigorous Debate over the Liability Framework for Injuries Involving Autonomous Vehicles

While heavy-handed regulation can quickly drive out autonomous vehicles, the area with the greatest potential "to derail this important technology" is excessive litigation.[17] Outsized liability, particularly in the early development and deployment stages, "could seriously undermine this potentially unprecedented public health success story."[18] It "could delay or even wipe out the vision of driverless cars gaining widespread consumer use."[19]

> *While heavy-handed regulation can quickly drive out autonomous vehicles, the area with the greatest potential 'to derail this important technology' is excessive litigation.*

LIABILITY BASED ON A FAILURE IN THE HUMAN-CAR INTERFACE

The immediate question for Congress, state legislatures, and courts to decide is how to address liability over the next twenty or so years as society transitions to widespread use of fully-automated cars. During this period, humans and cars' self-driving technology will share the roads and responsibility and control over driving decisions. Therefore, as the Brookings Institution's Center for Technology Innovation found in a 2014 study, there will be "complex questions of liability shared by both the human driver and autonomous vehicle technology providers."[20]

Industry experts broadly agree with both the complexity and importance of getting liability issues right during this phase-in period. "We're entering a whole new world of assessing who's at fault in an accident and where the ultimate liability and risk ultimately falls," explained Joe Schneider, an insurance analyst with KPMG.[21] David Strickland, a former NHTSA Administrator, echoed this point: "There is going to be a moment in time when there's going to be a crash and it's going to be undetermined who or what was at fault.... That's where the difficulty begins."[22]

States are beginning to tackle these liability issues. California and Nevada law explicitly places liability for any accident on the "operator" of the autonomous vehicle, defining the operator as the person behind the controls or who "causes the technology to engage."[23] Under general tort law principles, the element of control is likely to be determinative in other states as well. "Suppose you're in a driverless car, and you see that you're about to rear-end another car. Whether you bear some responsibility for the crash may ultimately turn on the degree of *control* you had over the car. Could you have reasonably prevented the accident, or not?"[24] One question that has arisen is whether this test can be applied fairly when the human "driver" has a disability, such as blindness, and cannot take control.

Other questions also arise: What happens if a driver falls asleep and the vehicle had driver monitoring systems that failed to wake up the driver? Can a driver legally rely on this feature (or lane or brake assist) and sue the manufacturer when the car did not alert him or her of a hazard? Should the driver be absolved of his or her own negligence? Can a manufacturer be subject to liability for not preventing an accident, even though its technology did not cause the harm?

As a legal matter, complete reliance on such prophylactic safety devices is likely to be seen as unreasonable. It also does not make practical sense to subject manufacturers to liability just because their safety devices were not able to prevent harm in every instance. Even if a

> *Novel liability issues will arise when accidents occur between human drivers and autonomous cars.*

preventative safety device avoids harm 20% of the time, it still offers improved safety over vehicles without that technology. Excessive liability for the remainder of the cases could delay their introduction or stop these technologies from being improved over time. If the device did not cause harm, there should be no liability under commonsense and traditional tort principles.

Novel liability issues will arise when accidents occur between human drivers and autonomous cars. For example, there may be differences between how humans and autonomous cars drive.[25] Autonomous cars may be programmed to drive in 100% compliance with the law. They may drive at the speed limit on a highway where the traffic customarily moves significantly faster, come to a full stop and pause at a stop sign, or stop at a yellow light where most drivers would have continued through. People who are unaccustomed to such "safe" driving could rear-end an autonomous vehicle. Finally, when a fender bender involves a human driver and a fully-autonomous vehicle, should the law recognize a presumption that the accident occurred as a result of human error absent a showing of a defect in the autonomous vehicle?

NEGLIGENCE VS. PRODUCT LIABILITY

Courts will be faced with determining the appropriate standard of care for evaluating whether an autonomous-vehicle manufacturer is subject to liability for a car accident. Traditionally, car accidents are assessed through the lens of driver negligence, with the potential for product liability only when a defect in the car causes the accident or is alleged to have exacerbated the injuries. A manufacturer has never had a duty "to design an accident-proof or fool-proof vehicle."[26]

Legal scholars suggest that negligence should govern liability for car accidents, whether due to the decision-making of autonomous vehicles or human drivers. They explain that these situations differ from traditional product harms because of the huge safety gains: "Holding computer-generated torts to a negligence standard will result in an improved outcome; it will accelerate the adoption of automation" and thereby reduce accidents.[27] A negligence assessment would focus on whether the car's decision or act showed a lack of reasonable care under the circumstances, not whether the computer could have been better designed. After an accident, a car's programming can be updated to account for any new information gained to help cars make better decisions going forward.

"Personal injury attorneys fearing that their business may dry up with the adoption of driverless cars," however, are looking for ways to pursue "autonomous-vehicle makers and their deep pockets."[28] They want to shift liability away from negligence claims against drivers with liability insurance limits to product liability lawsuits targeting car manufacturers, software designers, and component makers.[29]

To this end, the American Association For Justice (AAJ), the national plaintiffs' lawyer organization, issued a report in February 2017 advocating that manufacturers should bear the burden of car injuries.[30] While AAJ acknowledged the "revolutionary impact" that so-called "robot cars" will have on public safety,[31] it asserted that imposing strict liability on automakers "may eventually be the most appropriate approach to liability."[32] Under AAJ's approach, "manufacturers would accept responsibility for all crashes caused by their cars."[33]

ALTERNATIVE LIABILITY THEORIES

The desire to provide compensation for people injured in autonomous cars without chilling the advancement of this life-saving technology has led legal scholars to consider alternatives to traditional tort liability. Two oft-mentioned options are no-fault insurance and a victim compensation fund. Both have precedent and both can be shaped to address the specific needs of the autonomous vehicle market.

The RAND Corporation found that rather than shift liability from the driver to the auto manufacturer, as AAJ suggests, it would be more beneficial for drivers to carry no-fault liability insurance.[34] A dozen states have used no-fault liability since the 1970s. The benefit of this system is that drivers maintain their own insurance and are compensated regardless of whether anyone, including the driver, was legally at fault. Lessons can be learned from current no-fault systems so that one can be tailored to autonomous cars to maximize efficiency.

Another option is for states or the federal government to establish a fund to compensate those who are injured, much like the National Childhood Vaccine Injury Fund. Congress established the Vaccine Fund in 1986 when liability concerns threatened public health by jeopardizing access to vaccines. Under this system, anyone injured by a vaccine can apply to the Fund for fair compensation without having to establish fault. The Fund is financed through a nominal ($0.75) excise tax on each dose of vaccine routinely administered to children to prevent disease.[35] As a result of the Fund, immunizations have increased, supplies have remained stable, and prices have decreased. A fund tailored to the autonomous car market could have a comparable effect—assuring that those who are injured in accidents receive compensation while not allowing excessive liability to impede the development and advancement of technology that makes the roads safer for everyone.

Federal preemption of state tort claims in conjunction with either of these no-fault regimes "could speed the development and utilization of this technology and should be considered, if accompanied by a comprehensive federal regulatory regime."[36]

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First Accidents and Outcomes Involving AV Technology

GOOGLE CAR SIDESWIPES BUS–FEB. 2016

A minor accident occurred between a Lexus SUV, which Google had modified with sensors and controls to enable self-driving, and a city bus in Mountain View, California. The Google car, which had a human engineer inside, assumed a city bus would slow down and allow the car to merge, but the bus continued and the car sideswiped the bus.[37] No one was injured in the February 2016 low-speed collision. In the wake of that accident, Google implemented 3,500 new tests and modified its technology to avoid similar accidents in the future.[38]

TESLA AUTOPILOT DEATH–MAY 2016

In May 2016, a driver was killed when he reportedly relied entirely on the autopilot system to drive his Tesla Model S, which is not its intended use.[39] The car crashed into the side of a truck that was crossing the highway. Tesla found that the autopilot did not recognize "the white side of the tractor against a brightly lit sky."[40] In January 2017, NHTSA completed its investigation, concluding that there was no defect in the design or performance of the Tesla's autopilot system.[41] The agency recognized that since autopilot is not cross-traffic aware, it requires a driver's "continual and full attention to monitor the traffic environment," and the driver had sufficient time to brake to avoid the accident.[42]

> *"In January 2017, NHTSA completed its investigation, concluding that there was no defect in the design or performance of the Tesla's autopilot system."*

Nevertheless, the incident became a touch point for liability discussions. Was the driver to blame for not being attentive? Is Tesla liable because the car did not stop on its own? Or is responsibility shared? If shared, then how is that responsibility divided?

MOTORCYCLIST COLLISION RESULTS IN FIRST KNOWN LAWSUIT AGAINST AUTOMAKER—JAN. 2018

In January 2018, the first known lawsuit against a manufacturer was filed over an accident involving an AV.

In that lawsuit, a motorcyclist alleges that he suffered neck and shoulder injuries after a 2016 Chevy Bolt EV knocked him to the ground while traveling on a San Francisco street.[43] General Motors (GM) and its Cruise subsidiary have had a permit to test autonomous vehicles on California roads since June 2015.[44] The accident occurred in December 2017.

According to the complaint, which is just four pages long, a driver was in the front seat, but was operating the car in self-driving mode with his hands off the steering wheel.[45] The operator instructed the Bolt to move from the center to the left lane. The complaint alleges that the motorcyclist, who was traveling directly behind the car in the center lane, attempted to move ahead and pass. As he did, the plaintiff alleges that the Bolt abruptly swerved back into its original lane, striking him and knocking him to the ground.[46]

As is frequently the case in car accidents, there is more than one side to this story. In a report GM filed with California's Department of Motor Vehicles, the automaker explained that the Bolt was driving in the middle lane when it saw a gap and attempted to merge into the left lane.[47] When the minivan ahead of the Bolt in the center lane slowed down, the Bolt abandoned its attempt to merge left. As the Bolt was "re-centering" itself in the middle lane, the plaintiff was approaching the car, "lane-splitting" between the center and right lanes in slow, heavy traffic.[48] As the motorcycle moved into the center lane, it "glanced the side of the Cruise AV, wobbled, and fell over," GM's report said.[49] The San Francisco Police Department report indicates that the motorcyclist was at fault for attempting to overtake and pass another vehicle on the right before it was safe to do so, but the motorcyclist's attorney also says the police report supports the motorcyclist's version of the events.[50]

The lawsuit names only GM as a defendant; it does not claim the Bolt's operator contributed to the accident. The sole claim, however, is negligence, making the lawsuit more like a traditional auto accident claim than a product liability claim that alleges that a vehicle was defectively designed. The complaint alleges that General Motors owed the plaintiff a duty to "hav[e] its Self-Driving Vehicle operate in a manner in which it obeys the traffic laws and regulations," and breached that duty "in that its Self-Driving Vehicle drove in such a negligent manner that it veered into an adjacent lane of traffic without regard for a passing motorist...."[51] If the case proceeds to trial, the plaintiff may argue that the Bolt failed to perform as a reasonable person would in similar circumstances. Basically, the lawsuit treats the AV much like a person, rather than as a product.

"The lawsuit suggests that as cars become autonomous, attorneys whose bread-and-butter work is auto accident claims may continue to bring traditional negligence claims, rather than complex product liability lawsuits..."

The lawsuit, which seeks unspecified damages, as well as attorneys' fees and punitive damages, is pending in the U.S. District Court in San Francisco. It remains to be seen whether the vehicle recorded and stored video or other data that will show precisely what occurred and can be produced in discovery, and whether the parties settle or proceed to trial.

The lawsuit suggests that as cars become autonomous, attorneys whose bread-and-butter work is auto accident claims may continue to bring traditional negligence claims, rather than complex product liability lawsuits that likely necessitate expert testimony on auto design and autonomous technology. One thing appears certain, however: auto manufacturers that

incorporate autonomous technology into their vehicles are increasingly likely to be named as defendants in motor vehicle accident cases.

ARIZONA PEDESTRIAN DEATH-MARCH 2018

The first known fatality stemming from an AV striking a pedestrian occurred in March 2018 in Tempe, Arizona, a Phoenix suburb. The accident occurred when an autonomous Uber test vehicle, a 2017 Volvo, hit a 49-year-old woman who was walking a bicycle across the road at night. The vehicle was moving at 40 miles per hour in self-driving mode with an employee behind the wheel.

The vehicle's cameras recorded both the pedestrian's and the operator's conduct during the accident. What those cameras captured (a pedestrian in dark clothing entering the roadway at night outside a crosswalk and a backup driver who appeared distracted) may have led the parties to enter a quick settlement.[52]

Uber responded by proactively pulling its test vehicles off the roads in all cities after the accident and Arizona Governor Doug Ducey suspended the ride-sharing service's tests in his state.[53] NHTSA and the National Transportation Safety Board, an independent body known for its involvement after airplane crashes and train wrecks, are investigating the accident.[54]

The Road Forward

NEW NHTSA REGULATORY GUIDANCE

In September 2017, NHTSA released new voluntary guidance entitled "Automated Driving Systems: A Vision for Safety 2.0."[55] The new 36-page guidance replaces and significantly pares down 2016 NHTSA guidance issued by the Obama administration.[56] It eases the process for manufacturing, testing and deploying AVs while discouraging states from implementing potentially conflicting AV regulations.

NHTSA's Safety 2.0 focuses on automation Levels 3 to 5 (Conditional, High, and Full Automation) and covers all vehicles under the agency's jurisdiction. The guidance describes 12 "priority safety elements"[57] for consideration in the design, development, testing, and deployment of AV technologies. The guidance encourages companies engaged in the testing and deployment of AVs to submit to NHSTA "Voluntary Safety Self-Assessment" letters demonstrating how they have addressed the safety elements. The guidance, however, makes clear that these letters are not required.

Safety 2.0 distinguishes the roles of the federal and state governments in regulating AVs. NHTSA is solely responsible for regulating the safety, design, and performance aspects of motor vehicles while states are responsible for regulating the human driver and vehicle operations. NHTSA's guidance provides a "best practices" framework that states may use in drafting applicable laws and regulations. When states craft such laws and

regulations, NHTSA encourages them to: (1) provide a "technology-neutral" environment; (2) provide licensing and registration procedures for AVs; (3) provide reporting and communication mechanisms to public safety organizations; and (4) review traffic laws that may serve as barriers to operation of AVs.

NHTSA is already working on updating its guidance for "Safety 3.0," which will emphasize a unified intermodal approach to automated driving systems policies.[58] The agency sought input on the new guidance at a March 1, 2018 AV summit.[59]

LEGISLATION ADVANCES

As NHTSA releases and updates its guidance, Congress has also taken up the issue of AVs. If the proposed legislation becomes law, it may help accelerate AV deployment.

In September 2017, the U.S. House of Representatives passed the Safely Ensuring Lives Future Deployment and Research in Vehicle Evolution (SAFE DRIVE) Act with broad bipartisan support.[60] The Senate has its own AV legislation pending, the American Vision for Safer Transportation through Advancement of Revolutionary Technologies (AV START) Act.[61] The Senate Committee on Commerce, Science, and Transportation favorably reported the bill in October 2017.

While there are differences in the Senate and House bills, they both provide the federal government with a framework for developing AV rules. They charge NHTSA with regulating the design, construction, and performance of the vehicles, with the goal of encouraging their testing and deployment. The bills would authorize NHTSA to update Federal Motor Vehicle Safety Standards and grant exemptions where needed, and both would require automakers to develop cybersecurity plans. They would preempt state laws in the areas regulated by NHTSA, while preserving the states' traditional authority to regulate registration, licensing, insurance, law enforcement, and traffic laws. The preemption provision is considered particularly essential, since introducing AVs will become increasingly complicated as more states enact their own laws.

"The preemption provision is considered particularly essential, since introducing AVs will become increasingly complicated as more states enact their own laws."

> *[A]t least 41 states and the District of Columbia have considered AV legislation over the past seven years, according to the National Conference of State Legislatures. Twenty-two states have passed such laws, and governors in 10 states have issued executive orders related to AVs.*

STATES MOVING FORWARD

Calls for preemption are warranted, as at least 41 states and the District of Columbia have considered AV legislation over the past seven years, according to the National Conference of State Legislatures.[62] Twenty-two states have passed such laws,[63] and governors in 10 states have issued executive orders related to AVs.[64] State rules for testing AVs on public roads can vary, from requiring a person in the driver's seat at all times to requiring no human driver in the car.

Fully autonomous vehicles are already operating in states such as Arizona, Florida, Michigan, and Pennsylvania.[65] California is the most recent state to change its rules. As of April 2018, AVs can be tested on public roads in the Golden State without a driver behind the wheel.[66] Under previous rules in place since 2014, AVs could be tested in the state only with a driver sitting behind the wheel who is able to take control if needed. The California Department of Motor vehicles issued 50 Autonomous Vehicle Testing Permits to various companies under the 2014 rules.[67]

BUILDING CONSUMER CONFIDENCE

Consumers, manufacturers, and insurers need to feel they are treated fairly in the event of a crash. Developing confidence in the safety of autonomous vehicles and the availability of a just remedy should an injury occur is important to gaining acceptance of the new technology.

Understanding this need, some manufacturers have said that they will accept liability for accidents involving their fully-autonomous cars. Erik Coelingh, Volvo's senior technical leader for safety and drive support technologies, explained that when the company's fully-autonomous system debuts as anticipated in 2020, its vehicles will include several redundancies to avoid accidents and eliminate human error: "Whatever system fails, the car should still have the ability to bring itself to a safe stop."[68]

Tesla has stated that it will accept liability if the accident is "endemic to our design."[69] Tesla's Elon Musk said that "[p]oint of views on autonomous cars are much like being stuck in an elevator in a building. Does the Otis [Elevator Company] take responsibility for all elevators around the world, no they don't."[70] But they do when an incident is their fault. Tesla has shared information with NHTSA showing that crash rates involving its vehicles dropped nearly 40% since autopilot came online.[71]

In the short term, courts will need to work through these thorny issues, and determine and allocate liability, on a case-by-case basis.

Endnotes

1 Michele Bertoncello & Dominik Wee, Ten Ways Autonomous Driving Could Redefine the Automotive World, McKinsey & Company Automotive & Assembly, June 2015.

2 *See* Insurance Institute for Highway Safety Loss Data Institute, Fatality Facts: Yearly Snapshot (Nov. 2016) (reporting 35,092 motor vehicle crash fatalities in 2015).

3 Alan D. Kaplan & Robert Sanzillo, Driverless Cars, Prod. Liab. L. & Strategy, Aug. 2016.

4 Eno Center for Transportation, Preparing a Nation for Autonomous Vehicles: Opportunities, Barriers and Policy Recommendations 8 (Oct. 2013).

5 *Id.*

6 *See* KPMG, Automobile Insurance in the Era of Autonomous Vehicles 5 (June 2015).

7 Eric Kroh, Fault Lines: How Driverless Cars Could Open Up New Roads for Product Liability Lawyers, Law360, Mar. 18, 2016.

8 *Id.*

9 *See* SAE Int'l, Automated Driving: Levels of Driving Automation are Defined in New SAE International Standard J3016 (2014).

10 *See* KMPG, *supra*, at 5.

11 *See id.* at 3.

12 Nat'l Highway Traffic Safety Admin., Vehicle to Vehicle Communications: Readiness of V2V Technology for Application 17 (Aug. 2014).

13 Danielle Muoio, 19 Companies Racing to Put Self-Driving Cars on the Road by 2021, Business Insider, Oct. 17, 2016.

14 Sean O'Kane, How Tesla and Waymo are Tackling a Major Problem for Self-Driving Cars: Data, The Verge, Apr. 19, 2018.

15 Ben Seal, What Happens if a Self-Driving Uber Is in a Crash?, Law.com, Sept. 16, 2016.

16 Alexandria Sage, Ford to Invest $1 Billion in Autonomous Vehicle Tech Firm Argo AI, Reuters, Feb. 10, 2017.

17 Adam Thierer, When the Trial Lawyers Come for the Robot Cars, Slate.com, June 10, 2016; *see also* Douglas Newcomb, Will Lawsuits Kill the Autonomous Car?, MSN Autos, Apr. 15, 2013; Dan Strumpf, Liability Issues Create Potholes on the Road to Driverless Cars, Jan. 27, 2013.

18 Thierer, *supra.*

19 Chris Nichols, Liability Could Be Roadblock for Driverless Cars, San Diego Trib., Oct. 30, 2013.

20 John Villasenor, Products Liability and Driverless Cars: Issues and Guiding Principles for Legislation 13-14 (Center for Technology Innovation at Brookings, Apr. 2014).

21 *See* Hope Reese, When Your Driverless Car Crashes, Who Will Be Responsible? The Answer Remains Unclear, Tech Republic, Sept. 7, 2016.

22 Keith Naughton, What Happens if Two Driverless Cars Crash? Lawyers Drool, Bloomberg News, Dec. 22, 1015.

23 Cal. Vehicle Code § 38750; Nev. Rev. Stat. § 482A.030.

24 Brian Fung, The Big Question About Driverless Cars No One Seems Able to Answer, Wash. Post, Feb. 17, 2016 (emphasis in original).

25 Kroh, *supra.*

26 *Larsen v. Gen. Motors Corp.*, 391 F.2d 495, 502 (8th Cir. 1968).

27 Ryan Abbott, The Reasonable Computer: Disrupting the Paradigm of Tort Liability, 86 Geo. Wash. L. Rev. 1 22 (2018).

28 Kroh, *supra.*

29 *Id.*

30 Am. Assoc. for Justice, Driven to Safety: Robot Cars and the Future of Liability (Feb. 2017).

31 *Id.* at 4-5.

32 *Id.* at 27.

33 *Id.* at 27-28.

34 James M. Anderson et al., Autonomous Vehicle Technology: A Guide for Policymakers (RAND Corp. 2016).

35 *See* Health Resources & Services Admin., About the National Vaccine Injury Compensation Program, *at* https://www.hrsa.gov/vaccine-compensation/about/index.html (last visited Apr. 23, 2018).

36 Nidhi Kalra, James M. Anderson & Martin Wachs, Liability and Regulation of Autonomous Vehicle Technologies (RAND Corp., Apr. 2009).

37 Joseph Serna, Video Shows Google Self-Driving Car Hit a Bus in Silicon Valley, L.A. Times, Mar. 9, 2016.

38 *See* Wayne Cunningham, Google's Chris Urmson Explains Self-Driving Car Crash, CNet, Mar. 11, 2016.

39 *See* Rachel Abrams & Annalyn Kurtz, Joshua Brown, Who Died in Self-Driving Accident, Tested Limits of His Tesla, N.Y. Times, July 1, 2016.

40 *See* Tesla, A Tragic Loss (blog post), June 30, 2016.

41 *See* Nat'l Highway Traffic Safety Admin., ODI Resume, Investigation PE 16-007 (Closed Jan. 19, 2017).

42 *Id.*; s*ee also* Danielle Muoio & Reuters, The Government Just Closed its Investigation into the First Autopilot Fatality, Business Insider, Jan. 19, 2017.

43 *See* Complaint, *Nilsson v. General Motors LLC*, No. 4.18-cv-00471-KAW (N.D. Cal. filed Jan. 22, 2018).

44 *See* Ethan Baron, Blame Game: Self-driving Car Crash Highlights Tricky Legal Question, Mercury News, Jan. 23, 2018.

45 *See* Complaint, *Nilsson v. General Motors LLC*, at 2.

46 *Id.* at 3.

47 *See* State of California DMV, Report of Traffic Accident Involving Autonomous Vehicle, Dec. 14, 2017.

48 *See* Baron, *supra*; *see also* Peter Holley, After Crash, Injured Motorcyclist Accuses Robot-driven Vehicle of 'Negligent Driving', Wash. Post. Jan. 25, 2018; Rachel Graf, GM Hit with First-Known Suit Over Self-Driving Car Crash, Law360, Jan. 24, 2018.

49 Baron, *supra*.

50 *See id.*

51 Complaint, *Nilsson v. General Motors LLC*, at 5.

52 *See* Ryan Randazzo, Uber Reaches Settlement with Family of Woman Killed by Self-Driving Car, The Republic, Mar. 29, 2018; Faiz Siddiqui, Uber Reaches Settlement with Family of Victim Killed After Being Struck by One of Its Self-Driving Vehicles, Wash. Post, Mar. 29, 2018.

53 *See* Ryan Randazzo, Arizona Gov. Doug Ducey Suspents Testing of Uber Self-Driving Cars, Mar. 26, 2018.

54 *See* Michael Laris & Faiz Siddiqui, After Driverless Uber Hits and Kills Pedestrian, Probe Looks for Broader Safety Insights, Wash. Post, Mar. 20, 2018.

55 *See* Nat'l Highway Transp. Safety Admin., Automated Driving Systems: A Vision for Safety 2.0 (Sept. 2017).

56 Nat'l Highway Transp. Safety Admin., Federal Automated Vehicles Policy: Accelerating the Next Revolution in Roadway Safety 5 (Sept. 2016).

57 The priority safety elements include: (1) system safety, (2) operational design domain, (3) object and event detection and response, (4) fallback (minimal risk condition), (5) validation methods, (6) human machine interface, (7) vehicle cybersecurity, (8) crashworthiness, (9) post-crash ADS behavior, (10) data recording, (11) consumer education and training, and (12) federal, state and local laws coordination. *See id.*

58 *See* David Shepardson, U.S. Transportation Agency Calls March 1 'Summit' on Autonomous Cars, Reuters, Feb. 9, 2018.

59 *See* Nat'l Highway Transp. Safety Admin., USDOT Automated Vehicles Activities, Feb. 13, 2018.

60 *See* The Safely Ensuring Lives Future Development and Research in Vehicle Evolution (SELF DRIVE) Act, H.R. 3388, 115th Cong. (2017-2018). The House approved the bill on a voice vote.

61 *See* The American Vision for Safer Transportation through Advancement of Revolutionary Technologies (AV START) Act, S. 1885, 115th Cong. (2017-2018).

62 *See* Nat'l Conference of State Legislatures, Autonomous Vehicles, Self-Driving Vehicles Enacted Legislation, Mar. 26, 2018.

63 States that have enacted autonomous vehicle laws include Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Louisiana, Michigan, Nevada, New York, North Carolina, North Dakota, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, and Vermont, as well as the District of Columbia. *Id.*

64 Governors have signed executive orders regarding autonomous vehicles in Arizona (2015, 2018), Delaware (2017), Hawaii (2018), Idaho (2018), Maine (2018), Massachusetts (2016), Minnesota (2018), Ohio (2018), Washington (2017), and Wisconsin (2017). *Id.*

65 *See* Sharon Jayson, Driverless Vehicles Hit the Road in Texas, U.S. News, Feb. 21, 2018; Cheryl Miller, We Asked California Lawyers for Views on the New Driverless Rules. Here's What They Said, The Recorder, Oct. 13, 2017; Russ Mitchell, Totally Driverless Cars Could be Allowed on California Roads by June 2018, L.A. Times, Oct. 11, 2017.

66 *See* State of Cal. Dep't of Motor Vehicles, Press Release, Driverless Testing and Public Use Rules for Autonomous Vehicles Approved, Feb. 26, 2018.

67 *See* State of Cal. Dep't of Motor Vehicles, Permit Holders.

68 Corine Iozzio, Who's Responsible When a Self-Driving Car Crashes, Scientific American, May 1, 2016.

69 Daniello Muoio, Elon Musk: Telsa Not Liable for Driverless Car Crashes Unless It's Design Related, Business Insider, Jan. 4, 2017.

70 *Id.*

71 *See* ODI Resume, Investigation PE 16-007, *supra*, at 10-11; *see also* Tom Randall, Tesla's Autopilot Vindicated With 40% Drop in Crashes, Bloomberg Technology, Jan. 19, 2017.

Notes

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