OEMs

Mitigating Potential Liability Posed by Autonomous Vehicle Crash Optimization Systems

By Jill G. Okun
and Ryan J. Rawlings

The time when technology will be able to develop autonomous vehicles has arrived. While this technological leap has significant potential benefits, it likely harbors increased liability for original equipment manufacturers.

The development of autonomous vehicles (AVs) has been a dream long held by engineers and consumers alike. We are finally at a time when technology will be able to accomplish this aspiration. This technological leap presents significant potential benefits for drivers but likely harbors increased liability for original equipment manufacturers (OEMs) and others involved in developing and implementing the technology.

The potential benefits presented by AVs are many. One of the greatest potential benefits presented by AVs is increased vehicular safety. Current statistics based on AV tests show that AV systems will likely reduce the number of collisions with the current level of AV technology. Danny Yadron & Dan Tynan, *Tesla Driver Dies in First Fatal Crash While Using Auto Pilot Mode*, The Guardian (June 30, 2016), https://www.theguardian.com/us. *See also* Nat'l Highway Traffic Safety Admin., NHTSA.gov. AVs also offer increased mobility to individuals who would otherwise face restricted access to transportation such as the elderly, the blind, and the physically disabled. James Anderson *et al.*, Autonomous Vehicle Technology: A Guide to Policy Makers 16–17, RAND Corporation (2016). AV technology could also increase fuel efficiency by reducing traffic congestion, decrease fuel consumption, and decrease greenhouse gas emissions. *Id.* at 17–18.

One of the ways that AVs accomplish their superior safety is through the use of a robust array of sensors feeding inputs into an AV's crash avoidance system. This is a system that can be comprised of a combination of systems including a mixture of LIDAR, SONAR, cameras, and GPS. *See* Kyle Colonna, *Autonomous Cars and*

■ Jill G. Okun is a litigation partner in Porter Wright's Cleveland office, where she focuses her trial work on product liability, commercial contracts, sanction proceedings, litigation management, toxic tort, class actions, bankruptcy litigation, RICO and antitrust matters. Ryan J. Rawlings is a member of the American Bar Association's Section on Science and Technology law, where he focuses on the effects of artificial intelligence on current legal principles.

Tort Liability, 4 J. Law, Tech. & the Internet 81, 86–87 (2012). When crash avoidance works well, the public will experience increased traffic safety. *See* Nat'l Highway Traffic Safety Admin., *Critical Reasons for Crashes Investigated in the National Motor Vehicle Crash Causation Survey* (Feb. 2015) (only about 6 to 10 percent of accidents are not caused by driver error).

When an unavoidable impact occurs, an AV relies on a separate safety system known as a "crash optimization system." A crash optimization system is designed to assess the circumstances of an impending collision and to execute maneuvers to minimize the negative effects of that collision.

However, crash avoidance systems are not perfect, and crashes can occur. To date, there have been three fatalities caused by AVs. In Florida, Joshua Brown died while using the "autopilot" function of his Tesla when he ran into a semi-trailer. Yadron & Tynan, *supra,* at n. 1. In Arizona, Elaine Herzberg was killed when she was struck by an autonomous Uber vehicle while she was crossing the street at night. Faiz Siddiqui, *Uber Reaches Settlement with Family of Arizona Victim Killed After Being Struck by Self-Driving Vehicle*, The Denver Post (March 29, 2018), https://www.denverpost.com. In California, Walter Huage died when his Tesla struck a concrete barrier while traveling on a state highway. *Tesla Car Involved in Fatal Crash in California "Was on Autopilot" When It Hit Concrete Barrier*, The Independent (Apr. 1, 2018), https://www.independent.co.uk/us.

The overall consensus is that when accidents involving AVs occur, the overall liability for such collisions will shift from negligence claims against individual drivers to product liability claims against original equipment manufacturers and potentially others. Jeffrey K. Gurney, *Crashing into the Unknown: An Examination of Crash-Optimization Algorithms Through the Two Lanes of Ethics and Law*, 79.1 Albany L. Rev. 183, 183–263, (2016); Dylan LeValley, *Note, Autonomous Vehicle Liability–Application of Common Carrier Liability*, 36 Seattle U. L. Rev. 5, 5–26 (2013); Gary Marchant & Rachel Lindor, *The Coming Collision Between Autonomous Vehicles and the Liability System*, 52 Santa Clara L. Rev. 1321, 1321–1340 (2012). The majority of the legal analysis regarding a shift in liability has been based on analyzing the consequences of AV technology when crash avoidance systems fail. The thinking is that if the crash avoidance systems work, no crash occurs. If the system fails, there was a defect for which a party may be liable.

Crash Optimization Systems

That seemingly binary choice may not be the case. Inevitably, there will be occasions when a crash is not necessarily the product of a system failure but is the product of external factors that have coalesced into an unavoidable accident. For example, an AV may encounter slick road conditions that could not be observed beforehand, such as black ice. Or an AV could potentially experience a mechanical failure such as a blown tire or broken axle. In these situations, an AV could temporarily lose control and be in a situation where an accident cannot be avoided. An unavoidable accident could also arise due to the actions of a third party. As an illustration, a pedestrian could emerge from behind a visual barrier and be too close to allow the AV to stop before, or avoid, impact. When an unavoidable impact occurs, an AV relies on a separate safety system known as a "crash optimization system." A crash optimization system is designed to assess the circumstances of an impending collision and to execute maneuvers to minimize the negative effects of that collision. Patrick Lin, *Why Ethics Matters for Autonomous Cars*, *in* Autonomous Driving: Technical, Legal and Social Aspects 70, 70–81, (Markus Maurer *et al.*, eds., Springer-Verlag Berlin Heidelberg, 2016). If AVs are to become the ubiquitous transportation mode of tomorrow, OEMs will need to navigate how to maximize crash optimization systems to minimize their liability and exposure.

The need to determine the most "liability neutral" crash optimization system stems from the Hobson's choice of whom or what will be most affected in an unavoidable crash. Because a crash optimization system will not necessarily prevent injuries and may even cause them, OEMs are likely to see a material number of product liability claims by accident victims asserting that a crash optimization system is defective. To reduce claims and potential liability, OEMs should examine how they design crash optimization systems and attempt to design such systems to minimize physical harm to AV occupants and third parties and to be consistent with consumer expectations that the AV occupants will be protected.

Product Liability Fundamentals

A product liability claim arises when a product is deemed to be unreasonably dangerous and thus defective. There are generally considered to be three categories of product defects: manufacturing defects, design defects, and warning defects.

A manufacturing defect is present when a product is not in the condition that the manufacturer intended, that is, it deviates from the intended design. As for a crash optimization system, a claim would only arise if the crash optimization system failed to operate as intended by the manufacturer and deviated from the programmed directives.

A warning defect occurs when the foreseeable risk of harm posed by a product could have been reduced or avoided by the provision of reasonable instructions or warnings. OEMs should be able to take concrete, premeditated steps to mitigate such claims by providing clear directions and warnings in the owner's manual and taking other steps to educate the consumer as to the system's programming.

A design defect occurs when a product is performing as intended but presents an undue risk of harm. Design-defect claims are the most likely product liability claim to be brought against original equipment manufacturers when an accident involving a crash optimization system occurs. If the crash optimization system activates, that means that there will be some sort of collision, which in turn increases the likelihood that there will be an injury to person or property. Under such a scenario, it is inevitable that a plaintiff could formulate a different course of action that would have minimized his or her damages. This is generally done through an expert who proposes a "reasonably feasible alternative"—a design that would have caused the crash optimization system to avoid harm to the particular plaintiff, but which would have caused physical harm to other persons or property. When designing crash optimization systems, avoiding design-defect claims is vitally important and requires serious attention and focus.

Minimizing Liability and Risk

Original equipment manufacturers could reduce potential liability and damages for design-defect claims due to injuries sustained by crash optimization systems by applying two general principles. All systems should

(1) be designed to create the least egregious harm possible, even if doing so would cause a larger number of minor injuries; and

(2) all other factors being equal, systems should be designed to protect the occupants of the AV.

To illustrate how these principles would be applied, we can consider several hypotheticals.

- **Hypothetical 1:** An AV with one occupant is traveling down a tree-lined residential street at 25 miles per hour. As it travels, a pedestrian enters the road from behind a tree. The pedestrian is too close to the AV for the AV to stop before an impact would occur. The AV can either strike the pedestrian, or avoid the pedestrian and strike a tree on either side of the road. The AV's crash optimization system determines that striking the pedestrian, even at low speed, could lead to the pedestrian's serious injury or death. Striking a tree would damage the AV and could injure the occupant, but the likelihood of severe injuries to the occupant is far less due to the AV's safety systems. Applying the principles above, the AV would avoid the pedestrian and strike a tree.
- **Hypothetical 2:** The same factors apply but the car has four occupants. In this situation, the AV would still avoid striking the pedestrian and strike the tree. Even though the number of injuries could increase by doing so, the severity of injuries would likely be less in comparison than those sustained by the pedestrian from an impact.
- **Hypothetical 3:** An AV with one occupant is traveling down a tree-lined residential street at 45 miles per hour. As it travels, a pedestrian enters the road from behind a tree. The pedestrian is too close to the AV for the AV to stop before impact would occur. In this situation, the AV's crash optimization system determines that striking the pedestrian could lead to the pedestrian's serious injury or death. However, the system also determines that striking a tree at 45 miles per hour could seriously injure or kill the occupant. Applying the principles above, the AV would strike the pedestrian and preserve the safety of the occupant.

Applying these principles should produce crash optimization outcomes that minimize claims and exposure under current product liability law.

While there are several tests used to determine whether a particular design is defective, courts generally use one of two tests: the consumer expectation test or the risk-utility test. A system conforming to the principles above should improve liability outcomes for OEMs regardless of which of the tests are applied.

Consumer Expectation Test

Under the consumer expectation test, for a product to be defective, it must be dangerous to an extent beyond that which would be contemplated by the ordinary consumer. The principles provided above are consistent with consumer expectations because they will cause the crash optimization system to behave as human drivers are required to behave under current automobile negligence case law. Specifically, most states apply a doctrine known as the "emergency doctrine" or the "sudden emergency doctrine." These doctrines provide that a person who is confronted with a sudden emergency situation and acts according to his or her best judgment but fails to act, or refrains from acting, in the least injurious manner is not chargeable with negligence as long as the driver acts as a reasonable person would in like circumstances. *Chevis v. Farm Bureau Ins. Co.*, 303 So. 2d 662, 791 (La. Ct. App. 1974). Courts in numerous cases have held that a driver who has encountered an emergency situation, such as an imminent collision, and caused a traffic accident that injured occupants, or even third parties, is not liable for negligence. This is so even when the driver's choice increased damages. *Id.* (The appellate court in this case upheld the trial court decision that the defendant was not liable for negligence for swerving off the road and striking the plaintiff when avoiding two vehicles stopped on a road at night). The emergency doctrine recognizes the fundamental belief that when a driver is faced with a sudden, potential collision, drivers will try to act either to avoid the impact or to minimize the harm caused it.

These principles also comport with the general American rule that there is no duty to rescue another person. *L.S. Ayres & Co. v. Hicks*, 220 Ind. 86, 93–94, 40 N.E.2d 334, 337 (Ind. 1942) (explaining that the rule of no duty to rescue is premised on the belief that there must be a legal duty in order to impose liability). It should be noted, though, that 10 states—California, Florida, Hawaii, Massachusetts, Minnesota, Ohio, Rhode Island, Vermont, Washington, and Wisconsin—have passed laws imposing a duty to rescue. However, this obligation generally applies to situations in which a crime was committed.

One could argue that negligence jurisprudence is not applicable to a product liability claim. Another potential argument against this approach is that we expect AVs to perform better than, not equal to, human drivers. However, in evaluating products that seek to replace human activities during the driving process, it is helpful (if not essential) to determine what the public considers to be basic, acceptable performance on the roadways. One cannot determine consumer expectations without such an analysis, nor can one accurately evaluate a consumer's awareness of the potential risks posed by employing an artificial intelligence system to replace human input. At this time, the entities generally operating on common roadways are humans, which necessitate looking at the law that has developed and adjudicating human accountability for reasonable behavior.

Finally, the principles listed above are consistent with consumer expectations regarding the focus of vehicle safety systems. Vehicle safety systems today are generally in place to protect vehicle occupants over third parties or property outside of the vehicle. An examination of a number of major safety innovations bears out this claim: (1) seatbelts, airbags, and other passive restraints are designed to prevent injury to the *occupants*; (2) collapsible steering columns are designed to prevent an *occupant* from impaling him- or herself; and (3) crumple zones in vehicles redistribute force from an impact around the *occupants* of a vehicle.

Risk-Utility Test

Under the risk-utility test, a product is unreasonably dangerous, and therefore, defective if the risks associated with a particular design exceed its benefits. There are a number of factors used to determine whether the risk outweighs the utility of a particular design, and they vary, depending on the jurisdiction. Some of the common factors include (1) the scope of the magnitude of potential injuries caused by the product as designed; (2) the likely awareness of product users, whether based on warnings, general knowledge, or otherwise, of the risk of harm; (3) the potential of designing and manufacturing a functional and reasonably priced alternative design; (4) the utility of the product; and (5) the likelihood of injury.

The approach advocated here is also consistent with the risk-utility test because it comports with the factors relied on to demonstrate the utility of the system. First, by reducing the magnitude of potential injuries, factor one should be met. The risk of harm mirrors and hopefully reduces the risks that consumers already face from human drivers today, and with adequate warnings and instructions, would meet factor two. Factor three would also favor an OEM that applies the proposed principles because the design is believed to be the best-priced option. An alternative that minimizes the number of individuals injured but that allows more severe injuries is obviously available. However, such an approach would directly conflict with factor one and cannot be deemed an acceptable alternative design. The potential utility of AVs is significant, as previously discussed, and therefore, nearly any design to increase proliferation of AVs complies with factor four. The only factor that would not lean in favor of these principles is factor five, the likelihood of injury. The proposed approach could lead to a larger number of injuries (both to person and property) than a different model, but again, consistent with consumer expectations, the emergency doctrine, and factor one, the law cannot countenance more severe injuries, especially at the expense of a vehicle owner.

The Need for a National Standard

It must be noted that while the principles proposed here are likely to reduce liability for design-defect claims against crash optimization systems, action by the National Highway Traffic Safety Administration (NHTSA), to create a clear standard regarding crash optimization systems, is vital. Without a federal motor vehicle safety standard (FMVSS) that articulates universal principles and requirements that will preempt claims inconsistent with the principles espoused above, OEMs will have to design crash optimization systems that accommodate current case law and the above-espoused principles without the assurances provided by a federal standard. Moreover, given the vagaries of case law, original equipment manufacturers will be forced to adapt designs as the case law evolves. *Bourke v. Ford Motor Co.*, No. 2:03-CV-136, 2007 U.S. Dist. Lexis 1860 (N.D. Ind. Jan. 8, 2007); *Ellison v. Ford Motor Co.*, 650 F. Supp. 2d 1298 (N.D. Ga. 2009); *Ford Motor Co. v. Washington*, 2013 Ark. 510, 431 S.W.3d. 210 (Ark. 2013); *Martinez v. Ford Motor Co.*, 488 F. Supp. 2d 1194 (M.D. Fla. 2007).

Fortunately, the National Highway Traffic Safety Administration seems to be paying close attention to AV development. Motivated by the unprecedented spike in automotive fatalities in 2015, mostly caused by human error, the United States Department of Transportation (DOT), through the NHTSA, has embraced self-driving cars as a means to reduce motor vehicle crashes significantly. In so doing, the DOT stands behind developing a regulatory framework that encourages the safe development, testing, and deployment of automated vehicles. Because current legislation and policies have not caught up with technology, Congress and the DOT are hoping to create legislation that balances technology and car manufacturers' freedom to test, evaluate, and deploy driverless cars with ascertaining the best ways to operate and govern these vehicles on U.S. roadways.

As such, the DOT released voluntary guidance on automated driving systems in September 2016, known as the "Federal Automated Vehicle Policy," and updated it in September 2017. That guidance, titled, "Automated Driving Systems: A Vision for Safety," revised the earlier guidance, based on public comments from, among others, the automotive industry, the technology industry, private citizens, and special interest groups. Just recently, on October 4, 2018, the National Highway Traffic Safety Administration issued its third guidance Automated Vehicle 3.0 titled "Preparing for the Future of Transportation." This release advances the DOT's commitment to self-driving vehicles, reiterating that "the right approach to achieving safety improvements begins with a focus on removing unnecessary barriers and issuing voluntary guidance, rather than regulations that could stifle innovation." Among other elements of this lengthy report is NHTSA's explicit willingness to engage a broad range of stakeholders and "provide them with opportunities to voice their concerns and expectations" and "to inform future research and policy developments." Going forward, the method most likely to produce the greatest level of certainty regarding the potential liability of original equipment manufacturers for crash optimization system designs is to draw from the principles discussed and take advantage of the opportunity to advocate to the NHTSA for their adoption.