
Managing Consumer Expectations For Autonomous Vehicles

By **Charles Moellenberg Jr.**

Law360, New York (August 28, 2017, 11:34 AM EDT) -- Satisfying consumer expectation drives sales and mitigates the risk of product liability litigation. As consumers begin to sit in the driver's seat of automated and autonomous vehicles, manufacturers and sellers have a golden opportunity to educate consumers on the benefits and risks of those vehicles and to shape their expectations.



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Many states continue to use the consumer expectation test to evaluate product liability claims. The European Union, in general, requires vehicles to meet reasonable safety expectations. The National Highway Traffic Safety Administration describes the goal as designing highly automated systems "free of unreasonable safety risks." [1] Courts will have to determine how to apply these tests when the technology is too new and complex for consumers to fully appreciate. Manufacturers and sellers can help themselves through careful planning of education, training, advertising, and messaging for consumers.[2]

Levels of Autonomy

Fully autonomous, self-driving vehicles will not leap from the drawing boards to the road for years. The NHTSA has described five different levels of vehicle automation.[3] At Level 0, the driver does everything. Level 1 autonomous vehicles sometimes assist drivers in some tasks, such as collision impact warnings, but the driver maintains control. In Level 2 vehicles, an automated system conducts some parts of the driving tasks on its own ("partial automation"), while drivers continue to monitor their cars at all times and do the rest of the driving tasks. Level 3 vehicles have automated systems that do some tasks on their own and monitor the driving environment in some instances without supervision, but drivers must be ready to take back control of their vehicles when the automated system requests the driver to resume control, such as when performance limits are exceeded (conditional automation"). Level 4 vehicles do not need drivers to take back control ("eyes and hands off"), but can only operate under certain conditions and in certain environments ("high automation"). Finally, Level 5 vehicles are fully autonomous. The NHTSA has defined "highly automated vehicles" to include only levels 3, 4 and 5, when the automated system is primarily responsible for monitoring the driving environment. NHTSA Policy, at 9-10.[4]

Most vehicles today are at levels 1 or 2. Audi reportedly achieved Level 3 automation this July.[5] It plans to have a Level 4 vehicle on the road by 2020.[6] With its acquisition of Mobileye, Intel has announced that it will begin road testing of Level 4 cars by year-end.

The important point is that consumers lack experience with "highly automated vehicles" and even with many new automated features. Consequently, some consumers are skeptical and have safety concerns.[7] In contrast, some safety groups anticipate a huge reduction in accidents, injuries and deaths.[8] The NHTSA, too, says: "Today, the automobile industry is on the cusp of a technological transformation that holds promise to catalyze an unprecedented advance in safety on U.S. roads and highways." [9]

Some autonomous vehicle manufacturers have videos demonstrating the features of their vehicles.

[10] These videos convey a similar message: we are developing and testing cars that can drive themselves safely. The messages sent by autonomous car producers will shape consumers' expectations.[11] And, there can be no doubt that consumers will expect highly automated vehicles to be as safe as, if not safer than, current vehicles.

The Consumer Expectation Test For Product Liability

While states' tests for design defect liability vary, courts typically apply one of two tests: the risk-utility test or the consumer expectation test, or sometimes both.[12] Under the consumer expectation test, the jury is instructed to consider, as the name suggests, whether a product's design meets the expectations of an ordinary consumer with ordinary knowledge of the product. This test is similar to the hypothetical "reasonable person" standard used to judge negligence.

When consumers are not able to form expectations about novel, sophisticated technology, some courts have rejected use of the consumer expectation test.[13] Still, other courts have applied the consumer expectation test to new products on the premise that consumers can understand what the product is intended to do, even if they do not understand how the technology functions.[14] State of the art evidence is admissible to establish a reasonable consumer's expectations.[15] Consumer expectations evolve with technology, marketing and experience. Sales messages and advertising can be relevant, indeed highly influential, to establish consumer expectations about product functions, capabilities and safety.

Setting Consumer Expectations for Autonomous Vehicles

How will consumers form expectations regarding the capabilities, limitations and safety of highly automated vehicles? The short answer is from the ground up. Consumers will learn a new vocabulary, much like they have learned about passive restraints, cruise control and automated emergency braking systems. Consumers will have questions: What is the difference between automated versus autonomous? What do the levels of autonomy mean as a practical matter for drivers? Under what conditions and circumstances do I have to control the vehicle, and when don't I? What is the fallback in case automated systems don't work properly? In addition to manufacturers, consumers will have abundant sources of information from reputable, safety-conscious sources, such as government regulatory agencies, consumer safety organizations and automotive magazines and reviews.

However, the new technology will branch into unfamiliar territory of advanced radar and lidar, other sensing systems, hardware and software. It could implicate the default choices programmed into software on how the vehicle will react when confronted with potential accidents and injuries: will those default choices differ among manufacturers? Did the vehicle manufacturer use the safest technology to detect objects ahead or approaching from the side of the car under the circumstances? To what extent has the manufacturer designed automated systems to override or compensate for driver inattention, misuse or error in judgment?

All technologies have trade-offs. Along with manufacturers and sellers, safety-oriented agencies and organizations as well as insurers can help to inform and educate consumers on the differences in the design of the technology among highly automated vehicles. Consumer surveys by manufacturers, government agencies and other organizations will be useful in learning consumer knowledge and expectations.

Consumers will also be bombarded with news articles about the new vehicles, first as novelties and curiosities, then as real choices to consider for purchase, rental or ride-sharing. However, whether the news media will provide accurate and reliable information, as opposed to sensational, attention-grabbing stories, remains to be seen. Television and movies, along with the internet, will portray autonomous vehicles to fit their story lines. Some will show safety magic; others will present autonomous vehicle technology as out of control and causing havoc.

It will be difficult for ordinary consumers to separate reality from fiction when they lack personal experience with highly automated vehicles. Consumer products are often experience goods, such as paints and toothpaste. Personal experience and word of mouth matter in purchasing decisions for experience goods. It will be many years before highly automated vehicles become products chosen

from experience.

Manufacturers and sellers will face the usual tension between promoting products to encourage purchases or use and advising consumers of potential safety risks and functional limitations. Manufacturers and sellers should be careful not to overpromise. Their marketing and advertising will shape consumer expectations, be seen as representations and provide a baseline for product liability.

In a world of novel, evolving technology, what can manufacturers and sellers of highly automated vehicles do to manage consumer expectations? The NHTSA's Federal Automated Vehicle Policy calls generally for consumer education and training: "Proper education and training is imperative to ensure safe deployment of automated vehicles." [16] However, NHTSA gives few specific recommendations and, of course, compliance with NHTSA guidelines or regulations does not insulate a manufacturer or seller from product liability claims.

Development of consumer education and training programs needs to proceed hand in hand with the design and testing of highly automated vehicles. This education and training will be complex, and follow-up surveys and studies will need to test effectiveness. [17] Experts in human factors and communications will have important roles to play.

Manufacturers and sellers have many options to consider and test:

- Instruction manuals will be important, but more creativity will be needed to increase the probability that consumers will read, understand and follow the instructions. Separate manuals as are used for navigation and sound systems may help. The NHTSA suggests that on-vehicle stickers and labeling may have utility, though familiarity and overuse causes disregard. [18]
- In our digital age, instructions and warnings may be presented more effectively through videos, DVDs, and internet links discussing the benefits and precautions for the highly automated features. Virtual reality may also become a feasible training tool. Working with government agencies, manufacturers, and sellers could present those training videos before vehicles leave the seller's lot. This individual education and training can be tailored to the particular vehicle that the consumer will operate — training that will be especially important during the time that vehicles are not fully autonomous, vehicles vary in their degree of automation and limitations on driving conditions and environments, and consumers are operating vehicles unfamiliar to them, such as rental cars.
- Sales representatives can be trained not only on vehicles' capabilities and limitations, but on appropriate messages to deliver on safety benefits and risks. In coordination with government regulators and safety organizations, special customer representatives to train and counsel consumers can provide personal training at dealerships or other places of use.
- Vehicle information screens and audible instructions can provide quick, on-time reminders of the most important features. They can also instruct drivers in real-time on recommended or required actions to take.
- Manufacturers can hold training seminars to provide up-to-date information on the functions, capabilities and limitations of highly automated vehicles to government regulators, safety organizations, insurers, media and others who will have roles in providing information and advice to consumers. Collaboration and coordination would help to ensure accurate, comprehensive public education and consumer training.

Personal education and training, including on-road or on-track experience, may be an option. Much like drivers' education, manufacturers and sellers, in coordination with government agencies, can require individual training before consumers are allowed to drive highly automated vehicles. Similar to commercial driving licenses, a driver can be required to prove sufficient training and competence to operate highly automated vehicles, especially before those vehicles reach fully autonomous capabilities.[19]

- Education may also need to discuss the vehicle's crashworthiness, particularly when highly automated vehicles roll out new designs in seating and seating configurations. Also consumers who expect highly automated vehicles to avoid any accident may not understand a continued need to use restraints and to take other precautions to prevent or mitigate injury in the event of an accident.
- Government agencies may require manufacturers and sellers to distribute government pamphlets or videos on functions, capabilities and safety risks pertinent to particular vehicles. Manufacturers and sellers, or their trade organizations, will want to have input into the information, instructions and warnings provided in the pamphlets or videos.
- Government agencies will likely run public service announcements through a variety of media. Again, manufacturers and sellers will want to have input into the messages.
- Manufacturers and sellers will likely need to provide continuing education and training as automated features are upgraded, as field experience indicates limitations, driver reactions or risks not previously known or anticipated, as regulations change, or as recalls or retrofits are needed.
- Finally, the high degree of media attention will require manufacturers and sellers to have in place trained personnel and detailed procedures prepared to respond promptly and accurately to media inquiries and reports. Manufacturers must be seen as reliable, trustworthy sources of information.

Forming reasonable consumer expectations as vehicle technology progresses incrementally will not be simple. It will necessitate cooperation and creativity in public messages, industry marketing, government regulations, public service announcements, media reports, and driver education and training. Realistic, informed consumer expectations will both build enthusiasm and help to avoid disappointment leading to liability claims.

Key Takeaways For Highly Automated Vehicle Producers

Shaping realistic consumer expectations is important to mitigate product liability risks as well as to foster sales and use of highly automated vehicles.[20] Producers can manage consumer expectations by realistically marketing highly automated vehicles; monitoring and educating media, safety organizations, and publications that influence consumer expectations; and coordinating with government agencies and standards organizations to develop regulations and guidelines for vehicle design, warnings, driver education, training and licensing. To meet consumer expectations of enhanced performance and safety, the development of effective consumer education and training programs should proceed at the same time as the development and testing of automated systems, hardware, and software. Human expectations will influence decisions on whether to buy or use highly automated vehicles and whether to sue when people are injured in an accident.

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[1] National Highway Traffic Safety Administration, U.S. Dep't of Transp., Federal Automated Vehicles Policy, at 20 (2016) ("NHTSA Policy").

[2] With the changing distribution and use of vehicles, "sellers" also may include providers, such as rental car agencies, fleet operators and ride-sharing companies. Similarly, "consumers" includes users.

[3] NHTSA Policy, at 9-10.

[4] U.S. House of Representatives Bill No. 3388, as recently approved by the House Committee on Energy and Commerce, similarly uses the terms "highly automated vehicles" and "automated driving systems." Active safety systems, such as electronic stability control and automated emergency braking, are not considered to be part of an automated system, because they do not eliminate or change the driver's role and do not perform part of the driving task. They are momentary interventions to assist in potentially dangerous circumstances.

[5] Philip E. Ross, *The Audi A8: The World's First Production Car to Achieve Level 3 Autonomy*, Spectrum (July 11, 2017), <http://spectrum.ieee.org/cars-that-think/transportation/self-driving/the-audi-a8-the-worlds-first-production-car-to-achieve-level-3-autonomy>.

[6] Id.

[7] Jeremy Hsu, *75 Percent of U.S. Drivers Fear Self-Driving Cars, But It's an Easy Fear to Get Over*, Spectrum (Mar. 7, 2016), <http://spectrum.ieee.org/cars-that-think/transportation/self-driving/driverless-cars-inspire-both-fear-and-hope>.

[8] E.g., Mothers Against Drunk Driving predicts that autonomous vehicles can prevent the 94 percent of traffic deaths caused by driver error.

[9] NHTSA Policy, at 5.

[10] Tesla, *Tesla Self-Driving Demonstration*, TESLA INC. (Nov. 18, 2016), <https://www.tesla.com/videos/autopilot-self-driving-hardware-neighborhood-long>; Google, *Self-Driving Car Test: Steve Mahan*, YOUTUBE (Mar. 28, 2012), <https://www.youtube.com/watch?v=cdgQpa1pUUE>.

[11] For example, a recent advertisement by a leading auto manufacturer has the caption: "What if your car could spot road hazards for you?" It then continues to predict that "autonomous cars will be safer and smarter than ever."

[12] Compare *Branham v. Ford Motor Co.*, 701 S.E.2d 5, 14 (S.C. 2010) ("We hold today that the exclusive test in a products liability design case is the risk-utility test."), with *Barker v. Lull Engineering Co.*, 573 P.2d 443, 456 (Cal. 1978) (holding that a plaintiff may proceed on either a consumer expectation theory or risk-benefit test).

[13] See *Pruitt v. General Motors Corp.*, 72 Cal. App. 4th 1480 (Cal. Ct. App. 1999); Andrew P. Garza, Note, "Look Ma, No Hands!": Wrinkles and Wrecks in the Age of Autonomous Vehicles, 46 *New Eng. L. Rev.* 581 (2012).

[14] *Pruitt*, 72 Cal. App. 4th at 1483; see also, e.g., *Bresnahan v. Chrysler Corp.*, 32 Cal. App. 4th 1559 (Cal. Ct. App. 1995).

[15] Gary C. Robb, A Practical Approach to Use of State of the Art Evidence in Strict Products Liability Cases, 77 NW. U.L. Rev. 1, 11–12 (1982).

[16] NHTSA Policy, at 24.

[17] For example, NHTSA recommends that “[c]onsumer education should cover topics such as an HAV [Highly Automated Vehicle] system’s intent, operational parameters, capabilities and limitations, engagement/disengagement methods, HMI [Human-Machine Interface], emergency fall back scenarios, operational boundary responsibilities, and potential mechanisms that could change function behavior in service.” NHTSA Policy, at 24.

[18] Id. at 24-25.

[19] House Bill No. 3388 leaves authority for driver education, training, and licensing to state regulators. The federal government would assume exclusive control over laws and regulations regarding the design, construction and performance of highly automated vehicles, automated driving systems and their components.

[20] While this article focuses on design defect liability, managing consumer expectations will also be important to mitigate the risks of fraud, misrepresentation, failure to warn, breach of express and implied warranty, false advertising, and consumer deceptive trade practices claims. Also, consumers will have expectations beyond vehicle design, such as cybersecurity and privacy.