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Narrative

How to Investigate, Analyze and Defend New Vehicle Technology Claims

I. Introduction

Advanced Driver Assistance Systems (ADAS) are rapidly proliferating in the marketplace.[1] Current new technologies include advanced sensing systems that detect information about the environment and either provide a warning to the driver or alter vehicle performance under specific conditions with the goal of enhancing occupant safety by reducing collision severity or avoiding collisions altogether. While not a replacement for the driver, these systems are changing the capabilities and limitations of vehicles as well as how people interact with them. Such changes will undoubtedly impact the issues and claims brought with respect to these systems and increase the need for new underwriting, legal, scientific and engineering approaches for understanding and describing the risk, exposure and value; the regulatory environment; the technological and design considerations; the driver vehicle interaction; implications for occupant restraint and safety; and the data provided from the vehicle. The continued growth and introduction of these technologies into the marketplace provide unique challenges, opportunities, and considerations for insurance and legal claims, including considerations for product recall and potential catastrophic loss.

II. Definition and Examples of Advanced Driver Assistance Systems (ADAS)

Advanced Driver Assistance Systems (ADAS) are a class of vehicle technologies that assist a driver using information gathered from various types of sensors. These sensors typically collect information from the vehicle, the driver, and/or the environment around a vehicle, often adjusting vehicle actions and performance in response to

[1] E.g., American Automobile Association (AAA), 2019

specific conditions. Some technologies currently available in production vehicles and being used on the road today include automatic emergency braking, forward collision warning, lane keeping assist, lane departure warning, blind spot detection, park assist, adaptive cruise control, and adaptive headlights. Future ADAS technologies may include automated driving systems that could incorporate methods for monitoring driver behavior and engagement, such as eye tracking.

II. How do drivers interact with these systems?

In typical driving scenarios, many ADAS largely operate undetected. Only when something changes or requires driver attention or action do these systems activate or notify the user. Every user has unique expectations of and experiences with these types of technologies that can impact how they interact with these systems.[2,3] For example, older users may be more hesitant to trust and engage with new and unfamiliar ADAS technologies, while younger drivers, with more expansive technological exposure and experience, may more readily adopt these systems. Some users may also seek to disengage available ADAS technologies if they find the technologies to be a nuisance or not operating in line with their expectations while other drivers may overreact to ADAS warnings. There is also a possibility for drivers to become over-reliant on these systems, expecting ADAS technology to detect hazards beyond their capabilities. For example, blind spot detection may not perform optimally when a non-standard object, like a motorcycle, scooter, or pedestrian, is in the detection space. A driver relying solely on the blind-spot detection technology to identify hazards in these spaces may respond inappropriately in this scenario, potentially resulting in a collision. This is one of the reasons why it is critical for users to understand that ADASs are not a replacement for an alert and attentive driver.

Various driving related distractions (e.g. cell phone use, other occupants, roadway hazards, etc.) can also affect driver attentiveness and/or sensitivity to ADAS notifications. At every instance during motor vehicle operation, a driver's awareness and "priming" for engagement with ADAS may vary. Dual- or multi-tasking can detrimentally affect one's ability to perform optimally in situations requiring rapid responses. When multiple sensory stimuli simultaneously demand attention, the potential for inappropriate driver responses to ADAS signals increases. The intersection of multiple factors influencing how drivers interact with ADAS technology complicates the expected effectiveness and performance of these systems, introducing the potential for claims alleging that the technology did not perform as designed advertised.

II. How do these technologies affect collision outcomes?

[2] Kidd, D. G., Cicchino, J. B., Reagan, I. J., & Kerfoot, L. B. (2017). Driver trust in five driver assistance technologies following real-world use in four production vehicles. *Traffic injury prevention*, *18*(sup1), S44-S50.

[3] E.g., Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. *Human factors*, *39*(2), 230-253.

In 2016, more than 37,000 people died in the United States from motor vehicle-related accidents.[4] Motor vehicle accidents in 2010 cost United States' citizens $242 billion in economic activity and $594 billion in loss of life and decreased quality of life. 94% of serious vehicle accidents are due solely to human error. ADAS technologies may be able to significantly mitigate the harmful effects of motor vehicles and present even more opportunities to utilize technology for the greater public good.

ADAS systems, like automatic emergency braking and forward collision warnings, can potentially prevent some collisions and may reduce crash severity and prevent occupant injury and fatality.[5,6,7] Reduction in collision frequency and severity will likely also reduce the frequency of insurance claims related to collision and property damage.[8,9]

However, no vehicle currently exists that can avoid or mitigate all possible crashes – even those vehicles equipped with ADAS. Situations will occur in which ADAS capabilities to detect and respond to potential hazards will be limited or where the laws of physics simply prevent the opportunity for mitigation or avoidance. ADAS features are typically designed to operate for certain conditions within an Operational Design Domain (ODD) that can be limited by sensor and processing limitations.[10] For example, forward collision warnings typically detect and alert the driver of the presence of another vehicle's rear end in the path of travel. If, instead, a non-typical object (e.g. a trailer positioned across a roadway) obstructs a vehicle's travel path, ADAS technologies such as forward collision warning and braking assist may be challenged to detect it as a potential hazard. If these systems do not successfully prevent or mitigate a collision in an environment they were not designed or optimized for, the system has not failed, but has rather been challenged to perform in a manner for which it was not intended. Such situations present the potential for product liability and/or catastrophic loss claims.

Some ADAS technologies could also, theoretically, influence the effectiveness of occupant restraints and the potential for occupant injury in the event of a crash. Collision mitigation technologies, like emergency braking assist, alter the vehicle's dynamics and could consequently affect occupant movement relative to the vehicle

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[4] https://www.nhtsa.gov/speeches-presentations/keynote-address-its-america

[5] Jermakian, J. S. (2011). Crash avoidance potential of four passenger vehicle technologies. *Accident Analysis & Prevention*, *43*(3), 732-740.

[6] Jermakian, J. S. (2011). Crash avoidance potential of four passenger vehicle technologies. *Accident Analysis & Prevention*, *43*(3), 732-740.

[7] Wang (2019)

[8] Highway Loss Data Institute (HLDI), 2018

[9] HLDI, 2018

[10] Capallera, M., Meteier, Q., de Salis, E., Angelini, L., Carrino, S., Khaled, O. A., & Mugellini, E. (2019, September). Owner manuals review and taxonomy of ADAS limitations in partially automated vehicles. In *Proceedings of the 11th International Conference on Automotive User Interfaces and Interactive Vehicular Applications* (pp. 156-164).

interior. Heavy braking before a collision has the potential to cause occupants to move forward in their seats, relative to the vehicle interior, changing how the occupant is positioned pre-crash and altering how they may interact with and be protected by their restraint system (e.g. seat belt, airbags, and seat). Overconfidence or overreliance in ADAS may also encourage non-standard occupant positions (e.g. reclining, slouching) that have the potential to alter occupant engagement with restraint systems and affect occupant injury potential. With the potential future introduction of fully autonomous vehicles, alternative cabin layouts and novel seating arrangements may be possible, creating additional challenges for ensuring desired occupant positioning and protection.

III. What does the proliferation of these systems mean for the present and future of litigating motor vehicle collisions?

To date, within the United States, the Federal Motor Vehicle Safety Standards (FMVSS) have not sought to mandate or regulate any particular ADAS technology.[11] Without federal legislation in this area, regulation of ADAS technologies could vary from state to state. The US Department of Transportation (DOT) and National Highway and Traffic Safety Administration (NHTSA) have, however, provided guidance documents reaffirming the federal government's authority on rulemaking in this area.[12] Without regulatory guidance or applicable standards, claims of non-compliance being evidence of a defect cannot be made. In contrast, non-defect presumptions available in certain states may not apply for claims related to ADAS technologies.

Product liability claims associated with ADAS technology could also become more frequent. As discussed earlier, for technologies designed to elicit user responses (e.g. forward collision warning), many factors can affect driver responsiveness. In the event that a collision does occur, regardless of how minor, a claim could be made that the ADAS warning was not sufficient to elicit appropriate driver responses. In this way, it may be possible for collisions that would have typically been handled through an insurance claim, could lead to a product liability allegation.

Rich data, including information related to ADAS sensors and actions could also be utilized to evaluate and litigate collisions in the future. All new passenger vehicles currently sold in the US are equipped with an Event Data Recorder (EDR), which has the ability to record and store specific vehicle and restraint information. Current US regulations stipulate that EDR data be retrievable by an accident analyst with a commercially available tool or device. The specific information collected and stored within an EDR as well as the period over which this information is stored depends on the type of events that occurred and the vehicle year, make, and model. Currently, EDR technology records information related to vehicle performance and occupant safety,

[11] Multiple OEMs have agreed, with coordination in part by the NHTSA, to make automated emergency braking (AEB) standard by 2022 or 2023.

[12] E.g., Blanco, et al. (2020)

such as engine speed, steering wheel input, vehicle speed leading up to and after an event, seat belt latch status (buckled or not), airbag deployment information, etc. These types of data have been used successfully to evaluate collision specifics for use in insurance investigations and in court proceedings. Current EDR technologies do not record or store information specific to ADAS system use or activation. It is possible that such information will become available to accident investigators in the future. Access to information related to ADAS will provide additional data to allow more complete evaluation of collision specifics but also creates opportunity for additional claims. For example, if the EDR indicates that ADAS technology like automatic emergency braking was active at the time of a collision, a product liability claim that the technology did not perform as designed could be made or a comparative fault argument could be made that the manufacturer bears some responsibility for the collision due to the technology's involvement. Questions related to the extent of responsibility held by a driver versus the vehicle itself are inevitable as this technology becomes more advanced and eventually moves toward more complete automation. Access to additional information and potentially even video of an incident recorded as a part of ADAS features would provide invaluable information for an accident reconstruction evaluation, but questions and challenges related to privacy concerns and admissibility of such data remain.

Certainly if the EDR data is available post-collision, it is only a matter of time before insurance companies begin seeking that data when underwriting and issuing policies. This effort is not likely to be specific to a driver in the beginning, but that may be down the road. Initially, the data can be collated to predict how certain demographics of drivers will respond to an incident on the road and price auto insurance policies accordingly. While insurers already do this with available data, additional data provided through EDRs and advance technologies provide another source of information.

As mentioned above, in litigating injuries as a result of a collision, plaintiffs and automotive liability carriers are increasingly likely to seek to bring contribution claims against the OEM's and Tier 1 or 2 suppliers of ADAS technology. Doing so expands a negligence claim/lawsuit into a products liability claim. This type of investigation will first look at who was responsible for the design – who owned the design – of the ADAS. Generally, OEM's provide performance specifications and the Tier 1 and 2 suppliers design and develop technical specifications for the component parts. If the root cause is determined to be a manufacturing, production, or raw material issue, the OEM may attempt to pass liability down the supply chain. If, however, the root cause is determined to be the implementation or design of the ADAS system within the larger vehicle, the OEM may face challenges in avoiding liability. In both cases, it is vital to review and understand contractual liabilities between the supply chain entities. Bringing an OEM to the table in a lawsuit may increasingly involve bringing other suppliers. This can pose some complexities, particularly when suppliers are not domestic.

Another issue that may arise with the increasing presence of ADAS features is how these ADAS technologies are being sold. Car dealers are not typically well educated in how these technologies function or what their limitations may be. Information communicated to consumers has the potential to influence the user's expectation for how a vehicle and its features will perform. Similarly, in purchasing a used car, the purchaser may not know if the vehicle had previously been involved in a minor accident (fender bender). Such minor collisions may not result in visible damage but do have the potential to damage ADAS sensors, affecting how the technology performs. Another related issue may be the history of repair to the vehicle. ADAS maintenance performed by an improperly or untrained technician also has the potential to alter its performance. Given the number of sensors and systems inherent in ADAS technology, opportunities exist to inadvertently altering the performance of these features unbeknownst to the user, which may influence how insurance claims of the future are handles.

IV. Conclusions

ADAS has the clear potential to significantly affect how insurance and litigated claims are investigated, analyzed, and handled. Understanding how these systems function, what their limitations may be, and what information may be gleaned from a vehicle itself will become and increasingly valuable skill for insurance adjustors and litigators as these technologies become increasingly prevalent on the road.