



LEGAL ASPECTS OF AUTONOMOUS VEHICLES – AN OVERVIEW

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Abstract

The primary objective of this page is to furnish current information regarding the legal regulation of autonomous vehicles (AVs) in Indonesia. The legal overview is primarily designed for technical professionals to provide them with a comprehensive understanding of autonomous vehicles (AVs). The authors assert that technical professionals must be cognizant of the legal regulations governing autonomous vehicles to engage in discussions regarding the viability of various legal provisions. In addition to defining AVs according to levels of automation, the article addresses the following inquiries: What are the primary advantages of autonomous vehicles? What modifications are necessary in the general road traffic legislation to permit the operation of autonomous vehicles on public thoroughfares? What are the distinctions between the present status of autonomous vehicle rules in the United States and Europe? Ultimately, the study highlights the most critical legal difficulties that autonomous vehicles provide to legislators, insurance providers, consumers, and, importantly, automobile manufacturers.

Keywords: autonomous vehicle, traffic law, legal challenges, liability

INTRODUCTION

3D tissue printing, autonomous vehicles, artificial intelligence, and robotics. Several years ago, we encountered these contemporary technological breakthroughs solely in science fiction films. Nevertheless, these inventions have become a reality in the present day, and they will continue to envelop us in the near future, until they become an integral part of our lives (Moigne, 1988; Cuayáhtil et al 2015; Pati et al 2015; Fagnant 2015). While the commonplace utilization of driverless vehicles may appear futuristic, forecasts anticipate their extensive use in the imminent future (Schubert ,2015). An autonomous vehicle (AV) is defined as a vehicle capable of navigating itself without human intervention. The term “autonomous” in relation to motor vehicles has occasionally been misconstrued, since in certain legal contexts, the notion of “autonomy” is linked to expansive philosophical ideas.

Conversely, the term “autonomous” in a technical context denotes that it operates independently of human intervention while driving. An "autonomous system" is a technical unit that performs certain duties independently of regular human commands.

SAE International offers a more precise definition of autonomous vehicles by delineating levels of automation. The degree of automation is contingent upon the human driver's involvement in executing the dynamic driving task (see to Chapter II).

Statistical data from the Police Force of the Slovak Republic indicates that Slovakia experiences over 14,000 road traffic incidents annually, resulting in over 7,000 personal injuries, of which around 300 are fatalities.

Proponents of autonomous technology project that self-driving vehicles might decrease traffic fatalities by 90%, equating to 270 lives saved annually in Slovakia. The advantages extend beyond mere safety. Autonomous vehicles possess the capacity to revolutionize personal mobility and provide access to those with impairments, elderly populations, and areas where automobile ownership is excessively costly, as well as to those who opt not to drive or own a vehicle. Cities will reassess spatial utilization and the provision of public transit.

Infrastructure capacity may be augmented without the addition of any new concrete truckloads. Autonomous cars possess the ability to conserve energy and mitigate air pollution from transportation by enhancing efficiency and facilitating vehicle electrification.

Belgium, France, Italy, and the United Kingdom are among the European cities that are preparing to implement driverless car transportation systems. Additionally, Germany, the Netherlands, and Spain have permitted the testing of self-driving vehicles in traffic. In 2017, the Swedish automotive giant Volvo commenced testing 100 of its autonomous vehicles on public highways, operated in standard traffic by ordinary consumers. The business declared a partnership with Swedish lawmakers and transportation authorities to evaluate the vehicles on a 30-mile roadway segment near Gothenburg by 2017, signifying Volvo's inaugural public trial of fully autonomous vehicles. Analysts forecast that fully autonomous vehicles would be available for purchase by 2025-2030.

As autonomous technology progressively diminishes driver control, legal frameworks must be revised in both their statutes and enforcement. It is a considerable challenge; but, it is not insurmountable. Consequently, any scientific inquiry into the legal regulation of autonomous vehicles is becoming increasingly essential and imperative, particularly in Europe. A significant and critical concern is the liability of autonomous vehicles. Research on this topic is now underway in the U.S. and Europe. This has been recently reported in multiple articles.

A new initiative, AdaptIVe (Automated Driving Applications and Technologies for Intelligent Vehicles), has been established in the context of Indonesia. The project involves numerous participants, primarily research institutions, including several legal research groups. Legal scholar Professor Eric Hilgendorf is one of the most prominent participants. At his research center, "RobotRecht," he oversees Europe-wide study on the legal ramifications of autonomous vehicle systems. The center's papers clearly indicate that the research addresses the question of liability. The importance of this research domain is demonstrated by numerous studies, as evidenced in the references. In early 2014, IHS Automotive published "Emerging Technologies: Autonomous Cars – Not If, But When," a study forecasting a global total of approximately 54 million autonomous vehicles by 2035, and anticipating that nearly all operational vehicles will likely be autonomous cars or

autonomous commercial vehicles post-2050. The outcome will be a driving environment significantly safer than our current one.

LITERATURE REVIEW

Indonesia Vehicles

Primarily, the United States (hereafter U.S.) addressed the matter of legalizing autonomous vehicles. In June 2011, the Nevada Legislature enacted legislation permitting the operation of autonomous vehicles. Nevada is the first jurisdiction globally to permit the legal operation of driverless vehicles on public roads. Currently, the majority of U.S. states address the fundamental legal status of autonomous vehicles. The United States operates as a federation; thus, it is essential to differentiate between actions executed by the federal government and those undertaken by individual states.

The National Highway and Transportation Safety Administration (NHTSA) released new recommendations for the safe development of autonomous vehicles (AVs) in September 2016, in accordance with federal road traffic regulations. The policy update comprises four components: vehicle performance criteria, model state policy, NHTSA's existing regulatory instruments, and potential additional regulatory measures that NHTSA considers beneficial for the secure deployment of autonomous vehicles. The policy outlines 15 best practices for prospective AV makers concerning the secure pre-deployment design, development, and testing of AVs before their commercial sale or operation on public roads. For additional information, please consult the Appendix.

Since 2012, nine states (Jakarta, Surabaya, Bandung, Semarang, Medan, Pontianak, Ujung Pandang, Kendari, and Palangkaraya) along with Banten, have enacted legislation concerning autonomous vehicles (AVs). In December 2016, an online legislative database was established, offering current, real-time information regarding state AV legislation. September 2016 became a pivotal moment for the state legislature, when California transportation officials implemented two significant alterations to its policy on autonomous vehicles.

The initial modification, a newly enacted legislation, authorizes the Contra Costa Transportation Authority to conduct a trial project on public roadways without a driver present. Previously, the state permitted public road testing alone if a human driver occupied the driver's seat and was "capable of assuming immediate manual control of the vehicle in the event of an autonomous technology failure or other emergency."

The legislation mandates that autonomous vehicles possess insurance coverage of \$5 million, that self-driving cars do not surpass a speed of 35 miles per hour on public roads, and that testing data be disclosed to the government while imposing geographic limitations. Testing is permitted exclusively at two sites: the old Concord Naval Weapons Station, now an AV testing center, and the San Ramon Bishop Ranch office park. The second modification is the amended draft regulations

issued by California's Department of Motor Vehicles, which might alter the testing protocols for all autonomous vehicles in the state by extending the privileges granted to the previously mentioned pilot program. If the law is enacted (it is now undergoing parliamentary procedures), it will permit car manufacturers to test federally approved vehicles on public highways without licensed drivers. The latest proposed laws mandate that a test driver maintain two-way communication with a vehicle, rather than being physically present in it.

Civil Law

Civil law encompasses a broad spectrum of legal issues pertaining to autonomous vehicles. The primary challenge pertains to the matter of civil liability. It encompasses, on one hand, liability for damage and/or injury associated with insurance matters, and on the other hand, product liability, which pertains specifically to damage and/or injury caused by a defective product. An paper from a German insurance journal is noteworthy in this context. The author delineates two potential conceptual frameworks that would facilitate the establishment of definitive liability regulations concerning autonomous vehicles and explicit insurance coverage. Moreover, it would lead to a reduction in lawsuits. The initial strategy involves mandatory motor third-party liability (MPTL) insurance under a stringent liability framework, requiring autonomous vehicle makers to allocate a share of the insurance for each vehicle. Manufacturers must be immune from product liability for injuries and damages covered by the mandatory MPTL insurance scheme, arising from a product flaw impacting AV functionality, unless such defect results from gross negligence. This technique is more theoretical than practicable due to potential administrative challenges.

The second approach advocates for a more stringent product liability by eliminating the requirement for a product flaw. The manufacturer should be held accountable for injuries and damages resulting from the performance of goods, including their actions, effects, and any failure to function or behave as expected. The primary contention for this methodology is as follows: although autonomous vehicles would be significantly safer than traditional automobiles, the complexity of the technology involved results in an uncontrollable residual risk of malfunction, even in the absence of errors in the product.

Consequently, the legislation ought to establish an incontrovertible presumption of a defect in a highly or totally automated vehicle that results in an accident, unless the manufacturer can demonstrate that the autonomous vehicle's operation did not contribute to the incident. The MTPL regime in this alternative would stay unchanged from the initial approach, except that manufacturers would be excluded from the MTPL system.

Human activities change the carbon cycle, by adding more CO₂ to the atmosphere, and by affecting to ability of natural sinks (forests and soil), to remove and store CO₂ from the atmosphere. Although CO₂ emissions come from various natural sources, emissions caused by human being activities are responsible for the increases that have occurred in the atmosphere. Human being

activities as main contribute to CO₂ emissions through the burning of fossil fuels (coal, natural gas, and petroleum) for energy and transportation, then specific industrial processes, and changes in land use (US-EPA, 2021).

RESULTS AND DISCUSSION

Vehicle Performance Guidance for Automated Vehicles.

The assessment is a 15-point "Safety Assessment" that is intended to ensure the safe design, testing, and deployment of automated vehicles. The manufacturer shall submit a statement addressing the 15 issues listed below. There exists no formal approval procedure.

1. Operational Design Domain: The specific conditions and environments in which the highly automated vehicle (HAV) is intended to function and operate;
2. Object and Event Detection and Response: The perception and response capabilities of the HAV system;
3. Fall Back (Minimal Risk Condition): The response and resilience of the HAV in the event of system failure;
4. Validation Methods: Testing, validation, and verification of a Highly Automated Vehicle (HAV) system;
5. Registration and Certification: Registration and certification of a HAV system to NHTSA;
6. Data Recording and Dissemination: The HAV system's data recording facilitates information exchange, knowledge acquisition, and crash reconstruction.
7. Post-Crash Behavior: Protocol for the operational conduct of a HAV following a collision and the restoration of automated functionalities;
8. Privacy: Considerations and safeguards for user privacy;
9. System Safety: Implementing engineering safety protocols to provide adequate system safety;
10. Vehicle Cybersecurity: Strategies to mitigate vehicle hacking threats;
11. Human Machine Interface: Methods for conveying information to the driver, passengers, and other road users;
12. Crashworthiness: Safeguarding occupants during collision events;
13. Consumer Education and Training: Educational and training prerequisites for users of HAVs;
14. Ethical Considerations: The programming of vehicles to navigate conflict situations on the road;
15. Federal, State, and Local Legislation:

Model State Policy

It outlines policy areas that states should take into account in order to establish a unified national framework for the testing and deployment of HAVs. States may establish the subsequent

administrative framework and procedures to regulate the utilization of public roadways for the testing and deployment of Highly Automated Vehicles (HAV) within their jurisdictions:

1. Application by manufacturers or other entities for public road testing of HAVs;
2. Jurisdictional authorization for testing;
3. Testing conducted by manufacturers or other entities;
4. Operators of deployed vehicles;
5. Registration and titling of deployed vehicles;
6. Considerations for law enforcement;
7. Liability and insurance matters.

The federal government anticipates that the states will implement this policy. It would prevent a fragmented array of state legislation.

CONCLUSION

The legal regulation of autonomous vehicles is a complex subject of study, yet intriguing. The primary advantage of autonomous vehicles is a considerably safer driving environment. Accidents will invariably be a facet of motor vehicle travel, necessitating a determination of accountability in such instances.

The legal system in Indonesia is well prepared to confront and adapt to the forthcoming difficulties in the regulation of autonomous cars. Moderate legislative modifications will likely be necessary. Nonetheless, after evaluating the significant decrease in injuries and fatalities resulting from road accidents, along with the additional advantages of autonomous technology, it is unequivocally worthwhile to implement legal modifications that would establish clearer regulations and practical applications.

This necessitates extensive collaboration among legislators and technical experts to attain the most suitable solutions. The primary focus of the paper is to provide a concise overview of the legal aspects of autonomous vehicles for technical specialists.

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