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# Problems of Ensuring Safe Operation of Highly Automated Vehicles Using the Potential of Public and Private Law

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## ABSTRACT

*The objective of the study was to critically comprehend several aspects that are significant for the theory of transport law and the practices of legal regulation of transport activities in the field of operation of highly automated vehicles. Those aspects concern relationship between the regulation of transport relations with the instruments of, respectively public and private law, associated with the typology of complex legal entities and the practices of economic sectors.*

*Particular research tasks included a systemic legal analysis of the currently available number of modern scientific developments in the field of legal regulation of relations related to the use of highly automated vehicles, with the aim to reveal shortcomings, search for ways to eliminate conflicts and gaps in legal regulation. To achieve the research goals the study applied formal-dogmatic and systematic methods of special legal research. This approach allowed evaluation of a promising development vector of legal regulation in this area.*

*The article largely summarises and expands the results of the research presented in earlier publications and proven in a scientific report during the Fifth Civil Readings in memory of Professor M. G. Pronina (March 16, 2023, Academy of Management under the President of the Republic of Belarus, Minsk, Republic of Belarus).*

*Based on the results of the research, it was concluded that several gaps in the legal regulation of relations related to introduction and use of highly automated vehicles create significant obstacles to effective development of the transport system, increases thus the relevance of the proposals to determine directions for further research in this area. Improving the legislative and regulatory framework will have a significant positive impact on successful expansion of the use of highly automated vehicles in the transport industry and within the entire economy.*

*Keywords: transport, highly automated car, legal regulation, innovative development, public and private law.*

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## INTRODUCTION

The traditionally high degree of importance of an extensive and effectively functioning transport system for socio-economic development of any country, national security and sovereignty of any state determines the mandatory high level of legal support for organising the activities of bodies authorised to act in this area. The increasingly complex transport management system and the expanding organisational structure that ensures optimal functioning of the transport complex necessarily requires the use of not only the instruments of private law, but also the tools of public legal regulation. Under the modern conditions of Russian reality, characterised by particular requirements for safety and efficiency of transport, together with the increasing number and degree of danger of risks and threats to safe operation of the transport complex, the degree of strictness of the legal regulation of transport relations increases quite naturally.

A formal dogmatic analysis of Russian positive law gives grounds for the conclusion that transport legislation has accumulated an impressive array of regulatory legal acts of the highest level. Several international conventions are devoted to issues of transport law. Transport law includes such a number of codified acts that, perhaps, no other branch of national legislation contains. Thus, the Civil Code of the Russian Federation (hereinafter referred to as the Civil Code) in chapters 40 («Transport forwarding») and 41 («Transportation») establishes the general, most significant and significant rules for proper conduct of participants in transport obligations of a property nature. The provisions of the Civil Code are specified in the norms of such codified acts as Air Code of the Russian Federation (1997), Merchant Shipping Code of the Russian Federation (1999), Code of Inland Water Transport of the Russian Federation (2001), Charter of Railway Transport of the Russian Federation (2003), Charter of Road Transport and Urban Ground Electric Transport (2007). At the same time, the named normative legal acts contain several provisions of a public legal nature. This circumstance has been repeatedly emphasised by representatives of transport legal science.

When solving problems of legal regulation of operation of highly automated vehicles, it is important to ensure continuity in science based on developments of Russian and foreign scientists related to multimodal transportation and digitalisation of transport and logistics processes, and organisation of seamless movement. We should especially note the contribution of Professor M. G. Pronina, who studied the problems of stimulating the execution of business contracts, legal regulation of entrepreneurial and economic activities [1], the results of whose scientific activity were developed in the works of the successors of the traditions of Belarusian civil law [2–4; 5, P. 93].

Changing the paradigmatic foundations and fundamental approaches to building a system of legal support for organisation of road traffic and transport safety, associated with emergence and increasingly active dissemination of innovations in transport aimed at increasing the autonomy of transport, should be focused on creating an optimal system of legal instruments, of both private and public law, ensuring implementation of unmanned vehicles and other vehicles using an automated driving system into the transport complex. Even though the general problematic issues of legal regulation have not been resolved. It is justifiably noted that «the digital economy is not a defined and clearly visualised element in identifying the object of legal regulation, if only because its place in the system of social production when replacing the classical economy has not been determined» [6].

Several authors note an even closer and more significant connection between law and new technologies. In particular, T. Ya. Khabrieva rightly notes that with the advent of a new, «digital» reality, «law… changes its forms, content, mechanism of formation and action» [7].

In relation to the topic of the study, it seems necessary to proceed from the fact that the use of highly automated transport, which includes unmanned and fully autonomous cars, entails a rejection of the traditional requirement for constant, during the entire period of driving, control by the driver over movement of the vehicle, as well as from the presumption of both guilty and innocent liability of the owner for harm caused by the car as a source of increased danger enshrined in Russian law.

Solidarizing with the opinion of S. A. Sinitsyn, who rightly notes that «development of technology, the growth of Internet communications, globalisation of markets, internationalisation of large capital were the objective factors in development of socio-

economic relations that posed new tasks for civil legal regulation» [8], it is also necessary to note the special importance of public law regulation, since it is by means of administrative law that are resolved the issues of establishing mandatory requirements in the field of technical regulation [9] and transport safety [10], admission to operation [11], establishing liability for violations of operating rules highly automated vehicles [5], including during the period of special legal regimes [12].

## RESULTS

### The Role of Transport Law in Regulating the Economy

The importance of the transport system for solving the problems of socio-economic development, defence and national security is increasingly increasing. It is noted that since 2011, the volume of the transport services market has been growing every year by approximately seven percent, and one of the most significant steps in logistics is introduction of unmanned vehicles [13]. At the same time, since automated driving technologies that make it possible to ensure creation of highly automated transport and unmanned vehicles have been developing in Russia since 2015, and there is no single system of legal support for their admission and subsequent operation, it should be argued that there is a contradiction between the needs of the practices of operation of highly automated transport, its introduction into the Russian transport system, on the one hand, and the lack of theoretical understanding of the problems of legal regulation of the legal relations arising in this case, on the other hand.

### Effects Associated with Development of Automated Driving System Technology

The need for clear and comprehensive legal regulation of relations arising in connection with introduction and increasing spread of highly automated vehicles, including unmanned vehicles, is determined by the needs of the economy and transport logistics.

It is justifiably noted that the use of unmanned driving technologies makes it possible to solve several problems, some of which are of essential, special importance for the economy and innovative development of the country's transport system.

In the field of transport economics, the use of unmanned driving technologies entails a reduction in transport costs by reducing the wage fund for drivers and related expenses, optimising the costs of maintenance, depreciation, repair and insurance of vehicles, fuel economy, etc..[1]

In the social sphere, this is, first, their ability to minimise transport safety risks [14], which have as their derivative the «human factor», the role of which «in the system of dangers of disasters due to violation of the rules of operation of transport infrastructure facilities and vehicles extremely high» [15, p. 4963].

Besides, as the world experience in countering the spread of the coronavirus pandemic COVID-19 has shown, the use of unmanned vehicles in a metropolis should be considered, firstly, as a new factor that «minimises the risks of the spread of infectious diseases» [16], and secondly, as «a means of ensuring the availability of transport services in a difficult epidemiological situation» [17, p. 16]. Additionally, it should be noted the promise of using unmanned vehicles to obtain information about the status and spread of infectious diseases in densely populated areas of a metropolis, the efficiency and economy of taking samples from patients. These measures, when carried out in the usual manner, involving the participation of the driver and crews performing the functions of monitoring the epidemiological situation, obtaining biological materials, etc., not only create the threat of so-called «cross-infection», but also significantly increase the cost of the procedures, the time of their implementation due to the need to carry out measures to disinfect personnel, equipment and vehicles.

### Novelty and Emerging Gaps in the Sphere of Legal Regulation

The history of introduction of new technologies into social practices, resulting from development of science and technology, indicates that an understanding of the significance of their clear and complete legal regulation is realised only after the collision of implementers of innovative solutions and developers of the foundations of legal support for the resulting social relations with unexpectedly arising problems of law enforcement [18, 19]. This consistent pattern is characteristic of transport

[1] Russian technologies of unmanned transport for smart cities [in Russian]. [Electronic resource]: https://naukatehnika.com/texnologii-bespilotnogo-transporta-dlya-umnyix-gorodov.html?ysclid=ll6dac2rru396132347. Last accessed 16.04 2023.

system to full extent as well. The fact is that introduction of innovative solutions and technologies into social relations arising in the process and regarding their inclusion in the system of transportation participants is impossible solely using general ideas about possible options for using innovative vehicles, but, on the contrary, requires in-depth scientific study of all any probable legally significant consequences of this process, establishing the legal status of the participants in the resulting legal relations, determining the directions, measures and grounds for liability for all possible offenses. Representatives of the scientific school «Transport Law» note a stable relationship, repeatedly recorded based on the results of historical and legal analysis, between the emergence of new types of transport based on fundamentally new technological solutions and significant changes in transport legislation, including the definition of the object and subject, the establishment of the objective and subjective side of offenses of a new type, development of proposals for legalisation of new measures of legal protection of emerging relations [20, P. 147; 21, P. 54; 1].

The actively ongoing process of development, approval for operation and use of unmanned vehicles relates precisely to such phenomena and, accordingly, represents a challenge to the system that has developed and effectively functioned on the principles of mandatory and continuous monitoring by the driver of the vehicle of the road situation, as well as the culprit, and innocent liability for causing harm by a source of high danger. Currently, understanding of the need to bring transport legislation in line with the needs of development of innovative transport, the relevance of resolving emerging contradictions between new principles of operation of unmanned vehicles and the paradigm of legal regulation and traffic management that does not correspond to them, ensuring transport safety, has been formed among all participants in the rule-making and law enforcement processes, which is obviously manifested in the rule-making activity of government bodies. At the same time, however, the attempts being made to form a set of legal norms governing these relations, without deep scientific study are not systemic in nature and, naturally, do not bring the expected effect.

**World Innovations in the Field of Legal Regulation of Highly Automated Transport Systems**

In the PRC, whose experience shows an accelerated pace of implementation of highly automated vehicles, until recently legislation has excluded the very possibility of using autonomous vehicles on general highways. The situation changed radically at the beginning of 2021, when more than 400 licenses were issued to various companies to test autonomous driving vehicles. Moreover, according to foreign authors, the total mileage of the tested vehicles was more than 2 million km [22].

To a certain extent, a breakthrough in further development of the legal regulation of highly automated vehicles was the entry into force of the Regulations on Management of Intelligent and Connected Vehicles in the Shenzhen Special Economic Zone (PRC) on August 1, 2022, which introduced permanent regulation of the operating mode of highly automated vehicles with driver behind the wheel.[2]

The beginning of 2022 in the US and EU was also marked by a significant increase in law-making activity, the purpose of which was to ensure the fastest possible transition from the stage of experimental regulation (the so-called «regulatory sandboxes») to the stage of limited introduction of universal regulation on operation of highly automated vehicles. Specifically, on March 11, 2022, the US National Highway Traffic Safety Administration revised the Federal Motor Vehicle Safety Standards requirement for a steering wheel to be included in the vehicle design, thereby removing a key regulatory obstacle to the implementation of fully autonomous vehicles (e. g.:[3]). In the EU, on July 6, 2022, Regulation (EU) of the European Parliament and of the Council 2019/2144 on vehicle safety requirements came into force,[4] containing, in particular, the basic safety

[2] Shenzhen unveils China's first regulation on intelligent connected vehicles. [Electronic resource]: https://www.globaltimes.cn/page/202207/1269924.shtml. Last accessed 16.04.2023.

[3] 49 CFR Part 571. Docket No. NHTSA-2021-0003. RIN 2127-AM06. Occupant Protection for Vehicles With Automated Driving Systems [Electronic resource]: https://www.nhtsa.gov/sites/nhtsa.gov/files/2022–03/Final-Rule-Occupant-Protection-Amendment-Automated-Vehicles.pdf. Last accessed 16.04.2023.

[4] Regulation (EU) 2019/2144 of The European Parliament and of the Council of 27 November 2019 on type-approval requirements for motor vehicles and their trailers, and systems, components and separate technical units intended for such vehicles, as regards their general safety and the protection of vehicle occupants and vulnerable road users. [Electronic resource]: https://www.legislation.gov.uk/eur/2019/2144. Last accessed 16.04.2023.

requirements for highly automated and fully automated vehicles (Article 11). New steps continue to be taken in this direction, considering the need to resolve a number of issues both at the level of legislation of the European Union and its member states, to harmonise national legislation, as well as to work within the framework of the Vienna Convention of 1968,[5].[6]

Against this background, the measures taken in this direction in Russia look very modest. Thus, a completely unmanned taxi is used to transport passengers exclusively within closed areas, such as the Skolkovo Innovation Centre and Innopolis. Also, in a few regions, an experiment was conducted to test unmanned vehicles without drivers on public roads,[7] based on the results of which it was proposed to draw conclusions about the feasibility and effectiveness of using highly automated vehicles.

## DISCUSSION AND CONCLUSIONS

The emerging set of legal problems poses several serious challenges for the public regulator.

Considering the analysis of current legislative norms and practical Russian and foreign experience, it is proposed to include requirements for an automated control system in Russian legislation. In addition to general standards, more specific standards should be developed regarding operation of unmanned vehicles in urban environments, in megacities, in areas with a high risk of contracting infectious diseases, etc. [17, 23], eliminating, through introduction of an additional qualitative criterion, legislative gaps in terms of narrow interpretation and understanding of «product deficiency» in the Federal Law «On Protection of Consumer Rights» and strengthening the mandatory requirements for safety of such vehicles.

The results obtained during the study allowed us to conclude that the distinction between «highly automated» and «lowly automated» cars is of essential importance in the context of administrative and legal regulation, as well as for the purposes of establishing civil liability for causing harm by a vehicle.

Based on the results of the work carried out during the study of the current Russian legislation, it was concluded that there are problems with legitimising the terminology used for the purpose of legal support for the use of highly automated vehicles.

In the course of subsequent work on the project, members of the research team will proceed from the fact that since the legal regulation of social relations associated with introduction of unmanned vehicles into operation must have a systematic basis, it is necessary to ensure construction of a logically interrelated categorical series, including terms that define the concept, types and essential features of highly automated vehicles, the system and competence of participants in legal relations arising in the process of admission to operation and use of unmanned vehicles, as well as the basis, measures and procedure regarding liability for violations of the rules for operating unmanned vehicles. At the same time, there is an obvious lack of elaboration, using a risk-oriented approach, of issues related to the typology and categorisation of threats to the safe use of unmanned vehicles in a metropolitan area, making it possible to establish sufficient and necessary legal measures that can minimise risks in this area, the qualitative and quantitative characteristics of which in modern situations are constantly increasing. The final result at the second stage of the study should be acquisition and systematisation of new knowledge about the set of legal measures to ensure safety when using unmanned vehicles in a metropolis, development of systematised proposals for introducing changes and additions to federal legislation and the legislation of megacities, in particular the city of Moscow.

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[6] Regulations Commission implementing regulation (EU) 2022/1426 of 5 August 2022 laying down rules for the application of Regulation (EU) 2019/2144 of the European Parliament and of the Council as regards uniform procedures and technical specifications for the type-approval of the automated driving system (ADS) of fully automated vehicles (Text with EEA relevance). [Electronic resource]: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1426. Last accessed 16.02.2023.

[7] The Ministry of Energy supported the testing of driverless drones for backup. [Electronic resource]: https://www.rbc.ru/technology_and_media/08/05/2020/5eb422529a7947216bff14c3. Last accessed 16.04.2023.

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