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# Unmanned Systems: Dynamics of Operational Boundaries and Prospects for Legal Regulation to Minimise Risks

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## ABSTRACT

***Zemlin, A. I., Matveeva, M. A., Gots, E. V. Current problems of minimising risks arising from the use of unmanned vehicles in a metropolis: system and legal analysis: Monograph [Aktualnie problemy minimizatsii riskov, voznikayushchikh v svyazi s ispolzovaniem bespilotnykh avtomobilei v usloviyakh megapolisa: sistemno-pravovoi analiz: Monografiya]. Moscow, KnoRus publ., 2023, 190 p. ISBN 978-5-406-12803-9.***

*The article is a review of the monograph "Current problems of minimising risks arising from the use of unmanned vehicles in a metropolis: system and legal analysis", prepared by academic staff of Russian University of Transport. The relevance of the topics included in the content of the monograph, the breadth of their coverage allows solving several tasks. In particular, the tools of historical-legal, comparative-legal and system-legal approaches facilitate the analysis and comprehension of the concepts of risk-based approach in the interests of monitoring, visualisation and development of management decisions to minimise threats in the context of various types of activities. The review especially emphasises the significance of the proposals formulated based on the results of the study, the implementation of which will minimise, through the integrated use of legal instruments, the risks of operating unmanned vehicles on public roads, which is important for ensuring the efficiency and safety of their operation, in the context of the development needs of the Russian economy, the achievement of national goals and strategic positioning of the Russian Federation in the modern world.*

*Keywords: unmanned systems, unmanned vehicles, road traffic safety, risk-based approach, threat minimisation, legal regulation.*

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***The original text of the review article in Russian is published in the first part of the issue.***
***Полный текст статьи-рецензии на русском языке публикуется в первой части данного выпуска.***

Crisis events of the last decade associated with deformation of the world order system [1–3], rethinking the role of society, state and law [4–5], the state of modern international relations, economic, social, legal problems, the emergence of new threats to peace, security and sustainable development [6–8] are taking place against the background of rapid development of technologies [9–10], the very existence of which seemed simply unthinkable just recently.

This fully applies to unmanned systems, the use of which was previously limited to the military and security spheres, mainly due to the use of unmanned aerial vehicles [11] and unmanned maritime systems [12], as well as individual projects in agriculture, environmental monitoring and delivery of small items to hard-to-reach areas.

A series of pandemics of various infectious diseases [13–16], the most significant of which was the COVID-19 pandemic[1], and the apocalyptic scenarios associated with them, served as an additional trigger for development of futuristic technologies. Drones have evolved into sophisticated transport systems capable of delivering significant payloads over significant distances. Driverless trains, ships and cars are no longer surprising. Delivery robots appeared on the streets of large cities, including Moscow. During the lockdown, they were used to deliver medicines to patients and tests from patients to medical laboratories; compliance with sanitary and lockdown measures in cities was monitored by patrol unmanned vehicles.

However, despite the increasingly active introduction of unmanned systems into our daily lives, one of the most significant problematic issues is the legal regulation of admission to operation and the subsequent use of unmanned vehicles. This applies to a greater extent to unmanned vehicles, as a source of increased danger, especially in a metropolitan area.

In this regard, it is no coincidence that the Concept for ensuring road traffic safety with participation of unmanned vehicles on public roads[2] specifically notes that new technologies introduced in vehicles can create additional risks for road traffic safety, therefore the task of the Concept is to minimise both existing and potential risks in the interests of the entire society. At the same time, Russia's lag in matters of prompt and mass introduction of highly automated vehicles into the national transport system is determined, not least, by the presence in the Russian law of a few conflicts and gaps that negatively affect the processes of using innovative transport technologies [17]. At the same time, critical assessment of the content of the decisions proposed within the framework of the rule-making initiative indicates their lack of scientific thoroughness.

These issues can be resolved by understanding the risks that arise in connection with changes in the principles and legal framework of the transport safety system, and in subsequent development of new approaches to traffic management that consider the appearance of unmanned vehicles on roads. This is the subject of the monograph by A. I. Zemlin, M. A. Matveeva and E. V. Gots «Current problems of minimising risks arising from the use of unmanned vehicles in a metropolis: system and legal analysis» [18], published with the financial support of Russian Science Foundation within the framework of scientific project No. 22–28–20334 «Legal means of ensuring safety of the use of unmanned vehicles in a metropolis»[3].

In the work under review, based on the need to achieve the goal of identifying and composing a typology of the risks of ensuring the safe use of unmanned vehicles, as well as preparing on this basis proposals for improving the system of legal regulation in this area in fundamentally new conditions, a number of scientific problems were solved. In particular, using the tools of historical-legal, comparative-legal and system-legal approaches, the concepts of using a risk-based approach in the interests of monitoring, visualisation and development of management decisions to minimise threats in the context of various types of activities have been analysed and comprehended. A critical understanding of the paradigmatic foundations of application of the risk-based approach in various spheres of social production and socio-economic relations made it possible to formulate and adapt to the needs of the research a systematically ordered set of terms and concepts used in scientific circulation and in rule-making activities related to the regulation of social relations, arising during the process of admission

[1] Zemlin, A. I., Zemlina, O. M., Klyonov, M. V., Openyshev, O. S., Kholikov, I. V. Organisational and legal foundations of functioning of the transport system in a difficult epidemiological situation: Textbook. Ed. by A. I. Zemlin, I. V. Kholikov. Moscow, Ru-science publ., 2020, 310 p. ISBN: 978–5–4365–6523–1.

[2] Approved by the Order of the Government of the Russian Federation dated March 25, 2020, No. 724-R.

[3] https://rscf.ru/project/22–28–20334. Last accessed 05.12.2023.

to operation and subsequent use of unmanned vehicles, taking into account the specifics of the application of a risk-based approach.

The use of methods of formal dogmatic analysis of the norms of Russian legislation, a system understanding of the opinions of scientists who studied the problems of using a risk-oriented approach in the interests of minimising threats in the process of emergence, change and termination of social relations in homogeneous and single-type relations was due to the need to identify general and specific characteristics of the risk-oriented approach methodology and provided the opportunity to determine the fundamental principles of building a risk management system that arises in the process of admission to operation and subsequent use of unmanned vehicles, ensuring development on a legal basis of management decisions to minimise threats to the safe use of unmanned vehicles in the metropolis.

The model for constructing a typology of risks associated with the emergence and increasingly widespread use of unmanned vehicles on public roads, presented based on the results of the study, can contribute not only to subsequent construction of a system with admission and subsequent use of unmanned vehicles, including in a metropolis, but also to the solution of tasks to develop an orderly and systemically interconnected set of legal measures aimed at preventing violations of the procedure for admission to operation and use of unmanned vehicles, establishing measures of liability for violations in the area under study using the potential of various branches of law.

The theoretical conclusions and practical proposals put forward in the monograph can serve the purposes of forming an orderly system of legal terms and categories used in legal acts regulating relations related to the use of highly automated vehicles, the interests of determining directions for further scientific study of problems that are essential for innovative development of the economy and transport. Legalisation in Russian law of the proposals formulated based on the results of the study will make it possible to minimise, through the integrated use of legal means, the risks of operating unmanned vehicles on public roads, which is important for ensuring the efficiency and safety of their operation, in the context of development needs of the Russian economy and achieving national goals and strategic positioning of the Russian Federation in the modern world.

However, despite the high level of the research performed, it seems possible to make some critical remarks. Firstly, the study would greatly benefit from including the results of a comparative legal analysis of the legislation and law enforcement practices of foreign countries that widely use unmanned systems in their megacities. Studying and creatively borrowing useful foreign experience can enrich domestic science and practice and help avoid repeating possible mistakes. Secondly, some provisions formulated by the authors do not have a final, closed or exhaustive nature and are hypothetical in nature.

However, the comments made are rather advisory in nature and can become a reason for a meaningful scientific discussion, an incentive and a basis for further scientific study of the problem under study.

As has been repeatedly emphasised, the need for legal knowledge for employees of the transport industry, especially in modern conditions of development of digital technologies and the widespread use of artificial intelligence, can hardly be overestimated [19–20]. In this regard, there is an interest in a possibility of preparing, on the basis of the published monograph, of training programs for the purpose of teaching the legal foundations of operation of unmanned systems, the use of risk-based approaches, both in secondary vocational education institutions and in higher educational institutions, including Russian University of Transport.

It should be especially noted that the provisions presented in the monograph have received coverage on the pages of leading peer-reviewed journals examining transport legal issues and related aspects of various branches of scientific knowledge, which confirms the scientific integrity of the authors and the thoroughness of the conclusions given in the monograph. Thus, a number of scientific works already published by the authors of the monograph are devoted to the issues of theoretical and legal research of fundamental approaches to building a safety system when using unmanned vehicles [21, P. 33; 22, P. 60], clarification of the definition of «highly automated vehicle» [23, P. 117], «automated driving system» [24, P. 31; 25, pp. 53–54], etc., substantiating the need for legislative recognition of such types of support for an automated driving systems as: software; information support; organisational support; legal support [26, P. 147].

The authors paid significant attention to the study of the experience of legal support for

introduction of innovative vehicles at various historical stages of development of the Russian transport system [27, pp. 8–9].

Based on the application of the comparative legal method, the authors, in scientific publications preceding the monograph, examined the experience of legal consolidation of the provisions of legislative acts of developed countries that ensure introduction and operation of highly automated vehicles, which made it possible to draw conclusions regarding the degree of possibility and feasibility of applying the experience of these countries in Russia [28, P. 457; 29].

In several works, to ensure the safe use of unmanned vehicles, the authors substantiate the need to consolidate the fundamentals of licensing, maintenance, control and supervision of admission to the use and operation of highly automated vehicles [30, P. 55; 31, P. 116].

A significant number of publications by the authors of the monograph reveal the features of a highly automated car as an object of administrative and legal regulation and a means of causing harm and contain practical recommendations for eliminating organisational and legal barriers that impede the implementation and safe use of unmanned driving technologies [32, P. 189]. Issues of fair distribution of the negative consequences of harm caused due to the shortcomings of a highly automated car are also considered in great detail by the authors [33, P. 5].

The authors of the monograph have published works aimed at developing a conceptual framework for a risk management model that arises in the process of admission to operation and the actual operation of unmanned vehicles [33, P. 4].

In conclusion, it seems possible to emphasise that the monograph «Current problems of minimising risks arising in connection with the use of unmanned vehicles in a metropolis: system and legal analysis» is a complete system work devoted to significant theoretical and practical problems and will certainly be useful for professors, scientists, researchers and practitioners, as well as for everyone interested in the implementation and operation of unmanned systems.

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