

Legal Regulation Problems by using Highly Automated Vehicles

R. R. Magizov^a, L. M. Gabsalikhova^b, T. A. Nikolaev^c and V. G. Mavrin^d
Kazan Federal University, Suyumbike Avenue, 10A, Naberezhnue Chelny, Russia

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Abstract: The application of new technologies in the design of modern cars has gradually led to the automation of various control processes. Today, the legal systems of different countries are faced with the problem of regulating the use of highly automated road transport. Such a vehicle may fulfill part of the functions of the driver or even, potentially, replace it completely. Different approaches to the problem of regulation give rise to different solutions. The presented article is devoted to the problems of legal regulation of the operation of highly automated cars. The problems of terminology are touched on, approaches to legal regulation in this area in different states are described. It is concluded that currently in Russia the legal basis for the use of unmanned vehicles has not yet been fully formed and there are a number of issues that need to be regulated. Based on the study, the author formulates proposals for amendments and additions to the legislation of the Russian Federation related to the operation of highly automated cars.

1 INTRODUCTION

The main trend in the development of the economy and society, which is currently associated with the rational and rational management and development of all areas of activity, including the automotive industry, is intellectualization. The high level of motorization and globalization of the markets force automakers to search for new solutions and to constantly improve both the design of the car and the production technology. The automotive industry is undergoing significant changes: the largest car manufacturers, together with IT developers, are moving towards the creation of vehicles with the possibility of fully autonomous driving.

Automation and digitalization are actively entering our lives; changes are caused by the introduction of many technological innovations used in various industries. Innovative developments of a modern navigation system for the autopilot of mobile ground objects can find application both in the military and civil sectors of our country - in freight and passenger transportation by rail and road.

In 2014, during the beginning of the development of “automation of driving systems”, the International Society of Automotive Engineers (SAE) published the concept of “level of autonomy”. SAE standards have been set and accepted for use by state regulatory authorities, world leaders in car manufacturers, engineers, and investors. The standards describe six levels of automation.

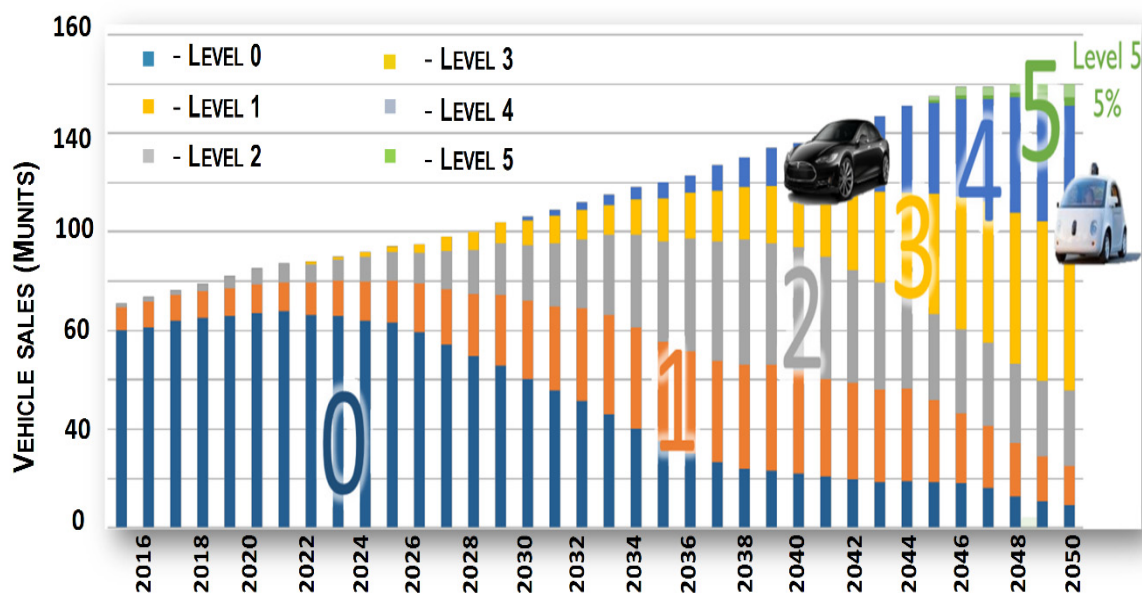
In September 2016, the National Highway Traffic Safety Administration (NHTSA) established its formal classification system - the SAE standard. The distribution of the six “levels of autonomy” is as follows: the “0” level is supposed to include a car that is under the complete control and constant control of a person, and the “5” level will mark absolutely well-functioning automation. The introduced concept of “autonomous driving” allows the vehicle to comfortably, and most importantly, safely move along public roads without human intervention, and thanks to self-driving technologies implemented in the car: an on-board computer and system sensors, with which it is possible to control the car instead of the driver in certain conditions.

^a <https://orcid.org/0000-0001-7918-0371>

^b <https://orcid.org/0000-0003-3325-3285>

^c <https://orcid.org/0000-0002-5410-2278>

^d <https://orcid.org/0000-0001-6681-5489>



By 2045, more than 70% of all vehicles sold integrate autonomous capabilities

Figure 1: Autonomous vehicle market dynamics by automation levels.

The process of digitalization and automation today affects almost all countries of the world. At the same time, each country determines its development priorities. To assess the readiness of countries for the emergence and implementation of autonomous vehicles, KPMG International has been conducting research since 2018. According to studies by the Netherlands, Singapore and Norway, the United States is on the top line. Russia is located in 22 of the 25 countries studied. The Netherlands is actively collaborating with neighboring countries on a project to introduce unmanned technology in the freight segment. Authorities are adopting new laws to address safety issues and legal regulation of the autonomous vehicle market. The law governing the experimental use of autonomous unmanned vehicles (Nieuwe wet maakt..., 2017) was approved by the House of Representatives of the Netherlands in April 2018 and finally approved by the country's Senate in September 2018.

Of course, the lack of proper legal regulation of the operation of unmanned vehicles can negate all its advantages. As for Russia, unfortunately, despite the limited timelines for introducing autonomous transport, our country has made less progress than others in developing legislation in the field of unmanned vehicle operation. At the moment, the scope of unmanned transport is regulated exclusively by bylaws. There is no regulation at the legislative

level, as a result, uncertainties and contradictions remain, which are a barrier to the further development and implementation of technology. Legislative issues are today one of the key obstacles to an effective solution to the problem of creating unmanned vehicles, both in Russia and around the world.

2 THE SOCIAL FACTORS ROLE BY TRANSITION TO AUTONOMOUS VEHICLES

Assessing possible changes in the transport system during the transition to autonomous cars, analysts evaluated, first of all, the opportunities that the economy and society receive. This is first of all:

- the liberation of man from the routine task of driving vehicles;
- reduction in the number of emergencies due to the human factor. Perhaps this is an overly optimistic forecast, since autopilot robots will make their mistakes typical of robots;
- improving the economy of vehicle use due to fuel economy, the possibility of round-the-clock use of technology, autonomous vehicles consume less fuel compared to vehicles with a driver, which helps to reduce harmful emissions in exhaust gases (Kouchak, M., Gaffar, A., 2017). The results of the

study (Pourabdollah M. et.al., 2017) show that semi-autonomous vehicles can reduce average fuel consumption by up to 5.3% depending on the driving situation and speed.

However, in most cases, positive effects have a downside. Thus, the benefit can lead to losses: for example, the most obvious fact is that by removing the “human factor” from the car control system, we create social tension by reducing the number of people involved in the transportation of drivers. In addition, the advantage, designated as “the ability to do some business during the trip”, according to doctors, can lead to an increase in ailments due to motion sickness. To avoid this, technical solutions that can be expensive are needed (Vine, S.L. et.al., 2015)

Consumers still have mixed feelings about autonomous vehicles. A HNTB survey (Autonomous vehicle knowledge..., 2019) showed that among all respondents, the vast majority (91%) believe that autonomous vehicles should have a person on board who can cancel automation in an emergency. Confidentiality issues related to data obtained from autonomous vehicles were identified by 63% of respondents.

The safety of the vehicles themselves and data security are highly valued by consumers, people need confidence that the technology is trustworthy.

The article (Bisht, M. et.al, 2017) provides a critical analysis of the modern social dilemma of autonomous vehicles. The article raises questions regarding their impact on our society and, in turn, the impact of society on these funds. When a person controls a vehicle, he feels comfortable in driving these tech cars. The control problem also covers problems arising from the possibility of hacking cars, which is associated with security.

The introduction of autonomous vehicles is fraught with a number of problems that need to be addressed, and these are, first of all, the issues of optimal cost, social tension, safety, legislative regulation so that people can be sure of these vehicles and that they are protected (Makarova et al., 2019).

3 FACTORS, THAT LIMIT TO AUTONOMOUS VEHICLES LEGAL REGULATION

The introduction of autonomous vehicles affects not only the road transport sector. Definitely, the consequences will affect the sphere of legislation,

insurance and other related industries related to the functioning of autonomous vehicles.

Among the main problems of the legal regulation of autonomous vehicles, the absence of a unified terminology in Russia can be distinguished. To describe the same vehicles with the functions of automating the control process, quite different terms are often used: autonomous vehicles, unmanned vehicles, connected vehicles, transport robots, etc.

Legislative documents should take into account the vehicles autonomy levels, since this determines the person's participating possibility in driving and, accordingly, his responsibility.

The lack of a common terminology is the main obstacle in the process of legal regulation that hinders the use of autonomous transport.

There is no doubt that in order to avoid the uncontrolled consequences of the widespread introduction of such funds in our lives, it is necessary to develop appropriate legislation. Of particular importance is the regulation of artificial intelligence systems used in transport.

In addition, for the successful development of the direction of unmanned transport technologies in the near future it is necessary to solve the issues of admitting cars with the autopilot function to public roads, and also to determine the responsibility for possible accidents involving them.

A number of countries have already made an attempt to legislatively regulate issues related to the production of highly automated and unmanned vehicles, their operation and liability for damage. So, at the National Conference of Commissioners for the Unification of the Law of the United States on October 26 - 28, 2018, a draft Act on Highly Automated Vehicles was developed. The draft Act introduces significant changes to the sections on the registration of automated vehicles and automated driving operators. Also in the United States, the Automated Driving Systems Safety Concept 2.0 Act is in force (Automated Driving Systems 2.0..., 2017), which defines 12 safety criteria for the operation of highly automated cars. At present, these provisions are advisory, but there is no doubt that legislative reinforcement of such criteria is required.

In Canada, new rules have been adopted for unmanned aerial vehicles. These rules are amendments to the applicable legal regulation for remotely controlled aircraft in Canada. The rules were developed by the Department of Transportation of Canada and relate to unmanned aerial vehicles (UAVs), which weigh from 250 g to 25 kg and are controlled within the direct line of sight of the pilot (Antonova N.V. et.al, 2019).

Regarding unmanned aerial vehicles, legislative changes have occurred in Russia. So, on March 30, 2016, Law No. 462-FZ “On Amendments to the Air Code of the Russian Federation regarding the use of unmanned aircraft” (On Amendments..., 2016) entered into force in the text of the Law the concept of “unmanned aircraft system”, “unmanned aerial vehicle”. According to paragraphs 5 - 6 of Art. 32 of the Air Code of the Russian Federation of March 19, 1997 No. 60- FL the definition of “unmanned aircraft” is fixed (Air Code of the Russian Federation..., 1997).

Of interest is the experience of the European Union (EU), where a roadmap is being developed for the deployment of vehicles with a high degree of automation in the EU. The GEAR2030 roadmap (competitive and sustainable growth of the European Union's automotive industry until 2030) focuses on three areas: adapting the production chain to new global challenges; automated and related vehicles; trade, international harmonization and global competitiveness (Gaysin S.V. et.al, 2017)

Belgium already has a Code of Practice for Testing Unmanned Vehicles (Autonomous vehicles. Code..., 2016), which defines the concept of an automated vehicle and enshrines the concept of a fully automated vehicle. Germany adopted the Unmanned Vehicles Act of June 20, 2017.

Russia was no exception. Manufacturers for a long time had problems with testing a new type of transport on the roads due to the unresolved issue. To eliminate the legal gap, an order was adopted by the Government of the Russian Federation (On approval of the action plan..., 2018), which approved a roadmap to improve legislation and remove administrative barriers in the field of automobile transport "AutoNet". The document lists 75 measures to improve the regulatory legal framework necessary for the introduction of new technologies, goods and services in the markets of electric, unmanned and connected cars, transport logistics, intellectual urban mobility, as well as telematics, transport and other information systems.

At the moment, automated vehicle control technologies remain non-standardized, this must be done taking into account international and national standards of technologically advanced countries.

The key issue remains the presence or absence of a driver in the cab. For example, the Traffic Rules in force in the Russian Federation (On the Rules of the Road, 2019), based on the Vienna Convention on Road Traffic of 1968 (Vienna Convention..., 1999), or the Charter of Road Transport and Urban Ground Electric Transport (Charter of road transport...,

2007), do not directly allow the delegation of driver functions to automatic control systems and do not imply the possibility of a driver missing from the vehicle. It should be noted that the amendments to the Vienna Convention in 2014 were not taken into account by the Russian legislator.

The infrastructure necessary for the operation of this kind of transport is only being created.

At the same time, the current trend in the legislation of economically developed countries is the responsibility on the driver for driving a vehicle even with a relatively high degree of automation, which implies the duty of the driver to maintain control over the road situation and over the vehicle. Moreover, the absence of a driver in a vehicle creates legal uncertainties that require resolution both in international treaties and in national legislation (Gaysin S.V. et.al, 2017)

As part of the implementation of the AutoNet roadmap, the Decree of the Government of the Russian Federation of November 26, 2018 No. 1415 “On the experiment on the pilot operation of highly automated vehicles on public roads” (On the experiment on the pilot..., 2018) from December 1, 2018 was prepared March 1, 2022 in the territory of Moscow and Tatarstan. The Ordinance refers to a “highly automated vehicle” in the cabin of which there is an insurance driver who does not intervene in driving. Definitions were also given to such concepts as automated control mode, automated driving system, owner and driver of a highly automated vehicle, in addition, the participants in the experiment and the order of participation were determined. It is important that the applicant, in order to participate in the experiment, must insure and maintain the risk of liability for obligations arising from damage to life, health or property of other persons to third parties in the amount of 10 million rubles for each highly automated vehicle during the period of operation.

Obviously, at this stage, as in situations related to the ordinary driver, completely emergency situations cannot be avoided. Several tragic cases involving autonomous transport are already known. So, during the Moral Machine experiment, the opinions of more than 2 million people from more than 150 countries of the world were collected on what moral principles self-driving cars should be guided in emergency situations when it is impossible to avoid human casualties and you need to choose the lesser of evils. The study showed that it would not be easy to develop a universal “moral law” for self-governing machines (Antonova N.V. et.al, 2019).

On July 17, 2018 Yandex signed an agreement with the Moscow authorities on the development of

unmanned vehicles in the city, which was a kind of soil for the development of the draft resolution. It is interesting that Yandex has already conducted tests on public roads: as early as the beginning of 2018, the car ran through the streets of Moscow. The driver was in the driver's seat, but did not touch the steering wheel. However, later it became known that the traffic police did not allow testing in Moscow. In October 2018, Yandex also launched a service on the territory of the Skolkovo Techno-park to call an unmanned vehicle through the "Yandex.Taxi" application.

Many countries are already ahead of us, not only technologically, but also because of the rapid response to regulatory needs. So, in Japan at the end of 2018, unmanned passenger buses were tested in the field. Of course, it is necessary to proceed from the realities of the readiness of roads for the exit of such vehicles in order to avoid casualties. So, even the US National Highway Traffic Safety Administration (NHTSA) has banned the use of unmanned school buses to transport children, the tests of which were recently launched by the American company Transdev.

A variety of transport robots are also courier robots, as they are designed to move goods. Estonia stepped forward in the legislative definition of this type of transport robots (Estonian Act on amendments..., 2017). Obviously, like any vehicle, courier robots must be safe. The Law discloses this criterion through requirements for road safety, provides for one more specific requirement - the obligation to provide a "black box" to authorized bodies in the circumstances established by law. Robots with similar functions exist in other national jurisdictions (for example, in the USA), but they are defined in different terms. For example, Virginia uses the term "electric personal delivery device" (Crespo Alexander P., 2017).

The problem of regulation of unmanned vehicles and automated driving is also discussed at the international level. So, from March 19 to March 23, 2018, a session of the working group on traffic safety WP1 of the UN Inland Transport Committee was held in Geneva. The session discussed the wording of the resolution on the regulation of highly automated transport, the basic principles and approaches to regulation, as well as the main definitions in this area. Already in September, a Resolution (Resolution on the implementation..., 2019) was adopted on the implementation of highly and fully automated vehicles in traffic conditions of the United Nations Economic Commission for Europe's Global Road Safety Forum, which outlines a number of

recommendations for users of high-altitude automated driving systems - and fully automated vehicles.

It should be noted the absence at the international level of a universal international treaty regulating legal, social and ethical issues in the field of artificial intelligence and unmanned vehicles. At the same time, the dominant trends include the maintenance of proper ethical standards, which are based on fundamental rights and values, including privacy and the protection of personal data, as well as the prohibition on the production and use of autonomous weapons systems. Certain aspects of the issue under consideration are regulated in the framework of the existing multilateral international treaties (Vienna Convention ..., 1999, Convention on the Law..., 1971). Within the framework of the activities of the International Organization for Standardization (CO), under the auspices of the UN, the conceptual apparatus of robotization has been developed, a classification has been presented, according to which industrial and service robots are distinguished.

Currently, the European Union is one of the key jurisdictions in which the regulation of robotics, artificial intelligence and cyber-physical systems is most fully developed. At the EU level, a number of legal studies on this issue have already been carried out. There are draft regulatory acts. Developed and successfully implemented concepts for the development of the studied industries, including from a legal point of view.

Within the EU, "the Horizon 2020" program is operating, which is the largest research and innovation program in the EU.

The Strategic Research Program (SRA) includes two related documents: The Strategic Research Program for Robotics in Europe until 2020 and the European Robotics Roadmap.

The European Union adopted Resolution 2015/2103 (INL) "Civil Law on Robotics" dated February 16, 2017. The document outlines the prospects for regulating liability for damage that may be caused by robots, a definition of the concept of "robot" is proposed, and it is also proposed to form a system of bodies on issues of robotics and artificial intelligence, aspects of creating a registration system for robots, the basic framework for developing ethical codes of manufacturers and determining the legal status of a robot in (Tikhomirov Yu.A. et.al., 2018).

In 2018, the European Declaration on Cooperation in the Field of Artificial Intelligence was adopted, which defines the main directions for the development of this field, in particular, increasing the level of information security, ensuring security in the

process of developing and using artificial intelligence, as well as increasing the accountability of artificial intelligence systems (EU Declaration..., 2018)

Summarizing the above, we can conclude that international regulation in the field of unmanned vehicles is at an initial stage. Perhaps due to the fact that there is currently no consensus among the international community on the regulation of the legal status of unmanned vehicles, it is impossible to sign any international agreement. Consequently, it is more efficient to use the law of recommendation, which will allow us to model the normative orientation, as for the legislation. It is not binding on the legislature and serves as a normative-orientating standard for them. The creation of uniform model acts serves as a means of unification and harmonization of legislation.

It is possible for the Russian Federation to initiate a model law within the framework of the Inter-Parliamentary Assembly of the CIS member states.

The main property of model acts is that they are a kind of bridge between the norms of international and domestic law. Model laws directly absorb the principles and norms of international law, translating them in a normatively concentrated form into national legislative acts. They are characterized by a recommendatory nature, which does not exclude peremptory norms recognized as voluntary commitments.

Another vector of necessary regulation is the determination of the procedure for resolving issues arising from tort. In the event of the establishment of a collective liability regime for causing damage to an unmanned vehicle, reference must be made to the relevant provisions of civil law on the collective responsibility of persons responsible for the actions of an unmanned vehicle, as well as fixing the peremptory procedure for applying this rule.

4 CONCLUSIONS

As the study showed, the legislation governing the use of highly automated vehicles is at the initial stage of its formation. Moreover, national regulation is rather fragmented, international as such is absent and lags behind national.

Despite the widespread introduction in the near future of highly automated vehicles at the international level, a universal international treaty has not been adopted that regulates legal, social and ethical issues in the field of artificial intelligence and unmanned vehicles. To date, not a single act or

technical document (standards) has been adopted only in the field of control and operation of unmanned vehicles.

Currently, in the Russian Federation, the sphere of unmanned transport is regulated exclusively by by-laws. There is no regulation at the legislative level, as a result, uncertainties and contradictions remain, which are a barrier to the further development and implementation of technology.

It seems that the next necessary step in the normative legal regulation of the operation of highly automated vehicles following the Decree of the Government of the Russian Federation of November 26, 2018 No. 1415 should be the development and adoption of an appropriate federal law reflecting its scope, enshrining the basic concepts, legal foundations, powers of state bodies authorities, requirements for the use of vehicles equipped with an automatic control system, requirements for automobile public horns, federal state control in the use of vehicles equipped with an automatic control system.

Of course, the adoption of a basic federal law will entail the need to make additions to certain regulatory acts of the federal level, and in particular, the procedure for obtaining permission to drive a highly automated vehicle, the rules for operating an unmanned vehicle and responsibility for their violations, standards that ensure the safety of a person and his rights under using an unmanned vehicle.

It will also be necessary to adopt national standards for automated vehicle control, taking into account international standards of technologically advanced countries.

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