Transport security: analysis and comparison of existing approaches

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Abstract. All countries are involved in ensuring transport security of transport infrastructure facilities and vehicles. Specialized transport security services are being created by type of transport. Each country develops its own methodologies that are acceptable in the specific conditions of the transport system functioning. However, there are general provisions. In this study, the specifics of the Russian Federation were examined and compared with the approaches used in the EU and the United States of America. Using a number of well-known methods, including the theory of qualimetry, the theory of networks, the method of expert assessments, an analysis and systematization of the existing structure and approaches in the field of transport security was carried out, on the basis of which the matrix of the existing situation in the relevant field, as well as an algorithm for ensuring security of transport infrastructure facilities and vehicles. The results obtained may be of interest to decision-makers in the field of transport security. Also, the presented results can be used for the training of specialists in the field of ensuring transport security and in the development of state programs aimed at ensuring security in the transport sector.

1. Introduction

During the period from 1970 to 2019, more than 800 acts of unlawful interference (AUI) were committed at transport facilities of the Russian Federation \cite{1}, their distribution by mode of transport is shown in figure 1.

The existence of the threat of committing new acts of unlawful interference in transport requires an analysis of existing approaches to ensuring transport security to determine their sufficiency and effectiveness.

In the works of a number of authors \cite{2-11}, various aspects of ensuring transport security were considered, but it can be noted that there are currently no works that comprehensively analyze existing approaches to ensuring transport security.

Since the beginning of the XXI century, a set of measures to ensure transport security (ETS) has been actively implemented to protect transport facilities in all countries of the world. But it can be noted that transport security (TS) at the present stage remains the most difficult socio-political and scientific-technical problem, the essence and content of which remain theoretically unexplored.

The aim of the work is to analyze and systematize the existing structure and approaches in the field of transport security, carried out using the example of the Russian Federation.
2. Methods
In carrying out this study, the following well-known methods of scientific research were used: the theory of qualimetry; network theory; method of expert assessments.

The existing practice of using specialized terms, as well as the need to develop international cooperation in ensuring transport security, necessitates the use of a specialized glossary when developing the methodological foundations of ETS. The main definitions and abbreviations in the area under consideration include the following:

- transport security - the state of protection of transport infrastructure facilities (TIF) and vehicles (V) from acts of unlawful interference (AUI);
- Act of unlawful interference (AUI) – unlawful action (inaction), including a terrorist attack, threatening the transportation safety and security, resulting in harm to life and health of people, material damage or threatening the onset of such consequences;
- subject of transport infrastructure (STI) - a legal or natural person who owns transport infrastructure facilities and vehicles or uses them on another legal basis.

3. Results
The analysis of the current regulatory framework carried out by the authors made it possible to systematize the existing structure and approaches in the area under consideration according to the following main areas:

3.1. Tasks of ETS
The main tasks of ETS established by the profile legislation of the Russian Federation are systematized in Figure 2.
3.2. Principles of ETS
The basic principles of ETS are systematized in Figure 3.

![Figure 3. Basic principles of ETS in the Russian Federation.](image)

3.3. Responsibility and control over ETS
In accordance with Federal Law No. 16-FZ dated 09.02.2007 “On Transport Security”, the provision of transport security of transport infrastructure facilities and vehicles is assigned to the subjects of transport infrastructure, unless otherwise established by the legislation of the Russian Federation.

TIF and V, ensuring of transport security of which is carried out exclusively by federal executive bodies are determined by federal laws, regulatory legal acts of the Government of the Russian Federation.

State control and supervision in the field of ensuring transport security is carried out by authorized federal executive bodies in accordance with the legislation of the Russian Federation. Currently, in accordance with the order of the Ministry of Transport of the Russian Federation No. 57, such a body is - Federal Service for Supervision of Transport (Rostransnadzor).

At this stage, the issues of ensuring transport security are regulated by more than 150 regulatory legal acts, including Federal laws, Presidential decrees, Government orders, orders of the Ministry of Transport and other federal departments. The main regulatory legal acts regulating the issues of ensuring safety is the Federal Law of 09.02.2007 No. 16-FZ “On transport security”.

As a result of the enforcement of the Federal Law of 09.02.2007 No. 16-FZ “On transport security”, a structure for ensuring transport security has formed in the Russian Federation (Figure 3).

In the Russian Federation, the competent authorities in the field of transport security for various types of transport include:

- air transport: Federal Air Transport Agency;
- railway transport: Federal Rail Transport Agency;
- sea and river transport: Federal Agency for Maritime and River Transportation;
- road transport: Federal Road Agency.

A number of public services in the field of transport security are provided by the competent state bodies (Figure 4).
Figure 4. The structure of ensuring transport security in the Russian Federation [12].

Figure 5. State services in the field of ensuring transport security.

Nowadays, in accordance with current legislation, the responsibility for ensuring transport security is assigned to the subjects of the transport infrastructure.
To implement the requirements for ensuring transport security of STI, a wide range of measures is being implemented, including:

- creation of specialized units responsible for ensuring transport security of TIF and vehicles belonging to the STI;
- equipping TIF and vehicles with engineering and technical systems for ensuring transport security (ETSETS);
- organization of training and certification of employees involved in ensuring transport security.

In general, the existing situation on ensuring transport security in the Russian Federation can be presented in the form of a corresponding matrix (Figure 5.).

Figure 6. Matrix of the current situation on ensuring transport security in the Russian Federation.

3.5. Algorithms for ETS
The algorithm for ensuring transport security in accordance with the current requirements is shown in Figure 6.

Figure 7. Algorithm for ensuring transport security in the Russian Federation.
4. Discussion
The results of the analysis of the existing structure and approaches in the field of transport security, carried out using the example of the Russian Federation, systematize the situation in the field of ETS that has developed over the period from 2000 to 2020. The importance of these results is determined primarily by ensuring the safety of passengers, personnel and visitors of transport infrastructure facilities, as well as the volume of financial investments in this area. The results of this work make it possible to assess the effectiveness of these investments, they can also be used in the development of new programs aimed at ensuring transport security in the Russian Federation.

Comparing the approach to transport security that has developed in the Russian Federation, it can be concluded that it has one main difference from the approaches used in the European Union and the United States, which is that in the Russian Federation, the responsibility for planning and implementing measures to ensure transport security is assigned to the subjects of transport infrastructure, i.e. owners of transport infrastructure facilities and vehicles. In the countries of the European Union and the United States, functions of ensuring transport security are carried out by government agencies. For example, in the United Kingdom, in the London Underground, activities for ensuring transport security are planned and implemented by the British Transport Police and the Department of Transport at the City Hall. In the United States, security of transport infrastructure facilities is carried out by a state structure - the Transportation Security Administration (TSA) [13].

5. Conclusion
This work analyzes the existing structure and approaches in the field of transport security, using the example of the Russian Federation, on the basis of which a matrix of the existing state of ETS and an algorithm for ensuring transport security of transport infrastructure facilities and vehicles have been formed. The results obtained may be of interest to decision-makers in the field of transport security. Also, the presented results can be used for the training of specialists in the field of ensuring transport security and in the development of state programs aimed at ensuring security in the transport sector.

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