TECHNICAL SURVEILLANCE SYSTEM OF THE EXTERNAL LAND BORDER, ITS DEVELOPMENT PERSPECTIVES

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Abstract: *The main task of the State Border Guard is to ensure the inviolability of the state border, including the prevention of illegal crossing of the state border. Modern technical means and innovative technologies for monitoring and controlling the state border and the border strip play an important role in the successful and efficient performance of the mentioned task. The purpose of the study: to evaluate innovative area surveillance and movement detection systems, their integration possibilities in a single platform, the possibilities of creating technically and technologically developed infrastructure and compatibility with technical means, the possibilities of information visualization and processing in the context of the implementation of border surveillance measures. The study aims to analyze the current state of the technical monitoring system of Latvia's external land border, to study its development directions, and to identify future perspectives, considering both national and international security threats. This work will examine both technological and organizational aspects related to border surveillance, as well as possible improvements and innovations that could increase the system's efficiency in the future.*

Keywords: *border, data, monitoring, technical means.*

Introduction

The technical monitoring system of the external land border of the Republic of Latvia is one of the most important components of ensuring national security and sovereignty. It plays a critical role not only in protecting the border and preventing illegal migration but also in the fight against international crime and terrorism. This system is essential not only in the context of national security but also in the context of the European Union because Latvia's external border is also the external border of the European Union.

Latvia's geographical position, being on the border between the EU and third countries, requires the use of modern and effective monitoring technologies to ensure safe and transparent border management. Considering today's challenges, such as the rapid development of technology, the increase in migration flows, and hybrid threats, the improvement of the

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technical monitoring system of Latvia's external land border is a continuous and important process.

The State Border Guard is one of the most important elements of Latvia's national security, which ensures the inviolability of the state border and the prevention of illegal border crossing. In this context, the role of the technical monitoring system of Latvia's external land border is becoming more and more important, as it ensures not only border surveillance but also a quick and accurate response to various threats.

The State Border Guard has extensive and complex tasks in the field of border monitoring, which significantly contribute to the provision of national security. Among the main tasks are controlling the state border, preventing illegal border crossing, fighting against smuggling, and responding to terrorist threats and other threats. To effectively perform these tasks, the State Border Guard uses various technical monitoring systems that allow continuous monitoring of the state border and the territory adjacent to it, as well as quick response to any threats.

The tense geopolitical situation in the Eastern European region poses serious threats to Latvia, especially in the areas of border security, illegal migration, hybrid attacks, and organized crime. The biggest risks are the aggressive behavior of Russia and its allied countries at the regional and international level, including the war against Ukraine, as well as cyber-attacks and disinformation campaigns directed against European Union and NATO members (VRK, 2024).

One of the most significant threats to Latvia is the hybrid attacks carried out by the authorities of Belarus on the external border of its neighboring countries (members of the European Union), which manifests itself as the diversion of illegal migration flows to the external borders of the European Union member states, the organization, and coordination of illegal border crossings. As a result of the mentioned actions, the State Border Guard is faced with continuous increased pressure of illegal migration on the border between Latvia and Belarus.

The complexity of the existing situation is characterized by the statistics compiled by the State Border Guard on the results of the State Border Guard's activities in the field of preventing illegal crossing of the state border (Authors compiled statistics 2021-2024):

- In 2021, 4,045 people have been prevented from illegally crossing the state border;
- In 2022, 5,286 people were prevented from illegally crossing the state border;

- In 2023, 13,863 people were prevented from illegally crossing the state border;
- In 2024 (January - August), 4,210 people were prevented from illegally crossing the state border.

Taking into account the fact that the length of the border between Latvia and Belarus is less than 173 kilometers, the mentioned statistics show that the pressure of illegal migration remains consistently high, which requires attracting additional resources to overcome the pressure of illegal migration.

In 2024, the construction of the fence on the border between Latvia and Belarus was completed, and the construction of the necessary infrastructure - patrol paths, footbridges, and other solutions necessary for the protection of the border - is currently underway along the entire 173-kilometer length of the country's border.

Fig.1 Fence and infrastructure elements (border guard unpublished image, 2023)

However, it should be taken into account that the built fence and other infrastructure elements by themselves cannot ensure complete prevention of illegal crossing of the state border. In itself, the fence serves as an obstacle that delays and makes it difficult for a person to move across the state border. Therefore, the fence needs to be supplemented with a technical monitoring system that will ensure the identification of illegal crossers of the state border already in the territory of the neighboring country, the recording of the exact location of the attempt to cross the state border illegally in real-time and the immediate transfer of information to the relevant structural unit of the State Border Guard, for quick and effective measures to prevent the illegal crossing of the state border to stop and prevent the attempt.

The basic regulatory act that determines the state border and the border guard system, as well as ensures the inviolability of the state border, is the State Border Law of the Republic of Latvia. Article 29 of this law

Stipulates that the State Border Guard uses technical means necessary for border inspection and border surveillance to ensure its functions. On the other hand, the regulations of the Cabinet of Ministers of July 27, 2010 No. 675 "Rules on the technical means necessary for border inspection and border surveillance" (LR Valsts robežas likums, 2009) defines the technical means necessary for border inspection and border surveillance, their types and purposes of use, as well as determines the requirements for technical means that are necessary for effective border inspection and border surveillance in the Republic of Latvia. These means include a variety of equipment used for person and vehicle checks, document authenticity checks, and border and territory surveillance. The rules describe in detail the functions and areas of application of the means, ensuring a high level of security and quick response to possible border violations. The planning of the amount and placement of technical means in the structural units of the State Border Guard, which is determined by the head of the State Border Guard, is also emphasized to optimize the distribution of resources and improve operational efficiency. The use of these assets is essential for maintaining national security and effective border management (LR Valsts robežas likums, 2009). Technical surveillance of Latvia's external land border includes the use of various technologies to ensure surveillance of the state border and adjacent territories, access control, and prevention of illegal activities. The system combines several components, forming a single and efficient monitoring network:

Video surveillance systems:

Video surveillance systems and presence detection systems are used to monitor national borders, prevent illegal border crossing, and maintain security. However, since these systems process and store sensitive data, their management requires a carefully designed legal framework. The State Border Guard has developed security regulations that define exactly how these systems should be used, what criteria they should meet, and how data security is ensured.

Internal regulations of the State Border Guard of January 6, 2022 No. 23.1-8.2/1 "Safety regulations for video surveillance systems and presence detection systems of the State Border Guard" regarding the use of video surveillance systems and presence detection systems. The regulations outline in detail the competence, rights, and obligations of State Border Guard officials and employees when using video surveillance systems and presence detection systems, performing system management, monitoring, and security. For example, the manager of information resources is obliged

to organize data processing by the functions of the State Border Guard, as well as to develop and maintain procedures for creating backup copies. The technical resource manager, on the other hand, is responsible for planning system development and organizing security checks. This detailed division of responsibilities ensures that systems are maintained at the highest level of security and that every aspect of the system is carefully managed. Data from video surveillance and presence detection systems must be protected with high-level security measures, such as encryption, to prevent unauthorized access. Encryption methods are regularly reviewed to ensure they meet the latest security standards. In addition, access to this data may only be granted to authorized users, and the grant, change, and cancellation of these access rights are carefully regulated. This reduces the risk of data falling into the wrong hands and ensures that only competent professionals can manage this critical data (Valsts robežsardzes videonovērošanas sistēmu un klātbūtnes noteikšanas sistēmu drošības noteikumi, 2010).

Therefore, it can be concluded that these rules cover all relevant aspects, from data encryption and backup to technical troubleshooting and access rights management. By following these rules, the State Border Guard can effectively fulfill its tasks, ensuring the security of the state borders and responding to possible threats with the highest accuracy and speed.

***Fig.2*. Video surveillance systems** (Border Guard unpublished image, 2020)

Presence detection systems: These technical means register movement, vibration, sound, and other factors that may indicate illegal activities. They are deployed in strategic locations to quickly detect border violations.

Presence monitoring systems ensure object fixation and fast information transmission, which allows the identification of the fixed object.

Fig.3 **Presence detection systems** (Border Guard unpublished image, 2022)

Communication systems and navigation devices: Ensures immediate exchange of information between border guards, enabling rapid response to events and effective coordination of operations.

Portable and stationary radio stations are used for information exchange.

Fig.4 **Communication systems and navigation devices** (Border Guard unpublished image, 2022)

In cooperation with the Latvian National Armed Forces, the State Border Guard is introducing the ATAK system, which will allow real-time monitoring of the location of both personnel and individual border guards, planning and adjusting routes, taking into account current conditions and the operational situation, marking important objects or places of interest on the map, making immediate exchange of messages between structural units of the State Border Guard, assignments of border guards and individual officials using voice and video communication, as well as text messages and image sharing.

Unmanned aerial vehicles: Provide control and surveillance of national borders, border strips, and border regime, and are used for search, pursuit, and coordination of apprehension of border violators.

Rotor-type and fixed-wing type b unmanned aircraft are used.

***Fig.5*. Unmanned aerial vehicles** (Border Guard unpublished image, 2024)

Information processing and visualization systems: Processes and visualizes collected information, ensuring quick and accurate decisions, as well as efficient distribution of resources in the appropriate places.

To ensure the creation of a high-quality and accurate picture of the national situation with its further integration into EUROSUR, in compliance with Regulation (EU) 2019/1896 of the European Parliament and the Council (November 13, 2019) on the European Border and Coast Guard and which repeals Regulation (EU) No. 1052/2013 and (EU) 2016/1624 requirements regarding the creation and maintenance of the picture of the national situation within the framework of EUROSUR, the State Border Guard continues to work on the creation of the Border Monitoring and Control System (Vikainis & Pokule, 2020).

The border monitoring and control system is designed as open-source software, which consists of several modules and, if necessary, allows for the improvement of the added modules or the addition of new modules.

The border monitoring and control system includes and visualizes information about events related to the control of the country's external border and the situation inside the country. For the transparency and systematization of information, several groups of information are used in the Border Monitoring and Control System, by EUROSUR information systematization standard (Vikainis & Pokule, 2020).

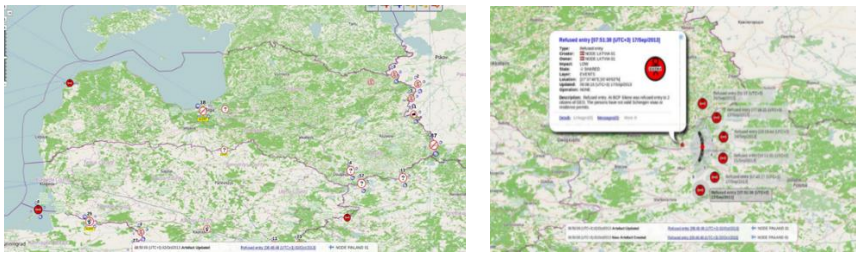

***Fig.6*. Visualization of information in the Border Monitoring and Control System** (Border Guard unpublished image, 2024)

Lithuanian practice: Cooperation with Lithuania is an essential element in ensuring the security and stability of the Baltic region and the EU. As one of the EU and NATO member states, Lithuania plays a strategic role in regional security issues, especially due to its geopolitical location bordering Russia and Belarus. Cooperation with Lithuania covers a wide spectrum, from border protection and security issues to economic and political cooperation, making this partnership an important aspect both in bilateral relations and in the wider European and international context. Ever-increasing security requirements and common challenges create the need for even closer cooperation based on mutual trust and common goals.

The introduction of the Lithuanian border surveillance system and its alignment with EU standards has been carefully planned and executed, and this process provides important lessons for both the country's internal security and the common understanding of the European border protection system. Lithuania's accession to the EU required the adjustment of state border control by EU standards. It was a complex process, which included the demarcation of the country's border with Russia, the creation of the necessary infrastructure, and the equipping of the State Border Guard Service (SBGS) with modern technologies. The purpose of these measures was to ensure Lithuania's readiness to become part of the Schengen area, which requires the highest possible level of security at the external borders (Lietuvas Republikas valdības apstiprinātie plāni Valsts robežas aizsardzības attīstības programmas īstenošanai, 2002).

Although Lithuania did not need to extensively align its legislation with EU requirements for border surveillance, some significant amendments were made. Mainly, the law on the state border and its protection were updated, including new terms and adjusting the organizational structure of the SBGS. These amendments were necessary to ensure that the Lithuanian border surveillance system is both effective and compatible with EU requirements. Harmonizing legislation and improving the organizational structure was a critical step to guarantee safe and effective border control.

The Schengen Borders Code (Union Code on the rules governing the movement of persons across borders (Šengenas Robežu kodekss, 2016), the main document in border surveillance, states that border surveillance should be oriented towards the prevention of illegal border crossings using stationary and mobile units supported by risk analysis. Lithuania's approach to this issue is aimed at nearly 100% situational awareness, which is achieved through a combination of human resources, physical barriers, and

modern technology. The border is divided into different risk sectors and the monitoring frequency is adjusted according to the identified threats.

***Fig.7*. Infrastructure and technical equipment of the Republic of Lithuania** (Unpublished images of the Lithuanian Border Guard, 2022)

Despite the achievements, Lithuanian border surveillance faces several challenges, including difficult terrain and visibility problems at certain sections of the border. These challenges require continuous adaptation of systems and strategies to ensure maximum security.

As security requirements in the European Union continue to grow, Lithuania's experience in creating and maintaining border surveillance systems is becoming an important example for other countries. Constant technological development and cooperation with EU partners will help ensure that Lithuania retains its position as one of Europe's most secure external borders.

Therefore, it can be concluded that Lithuania's successful integration into the EU and its achievements in border surveillance is a story of determination and adaptation to growing security requirements. This experience not only strengthened Lithuania's security but also made a valuable contribution to the common security architecture of the European Union. In the future, Lithuania will continue to be an important player in the EU border protection system thanks to its innovations and effective security strategies.

In conclusion, it can be concluded that the technical monitoring system of Latvia's external land border is an essential element of national security, which requires continuous development and improvement, taking into account changing security threats and technological development. Effective and sustainable border management requires a focus on several critical areas. First, technological innovation should be considered a cornerstone, as modern surveillance technologies such as drones, thermal cameras, and

sensors are capable of significantly increasing the efficiency and speed of border surveillance. Secondly, the modernization of the infrastructure, including the improvement of physical barriers and the development of communication networks, will ensure the operational and safe operation of the border guard. Third, personnel training and capacity building are essential for border guards to be able to effectively use new technologies and respond to today's challenges.

International cooperation with EU member states and Frontex is another important dimension that allows the sharing of experience and ensures coordinated action at the EU level.

Finally, the provision of financial and political support is critical to achieving all the above areas of development. Without adequate funding and strategic vision, these initiatives will not be fully implemented. Thus, only with an integrated and long-term approach is it possible to achieve a safe and well-protected border of Latvia, which in turn will strengthen the sovereignty and stability of both the country and the European Union.

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