

PRACTICAL ASPECTS OF USING THE PRESENCE DETECTION SYSTEMS IN THE STATE BORDER GUARD

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Abstract. *The authors of the article analyse data on the effectiveness of presence detection systems in state's border guarding and characterize presence detection systems used by the State Border Guard, as well as summarize international experience of presence detection system usage. Aim of the research is to explore practical aspects, problems and development facilities of all presence detection systems used by the State Border Guard of Latvia.*

Keywords: *presence detection systems, the State Border Guard, effectiveness of presence detection systems.*

Introduction

New technologies (2) are used to ensure and promote the security of the state border as well as the internal security of society. The EU conducts “technology upgrade” (1) to ensure the security of the EU's border. Since 2016, the State Border Guard (SBG) has acquired new presence detection systems to increase capacity of the state border surveillance, thus contributing to assurance of the state's integrity and internal security.

Any state must take care of the national border security systems (3). When guarding the eastern border of Latvia, the State Border Guard staff would be the first exposed to certain manifestations of external threats (6). The SBG must be equipped with the primary reporting systems for illegal operations at the state border, that is, by the presence detection systems.

Aim of the research: to explore practical aspects, problems and development facilities of all presence detection systems used by the State Border Guard of Latvia.

The following methods are used within the framework of the research: general economical and statistical analysis, logically constructive method; qualitative research methods – descriptive method, analysis and synthesis method; quantitative research methods – graphic data display methods (MS Excel).

Role of the presence detection systems in surveillance of the external border

The task and function of the State Border Guard is to ensure national security. The national security measures are determined by the Law on the

State Border of the Republic of Latvia, the National Security Law of the Republic of Latvia, and the Law on National Security Authorities of the Republic of Latvia. Safeguarding of the national security is a set of measures to guarantee the integrity of the State border and to prevent the national threat (5). Border surveillance is one of the tasks carried out by the SBG for the provision of the security of the State border.

As defined in Article 13 of Regulation 2016/399 of the European Parliament and of the Council of 9 March 2016 on the Union Code on the rules governing the movement of persons across borders (Schengen Borders Code), to fulfil the objective of the border surveillance (to prevent unauthorized border crossings, to combat cross-border crime and to take measures against persons, who cross the border illegally) the presence detection systems are used by the SBG for border surveillance. Surveillance may also be carried out by using technical means (7). The Cabinet of Ministers determines the technical means necessary for border checks and border surveillance (5). The use of the technical means for the border surveillance is determined by Regulations No. 268 “On the Establishment and Maintenance of the State Border of the Republic of Latvia” of the Cabinet of Ministers dated May 3, 2016. In order to use the technical means efficiently, it is necessary to carry out work for the establishment and maintenance of the border of the Republic of Latvia.

The establishment and maintenance of the State border of the Republic of Latvia on the external border of the European Union is specified by Regulations No. 268 “On the Establishment and Maintenance of the State Border of the Republic of Latvia” of the Cabinet of Ministers dated May 3, 2016.

Aim of the use of the presence detection systems for border surveillance includes the following:

- 3.1. Detection of the presence of objects (people, vehicles, etc.), transmission of information and determination of the movement direction of an object;
- 3.2. Control of the State border and border area regime;
- 3.3. Providing the security of the State border guard objects;
- 3.4. Providing tactical training;
- 3.5. Providing other State border control measures. (8)

The presence detection systems are designed for the control of the State border, border zone and borderland regime. The State border zone regime is in force at the State border zone along the external border. (5) Consequently, the State border regime requires that the stay of unauthorized persons at the State border is prohibited except in the cases of border surveillance, maintenance and renewal of the State border, repair of communications, cartographic or disaster recovery works as consistent

with the SBG. In order to ensure uninterrupted surveillance of the State border security, the SBG is provided with human resources and technical means of border control. The technical means of border surveillance for detecting violations of the State border regime are of great importance in ensuring the security of the State border.

The technical means of border surveillance to control the State borders, border areas and border area regime, and surveillance of territorial sea and inland waters (9) are the presence detection systems.

The European Border and Coast Guard Agency (FRONTEX) defines the presence detection systems as objects for identification and monitoring the borders supported by other means to validate, track, and identify the object of interest. (4)

The SBG uses area surveillance and motion detection systems. The presence detection systems allow a large part of the border lanes to be covered by minimal human resource and detect an offense without the presence of a border guard at the State border. The presence detection systems are one of the most effective means of border surveillance that detects offenders.

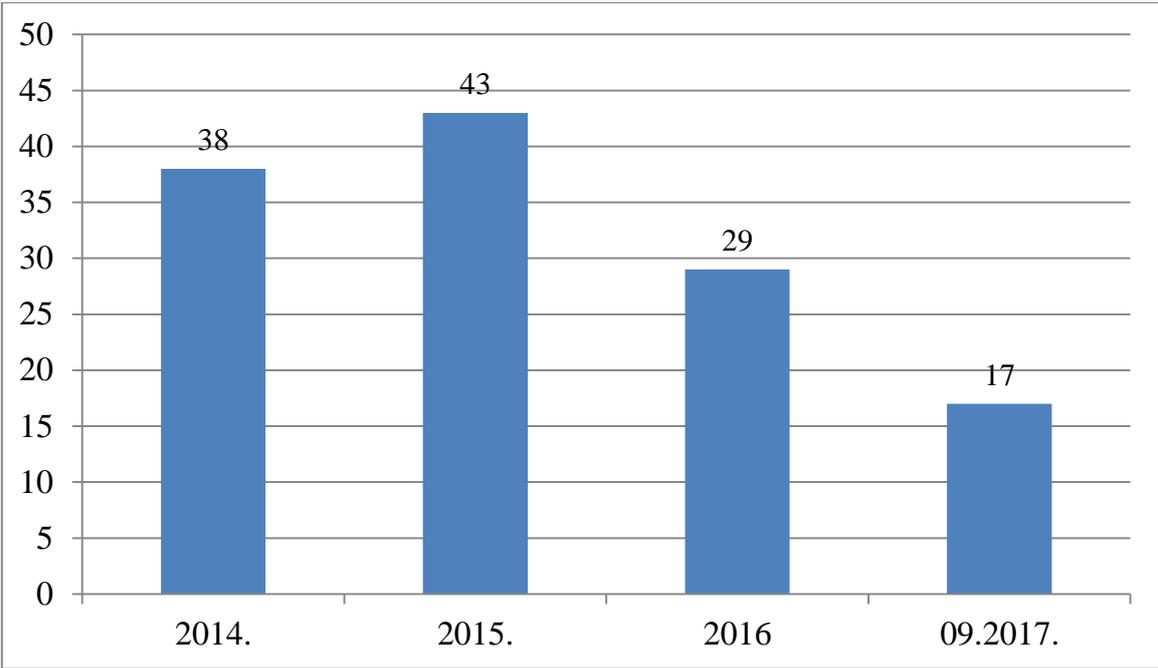


Figure 1. Number of persons detained on the LV-RU and LV-BY borders by the presence detection systems in the period from 2014 until September 30, 2017 (11)

Summing up data, 127 (12%) of 1095 persons detained on the border were detained by the means of presence detection systems from 2014 to September 30, 2017.

Characteristics of the presence detection systems used by the state border guard

In order to improve the security of the State border, the four types of the presence detection systems are widely used in the SBG:

- QUAL TRON;
- SMARTDEC GSM;
- SMARTDEC 869MHz;
- DEFENDGUARD.

Until 2017, the SBG used *Qual-Tron* and *Racall Classic 2000* presence detection systems. Currently, only *Qual Tron* is used; the system is outdated and no longer produced, its repair is expensive. The SBG has acquired *SmartDec GSM*, *SmartDec 869MHz*, and *DefendGuard* presence detection systems following the modern technologies.

The number of available presence detection systems allows covering about 7.8 km of 445 km of the State border of Latvia, i.e. only 1.7%. On the other hand, more presence detection system resources to ensure security of the borders are used in Lithuania and Estonia.

In order to ensure the integrity of the State border and internal state security, to prevent possible threats to national security and the risks of illegal migration, the SBG deploys the presence detection systems not only on the State border, but also in the border zone and borderland, where the private property of individuals is located. Since the specificity of the existing presence detection systems allows the placement of the masts and the State border is not set up for this purpose, the SBG deploys the presence detection systems in the adjacent territory - in the border zone and the borderland.

Border guards throughout the border zone (...) have the right to perform their duties, move freely, check personal documents, and control vehicles and their cargoes (12) Consequently, border guards can move throughout the border zone while performing their duties, including performing their official duties in private property, but there is no regulatory framework for ensuring the security of the State border through technical means in the border zone and the borderland.

In order to implement the provision of the State border and national internal security, amendments to the third part of Article 13 of the Border Guard Law should be amended. At present, the third part of Article 13 "Border Guard Tasks" of the Border Guard Law instructs "to observe the land area, waters and airspace adjacent to the State border" (12). The word "observation" is not followed by the specification of the means to be used for the observation of the territory adjacent to the State border. Therefore, the authors of the paper proposes to amend the third part of Article 13 of

the Border Guard Law using the following wording: "to carry out border checks on land, waters and airspace observation with the technical means of border surveillance". The use of technical means of border control is determined in accordance with the procedures specified by the Cabinet of Ministers.

Table 1. Advantages and disadvantages of the existing presence detection systems in the SBG

	Advantages	Disadvantages
<i>Qual Tron</i>	<ul style="list-style-type: none"> • Simple to set up • No special technical support is required for installation • The operation is not affected by the area • Easy to disguise • Battery life • Mobile 	<ul style="list-style-type: none"> • Outdated • False alarms • No moisture resistant • No longer manufactured • Performance of each sensor or sensor circuit has to be checked
<i>Smart Dec GSM</i>	<ul style="list-style-type: none"> • Takes pictures when an object enters the sensor's operation field • Simple application • Installation • No limited deployment distance from border guard unit (BGU) • Not effected by weather • No false alarms • Detector captures objects when there is no connection at the radio-communication; after the connection is restored, photos are sent • Mobile 	<ul style="list-style-type: none"> • Location of the deployment depends on the Internet signal • Discreet installation cannot be performed • Battery life • Flash element is in bright, shimmering colour • Can cover a small part of the State border
<i>Smart Dec 869MHz</i>	<ul style="list-style-type: none"> • Takes pictures when an object enters the sensor's operation field • Simple application • Not effected by weather • No false alarms • Detector captures objects when there is no connection at the radio-communication bridge; after the connection is restored, photos are sent 	<ul style="list-style-type: none"> • Limited deployment distance from BGU • Detection of the presence detection system components (antenna) in the area • Influenced by the area • Can cover a small part of the State border • Limited mobility

<i>Defend Guard</i>	<ul style="list-style-type: none"> • Multifunctional (performs video recording and captures earth-generated vibrations) • Operating time of the seismic sensor's battery • Can cover long distances of the State border • Long-term dislocation site • Easy to disguise 	<ul style="list-style-type: none"> • Limited deployment distance from BGU • Detection of the presence detection system components (antenna) in the area • Influenced by the area • Long-term dislocation site
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In addition, the SBG needs to develop an agreement with landowners regarding the installation of the presence detection systems in their property, if the property is located near the State border zone. At present, the border guard unit (BGU) installing the presence detection systems in the border zone and the borderland with an aim to prevent violations of border, borderland and border zone regime is responsible for the installation.

While carrying out economic activities at his/her property, landowner could damage the presence detection systems. Amendments to the law and an agreement with the landowner would allow the legal use of the presence detection systems in the border zone and borderland. Cooperation with landowners would be established to ensure the security of the State border and prevent illegal migration, while preserving the discretion of the locations of the presence detection systems.

The SBG has purchased new and up-to-date presence detection systems operating in the radio frequency range and GSM network. Each of the operating principles of the presence detection systems has problems that are faced by the SBG in performing border surveillance tasks. One of the problems is the coverage of the GSM signal on the State border and the border zone. The SBG uses *SmartDec GSM* presence detection systems and uses the Internet services of two mobile operators – *LMT* and *TELE2*. The Internet signal from mobile operators in the immediate vicinity of the State border is weak or there is no signal at all.

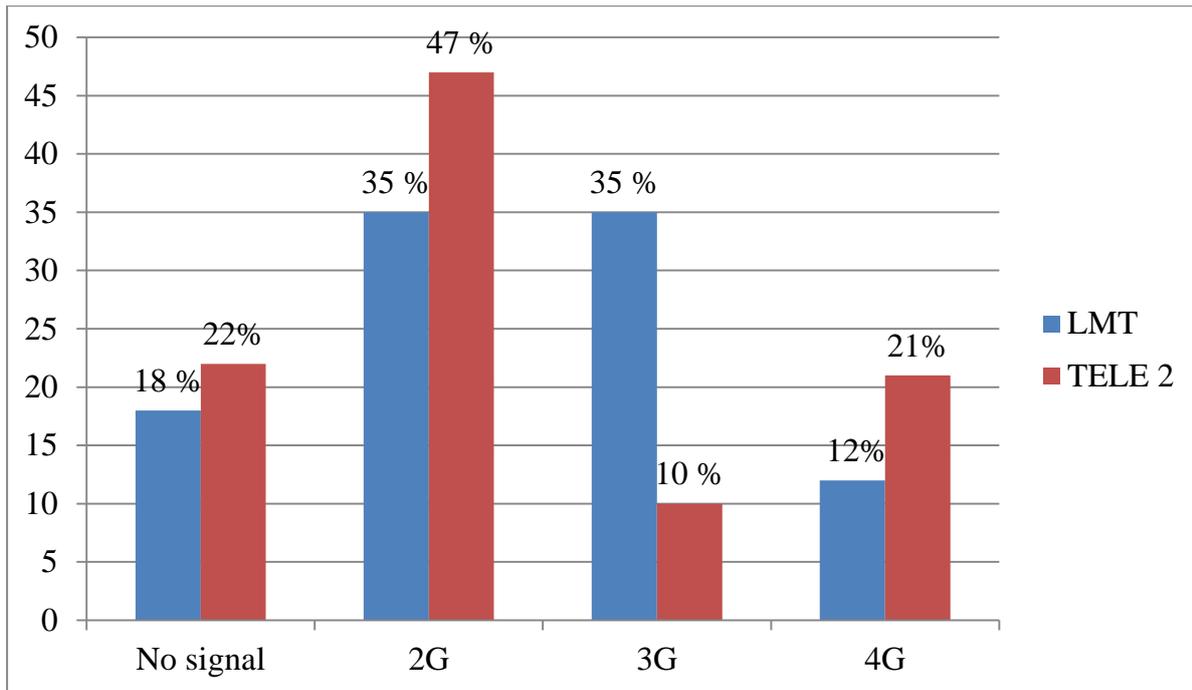


Figure 2. The GSM coverage of the mobile operators *LMT* and *TELE2* at the SBG Daugavpils Board on the State border (13)

The main problem of the *SmartDec GSM* presence detection system is related with transfer of incident photos from radio-communication bridge to workstation using mobile Internet connection. Accordingly, there are problems with loading incident photos; moreover, use of *SmartDec* application on a tablet on the State border is not possible.

Considering the total length of the State border with no Internet coverage and with only 2G signal, it leads to number of 105 km of the State border where it is, in fact, impossible to install the *SmartDec GSM* presence detection systems. Consequently, the *SmartDec GSM* presence detection systems cannot be used in section of 105km of the state border, practically, that is length of all Latvian-Belorussian border. There are only 67 km (of 172 km) of the State border with 3G or 4G Internet signal where *SmartDec* presence detection system operates without any technical interruption during information transfer and loading.

According to the figure above, the SBG Daugavpils Board mostly uses *LMT* Internet coverage for *SmartDec GSM* presence detection systems. Comparing *LMT* and *TELE2* 3G and 4G Internet coverage, it has to be concluded that *LMT* Internet coverage on the state border is better than coverage of *TELE2* Internet.

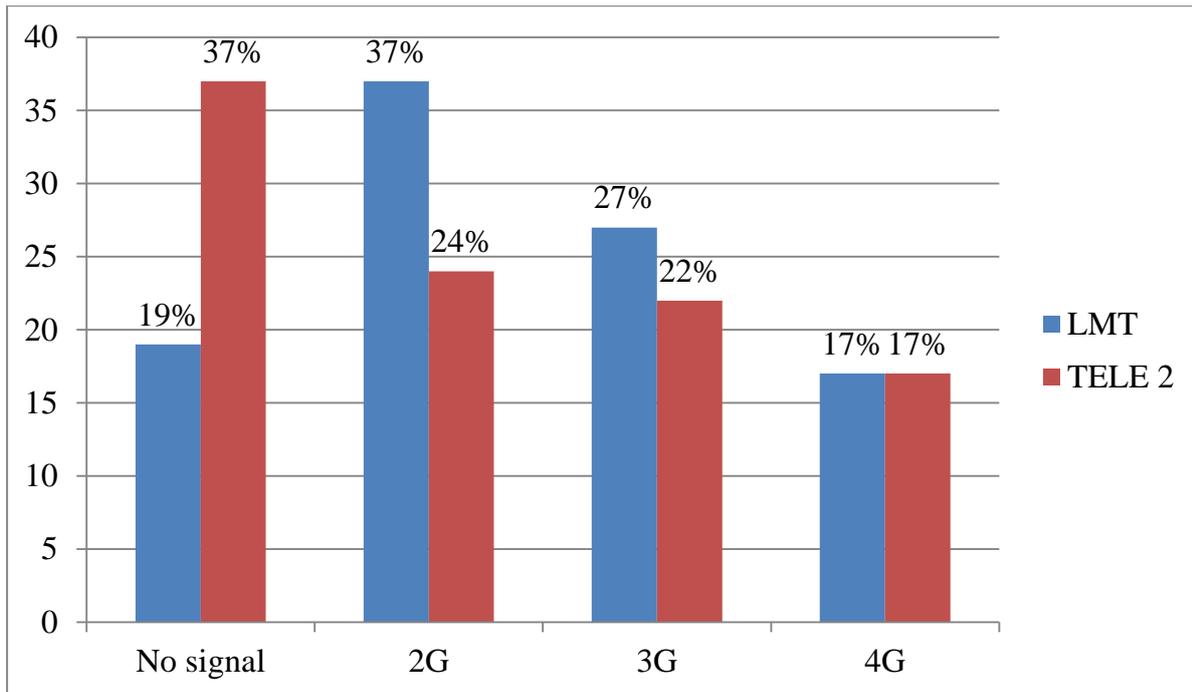


Figure 3. The GSM coverage by the mobile operators *LMT* and *TELE2* at the SBG Ludza Board on the state border (10)

2G Internet coverage is irregular. Thus, there is 81 km of 138 km long section of the state border guarded by the SBG Ludza Board with no Internet coverage at all. There are only 57 km of 138 km of the state border covered with 3G or 4G Internet signal where *SmartDec* presence detection system operates without any technical interruption during information transfer and loading.

Analyses of data on Internet coverage at the SBG Ludza Board shows that both *LMT* and *TELE 2* provide equivalent Internet coverage that can be used.

The authors of the paper suggest that the SBG shall provide the *SmartDec* GSM presence detection systems with Internet signal amplifier antennas. As one of the ergonomic antennas *ATK-8/2.4 GHz GSM* antenna manufactured by the Polish company *Navi-Netpl* could be proposed.



Figure 4. ATK-8/2.4 GHz GSM antenna (14)

The *ATK-8/2.4 GHz* antenna is designed for data transmission in the 2.4 GHz frequency band (14). The *SmartDec GSM* presence detection systems transmit data in the 2.4 GHz frequency band. The antenna amplifies GSM signal from the base station to distance of 10 km (15), and its operation is minimally affected by external obstacles in area.

One of the most essential problems is type of the vehicle that is used to implement the preventive measures for the presence detection systems – installation, inspection, change of the system's location, and other tasks necessary for operation of the presence detection systems.

At present, the SBG quad bikes and off-road vehicles are used to ensure the preventive measures for the presence detection systems. Due to the construction of the state border, access to the presence detection systems is difficult. The service experience of the authors shows that it is not possible to ensure the prevention work of the presence detection systems by using the SBG vehicles.

For example, in order to implement the preventive measures for *SmartDec GSM*, *SmartDec 869 MHz*, and *DefendGuard* presence detection systems, the necessary equipment should be the following: aluminium folding stairs (4 m, weight ~15 kg); nuts; repair keys; security equipment; cordless screwdriver; other necessary accessories.

It can be moved to the maximum close location of the presence detection systems in the car, but the necessary equipment and accessories has to be taken further on foot where distances may vary from a few hundred meters up to a kilometre or more. Walking with such equipment makes the prevention of the presence detection systems no longer discreet. Thus, the location of the presence detection systems could be detected by offenders or their supporters.

It is not safe to move this amount of equipment with a quad bike because it is not fitted with a cargo box, where the necessary equipment can be safely placed and fastened without danger to health of a border guard while driving.

In order to avoid traumatizing border guards, to ensure safe and ergonomic prevention of the presence detection systems, the authors suggest the SBG should acquire a *John Deere XUV855M* vehicle of *John Deere Gator* for each BGU unit.

The use of such techniques would increase the capacity of the State border surveillance, because the vehicle is multifunctional; it can be used for the examination and surveillance of the State border, as well as for the tasks of the border guard task force and performance of other duties at the State border.

Conclusions and suggestions

1. In Latvia, there is no individual legal regulation on the installation of the presence detection systems in the borderland and border, when it affects private property of a physical person. There is no appropriate technical support for a team of two border guards with necessary equipment to get to the presence detection system dislocation places safely and effectively. There is not enough of the presence detection systems on the State border. Border guards are not trained to work in altitude; it influences the placing and prevention of the presence detection systems. The State borderland with engineering support in order to put up *SmartDec* and *DefendGuard* presence detection systems is not established.
2. The Central Board of the State Border Guard should amend the Law on the State Border Guard particularly on the installation of the presence detection systems in the borderland and border zone concerning private-ownership territories. Amendments to the law will make it possible to ensure the security of the presence detection systems and the free surveillance of the borderland and border zone.
3. The Central Board of the State Border Guard should purchase *John Deere XUV 855M* vehicle for border surveillance. This vehicle is multifunctional; it can be used for working groups, State border inspection and other border surveillance tasks.
4. The Central Board of the State Border Guard should purchase additional *SmartDec GSM* presence detection systems in each Border Surveillance Unit in order to increase the capacity of the State border surveillance and security of the State border.
5. The Central Board of the State Border Guard should update the issues of occupational safety at facilities and provide border guards with the opportunity to attend practical training regarding the work at height which would be organized by companies that have specific work at heights and related environment.
6. In order to ensure the use of the presence detection systems on the State borderland, the Central Board of the State Border Guard should provide the State border with masts at the sections of a high risk of illegal migration. Providing the State border with masts would allow the effective use of the presence detection system and ensure prevention of illegal migration.

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