

LEGAL REGULATION OF THE IMPLEMENTATION OF INTELLIGENT VIDEO MONITORING SYSTEMS IN THE LAW ENFORCEMENT ACTIVITIES OF UKRAINE: EUROPEAN STANDARDS AND FOREIGN EXPERIENCE

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INTRODUCTION

Taking into account the martial law, the current level of ensuring the security of the population of Ukraine from threats to life, health and property does not fully meet the security standards inherent in leading countries of the world. Given the complexity and diversity of factors affecting the level of ensuring national security, the state and dynamics of crime, the degree of protection of the population from emergencies, a fundamental improvement in the security situation in the country can be achieved only through the combined efforts and joint coordinated work of security forces, other state bodies and local governments¹.

An important reference point for Ukraine is the experience of high-tech countries in the large-scale use of technical means and devices, in particular with photo, audio and video recording functions, which provide the possibility of early detection of offenses, identification of persons and objects, as well as monitoring of vehicles. Currently, measures in this direction are fragmentary, which necessitates the creation of comprehensive video monitoring systems for public safety as a tool for increasing the effectiveness of criminal offense prevention, protection of the population, territories and objects of critical infrastructure of the state.

By Decree of the President of Ukraine dated May 11, 2023 No. 273/2023, the Comprehensive Strategic Plan for Reforming Law Enforcement Agencies as Part of the Security and Defense Sector of Ukraine for 2023–2027 was approved². The plan provides for a comprehensive digital transformation, in particular:

– Further implementation of innovative technological achievements in the activities of law enforcement agencies and the prosecutor's office, ensuring the flexibility of operational processes, IT solutions, digital capabilities to

¹ Про єдину систему відеомоніторингу стану публічної безпеки: проект Закону від 20.02.2024 р. № 11031. URL: <https://itd.rada.gov.ua/billInfo/Bills/Card/43733>

² Про Комплексний стратегічний план реформування органів правопорядку як частини сектору безпеки і оборони України на 2023 – 2027 роки: Указ президента України від 11.05.2023 №273/2023. URL: <https://www.president.gov.ua/documents/2732023-46733>.

promptly respond to events and changes and achieve results focused on the interests of society;

- Implementation of security measures and personal data protection in accordance with EU standards;

- Implementation of a unified personal authentication system and biometric matching system in all law enforcement agencies and the prosecutor's office, gradually ensuring its compatibility with European systems. Widespread use of artificial intelligence, blockchain, cloud computing and other innovative solutions during pre-trial investigations, as well as for data processing and analytical activities of law enforcement agencies and the prosecutor's office³.

Many well-known Ukrainian scientists have devoted their scientific works to the issue of using information technologies for the prevention and investigation of criminal offenses, in particular G.K. Avdeeva, V.S. Batyrgareeva, V.I. Borisov, T.Ya. Gnidets, Yu.I. Dmytryk, K.V. Dubonos, N.M. Dyachenko, V.A. Zhuravel, V.P. Zakharov, A.O. Ignatovych, R.S. Kozyakov, V.O. Konovalova, T.M. Lemekha, A.M. Lysenko, O. S. Melnyk, A. O. Moroz, I. V. Oleshko, Yu. V. Osadcha, O. V. Rybalsky, V. I. Rudeshko, V. I. Solovyov, L. I. Sopilnyk, I. O. Suprun, V. V. Topchiy, A. O. Fesenko, V. G. Khakhanovsky, L. M. Khmelnychyy, R. Yu. Tsarev, V. A. Shvets, V. M. Shevchuk, V. Yu. Shepitko, and others⁴.

It should be noted that the literary sources mainly considered individual aspects of the use of video monitoring technologies in the activities of law enforcement agencies. At the same time, in our opinion, the issues of legal regulation of the use of such systems in Ukraine, the positive experience of other high-tech countries and the prospects for the use of such technologies in the context of ensuring the safety of the population of Ukraine from threats to life, health and property were not sufficiently covered. Therefore, the issue of studying the possibility of introducing such technologies into activities related to the investigation and prevention of criminal offenses requires further consideration. Also, in connection with the war in Ukraine, the issue of using the capabilities of video monitoring technologies in increasing the efficiency of the investigation of war crimes and crimes of aggression in Ukraine is extremely relevant.

³ Про Комплексний стратегічний план реформування органів правопорядку як частини сектору безпеки і оборони України на 2023 – 2027 роки: Указ президента України від 11.05.2023 №273/2023.

⁴ Shevchuk, V., Morozova T., Chornyi, H., Nehrebitskyi V., and Slobodeniuk, I. Artificial Intelligence in Criminal Proceedings: Criminalistic and Criminal Procedural Problems. *International Annals of Criminology*, 2025. Pp. 1-19. DOI: <https://doi.org/10.1017/cri.2025.10090>.

Therefore, researching global trends in the implementation of intelligent video monitoring systems and analyzing the possibilities of their adaptation in Ukraine is a scientifically sound and practically necessary task that meets the modern challenges of digital transformation and the needs for improving regulatory regulation.

1. Problems of regulatory regulation of personal data protection when using intelligent video monitoring systems in the field of public security

The rapid development of digital technologies and the introduction of video monitoring systems for public safety in Ukraine create new opportunities for ensuring law and order, combating crime and increasing the level of public safety. At the same time, these processes are accompanied by significant risks of violating the right to privacy and protection of personal data.

Automated video monitoring systems based on biometric technologies have become key for law enforcement agencies. They help to effectively investigate and prevent crimes, promptly identify suspects, track their movements and prevent threats, increasing the level of public safety. The use of biometric technologies, facial recognition systems and analytical algorithms in real time involves the processing of significant amounts of personal information, which requires clear legal regulation and effective control mechanisms.

In Ukraine, the legal framework for the protection of personal data is defined by the Law "On the Protection of Personal Data"⁵, as well as international instruments ratified by the state, in particular the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (ETS No. 108). and the Additional Protocol thereto. However, modern technological challenges associated with the integration of video surveillance systems into a single information space require harmonization of national legislation with European standards enshrined in the General Data Protection Regulation (GDPR) (Ovcharenko, 2018).

In Ukraine, the protection of personal data in video monitoring systems for public security must comply with the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data⁶, the Additional Protocol to the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data concerning supervisory

⁵ Про захист персональних даних: Закон України від 01.06.2010 № 2297-VI. URL: <https://zakon.rada.gov.ua/go/2297-17>

⁶ Конвенція про захист осіб у зв'язку з автоматизованою обробкою персональних даних. Страсбург. 28.01.1981. URL: https://zakon.rada.gov.ua/laws/show/994_326#Text

authorities and transborder data flows⁷, the General Data Protection Regulation (GDPR) adopted in the European Union⁸, as well as legislation in the field of information protection. To implement the GDPR into the legislation of Ukraine, the People's Deputies of Ukraine submitted a draft Law of Ukraine "On the Protection of Personal Data" (Registration No. 8153) on 25.10.2022⁹.

The GDPR establishes fundamentally new rules for the processing of personal data that have extraterritorial effect. This means that its provisions apply not only to EU Member States, but also to entities operating in the EU market or processing data of Union citizens. For Ukraine, which is actively implementing digital services and integrating into the European space, the implementation of GDPR norms is not only a matter of time, but also a condition for ensuring competitiveness at the international level. According to Article 3 of the Regulation, data processing within the framework of monitoring the behavior of individuals located in the EU falls under its scope, even if the controller or operator is located outside the Union (GDPR, 2016).

Public security video surveillance systems, especially those using biometric technologies, pose increased risks of privacy breaches. The collection, storage and analysis of video images that allow for the identification of a person constitutes the processing of personal data within the meaning of the GDPR. This requires compliance with the principles of lawfulness, proportionality and data minimization, as well as ensuring the rights of data subjects, including the right to access, rectify and delete information. At the same time, Ukrainian legislation does not yet contain comprehensive mechanisms for controlling the use of such technologies in the field of public security, which creates legal gaps and risks of abuse.

Addressing the issue of personal data protection in video surveillance systems requires a comprehensive approach. First, it is necessary to harmonize national legislation with the provisions of the GDPR, including the introduction of an independent supervisory authority to oversee compliance with data processing rules. Second, it is necessary to provide for the mandatory appointment of data protection specialists in state authorities and private structures operating video surveillance systems. Third, it is important to implement technical and organizational security measures, such as encryption, anonymization and restriction of access to information. Finally, it is necessary to establish effective sanctions for violations of personal data

⁷ Додатковий протокол до Конвенції про захист осіб у зв'язку з автоматизованою обробкою персональних даних щодо органів нагляду та транскордонних потоків даних. Спробує: 08.11.2001. URL: https://zakon.rada.gov.ua/laws/show/994_363#Text.

⁸ Загальний регламент про захист даних (GDPR). URL: <https://gdpr-text.com/uk/>

⁹ Про захист персональних даних: проект Закону від 25.10.2022. № 8153. URL: <https://itd.rada.gov.ua/billinfo/Bills/Card/40707>.

processing rules that meet European standards and provide a real preventive effect¹⁰.

The implementation of GDPR in Ukraine is of strategic importance not only for the protection of citizens' rights, but also for the development of the digital economy and integration into the European legal space. In the context of developing a public security video monitoring system, this will allow combining the effectiveness of law enforcement activities with privacy guarantees, ensuring a balance between security and human rights, and increasing public trust in state institutions.

On February 20, 2024, the Verkhovna Rada of Ukraine registered a draft law “Pro yedynu systemu videomonitorynhu stanu publichnoi bezpeky” (On a Unified System of Video Monitoring of the State of Public Security), which proposes to introduce a unified all-Ukrainian video monitoring system using citizens' personal data¹¹. The presented project was developed to ensure national and state security, increase the general level of public safety and order, ensure the safety of citizens' places of residence and stay by introducing a unified video monitoring system of public safety on the basis of state authorities and local governments in accordance with uniform functional and technological standards, which will provide monitoring and contribute to the prevention and elimination of possible threats, as well as control over the elimination of the consequences of emergencies and offenses.

The draft law stipulates that state regulation of public relations in the field of creating and implementing a unified system of video monitoring of the state of public safety will be based on the following principles:

- the rule of law;
- legality;
- respect and observance of human and citizen rights and freedoms;
- openness and transparency;
- continuity;
- ensuring the security of individuals, society and the state when using information and communication technologies;
- respect for human dignity;
- openness to democratic civil control.

In order for the future video monitoring system of Ukraine to work, the draft Law provides for regulatory regulation in the following important areas:

¹⁰ Овчаренко Я.О. Регламент захисту персональних даних європейського союзу (GDPR) та можливість його застосування на території України. *Юридичний науковий електронний журнал*. 2018. №3. С.236-239. http://lsej.org.ua/3_2018/68.pdf

¹¹ Про єдину систему відеомоніторингу стану публічної безпеки: проект Закону від 20.02.2024 р. № 11031. URL: <https://itd.rada.gov.ua/billInfo/Bills/Card/43733>

- unified functional and technical requirements for the construction and operation of video monitoring systems of the state of public safety at the central, regional and local levels, departmental video monitoring systems of enterprises, institutions, organizations (regardless of ownership forms) and individuals installed in public places, the procedure for access to information, as well as the composition of video data, metadata, analytical data, video archives, and alarm signals generated by them;

- ensuring unified rules for information exchange at the state, regional and local levels between entities of the unified system of video monitoring of the state of public safety through a single information space, taking into account the delimitation of access rights to information;

- ensuring the protection of information, including personal data, in video monitoring systems of public security at the central, regional and local levels and in departmental video monitoring systems of enterprises, institutions, organizations (regardless of ownership forms) and individuals located in public places. According to the authors of the bill, the implementation of a unified system of video monitoring of the state of public safety corresponds to and is based on such important regulatory legal acts as the Constitution of Ukraine, the Civil Protection Code of Ukraine, the laws of Ukraine "Pro natsionalnu bezpeku Ukrainy" (On National Security of Ukraine), "Pro zakhyst informatsii v informatiino – komunikatsiinykh systemakh" (On Information Protection in Information and Communication Systems), "Pro elektronni komunikatsii" (On Electronic Communications), "Pro krytychnu infrastrukturu" (On Critical Infrastructure), "Pro obiekty pidvyshchenoi nebezpeky" (On High-Danger Facilities), "Pro Natsionalnu politsiiu" (On the National Police).

Indeed, the Decree of the President of Ukraine No. 273/2023 of May 11, 2023 approved "Kompleksnyi stratehichnyi plan reformuvannia orhaniv pravoporiadku yak chastyny sektoru bezpeky i oborony Ukrainy na 2023–2027 roky" (the Comprehensive Strategic Plan for Reforming Law Enforcement Agencies as Part of the Security and Defense Sector of Ukraine for 2023–2027)¹². "Every element of the state system – law enforcement agencies, first of all – must work so that people really feel safe and secure, so that people really feel justice, so that it is guaranteed at the level of institutions, at the level of everyday work of those by whom people judge the state. Trust in the state, trust in the state are formed from trust in those who act on behalf of the state. Law enforcement officers, the prosecutor's office system are key

¹² Про Комплексний стратегічний план реформування органів правопорядку як частини сектору безпеки і оборони України на 2023 – 2027 роки: Указ президента України від 11.05.2023 №273/2023. URL: <https://www.president.gov.ua/documents/2732023-46733>.

in this. Of course, together with everyone else who works in the state apparatus," the President of Ukraine emphasized¹³.

The document was jointly developed by an interagency group, which included the heads of the Prosecutor General's Office, the Ministry of Internal Affairs, the Ministry of Justice, the Security Service of Ukraine, the State Border Guard Service, the State Customs Service, as well as representatives of the Office of the President of Ukraine, the Cabinet of Ministers of Ukraine, international experts from the Council of Europe Office in Ukraine, the EUAM, the EU project "PRAVO-JUSTICE", the Law Enforcement Affairs Department of the US Embassy in Ukraine, and the International Development Law Organization (IDLO). The main goal of the developers of the Plan was to put the person, his life, health, honor and dignity, rights and interests protected by law at the center of attention of the law enforcement sector, the security and defense sector. Every Ukrainian should be sure that he lives in safety, has freedom and can count on the mechanisms of justice.

The plan identifies six strategic priorities that will allow modernizing the security sector and bringing it into line with the standards that Ukraine must achieve on its path to EU membership, including:

1. Effectiveness and efficiency of law enforcement agencies and the prosecutor's office as an integral part of the security and defense sector, within which they ensure the national security of Ukraine, including public safety and order, and combat crime, taking into account strategic goals and in accordance with the standards of human rights and fundamental freedoms, including ensuring gender equality.

2. Consistent criminal policy, the priority of which is the prevention of crime, the inevitability of liability, the protection of the individual, society and the state from criminal offenses, and the protection of the interests of the victim.

3. Efficiency of criminal proceedings in compliance with international standards and the principle of the rule of law.

4. A result-oriented management system in accordance with established priorities.

5. Comprehensive digital transformation.

6. Openness, transparency, accountability and independence.

¹³ Президент України схвалив Комплексний стратегічний план реформування органів правопорядку (12.05.2023). URL: <https://www.gp.gov.ua/ua/posts/prezident-ukrayini-sxvaliv-kompleksnii-strategicnii-plan-reformuvannya-organiv-pravoporyadku>.

2. The “Safe City” System – An Innovative Technological Solution for Ensuring Security and Improving Law Enforcement Activities

According to the draft Law of Ukraine “On a Unified System of Video Monitoring of the State of Public Security” (Registration No. 11031), video monitoring is a continuous, systematic process of collecting and processing data on the state of public security, carried out using technical means designed to process information¹⁴. This is a surveillance process implemented using optoelectronic devices designed for visual control and automatic analysis¹⁵. Video surveillance systems are widespread and widely used in various areas of human life. To control the environment for the purpose of life safety, video surveillance systems are currently widely used – a set of equipment and software designed to monitor behavior, actions or information for the purpose of collecting information, influence, management and coordination. Due to automation and speed of work, the use of biometrics for face recognition, such technologies are very useful in any field of human activity where it is necessary to verify and confirm a person by his biometric characteristics. This can be security, defense, migration processes, banking and monitoring, etc. Moreover, it is impossible to give an exhaustive list of areas of application of biometric technologies today, since the very idea of verifying and confirming a person's identity is becoming more and more attractive and associated with security.

The Safe City system «Bezpechne misto» in Ukraine is considered as a comprehensive technological solution aimed at increasing the level of public safety and the efficiency of law enforcement agencies. Its main goal is to create a single integrated environment that provides operational monitoring of the situation in settlements, rapid response to incidents and prevention of offenses. The concept is based on the use of modern digital technologies, including video surveillance systems, analytical platforms and data exchange channels between various services. According to official sources, the Safe City «Bezpechne misto» system involves installing a network of video surveillance cameras in key locations – at transport hubs, in public places, on streets and in residential areas. Video streams from these cameras are transmitted to a single data processing center, where they are analyzed in real time. This allows law enforcement agencies to respond promptly to violations of public order, traffic incidents and other dangerous situations. In addition, the system integrates with other information resources, which allows for the

¹⁴ Про єдину систему відеомоніторингу стану публічної безпеки: проект Закону від 20.02.2024. № 11031. URL: <https://itd.rada.gov.ua/billInfo/Bills/Card/43733>.

¹⁵ Рувінська В.М., Девятков В.В. Відеоспостереження для систем безпеки: моделі, методи та запропоновані рішення. Інформатика та математичні методи в моделюванні. 2021. Том 11, № 4. С.331-342. URL: [http://immm.op.edu.ua/files/archive/n4_v11_2021/2021_4\(9\).pdf](http://immm.op.edu.ua/files/archive/n4_v11_2021/2021_4(9).pdf)

formation of a comprehensive picture of city security and increases the efficiency of management decisions¹⁶.

An important aspect is the use of analytical tools that allow not only to record events, but also to automatically classify them, identify suspicious behavior and predict risks. This significantly expands the capabilities of law enforcement agencies in preventing crimes and ensuring public order. The system also facilitates interaction between different services – police, local governments, emergency and utility services, which provides a comprehensive approach to managing the security of the urban environment¹⁷.

Additional confirmation of the system's effectiveness is its use in the activities of state bodies, in particular the National Agency for Identification, Tracing and Asset Management (APMA), which has received access to video surveillance within the framework of the "Safe City". This allows for control over objects under the agency's management and increases the transparency and security of asset management processes¹⁸.

The deployment of the Safe City system "Bezpechne misto" in Ukraine is not only an example of the implementation of modern technologies in the field of public safety, but also an important element of the digital transformation of city management. This system forms a single information space that integrates video surveillance, analytical services and channels of interaction between law enforcement agencies, local governments and other services. Its functioning provides operational monitoring, rapid response to incidents and preventive control, which corresponds to the key principles of the Smart City concept – the creation of a safe, technologically advanced and sustainable urban environment.

In the scientific literature, the concept of "Smart City" is defined as an innovative tool for sustainable urban development and post-war reconstruction.

The concept of a smart city is a system in which city services are used in the most optimal way and provide the greatest convenience to city residents. This requires a close connection between smart city projects (street video surveillance, public services, intelligent transport system and others) on a city scale¹⁹.

¹⁶ Система «Безпечне місто» – інноваційні рішення, які дбають про безпеку. URL: https://i-lug.gov.ua/news/sistema_%C2%ABbezpechne_misto%C2%BB_-_innovacijni_rishennja_jaki_dbajut_pro_bezpeku.

¹⁷ Безпека в місті. Вуличний відеонагляд. URL: <https://360view.com.ua/bezpechne-misto/>

¹⁸ АРМА отримало доступ до систем відеоспостереження «Безпечне місто»

21.12.2022. URL: <https://arma.gov.ua/news/typical/arma-otrimalo-dostup-do-sistem-vidiosposterejennja-bezpechne-misto>.

¹⁹ Безпека в місті. Вуличний відеонагляд. URL: <https://360view.com.ua/bezpechne-misto/>.

Smart city technologies will improve key indicators in all major areas: medicine and health of citizens, security, cost of living, employment of the population, social ties, environmental protection.

Street video surveillance is a software and hardware complex that provides full monitoring of all open spaces in any climatic conditions and is designed to prevent, prevent and respond to offenses. The tasks of outdoor video surveillance include not only monitoring the perimeter of the protected object, but also the approaches to it: fences, parking lots, etc.

Most often, the installation of a street video surveillance system is used at the following facilities:

- car parks;
- gas stations;
- industrial zones;
- warehouses;
- parking lots at large shopping centers;
- schools;
- train stations and airports, etc.

When forming an outdoor video surveillance kit, the architectural and terrain features are first of all taken into account. In addition to quite obvious factors, such as the possibility of fixing cameras at selected viewing points and the absence of objects in the frame that cover significant parts of the scene, it is necessary to foresee the influence of regular natural phenomena. For example, the angle of incidence of sunlight (depending on the season and time of day) – to avoid lighting up the video image; or the presence of windows, mirrored windows, water surfaces in the frame, which can create blinding brightness for a camera operating in IR mode.

To organize street video surveillance in low light conditions (in night mode), as a rule, additional lighting is used with spotlights of the visible spectrum of lighting or with the help of infrared illumination. The choice between them depends on the characteristics of the protected object. Lights operating in the visible spectrum usually have a higher power consumption and may not meet the requirements of urban infrastructure (violate the decorative lighting complex, interfere with the owners of residential premises). However, in some cases, such lighting is necessary. For example, for facial identification, which is practically impossible when a security camera operates in infrared mode. Built-in IR illumination does not always have a sufficient range for effective video surveillance on the street. Therefore, systems with additional IR spotlights are often used for external surveillance objects. When installing such a street surveillance system, it is necessary to take into account that the direction and angle of the infrared

illumination must coincide with the viewing angle and direction of the video camera.

The distance of the viewing points from the video camera can not only increase the cost of the outdoor video surveillance system by including additional repeaters and video signal amplifiers, but also directly affects the number of wires that need to be protected from the effects of an aggressive environment. Lightning protection of outdoor video surveillance cameras. Lightning protection devices are designed to ensure uninterrupted operation of the equipment in adverse weather conditions, in particular, to protect the elements of the video surveillance system from damage by powerful electromagnetic interference created by lightning discharges. To protect the external elements of the outdoor surveillance system from lightning strikes, as a rule, special canopies or lightning rods are used. However, if one of the parts is struck by lightning (or its breakdown due to adverse environmental conditions), all equipment is at risk: video recorder, video server computer, cameras, power supplies, surveillance station (control station).

Outdoor video surveillance camera. When organizing outdoor video surveillance systems, the volume and power of the video recorder are selected based on the number of connected video cameras, their resolution and the required video recording mode; and the type of cameras – depending on the goals of video surveillance and the operator's distance from the protected area.

Design of outdoor video cameras. Structurally, outdoor video cameras are no different from conventional security cameras. They can also be analog or digital, housingless (for installation in a thermal housing) or have different housings with a high protection class, use a rotating mechanism or a "fisheye" lens to cover a larger scene. It is necessary that the electronics have protection from external influences. The most popular when installing video surveillance systems, thanks to their streamlined housing, are dome cameras and bullet-type video cameras (external video surveillance cameras that have a cylindrical shape and are equipped with a sun visor). However, an outdoor video camera is the main constituent element of the system and its selection requires the greatest attention. First of all, outdoor surveillance cameras differ from conventional video cameras in the protection of electronics from moisture, dust, and mechanical damage. As a rule, the housings of such video cameras have a certain degree of IP and / or IK protection.

Operating temperature range. Video surveillance cameras have quite sensitive electronics, so to install a video camera outdoors, it must be protected from sudden temperature changes and be able to operate at very low or very high temperatures.

An outdoor surveillance camera can be a complete "all-in-one" solution and have a package that is suitable for working outdoors in a wide temperature

range and in various adverse environmental conditions. For outdoor video surveillance, you can also use a standard video camera by placing it in a thermal housing. The choice between an outdoor “all-in-one” camera and installing equipment in a thermal housing is usually determined by individual requirements for the characteristics of the video surveillance system for the object. An “all-in-one” outdoor video camera is much easier to install and configure, because it is a set of equipment balanced in functionality and technical characteristics. When installing in a thermal housing, you should select not only the video camera, but also the heating, ventilation modules, etc. – work out the connection diagrams, calculate the power consumption (for connection to the power source). However, this approach allows you to get equipment for street video surveillance with non-standard characteristics. For example: increase the sensitivity of the video camera or the backlight range, create a camera for video surveillance of street objects in conditions of extremely high or extremely low temperatures.

The concept of a smart city involves the integration of digital technologies into all areas of urban life, including security, transport, energy, municipal infrastructure and resource management. As noted by V.G. Olyukha, the practical implementation of this concept in Ukraine requires regulatory regulation, since it has not yet been enshrined at the law level. Existing by-laws, in particular the Concept of Development of the Digital Economy and Society of Ukraine for 2018–2020, are declarative in nature and do not contain specific implementation mechanisms. Therefore, the key task is to develop urban conceptual Smart City projects that take into account local needs, sources of funding and the possibility of creating clusters with the participation of municipal enterprises, private business and scientific institutions (Olyukha, 2024)²⁰.

The relationship between the Safe City system and the Smart City concept lies in the common goal of forming a digital urban space that ensures the integration of data and services to improve management efficiency and security. The use of analytical platforms, artificial intelligence and network technologies in the Safe City "Bezpechne misto" system complies with international standards for urban infrastructure management (ISO 37120, ISO 37101), which are recommended for implementation within the framework of digital transformation. This approach is consistent with the Decree of the President of Ukraine No. 722/2019 "Pro Tsili staloho rozvytku Ukrainy na period do 2030 roku" (On the Sustainable Development Goals of Ukraine for

²⁰ Олюха В.Г. Правові основи реалізації концепції «Smart City» в Україні. *Аналітично-порівняльне правознавство*. 2024. С.339-344. URL: <https://doi.org/10.24144/2788-6018.2024.06.55>. URL: <https://app-journal.in.ua/wp-content/uploads/2024/12/57.pdf>

the period up to 2030), where the development of cities on the basis of sustainability is identified as a priority of state policy²¹.

As part of the project "Bezpechne misto", the municipal enterprise Informatika has implemented a new analytical module for video surveillance (Kyiv Smart Safe City²²). The unique module allows you to search for criminals not only thanks to specialized facial recognition cameras. It captures images from any camera installed within the network and compares them with the existing database of offenders. If the system detects a similarity, the operator immediately receives an alarm signal. Thus, law enforcement officers will be able to track dangerous criminals faster. The new analytical module for facial recognition includes an analytical system and a database consisting of a list of wanted people.

The effectiveness of the implementation of the Smart Safe City "Bezpechne misto" system can be somewhat concluded by analyzing the indicators of street crime in Ukraine. Thus, in recent years, during the gradual implementation of the project (during 2017–2019), the level of crimes committed on the streets has sharply decreased. For comparison: if in 2013 there were 66,971 criminal offenses committed on the streets, in 2014 – 66,255, in 2015 – 61,718, in 2016 – 62,064, then in 2017 the number of such offenses was 45,707, in 2018 – 42,465, and in 2019 – 38,139 criminal offenses²³.

In Ukraine, the Smart City project is actively used in the cities of Kyiv, Kharkiv, Lviv, Dnipro, Vinnytsia, Mariupol, Chernihiv, etc. A special type of such project is "Smart Safe City" – a new generation information and analytical program that recognizes potential dangers, analyzes the situation in real time, and transmits already processed data on detected threats of a terrorist, criminal, and man-made nature in places of mass stay of citizens, at critical infrastructure facilities, transport interchanges, and to emergency service operators for a quick response to emergencies.

Thus, the Smart Safe City "Bezpechne misto" system is not only a technological solution for increasing public safety, but also an important component of Ukraine's digital transformation strategy. Its integration into the broader Smart City ecosystem creates the prerequisites for the comprehensive

²¹ Про Цілі сталого розвитку України на період до 2030 року : Указ Президента України від 30.09.2019 № 722/2019. URL: <https://zakon.rada.gov.ua/laws/show/722/2019#Text>.

²² У рамках проекту «Безпечне місто» запущено новий аналітичний модуль відеоспостереження, що прискорить пошук правопорушників. URL: https://kyivcity.gov.ua/news/u_ramkakh_proektu_bezpechne_misto_zapuscheno_noviy_analitichniy_modul_vidEOSpos_terezhennya_scho_priskorit_poshuk_pravoporushnikov/.

²³ Зменшення можливостей вчинення злочинів: стратегічний підхід: монографія / за заг. ред. В. В. Голіни. – Харків: Право, 2020. – С.191. URL: https://ivpz.kh.ua/wp-content/uploads/2021/09//моно_Стратегія-зменшення-можливостей.pdf.

development of urban areas, ensuring transparency of management, and implementing European standards of sustainable development.

3. Implementation of foreign experience of legal regulation of video monitoring systems in the law-making activity of Ukraine

Singapore is one of the safest cities in the world, largely due to the effective use of the PolCam police camera system, integrated into the Singapore Police Force (SPF). Introduced in 2012, the system has become a key tool in combating crime, contributing to the resolution of over 5,000 criminal cases and significantly reducing the time it takes to investigate, with some cases being concluded within hours of a complaint being filed. In 2016, the network was expanded as part of the PolCam 2.0 project, which included the installation of over 90,000 cameras in residential areas, commercial areas, multi-storey car parks and transport hubs. As of 2025, the country will have over 90,000 police cameras covering residential areas, transport hubs, public spaces and commercial areas, with a planned expansion to 200,000 cameras in the 2030s²⁴.

Singapore's experience in implementing public video surveillance systems is a prime example of a centralized, technology-intensive, and strategically sound model for ensuring public safety. Unlike many countries where video surveillance is viewed primarily as an auxiliary technical tool for law enforcement, in Singapore it is integrated into the national digital development policy and is actually an element of the modernization of the state administration mechanism. The central place in this model is occupied by the Police Cameras (PolCam) system, which operates under the auspices of the Singapore Police Force and is part of the large-scale state program Smart Nation.

Traditional investigative methods, such as interviewing victims and witnesses, remain important, but PolCam has significantly expanded the capabilities of the police²⁵. The system provides identification of the location and behavior of suspects, the use of video footage as evidence in legal proceedings, crime prevention through strategic camera placement, rapid response to incidents through real-time monitoring, traffic control and traffic flow management. During the COVID-19 pandemic, the system was used to monitor compliance with social distancing and mask wearing.

²⁴ State of Surveillance. Singapore's Smart Nation: Privacy and Surveillance. URL: <https://stateofsurveillance.org/articles/government/singapore-smart-nation-privacy-surveillance/>

²⁵ Public Surveillance. An outline of Singapore's extensive CCTV network and its role in maintaining security. URL: <https://citiesinsider.com/country/singapore/singapore/public-surveillance/>

The system is funded by the government, so there are no direct costs for citizens and visitors. Indirect costs are associated with fines for violations, for example, littering is punishable by a fine of 300 to 1,000 SGD, and smoking in prohibited areas is punishable by up to 1,000 SGD. Video footage is used as evidence in criminal proceedings, and the data is stored for a limited time if not needed for investigations. While most citizens perceive the system as a necessary security measure, it may seem excessive to visitors from jurisdictions with stricter privacy standards. The government emphasizes the responsible use of technology.

Singapore's public surveillance system is part of the country's Smart Nation program, which involves using digital technologies to improve governance. The cameras are equipped with facial recognition, license plate recognition, and artificial intelligence algorithms to analyze behavior. An important element is the integration with smart lighting fixtures (LAMPP), equipped with sensors to collect environmental and safety data, as well as video surveillance systems in public transport. The government guarantees that data is protected, used only for authorized purposes, with strict protocols to prevent misuse.

Video surveillance in Singapore was not introduced piecemeal or situationally in response to the increase in crime, but as a tool for implementing a long-term strategy for the digitalization of the state. It is in this context that the legal significance of the PolCam system goes beyond the narrow regulation of police powers and acquires the character of strategic legitimization through state-level program documents. The *Smart Nation program*, launched in 2014, laid the conceptual framework for the permissible use of digital technologies in the public sphere and created the basis for further normative development²⁶.

The materials related to Smart Nation 1.0 explicitly state that this strategy was aimed at using digital technologies to transform social processes and public administration. Thus, the official description of the program emphasizes: "Smart Nation 1.0 was developed to to help Singapore ride the wave of change and leverage digital technologies to transform domains like health, transport, education, finance, infrastructure, and the environment". Within the framework of this strategy, four interrelated areas of digital development have been identified, each of which has direct significance for the legal legitimization of public video monitoring systems.

²⁶ Smart Nation 2.0 Vision to Ensure a Thriving Digital Future for All [Электронный ресурс] : press release / Ministry of Digital Development and Information (Singapore). Singapore, 2024. URL: https://www.sgpc.gov.sg/api/file/getfile/1/%20Smart%20Nation%202%20Press%20Release_FINAL.pdf?path=/sgpcmedia/media_releases/mddi-ced/press_release/P-20241001-1/attachment/1/%20Smart%20Nation%202%20Press%20Release_FINAL.pdf

In particular, the direction of *Digital Government* is formulated as "building a government that is digital to the core and serves with a heart, by designing services that are seamless, personalized and inclusive"²⁷. This provision is of fundamental legislative importance, as it recognizes digital tools as not auxiliary, but organic elements of the activities of state authorities, including law enforcement agencies. In this context, PolCam is positioned as a digital security management tool that contributes to a more effective and prompt response to offenses.

B At the same time, the *Digital Security* direction, which is defined as "strengthening Singapore's cybersecurity efforts, so that the increasing number of services and transactions that take place online are secure and resilient", expands the traditional understanding of security and actually combines the physical and digital spaces into a single sphere of state protection. Although the formulation focuses on cybersecurity, in the practice of implementing Smart Nation it has been interpreted more broadly – as a justification for the need for comprehensive monitoring of urban space, including through a network of police cameras.

No less important is the *Digital Society* direction, which involves "fostering a society where Singaporeans are ready to embrace the digital world through efforts to improve digital access, digital literacy and digital adoption". It is through this component that the social legitimization of mass video surveillance is ensured, because the population is involved in digital processes and perceives video monitoring as part of the normal urban environment, and not as an exceptional measure of control. Thus, legal regulation is based not only on formal norms, but also on the formed digital culture of society.

This model was further developed with the adoption of the *Smart Nation 2.0* concept in 2024, which was a response to the growing role of digital technologies in everyday life and at the same time to the intensification of public debates on privacy and the limits of state intervention. The Smart Nation 2.0 Report explicitly states: "In Smart Nation 1.0 we focused on building up capabilities and encouraging the use of technology. Under Smart Nation 2.0, we will sharpen our focus on using technology more effectively to transform our future and shape our nation together"²⁸. This means a transition from infrastructural logic to value-normative logic.

The strategic directions of Smart Nation 2.0 are formulated through three key goals – *Trust*, *Growth* and *Community*²⁹. In particular, *Trust* is defined as

²⁷ Smart Nation Singapore. Smart Nation 1.0 – Our Vision. Офіційний вебсайт Уряду Сінгапуру. URL: <https://www.smartnation.gov.sg/about/our-vision/sn1/>

²⁸ Ministry of Digital Development and Information (Singapore). Smart Nation 2.0 Report. 2024. URL: <https://file.go.gov.sg/smartnation2-report.pdf>

²⁹ Ministry of Digital Development and Information (Singapore). Smart Nation 2.0 Report. 2024. URL: <https://file.go.gov.sg/smartnation2-report.pdf>

follows: “Trust, because Singaporeans must be able to go online with confidence, knowing that their wellbeing is not compromised”. In a legislative dimension, this means that the state assumes responsibility for the safe use of technologies, including video monitoring systems, and thereby legitimizes their use even under conditions of restrictions on certain aspects of privacy.

The *Community* goal is formulated as “community, because we must use technology to unify, not divide”. In the context of PolCam, this allows us to consider video surveillance as a tool for protecting the common interests of the community, where public safety is a collective good. This approach reduces the weight of individual objections to video surveillance, as it is presented as a means of maintaining social stability.

Finally, the *Growth* goal is defined as “because technology must empower our people and businesses to reach their full potential.” In legal terms, this allows the costs of PolCam infrastructure development to be included in economic development measures without requiring separate special legitimization through detailed legislative regulation.

Thus, Singapore is one example of a centralized and technology-intensive model of public video surveillance, implemented within the framework of the government's Smart Nation program³⁰. The main tool of law enforcement video monitoring is the PolCam system (Police Cameras), deployed by the Singapore Police Force. A fundamental feature is that video monitoring in Singapore is considered not only as a technical measure, but as an instrument of state policy to ensure public safety, which directly affects lawmaking activity. The PolCam system in Singapore is legitimized not so much through a special law, but through a combination of strategic documents, administrative practice and public consensus. This approach largely explains why law enforcement agencies are partially excluded from the direct action of the *Personal Data Protection Act*, operating on the basis of special public-legal regimes³¹.

Singapore's experience demonstrates that a comprehensive approach to implementing video surveillance systems, which combines technological innovations, legal mechanisms and social responsibility, is an effective tool for ensuring law and order. Its effectiveness is confirmed by the low level of crime and high safety standards. For Ukraine, this experience is relevant given the need to increase the effectiveness of law enforcement activities in the

³⁰ Smart Nation 2.0 Vision to Ensure a Thriving Digital Future for All [Електронний ресурс] : press release / Ministry of Digital Development and Information (Singapore). Singapore, 2024. URL: https://www.sgpc.gov.sg/api/file/getfile/1%20Smart%20Nation%202%20Press%20Release_FINAL.pdf?path=/sgpcmedia/media_releases/mddi-ced/press_release/P-20241001-1/attachment/1%20Smart%20Nation%202%20Press%20Release_FINAL.pdf

³¹ Personal Data Protection Act 2012 (Singapore). Singapore Statutes Online. URL: <https://sso.agc.gov.sg/Act/DPDA2012>

context of urbanization and increasing threats to public safety. The implementation of similar systems can contribute to a prompt response to offenses, reduce the level of crime and increase citizens' trust in law enforcement agencies.

Adapting the Singapore model in Ukraine requires taking into account a number of factors. First, it is necessary to ensure an appropriate regulatory framework that will regulate the use of video surveillance technologies and the protection of personal data. Second, it is necessary to develop financing mechanisms that may include state and municipal budgets, as well as partnerships with the private sector. Third, it is important to take into account socio-cultural characteristics and the level of readiness of society to accept a mass surveillance system. Finally, transparency and control over the use of data should be ensured in order to avoid risks of abuse and human rights violations.

The forecast for the development of such systems in Ukraine until 2030 indicates significant prospects³². It is expected that by 2025–2027, the network of cameras in cities with a population of over a million will be expanded and pilot projects using artificial intelligence algorithms for video analytics will be implemented. In the period from 2028 to 2030, it is predicted that video surveillance systems will be fully integrated with the Safe City platforms and information resources of the Ministry of Internal Affairs, predictive analytics will be introduced to prevent crimes, and biometric technologies will be used in transport and public places. The mass implementation of 5G and the development of IoT will allow real-time video transmission from thousands of cameras without delays, and cloud services will become the basis for processing large data sets. It is expected that by 2030, 90% of large cities in Ukraine will be equipped with intelligent cameras with AI analytics functions, and the crime rate in cities will decrease by 15–20% thanks to preventive technologies. At the same time, key challenges will remain financing, cybersecurity, and the development of clear rules for the protection of personal data.

Thus, Singapore's experience can serve as a guide for Ukraine in shaping a modern security concept based on the integration of intelligent video monitoring systems into law enforcement activities. Its implementation requires a comprehensive approach that combines technological solutions, legal guarantees, and public consensus, which will allow achieving high standards of security and law and order.

³² Police surveillance system using video analytics to detect targets wins Home Team Achievement Award. Oct 28, 2021. URL:<https://www.straitstimes.com/singapore/community/police-surveillance-system-using-video-analytics-to-detect-targets-wins-home>

CONCLUSIONS

The implementation of intelligent video monitoring systems is a key factor in increasing the effectiveness of law enforcement and ensuring public safety. Ukraine should focus on the experience of high-tech countries, adapting it to its own legal and social realities. This requires a comprehensive approach that combines technological solutions, legal guarantees and public consensus.

In Ukraine, the protection of personal data in video monitoring systems for public security must comply with the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, the Additional Protocol to the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data by Supervisory Authorities and Transborder Data Flows, the General Data Protection Regulation (GDPR) adopted in the European Union, as well as legislation in the field of information protection. We fully support the importance of adopting the Law of Ukraine "Pro yedynu systemu videomonitorynhu stanu publichnoi bezpeky" (On a Unified System of Video Monitoring for Public Security). The introduction of comprehensive security monitoring systems will significantly increase the effectiveness of prevention, in particular of corruption offenses, ensuring more reliable protection of citizens and society as a whole. There is a need to implement the General Data Protection Regulation (GDPR) into the legislation of Ukraine.

The conducted research allows us to conclude that the use of digital technologies and systems will expand the possibilities of timely notification of law enforcement officers about offenses, search and identification of criminals, and optimize the process of investigating criminal offenses. In the case of implementing a video monitoring system for security, modern video surveillance technologies, integrated with analytical algorithms and artificial intelligence, are capable in real time:

- recognize threats and help law enforcement officers prevent crimes;
- promote effective investigation of offenses;
- reduce the human factor in security issues, which minimizes corruption risks;
- improve coordination between law enforcement agencies;
- serve as an element of rapid response to emergencies.

Singapore's experience in the field of implementing public video monitoring systems is positive for Ukraine. For Ukraine, this experience is important primarily in the methodological aspect, since effective legal regulation of video monitoring systems is impossible without harmonizing legislation with strategic documents of state development. At the same time, direct transfer of the Singapore model is unacceptable in view of European standards for the protection of human rights and the requirements of the European Convention on Human Rights. This necessitates the formation of a

new paradigm of legal regulation of security in Ukraine, in which the implementation of digital surveillance systems should be accompanied by a clear legislative definition of their goals, limits and guarantees of judicial and public control. It is the combination of strategic vision, technological capabilities and legal norms that can ensure the legitimacy and effectiveness of such systems in modern conditions of state-building.

SUMMARY

The article is devoted to the study of the possibilities of using intelligent video monitoring technologies in the activities of law enforcement agencies of Ukraine. The relevance of implementing video monitoring systems in law enforcement activities of Ukraine is considered, taking into account the experience of high-tech countries. The need to create comprehensive public security systems is substantiated, the role of digital transformation and international standards in the formation of a modern concept of security is determined. The importance of harmonizing national legislation with European standards and integrating innovative technologies into the activities of law enforcement agencies is emphasized. Based on the analysis of the axiological aspects of the implementation of information technologies and security systems in law enforcement activities in leading countries of the world, examples of implementation, and the results of specialized scientific research in this area, the conclusion is made that the implementation of comprehensive security monitoring systems will significantly increase the effectiveness of prevention, in particular, of corruption offenses, ensuring more reliable protection of citizens and society as a whole. There is a need to implement the General Data Protection Regulation (GDPR) into the legislation of Ukraine.

Keywords technologization, video monitoring, digitalization, innovation, artificial intelligence, law enforcement, martial law.

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