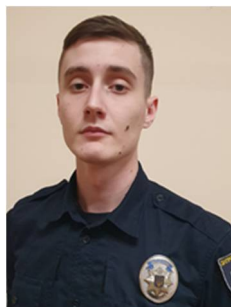


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### **THE USE OF MODERN TECHNOLOGIES IN THE TACTICAL AND SPECIALISED TRAINING OF POLICE OFFICERS UNDER MARTIAL LAW**

**Олена Бойко, Андрій Мельник. ЗАСТОСУВАННЯ СУЧАСНИХ ТЕХНОЛОГІЙ У ТАКТИКО-СПЕЦІАЛЬНІЙ ПІДГОТОВЦІ ПОЛІЦЕЙСЬКИХ В УМОВАХ ВОЄННОГО СТАНУ.** У статті проаналізовано можливості застосування сучасних технологій у тактико-спеціальній підготовці поліцейських в умовах воєнного стану. Воєнний стан створює надзвичайні ситуації, коли поліцейським доводиться працювати в умовах підвищеної небезпеки й нестабільності. У таких обставинах застосування сучасних технологій у тактико-спеціальній підготовці поліцейських стає надзвичайно важливим для забезпечення їхньої безпеки, ефективності та успішності виконання завдань.

Обґрунтовано переваги використання таких технологій, як віртуальна реальність, доповнена реальність, безпілотні літальні апарати, роботизовані системи та штучний інтелект. Так, основними напрямками застосування сучасних технологій у тактико-спеціальній підготовці поліцейських є: використання віртуальної реальності та доповненої реальності для відпрацювання практичних навичок, зокрема для відпрацювання бойових дій, що забезпечує більш ефективне навчання поліцейських; використання безпілотних літальних апаратів для спостереження та отримання інформації про обстановку на місцевості без ризику для життя поліцейських; використання роботизованих систем для виконання небезпечних або важких завдань, зокрема завдань з розмінування чи завдань з огляду місць масових захоронень з можливими мінами-пастками; використання штучного інтелекту для оптимізації роботи поліції у складних ситуаціях.

Встановлено, що застосування сучасних технологій дозволяє підвищити ефективність навчання поліцейських, зменшити ризик для їхнього життя та покращити безпеку громадян.

У зроблено висновок, що застосування сучасних технологій є невід'ємною складовою тактико-спеціальної підготовки поліцейських в умовах воєнного стану. Технології допомагають поліцейським ефективно протистояти загрозам, забезпечують безпеку та допомагають досягати успіху виконання завдань. Розвиток і вдосконалення цих технологій є важливим напрямком для підвищення ефективності поліцейської роботи в умовах воєнного стану.

Впровадження сучасних технологій у тактико-спеціальній підготовці поліцейських є важливим завданням, яке дозволить підвищити ефективність діяльності поліції в умовах воєнного стану.

**Ключові слова:** тактико-спеціальна підготовка, поліцейські, воєнний стан, сучасні технології, віртуальна реальність, доповнена реальність, безпілотні літальні апарати, роботизовані системи.

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**Problem statement.** The introduction of modern technologies into the tactical and specialised training of police officers is an important task that will increase the effectiveness of police activities under martial law.

The conditions of martial law require special training and skills of police officers to act quickly and effectively in complex and dangerous situations. Modern technologies have become an integral part of tactical and specialised police training, helping to increase their efficiency, safety and ability to respond quickly to threats.

**Recent publication's review.** Some problematic issues of police training have been discussed in the works of S. I. Apukhtin, O. M. Bandurka, O. M. Baranovska, V. V. Bachal, V. O. Holubev, V. Ye. Kudinov, G. Maklakov, A. Ovchynsky, Yu. Orlov, V. Orlynsky, V. Polivaniuk, E. Ryzhkov, O. Chernyshenko, O. Fedorenko, V. Khakhanovsky and others.

**The research paper's objective.** However, despite the large number of works, the issue of using modern technologies in police training is still relevant in view of martial law and hostilities on the territory of Ukraine.

**Discussion.** It is well known that police officers need appropriate training in order to perform their duties effectively. The Order of the Ministry of Internal Affairs of Ukraine No. 50 of 26 January 2016 defines the following types of training: functional training, general training, tactical training, firearms training and physical training[9]. In the context of martial law, this training should be aimed at developing skills and abilities necessary for conducting combat operations and ensuring the safety of citizens.

The use of modern technologies in police training can increase its efficiency and effectiveness.

The main areas of application of modern technologies in tactical and specialised training of police officers under martial law are as follows:

- Using virtual reality and augmented reality to develop practical skills. Virtual reality allows the creation of realistic environments for combat training, which can be used to train police officers more effectively. Augmented reality allows additional information to be added to the real world, which can be useful for training police officers in counter-terrorism tactics and techniques.

- The use of unmanned aerial vehicles for surveillance and combat operations. Unmanned aerial vehicles provide information about the situation on the ground without risking the lives of police officers. They can also be used for combat operations, such as destroying targets or delivering cargo.

- Use of robotic systems to perform dangerous or difficult tasks. Robotic systems can be used for mine clearance, defusing or destroying explosive devices, or special operations.

- Use of artificial intelligence to improve policing in difficult situations. Artificial intelligence can be used to analyse information, predict events and make decisions in difficult situations, such as during hostilities or mass disturbances.

The use of modern technologies in tactical and specialised police training under martial law has a number of advantages:

- Increasing the effectiveness of police training. Modern technologies allow for more realistic training conditions, which contributes to the effectiveness of police training.

- Reducing the risk to the lives of police officers. Unmanned aerial vehicles and robotic systems allow police officers to perform their duties without risking their lives.

- Improving citizen safety. Modern technology enables police officers to effectively counter terrorism and other threats to public safety [5].

Pattern recognition and biometric systems are important technologies that can be used in the tactical and specialised training of law enforcement officers. These allow large amounts of data, including video and photographic images, to be automatically analysed to identify suspicious people or objects. This helps officers respond quickly to potential threats and conduct effective investigations.

Another modern method increasingly used in tactical and specialist police training is the use of virtual reality (VR). It allows you to simulate real-life situations, interact with virtual characters and environments, and train skills and responses in realistic conditions. The use of VR provides a powerful tool for improving police officers' skills and readiness to act in real-world environments.

Virtual reality (VR) and augmented reality (AR) allow police officers to train their skills in realistic scenarios that simulate military conflict situations. They can be used to train tactical manoeuvring, marksmanship, communication and teamwork. This allows officers to

gain valuable experience and improve their response to difficult situations, reducing the risk to themselves and others [2;3].

For example, there is a US pilot training programme called Air Force Pilot Training Next (PTN) and Undergraduate Pilot Training 2.5 (UPT 2.5). They use virtual and augmented reality technologies to teach cadets the fundamentals of flying. In 2018, San Antonio-Randolph (Texas) introduced the PTN programme for the first time, which assesses students' skills in an augmented reality space that simulates real flight. PTN allows students to learn and self-correct in realistic scenarios before getting behind the controls of a T-6 Texan II trainer aircraft. In July 2020, the UPT 2.5 programme will be introduced, which is an extension of the PTN. The main part of the training involves flying a T-6 aircraft, but then moves on to the use of virtual reality and simulators[10].

Augmented and virtual reality technologies are also used in Ukraine because they are effective and relatively inexpensive. For example, the Desna Training Centre of the Ukrainian Armed Forces has deployed a set of augmented reality simulators using Virtual Battlespace 3 (VBS3). These simulators have the same controls as their real-world counterparts, as well as monitoring equipment that directly transmits the sensations of movement and shooting through special platforms[11].

UAVs and quadcopters are another important technology that has found wide application in tactical and specialist police training. Drones can be used for surveillance, intelligence gathering, search and rescue, threat detection and much more. They allow police officers to get an aerial view, move quickly over a large area and collect important data for real-time decision making (add technical specifications – thermal imagers, etc.).

Intelligent analysis and data processing is another aspect of the use of modern technology in tactical and specialised police training. Thanks to advanced data processing, police officers can quickly and accurately analyse information on potential threats, enemy movements, intelligence links and other factors affecting the situation of a military conflict. This helps police officers make informed decisions and plan their actions based on the most up-to-date data.

In addition, communications technologies play an important role in the tactical and specialised training of police officers during martial law. Wireless communication systems, message encryption and other technologies ensure effective communication between police officers on the battlefield. This enables rapid information exchange, coordination and interaction between different police units [7].

Artificial intelligence (AI)-based training systems have also found their way into tactical and specialised police training. These systems can analyse the behaviour and reactions of police officers in simulated scenarios, identify weaknesses and recommend improvements. They can also generate personalised training programmes based on the individual needs and abilities of each police officer.

In view of the above, practical training using an Interactive Multimedia Laser Range (IMLR) can be considered as a special type of training. During these exercises, cadets acquire interdisciplinary knowledge and skills in responding to crimes and offences and in applying police measures. This approach is based on an integrated teaching method and provides an opportunity to highlight the main elements of education and to establish links between academic disciplines[8, p. 5].

There are many advantages to using this technology, the first of which is safety:

Laser ranges offer a high level of safety compared to traditional ranges. The absence of real ammunition helps to avoid possible accidents and injuries during training.

Training efficiency:

Trainees can improve their accuracy and shooting skills on a laser range without having to travel to a traditional shooting range.

Ammunition savings:

Using a laser range saves ammunition because you don't need to use real ammunition for training. This reduces costs and contributes to a more efficient use of resources.

Realistic scenario capabilities:

Laser ranges often simulate real-life shooting scenarios and can include a variety of options such as firing at moving targets, cutting through encounters, etc., allowing cadets to train in a variety of situations.

Analysis of results:

Laser ranges are often equipped with systems for analysing shooting results. Cadets can receive reports on their accuracy, reaction time and other metrics, allowing them to

effectively improve their skills.

Today's urgent and growing security threats require a high level of police training and the effective use of tactical and specialist skills. The use of modern methods and technologies in tactical and specialised training is becoming a key aspect in facilitating the performance of police officers' professional duties. In this paper we have analysed modern methods and technologies used in tactical and specialised police training, their advantages and results.

One of the modern methods widely used in tactical and specialised police training is simulation training. These computer systems make it possible to recreate various scenarios and situations that police officers may encounter in real life. By simulating realism and interacting with virtual objects and characters, simulators enable police officers to improve their shooting skills, tactics for responding to dangerous situations and decision-making in a fast-paced environment.

Thus, one of the simulation technologies is the use of the online modelling system "OpenLabyrinth". With the help of this system, cadets would be able to practice algorithms of real-life situations many times during tactical and specialised training, which would have a positive impact on the memorisation of training material. And since the labyrinth system has the ability to branch out into multiple options and different scenarios, the situations become as close as possible to the operational and combat activities of a police officer[12].

In addition to drones, video surveillance systems are another important technology for police officers during martial law. They allow for continuous monitoring of important facilities, control of public places and response to dangerous situations. Video surveillance systems allow police officers to have a constant overview of the area and to better respond to hostile actions.

Despite the fact that working with electronic simulators has both positive and negative aspects, constant supervision by the instructor remains one of the key elements of teaching practical disciplines.

Martial law creates emergency situations in which police officers have to work in conditions of increased danger and instability. In such circumstances, the use of modern technologies in the tactical and specialised training of police officers becomes extremely important in order to ensure their safety, efficiency and success in the performance of their duties.

**Conclusions.** In conclusion, the use of modern technologies is an integral part of the tactical and specialised training of police officers under martial law. They help police officers to effectively counter threats, provide security and achieve success in their duties. The development and improvement of these technologies is an important area for increasing the effectiveness of martial law policing. In particular, the further development of drones can include improving their reconnaissance and surveillance capabilities, installing advanced sensors and high-resolution cameras, and extending their autonomous functionality. This will provide police officers with more detailed and objective information about the situation on the ground, helping them to make better decisions and ensure safety.

In the area of video surveillance, there is potential for the further development of artificial intelligence systems that can automatically detect suspicious activity, recognise objects and analyse images in real time. This will help police officers identify threats and potential criminals faster and reduce the burden on CCTV operators.

In the area of communications technologies, further improvements in radio communications are possible, including extending the range of signal transmission, improving the quality of communications and ensuring resistance to interference. Specialised communication systems can also be developed to allow police officers to exchange information quickly and coordinate their actions in real time.

The development of simulation technologies also has great potential for tactical and specialised police training. Improving virtual environments, increasing the realism and interactivity of training simulations will help police officers to receive even more realistic training, bringing them closer to real working conditions. In addition, the development of virtual simulators for specific law enforcement situations will allow police officers to effectively improve their skills and respond to different scenarios.

In general, the use of modern technologies in the tactical and specialised training of police officers under martial law can significantly improve their capabilities and effectiveness. Further development of these technologies will contribute to ensuring the safety of citizens and police officers in difficult conditions.

*Conflict of Interest and other Ethics Statements*

The authors declare no conflict of interest.

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#### ABSTRACT

The article analyses the possibilities of using modern technologies in the tactical and specialised training of police officers under martial law. Martial law creates emergency situations when police officers have to work in conditions of increased danger and instability. In such circumstances, the use of modern technologies in tactical and specialised training of police officers becomes extremely important in order to ensure their safety, efficiency and success in performing their tasks.

The article outlines the benefits of using technologies such as virtual reality, augmented reality, unmanned aerial vehicles, robotic systems and artificial intelligence. Thus, the main areas of application of modern technologies in the tactical and special training of police officers are: the use of virtual reality and augmented reality to develop practical skills, in particular for training in combat operations, which ensures more effective training of police officers; the use of unmanned aerial vehicles to monitor and obtain information about the situation on the ground without risking the lives of police officers; the use of robotic systems to perform dangerous or difficult tasks, in particular tasks of search and rescue; the use of virtual reality and augmented reality to develop practical skills, in particular for training in combat operations, which ensures more effective training of police officers; the use of virtual reality and augmented reality to develop practical skills, in particular for training in combat operations, which ensures more effective training of police officers.

It is noted that the use of modern technologies can increase the effectiveness of police training, reduce the risk to their lives and improve the safety of citizens.

The author concludes that the use of modern technologies is an integral part of the tactical and specialised training of police officers under martial law. Technology helps police officers to effectively counter threats, provide security and be successful in their work. The development and improvement of these technologies is an important area for improving the effectiveness of police work under martial law.

The introduction of modern technologies in tactical and specialised training of police officers is an important task that will increase the effectiveness of police activities under martial law.

**Keywords:** *tactical and specialised training, police officers, martial law, modern technologies, virtual reality, augmented reality, unmanned aerial vehicles, robotic systems.*