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Modern possibilities of using unmanned aerial vehicles by Police authorities and units: Analysis of foreign and Ukrainian experience

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■ **Abstract**. The relevance of the research subject is conditioned upon the scientific originality and practical significance of using modern capabilities of unmanned aerial vehicles by police authorities and units. The relevance of the research issue is that the provisions of the current legislation defining the legal basis for using unmanned aerial vehicles by police authorities and units are mostly formally defined. Based on this, and considering that the law enforcement system has encountered new challenges which constantly require the introduction of the latest methods and means of countering crime, including using modern achievements of digital, technological, scientific and technical progress, the purpose of this research is to analyse the foreign experience of using unmanned aerial systems by law enforcement agencies, and based on this, to develop proposals for improving the current legislation in the part concerning using UAVs. The research methodology includes a combination of general scientific and special methods that allow for defining assumptions and drawing conclusions. The research examines the relevant issues of the day concerning using the technical capabilities of unmanned aerial systems in the course of performing the tasks assigned to police agencies and units. In particular, the author examines the international experience of some technologically advanced countries (the USA, Great Britain, Germany, France, China and Israel) in using modern capabilities of unmanned aerial vehicles by law enforcement agencies. Attention is devoted to the development of the aviation industry of Ukraine in terms of the design of Ukrainian unmanned aerial vehicles, and the prospects for their implementation in the activities of the National Police. The author outlines the main prospects for using unmanned aerial vehicles in the activities of police agencies and units. In particular, those related to the protection of public order, road safety, detection, suppression and counteraction to criminal and administrative offences, and protection and defence of human rights and freedoms, life and health. The scientific originality and practical significance of the research are that it highlights the current possibilities of using unmanned aerial vehicles by police authorities and units, outlines some issues of a working nature which require resolution, and, based on international experience, identifies the areas for improvement of the current legislation on using unmanned aerial vehicles by the National Police

■ **Keywords**: unmanned system; robotic complex; drone; law enforcement agencies; criminal offences; crime investigation

■ Introduction

According to the National Security Strategy of Ukraine, approved by the decision of the National Security and Defence Council of Ukraine on 09/14/2020 [1], the introduction of the latest technologies in the activities of law enforcement agencies is one of the priority areas of national security policy.

Considering this, the efficiency of police agencies and units depends to a large extent on their qualitative use of technical science [2, pp. 3-4; 3, pp. 16-19].

A particular place among modern robotic systems and innovative technologies that can be used effectively by law enforcement agencies is occupied by unmanned aerial vehicles (hereinafter referred to as UAV, drone). It is primarily explained by their wide functionality, which allows combining the automatic piloting system with the receipt and transmission of information in real-time by using modern equipment for navigation, aerial photography and video recording (multispectral, magnetic, large-scale survey, photogrammetry, etc.), video monitoring (video

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surveillance), mapping, 3-D modelling, infrared and thermal imaging of terrain, premises, structures, land and water surfaces.

The procedure for using technical means installed on UAVs that have the photo and video recording functions by police bodies and units is regulated by Section VI of the separate Instruction approved by the Order of the Ministry of Internal Affairs of Ukraine No. 1026 dated 12/18/2018 [4]. However, the provisions of this section are mostly formally defined and blanket, forcing it to refer to other regulations.

The Laws of Ukraine "On the National Police" [5] and "On Operational and Investigative Activities" [6] do not provide a detailed answer on the grounds and procedure for using UAVs by police authorities and units, and only state that a police officer has the right to use special means to perform their duties" (Article 45 of the Law of Ukraine "On the National Police", Article 19 of the Law of Ukraine "On Operational and Investigative Activities").

The complexity of this issue is that according to Article 42 of the Law of Ukraine "On the National Police", UAVs are not classified as special technical means that police officers are entitled to use to perform their duties. In addition, unlike the Law of Ukraine "On the State Border Guard Service" [7], Section IV of the Law of Ukraine "On the National Police", entitled "Powers of the Police", does not contain any information on using aircraft, including UAVs, by police within their powers [5].

In the Criminal Procedure Code of Ukraine (hereinafter – the CPC) [8], this issue remains open. Thus, according to its provisions, "procedural actions during criminal proceedings can be recorded on a data carrier on which procedural actions are recorded through technical means" (Article 103 of the CPC of Ukraine). "In case of recording of procedural actions during the pre-trial investigation through technical means, this must be indicated in the protocol" (Article 104 of the CPC of Ukraine). "A specialist may be invited to participate in the inspection who has the right to take measurements, photographs, sound or video recordings, compile plans and diagrams, and make graphic images of the inspection of a place that is relevant to criminal proceedings" (Articles 71, 237 of the CPC of Ukraine).

Considering the above and the fact that the law enforcement system has encountered new challenges which constantly require the introduction of the latest methods and means of combating crime, including using modern achievements of digital, technological, scientific and technical progress, the purpose of this research is to analyse the foreign experience of using unmanned aerial systems by law enforcement agencies, and to develop proposals for improving the current legislation in the part related to using UAVs by the National Police.

In this regard, notably, in the legal literature, the discussion of problematic issues related to using UAVs by law enforcement agencies is a relatively new area of research. Some of their aspects are reflected in the scientific works of V. Korshenko [9], N. Pavlyuk [10], S. Moslenko, S. Zelenskyi [11], A. Movchan, M. Movchan [12], H. Korotenko [13], etc. Undoubtedly, the scientific and theoretical developments of these authors are essential for solving problematic issues related to using UAVs by law enforcement agencies but they do not fully cover the subject of the study. In addition, the analysis of this literature suggests that using UAVs by police agencies and units has not been explored at the level of foreign experience. Considering this, the following is a more detailed analysis of the foreign experience of using UAVs by police agencies and units and based on this analysis, proposals for improving the current legislation, the provisions of which determine the legal basis for using UAVs by police agencies and units of Ukraine.

Materials and Methods

The regulatory framework of the research is the current legislative and subordinate regulations, the provisions of which regulate specific issues regarding the rights, duties and powers of law enforcement agencies in terms of using UAVs, namely: The Air Code of Ukraine [14], the CPC of Ukraine [8], the Laws of Ukraine "On the National Police" [5], "On Operational and Investigative Activities" [6], "On the State Border Guard Service" [7], the Traffic Rules approved by the Resolution of the Cabinet of Ministers of Ukraine No. 1306 of 10/10/2001 [15], the National Security Strategy of Ukraine enacted by the Decree of the President of Ukraine of 09/14/2020 No. 392/2020 [1], the Instruction on using technical devices and technical means with photo and film shooting, and video recording functions by police authorities and units approved by the Order of the Ministry of Internal Affairs of Ukraine No. 1026 of 12/18/2018 [4], etc.

The theoretical basis of the research is the scientific works of scholars and practitioners in the fields of criminal procedure and forensics who have explored individual issues related to the subject of research.

Research methodology. The author of the study used theoretical research methods. The study is based on the diagnostic method of cognition of social and legal phenomena and concepts in their development and interdependence. In particular, this method was used to explore and analyse regulations, analytical materials, concepts and opinions of authors on individual issues within the subject of the research. The author used descriptive, analytical, and dogmatic methods to analyse interpretations of legal categories, definitions, clarifications of the terminology, and proposals for improving the current legislation on the subject of the research. The comparative legal and

formal legal approaches were used to analyse the regulations governing the activities and powers of police authorities and units, and individual issues related to using UAVs by police authorities and units. The modelling method was used to develop conclusions and proposals for improving the current legislation.

Results and Discussion

1. Foreign experience in using UAVs by police authorities and units. Using robotic systems in the work of police authorities and units began in 2009. Nowadays, it is increasingly possible to encounter such terms as "police robot" or "police robotics" [16-18], which are commonly understood as programmable mechanisms capable of performing tasks assigned to police authorities and units in remote (automatic) mode.

Considering the above and the functional capabilities and technical features of unmanned aerial systems, the term *"police drone"* may be used to define an unmanned aerial vehicle used by police authorities and units to perform and solve their tasks.

1. Using UAVs by the USA police

It is considered that the USA police were among the first to use drones in law enforcement. American law enforcement agencies are the first to use a drone armed with a stun gun to arrest a pursued criminal [19]. In 2015, the North Dakota police proposed to equip drones with nitrous oxide gas, explaining their initiative by the fact that using police drones allows real-time monitoring and control of aggressive crowd behaviour from the air, which in turn reduces the necessity for ground regulation and reduces the risk of injury to police officers [17].

Using UAVs by the police resulted in public and human rights criticism of Americans, motivated by numerous cases of violation of constitutional rights and freedoms regarding the illegal acquisition of conferencing information and information about the secrecy of personal and family life by law enforcement agencies. For example, in July 2020, the Minnesota police used backup drones to conduct video surveillance and video recording of nude vacationers (nudists) on one of the beaches to further prosecute them [18]. Evidently, the data obtained through a drone is not open, and therefore its acquisition, storage, processing and transmission require precise regulation.

The problem is that the USA, in each state separately, has its legislation, including on using UAVs by police. It is explained that the *Federal Aviation Administration (FAA)*, which is authorised to grant permits for using drones by police in the US airspace, has not established any federally defined rules that would regulate using drones by US police officers, and the procedure for storing and disclosing information obtained through unmanned aerial systems [20]. In this regard, the resolution of these issues was entrusted to the competence of local legislative authorities in each state separately. In practice, this circumstance has caused legal conflicts explained by the fact that each state has defined its own separate rules for using drones by police, which differ significantly from each other. [21]. For example, in 2020:

– four states (Florida, Idaho, Minnesota, and South Dakota) have authorised using UAVs by emergency workers, including those managing forest fires;

– two states (Minnesota and Missouri) have banned using UAVs over private property, including correctional and psychiatric facilities, and crowded areas such as sports stadiums;

– two states (Idaho and Minnesota) have authorised law enforcement agencies to use UAVs for specific purposes, such as monitoring the traffic situation and inspecting road traffic accidents (hereinafter referred to as "RTAs"), conducting search and rescue operations, and for training purposes;

– one state (Vermont) – has banned law enforcement agencies from using UAVs to identify individuals, except in cases of search and rescue operations, including forest fires, floods, storms, etc;

– three states (Florida, Massachusetts, and Virginia) have allocated funds for the certification of programs and public-private partnerships related to unmanned aerial vehicles;

– one state (Virginia) has authorised local authorities to regulate the takeoff and landing of UAVs in the territory under their control. Previously, settlements did not have such powers [21].

This circumstance forced the US authorities, at the federal level, to adopt several regulations on using UAVs by law enforcement agencies. In particular, according to the so-called "Part 107" of the federal rules [21], only a certified operator can fly a drone, with a special permit from the Civil Aviation Authority, and only in cases of visibility, during the daytime, without posing a threat to the objects and population located within the perimeter of its flight.

In addition, according to the decision of the U.S. Supreme Court adopted according to the Fourth Amendment of the U.S. Constitution, called the "Bill of Rights" [22], using drones in law enforcement can only occur in cases of recording criminal activity and subject to a court order, except in cases of using drones in emergencies and natural disasters.

In this regard, some human rights activists have expressed the opinion that using UAVs by law enforcement agencies will ultimately allow improving the legislation on the protection and enforcement of constitutional rights and freedoms of citizens, as it will encourage society to demand broader guarantees from the state to ensure the protection of constitutional privacy rights [23].

In January 2020, the US government decided to ban using drones made by the Chinese company DJI. In October of the same year, the U.S. Department of Justice vetoed the purchase, and use of unmanned aerial vehicles by government agencies from foreign companies considered a threat to national security, thus supporting its manufacturer [23].

In addition, the US police use drones in more complex operations, such as surveillance of potentially dangerous criminals. In particular, in June 2018, Axon, a world leader in software (platform) for drones used by law enforcement agencies, announced the supply of patrol drones to the police under the Axon Air program [24; 25]. According to this program, all police UAVs will be connected to cloud-based online storage, which will receive and analyse all the information from the surveillance cameras of the drones used by police units.

In addition, Taser International announced that it had granted US police permission to use its developments to equip drones with stun guns. In this regard, the US law enforcement agency believes that: "using drones armed with Taser stun guns will eliminate the risk of injury or death to police officers during dangerous operations, such as the apprehension of potentially armed criminals. Therewith, the public's rejection of the idea that drones can be a type of weapon is an obstacle that must be overcome with understanding" [17; 26].

2. Using UAVs by the police of Great Britain and Germany. The first successful operation of quadrocopters by the British police became known in February 2010, when the Merseyside police were using an AirRobot AR100B equipped with video and thermal imaging surveillance systems to detect a car thief in thick fog [27]. Similar drones are still used in the Great Britain. It is known that the technology of the device was originally developed for military intelligence needs. In this regard, it is practically silent and can work at night, transmitting video images in real-time.

In March 2014, Sussex County Police announced a pilot project using Aeryon Skyranger drones to patrol and monitor visitors to Gatwick Airport. The investor in this project was a private non-profit organisation established in 1948 to develop police practice called the "Association of Chief Police Officers of England, Wales and Northern Ireland". In total, this project cost £45,000, of which £35,000 was spent on equipment and £10,000 was spent on the training and education of four police operators [28].

In 2019, a project to use police drones for traffic control was launched in Great Britain's capital. According to Scotland Yard's management, the purpose of this project is to identify and prosecute offending drivers who endanger the lives and health of road users by their actions. When recording a traffic offence, the drone transmits the information to the police crew for further documentation of the offence and termination of illegal actions committed by the driver of the vehicle [29].

In 2008, the Saxony police launched its first project to document and prevent football hooliganism, which was the first time that German police units used the Sensocopter UAV from the German defence company Diehl BGT Defense, which manufactures weapons [30].

Nowadays, police drones are an integral part of the German police's equipment. They are used during mass events, to search for people and free hostages, and to monitor railways and other critical infrastructure. UAVs have been widely used in the detection of illegal cannabis crops, the detection and investigation of other criminal offences, and various operations by special police units, including ensuring security and order during political events at the international level [30].

3. Using UAVs by the Chinese police. In China, police drones equipped with loudspeakers have been widely used to inform citizens about the bans and restrictions imposed due to the COVID-19 quarantine and to deliver medicines to people in need. In addition, according to statistics from open information sources, China has one of the largest video surveillance systems in the world, with more than 170 million video surveillance cameras, each of which is connected to a single face identification system (database) [17].

In addition, China is considered to be one of the leaders in the production of drones for both commercial (domestic) needs and law enforcement purposes. Thus, for example, DJI drones have been widely used in the activities of the National Police. In addition, DJI drones are used in reconnaissance missions by both Ukrainian and aggressor military personnel [31]. In 2021, the company launched an investment initiative to establish a plant in Zakarpattia, Ukraine, to produce drones for agricultural purposes. The first production facilities are expected to be launched in the second half of 2023 [32].

4. Using UAVs by the French police. Therewith, using drones by the French police during the COVID-19 pandemic has resulted in several lawsuits initiated by the League for Human Rights and La Quadrature du Net, a French legal group promoting digital rights and freedoms of citizens [33].

Demanding that the leadership of the Paris police immediately take measures to stop using drones by subordinate law enforcement officers, representatives of civil society organisations claimed that in this way the police grossly violates the right to privacy and family life of citizens and neglect personal data protection. In this regard, the French Themis declared the police's actions to use UAVs for video

surveillance without prior court authorisation to be illegal. In justifying its decision, the French court emphasised that using drones by the French police was outside the legal framework, which requires law enforcement officers to obtain a court decision to collect confidential information about citizens [33].

5. Using UAVs by the Israeli police. One of the centres for the production of unmanned aerial vehicles is Israel. Thus, for example, according to open-source data, the Israeli security industry has more than 350 companies employing more than 45,000 workers. Total exports of goods produced by these enterprises amount to $7.4 billion, which is approximately 12% of the country's exports, with a population of about 10 million people [34].

In addition, this circumstance has had a positive impact on the development of military-related industries, including those related to the production of light drones for the police. Thus, for example, Bluebird has managed to develop a micro UAV that weighs only 0.5 kg and can fly for two hours. Therewith, the specified weight of this complex includes a battery, a camera, a parachute, and all the necessary equipment for pursuit and patrolling [35].

According to Bluebird representatives, "in the future, every police car will be equipped with such an unmanned system". Currently, the cost of this drone is $15,000 and includes a high-quality video camera for daytime shooting, an infrared camera for use in dark conditions, and a panoramic camera that allows focusing on individual objects or specific targets [35].

6. Ukrainian experience of using UAVs by police. Ukraine can replicate the success of the Israeli state in the design and production of high-tech unmanned aerial vehicles [34]. Ukraine not only has a remarkable aviation history, but it is still one of the few countries in the world with an aviation industry capable of competing with the world's leading manufacturers. Currently, Ukraine is making attempts to provide state support for UAV manufacturing companies and start-ups. Thus, for example, the Ukrainian strike and reconnaissance unmanned aerial vehicle "PUNISHER" developed by "UA Dynamics" has recently been successfully tested. According to open information sources, this drone is considered one of the cheapest in the world [34].

Considerable interest was demonstrated by the Ukrainian "Sokil-200" attack drone designed by the "Luch" design bureau. The UAV can be equipped with four 50 kg missiles and fly for 24 hours at a speed of 150 to 200 km/h. According to the international classification, the "Sokil-200" is close to the American Predator and the Israeli Hermes [36].

In addition, Ukrainian aircraft engines have proven themselves in the military production of the North Atlantic Alliance member countries. Not an exception to this list is the well-known Turkish company "Baykar Makina", which produces Bayraktar [36]. Thus, for example, the developers of the Bayraktar Akinci drone established a new record for the height of flight of a drone equipped with a Ukrainian-made engine that allowed the UAV to fly to a distance of 10.668 km above the ground. These characteristics allow the drone to remain undetected by enemy medium- and short-range air defence systems [36].

All this demonstrates that Ukraine is capable of becoming one of the world's leaders in the production of unmanned aerial vehicles and their systems, which will eventually become the foundation for the introduction of Ukrainian UAVs into law enforcement.

Currently, Ukraine continues to take steps to introduce unmanned aerial vehicles into the work of the National Police. Thus, for example, the Patrol Police Department has established an aerial reconnaissance unit equipped with DJI drones. The robots assist police officers in detecting criminal offences, such as illegal amber mining, illegal cannabis cultivation, illegal deforestation, and poaching, detecting forest fires, searching for people in forest or mountainous areas, monitoring roads to detect and stop traffic offences, etc. Soon, the police plan to establish special aerial reconnaissance groups in each region separately [17].

The State Border Guard Service of Ukraine has had a positive experience with drones, which are widely used in monitoring the state border of Ukraine. This method of monitoring the state border has become particularly important in the border areas with the aggressor country, and the frontline zone. In addition, drones are effectively used to detect smugglers and illegal migrants in the remote mountainous areas of Ukraine [17].

All of this, as a result, indicates that nowadays, the world is witnessing a trend of involving technical achievements of mankind, in particular, in the fields of artificial intelligence and robotics, in all spheres of human activity. The development of scientific and technological progress and the introduction of new technologies into human activity will inevitably have side effects. Sooner or later, humans will have to delegate moral decision-making to automatic artificial intelligence systems. If the risks are not controlled, the establishment of artificial intelligence may become the last technological achievement of mankind.

Considering this, lawyers should already consider the provisions of those regulations governing the grounds for using UAVs by police authorities and units, and the procedure for obtaining, storing and disclosing classified information obtained through them.

7. Analysis and proposals for improving the current legislation. To ensure an appropriate level of road safety at the state level, it is necessary to introduce new, modern technical means of monitoring, recording and controlling road safety.

Recently, there has been a trend towards a significant increase in the number of wheeled vehicles and traffic intensity on Ukrainian roads. It is confirmed by official data provided by the State Service of Ukraine for Transport Safety [37]. According to the data, as of 2021, the road transport system consisted of more than 10 million vehicles, including more than 7 million passenger cars, about 300 thousand buses, about 2 million trucks, and more than 1 million motor vehicles. This circumstance increased the number of road accidents and their adverse consequences. For example, according to the statistics of the Ministry of Internal Affairs of Ukraine, in 2021, more than 155 thousand traffic accidents occurred on Ukrainian roads, which is 14% more than last year. Therewith, about 31,000 road users sustained injuries of varying severity, and 2,500 people died as a result of RTAs [38].

According to the World Bank's estimates presented in the explanatory note to the draft Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine on the Inclusion of Personal Transport in the Unified Transport System of Ukraine and Improving Road Safety" [39], even though the dynamics of road deaths decreased by 9% last year, Ukraine's annual losses as a result of RTAs amount to about USD 5 billion, which is a disappointing indicator for Ukraine's national security in both social and economic terms.

Thus, at the state level, the issues of preventing road accidents, preventing RTAs, and preventing deaths among road users remain relevant. In addition, the provisions of the National Transport Strategy of Ukraine for the period up to 2030 [40] emphasise this, and the lack of a precise regulatory framework for using UAVs and controlling their use, particularly in areas of transport infrastructure, is among the main factors that contribute to high mortality and injuries as a result of RTAs.

Technical means of surveillance include glider-type UAVs, which are capable of remote, aerial, real-time operation, regardless of the time of day or terrain:

– identification of the state license plate of a moving vehicle whose driver violates or has violated the Traffic Rules;

– identification of wanted vehicles and persons driving them;

– traffic control, particularly in areas with a high accident rate;

– instant transmission of the received information to the operator at the road safety management and control point for further processing by the relevant units of the National Police.

The list is not exhaustive. The technical capabilities of unmanned aerial systems are much broader and allow for effective measures to be implemented:

– searching for and pursuing road users if they attempt to leave the place of an accident in which they were involved;

– detection of illegally parked wheeled vehicles in places where such parking is prohibited by traffic rules;

– traffic control on particular sections of streets and highways where it is technically impossible to install a stationary surveillance system.

In addition, UAVs can be used to monitor traffic flow, to control and analyse the traffic situation. Traffic monitoring using drones ensures prompt detection of congestion and traffic accidents with subsequent transmission of the data to the operator for the latter to make an appropriate decision and, in case of detection of wanted vehicles, to pursue them until they are stopped and detained by the police.

Thus, using UAVs allows timely detection of vehicles whose drivers violate traffic rules (e.g., speeding, driving on the oncoming lane, driving on the roadside, etc.), recording the fact of the violation, identifying the vehicle's state registration number, and transmitting the information to the nearest patrol police unit to take the necessary measures to stop the offence on time and bring the perpetrators to legal responsibility.

According to the head of the Patrol Police Department, O. Biloshytskyi [41], the most common cause of car accidents is speeding, which accounts for more than 40% of all accidents with victims and fatalities. Other causes include violations of manoeuvring rules, rules for crossing intersections and pedestrian crossings, and failure to maintain a safe distance. Therewith, the number of RTAs involving fatalities and injuries has decreased threefold on road sections equipped with traffic cameras. Thus, while in 2020, there were an average of 123 RTAs with victims and fatalities on particular road sections, this number dropped to 44 after the installation of photo and video recording cameras.

Currently, according to the Ministry of Internal Affairs of Ukraine [41], there are 236 automatic fixation cameras on Ukrainian highways. In the future, the Ministry of Internal Affairs plans to increase this number to the required 2,000 in conjunction with cameras installed on so-called car phantoms.

Considering this, notably, using UAVs to monitor traffic rules can have a psychological impact on participants. Since, noticing a drone in the air and being aware of the legal responsibility for the violation, vehicle drivers will subconsciously reduce their speed and become more disciplined, which will have a positive impact on road accident statistics [12].

Considering this, it would be appropriate to supplement the Traffic Rules of Ukraine [15] with a new information and guidance road sign with the number "5.70.1." and the title "Photo and video recording of traffic violations from an unmanned aerial vehicle", which would inform road users that it is possible to control traffic violations on the specified section of the road through special technical means installed on an unmanned aerial vehicle (see Fig. 1).

■ **Figure 1.** The image of the proposed project of the information sign is numbered "5.70.1. – photo and video recording of traffic violations from UAVs"

Using unmanned aerial systems can occur when police officers are recording RTAs. Since photo and video recordings of the scene from the air will greatly facilitate the process of learning about the past event and establish the prerequisites for a better mental reconstruction of the situation and circumstances of the event. In addition, the drone will significantly increase the inspection time, which will have a positive impact on the time it takes to clear the roadway section from the traffic jam caused by RTA.

As is known, an inspection of the scene of an incident refers to urgent investigative (detective) actions, the main purpose of which is to identify and remove traces of a criminal offence, tools and means of its commission, property obtained as a result of its commission, search for suspects in hot pursuit, establish the location of missing persons, and identify caches, burial grounds and other illegal burials. In these conditions, technical and forensic means, to which belong UAVs, are of particular significance in the process of protocoling and recording evidence.

The most efficient use of glider-type drones is possible during the inspection of open and large areas of the terrain, where it is necessary to reproduce the event in detail, establish its exact location, take aerial photographs (aerial video) and mark the exact coordinates of the location of traces, objects, parts, corpses, buildings, structures and other forensically significant information found at the scene of the event [10].

The detection of sources of forensically relevant information using UAVs allows for more accurate recording during protocoling and confiscation, as using aerial photography or aerial video recording allows for top-down analysis of the scene, which enables the investigator to better understand and model the event that occurred (past event).

The technical capabilities of most unmanned aerial systems allow for 3-D modelling of the surface of the area under inspection. Therewith, it is not necessary to have a special laser scanner. The terrain is reconstructed using a high-resolution camera with a global positioning system and automatic height control and monitoring. Drawing up a 3-D model during the inspection of the scene allows the investigator to more objectively assess the event of the criminal offence and propose plausible investigative versions [13].

Using UAVs in criminal proceedings should not be limited to the implementation of surveillance functions. The technical capabilities of drones can be useful for inspecting hard-to-reach areas, buildings, terrain, etc. Therefore, the author recommends using glider-type UAVs during searches with the involvement of a specialist as an operator who must ensure proper control of the drone and the technical devices with which it is equipped.

In addition, the literature describes cases when investigators use the capabilities of UAVs to deliver procedural mail to addressees located at a significant distance from the point of departure or in a remote area [42, p. 6-10; 43, p. 87-90]. Such mail can include material evidence, inspection materials, materials on the appointment of forensic examinations, etc. Therewith, it should be mentioned that the UAV's range is limited, and depending on the model, type of powerplant, weather conditions and cargo weight, it can be up to 30 minutes.

Depending on the specific modification, on average, the payload of a multicopter can range from 0.5 to 3 kg at a flight speed of up to 70 km/h. There are modifications with a much higher payload capacity. These include the British-made Malloy Aaeronautics T150 skimmers. Each of these UAVs is capable of delivering up to 68 kg of payload over a distance of up to 70 km. These drones are in service with the Armed Forces of Ukraine, due to military support from the UK government, as part of a Western aid package and Ukraine's transition to NATO weapons and standards [44].

The efficient use of UAVs by police officers can occur when ensuring the protection of public safety and property, the safety of individuals and public security and order, including the recording of offences related to non-compliance with curfews during martial law, etc.

Thus, considering the above, in the author's opinion, the provisions of Section IV of the Law of Ukraine "On the National Police" [5] should be supplemented with a separate paragraph that would define the legal grounds for police officers to use UAVs in the performance of their duties. The text of this clause could be as follows: "*To ensure public safety and order, control compliance with traffic rules, monitor the traffic situation, protect facilities and property located on these facilities, protect human rights and freedoms, their life and health, and during operational and investigative activities and procedural actions related to obtaining information relevant to the detection, investigation and prevention of criminal offences, police officers have the right to use UAVs.*

A UAV operator can be a specialist police officer who has undergone appropriate UAV operator training and who holds a certificate confirming their right to operate a UAV.

UAVs used by police officers in the performance of their duties must be registered in the relevant State Aircraft Register of Ukraine.

Using UAVs by the police is possible only if the Department of State Aviation Regulation of the Ministry of Defence of Ukraine provides prior permission to conduct flights.

Police officers are prohibited from using UAVs at night, in adverse weather conditions, and if it poses or may pose a threat to the life or health of others and/or damage or destroy their property.

Using UAVs to obtain classified information is performed based on the relevant court decision, according to the procedure established by the Constitution and the Criminal Procedure Law of Ukraine".

The presence of this provision will allow supplementing Article 8 of the Law of Ukraine "On Operational and Investigative Activities" [6] with the following text: *"Operational units in the course of operational and investigative activities have the right to use UAVs on the grounds and in the manner prescribed by the Law of Ukraine "On the National Police".*

Specific regulation is required by the Law of Ukraine "On the National Police" [5], which would establish the legal basis for using special technical means to combat offending drones by police. The text of this provision could be as follows: *"To protect and defend human rights and freedoms, their life and health, police officers have the right to use special systems (means, devices) of the gun, radio-electronic and laser type designed to neutralise UAVs".*

Using UAVs during pre-trial investigations requires separate regulation in the provisions of criminal procedure law. Thus, considering the fact that a UAV is an aircraft belonging to sources of increased danger, in the author's opinion, paragraph 5 of Chapter 3 of the CPC of Ukraine [8], entitled "Other Participants in Criminal Proceedings" should be supplemented with a separate provision *"Specialist UAV Operator"*, which would establish the legal grounds for involving a UAV operator in conducting procedural actions, and define their powers (rights, duties) and responsibilities.

Problematic issues regarding the technical capabilities of using UAVs as a technical and forensic tool require further research. For example, some of them include the fact that the takeoff, landing and flight of a drone are significantly affected by meteorological factors, in which using a UAV is extremely undesirable. In severe weather conditions caused by rain, hurricane, hail, fog, snow drifts, etc., using ultralight, lightweight, and small drones is virtually impossible. Thus, before each UAV use, the specialist operator must familiarise himself with the actual and expected meteorological data, which, if ignored, can result in unforeseen circumstances, including accidents resulting in loss of life or damage to property. Therefore, in the event of a sharp deterioration in weather conditions, the police officer should immediately stop the UAV flight [12; 13; 45].

One of the disadvantages of the unmanned aerial vehicle system is its relatively low efficiency in dense urban areas, where it is very difficult to monitor objects, particularly when they are in motion.

UAVs are very useful technical and forensic tools that should not be limited to inspecting the scene of an accident. The modern development of information technology allows UAVs to be equipped with special digital equipment that can identify persons wanted in the video stream or those entered in the relevant law enforcement databases as active participants in mass disorders, persons involved in terrorist activities, organised crime and banditry, model their 3-D images and store the information in the relevant information resources. Using such systems can be especially effective during public events, sports competitions, protests, mass disorders, and other crowded places where it is technically impossible to install stationary surveillance systems.

Using UAVs can occur during search operations to locate missing persons, in particular, when it comes to densely planted areas, forests, mountainous areas and other hard-to-reach or dangerous places. The priority area for using UAV capabilities is to establish the facts of poaching, illegal mining, illegal logging, illegal planting of narcotic plants, etc.

Conclusions

Thus, considering the above, the following conclusions can be drawn, namely:

1. In real-time conditions, UAVs are no longer the prerogative of the military alone; they are actively used by police around the world to perform their tasks. It allows for increasing the efficiency of law enforcement agencies in identifying and recording forensically relevant information. Due to its multi-functionality, using UAVs in law enforcement and forensic activities allows for relatively low financial costs to effectively accomplish tasks that were previously required using a large number of personnel and small aircraft. Using drones eliminates the risk of accidents involving explosive or fire hazards, injuries, injuries or deaths to participants in such operations.

2. The technical capabilities of UAVs allow for efficiently implementing measures to prevent criminal and administrative offences by aerial monitoring of the road situation, main pipeline facilities and railway transport. The specific features of this monitoring include using both analogue and multichannel video recording in real-time, which is capable of simultaneously monitoring several spectral ranges (visible, infrared, radar, thermal imaging, etc.), which allows tracking objects both at night and in poor visibility conditions.

3. Therewith, UAVs are a source of increased danger, using which, if incompetent, can result in irreparable consequences for people, society and the state in general. Thus, using UAVs, including by police agencies and units, requires precise regulation, which forces legislators to supplement the provisions of the Laws of Ukraine "On the National Police" and "On Operational and Investigative Activities" and the provisions of the Criminal Procedure Code of Ukraine on this issue.

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Сучасні можливості використання безпілотних літальних апаратів органами та підрозділами поліції: міжнародний і вітчизняний досвід

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■ **Анотація**. Актуальність теми дослідження обумовлена науковою новизною та практичною значущістю використання сучасних можливостей безпілотних літальних апаратів органами та підрозділами поліції. Затребуваність проблематики дослідження полягає в тому, що норми чинного законодавства, які визначають правові підстави використання безпілотних літальних апаратів органами та підрозділами поліції, здебільшого мають формально визначений характер. З огляду на зазначене та зважаючи на те, що перед правоохоронною системою з'явилися нові виклики, що постійно потребують упровадження у свою діяльність новітніх методів і засобів боротьби зі злочинністю, що передбачають застосування сучасних досягнень цифрового, технологічного та науково-технічного прогресу, метою цієї статті є аналіз міжнародного досвіду використання органами правопорядку безпілотних авіаційних систем та розроблення пропозицій щодо вдосконалення чинного законодавства стосовно використання БпЛА поліцейськими. Методологія дослідження полягає у використанні сукупності загальнонаукових і спеціальних методів, завдяки яким сформульовано припущення та висновки. У статті досліджено актуальні питання сьогодення, що стосуються використання технічних можливостей безпілотних літальних комплексів під час реалізації завдань, покладених на органи та підрозділи поліції. Зокрема, розглянуто міжнародний досвід деяких технологічно розвинутих держав світу (США, Великої Британії, Німеччини, Франції, Китаю, Ізраїлю) щодо використання сучасних можливостей безпілотних літальних апаратів органами правопорядку. Акцентовано на розвитку авіаційної галузі України щодо розроблення українських безпілотних літальних комплексів, а також перспектив їхнього впровадження в діяльність Національної поліції України. Окреслено основні перспективи використання безпілотних літальних апаратів у діяльності органів і підрозділів поліції, зокрема пов'язаної з охороною громадського порядку, безпекою дорожнього руху, виявленням, припиненням і протидією кримінальним та адміністративним правопорушенням, а також охороною та захистом прав і свобод людини, її життя та здоров'я. Наукова новизна та практична значущість статті полягає в тому, що в ній висвітлено сучасні можливості використання безпілотного літального апарату органами та підрозділами поліції, окреслено деякі питання проблемного характеру, що потребують вирішення, а також на підставі міжнародного досвіду визначено напрями вдосконалення чинного законодавства щодо використання безпілотних літальних апаратів Національною поліцією України

■ **Ключові слова**: безпілотна система; роботизований комплекс; дрон; правоохоронні органи; кримінальні правопорушення; розслідування злочинів