Unmanned Aerial Vehicles 'in service' of Internal Security of the State

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Abstract. *The study was created thanks to the author's preferences to learn increasingly more about new technologies that are able to increase the potential of internal security of the state. Recently, interest in recording areas (difficult to access, dangerous, monitored in adverse weather conditions, monitored due to the implementation of tasks by relevant services), the development of methods enabling the transmission of various materials at a distance, and performing other complicated activities have increased. For this purpose, unmanned aerial vehicles (so-called drones, UAVs) that are versatile in many respects are used. The author noticed the need to disseminate such innovative devices on native soil, especially for using them in multidirectional strengthening of the security sphere. Polish companies producing UAVs for many foreign customers have already marked their presence in this matter. The achievements of the designers are so impressive that it makes us appreciate the development of our technical thought, and above all, the use of drones to ensure security and public order in Poland. A series of training courses is already conducted by the Police Academy in Szczytno, which is a good solution both for teachers and, above all, for the trainees themselves. Such an initiative will undoubtedly translate into increased interest in drones, and especially the incredible usefulness of these devices for uniformed services and other entities.*

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Introduction

In 1867, Alfred Nobel patented the technology of saturating diatomaceous earth with nitroglycerin in the form of a paste that can be formed into small diameter rods, allowing them to be placed in cracks and blow up rocks. The invention was registered under the name 'dynamite'. After equipping it with a detonator and a fuse, the creator unfortunately did not take into account the variant of creating a tool for spreading annihilation in this way. The situation is similar in the case of the development of many other modern technical thoughts, which are put into use to make it easier for people to function in different areas of life. Unfortunately, it often goes in the opposite direction. The author of this paper has decided to present the opposite situation, i.e. the use of unmanned aerial vehicles popular for several years, commonly called 'drones' or UAVs, for the purpose of internal security of the country. The first models were developed in military laboratories and were introduced to mass production as a tool to support operations on the battlefield[1]. It was only with time that their construction began to be transformed

[1] Nikola Tesla constructed the first device which operated on a principle similar to drones in 1898. The prototype was presented at an exhibition in Madison Square Garden as a radio-controlled water vehicle, called by its creator 'teleautomaton'. The moving mechanism of the device was a complex panel, which was activated after entering the security code from several radio frequencies several times. American military laboratories worked on improving the remote control

into remote-controlled devices, helpful in transporting packages for research teams working at the far end of a search area, taking various photographs, and recording videos and surveillance from the air intended for non-military use. Although the threats resulting from the use of drones in areas not necessarily conducive to human society cannot be underestimated, it turned out that thanks to their construction (without any human inside the device), they efficiently support the work of: law enforcement agencies, other uniformed services and medical emergency services, critical infrastructure, and the private sector (securing large facilities). This involves supporting each other with drones, both in carrying out 'day-to-day' tasks assigned to specific services or local authorities, and to ensuring the rule of law, public order[2] and medical assistance during crisis management, the emergence of a crisis situation, or as part of a crisis[3]. It can therefore be assumed that the

for several years, in which, thanks to technological design solutions, air, land and sea vehicles were built. The patent was also used by the British, who during World War I, led to the creation of a prototype of a boat controlled by a stream of light from a very high frequency spotlight, invisible to the human eye, *see:* Levy J, 50 typów broni, które zmieniły bieg historii. Warsaw, 2016.

[2] The correctness and quality of the tasks related to ensuring the rule of law and public order are positively influenced by: 1) hiring staff at an appropriate level of education to be able to handle professional equipment in the course of performing official duties; 2) continuous introduction of new technologies and methods to implement the necessary tasks; 3) conducting staff training as part of introducing modern technological solutions to activities performed by them; 4) increasing the number of experts and specialists with expertise in interpreting the results obtained by using the latest generation of equipment; 5) deepening cooperation and preferring systemic solutions between the cooperating actors so that the actions taken are understandable to all, and thus produce the desired results (e.g. on-site visual inspection of a serious incident); 6) striving for increased managerial supervision of activities carried out in the field for serious mass events, using highly specialised equipment (e.g. for decontamination, spherical, slit or thermal imaging cameras, pyrotechnic robots, pyrometers, detectors for contamination, gases and radioactivity), *see:* Drony w służbie samorządów. *Electronic source:* https://portalkomunalny.pl/drony-w-sluzbie-samorzadow-322921/, *accessed:* 3.07.2019.

[3] 'Unmanned aerial vehicle (…) does not have a legal definition in a Polish normative act of statutory rank. Reference should therefore be made to international and European Union legislation in this regard, although there is no single, exhaustive definition and the terminology used is not consistent. However, there is a multiplicity of definitions and their inconsistency in terms of subject matter. For example, the International Civil Aviation Organisation (ICAO) documents use the concept of unmanned aerial vehicle (UAV) and for UAV flights the concept of unmanned aerial system (UAS). In Annex 7 to the Chicago Convention, the term 'aircraft to be operated without a pilot on board' is referred to as unmanned, and among the legal definitions contained therein is the term remotely piloted aircraft (RPA) — it is an unmanned aircraft that is piloted from a remote pilot station. Also Regulation (EC) No. 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No. 1592/2002 and Directive 2004/36/EC6 (hereinafter: Regulation No. 216/2008), which is of key importance for determining the legal status of unmanned aerial vehicles, does not contain a definition, although the Union legislator uses the concept of unmanned aerial vehicles in this act. It can therefore be considered that the use of unmanned aerial vehicles is so new that the legal systems, even at the terminology level, are not yet shaped in this respect'. *See:* Sikorski S, Szmigiero M, Możliwości zastosowania bezzałogowych statków powietrznych w systemie Państwowego Ratownictwa Medycznego w świetle obowiązujących regulacji prawnych. *Kolegium Zarządzania i Finansów. Zeszyt Naukowy*, 2018, No. 167, pp. 143–155.

use of these unmanned, mobile devices has significantly exceeded the original idea of using them for combat tasks. As previous experience teaches, the choice of technical means and methods to use modern technologies triggers distance and the need for prudence, but the practice has proven the positive qualities and high non-military utility of drones. They are adapted to intelligent remote control, and thus trigger many different functions. At the same time, they accurately capture and provide high quality image stabilisation, skillfully map over long distances, and adapt to a wide range of applications, with long battery life and the low weight needed to carry a load. The main performance advantages of UAVs are as follows:

- the speed of data collection and the completion of expected tasks;
- wide perspective, wide angle of view, adjustable manoeuvring area;
- recording of high-resolution images (even from long distances, while maintaining adequate depth of the image);
- non-intrusive and remote observation (even from high altitudes);
- observation at different times of day and year, regardless of environmental conditions, i.e. atmospheric, environmental (even difficult: night, darkness, rain, snow, fog, dust, contamination, etc.),
- space imaging and taking thermal measurements;
- the possibility of introducing additional sensors that can be calibrated with a scanner (e.g. with a gamma-ray detector, which creates conditions to show on the spatial model the expansion of the range of radioactivity).

Therefore, the equipment in question makes it possible to get to know the individual or 'faces' of the facts better, to reach places that are inaccessible or threaten human safety, to shorten the time needed to explain the circumstances of the event, and thus to reach the objective truth of the case faster. UAVs, by providing high resolution when recording objects related to the course of events, meet the basic requirements of a reliable source of evidence for courts, which is in line with the requirements for detective photography. This means that their recordings have evidential value in a conducted case, as they guarantee:

- a clear image of a person or an object which can be recognised without any doubt and from which they can be identified;
- a clear picture of the situation and relevant behaviour of persons who are directly involved in criminal activities;
- a clear picture of the place which, in combination with the persons present there and the time of recording, makes it possible to identify those involved in the crime[4].

With regard to the use of unmanned aerial vehicles in the course of conducting important, from the point of view of the detection process, procedural and non-procedural acts, the fact of their importance to the multi-faceted state security should not be overlooked. The author will cite a few examples of this kind, and include regulations that condition the usefulness of the described equipment.

The use of UAVs as an important element in the implementation of changes in the field of security is directly connected with the progressive commercialisation of solutions and an increase in financial outlays for two key elements, i.e.

[4] *See more:* Kędzierska G, Kędzierski W (Eds), Kryminalistyka. Wybrane zagadnienia techniki. Szczytno, 2011, pp. 429–443.

technological and human factors. Among them, account should be taken of the multidirectionality of the proposed technologies and the cost of proper preparation of the entities to operate them[5]. Nevertheless, the financial resources incurred should quickly pay off and bring measurable benefits as the use of much more expensive equipment is eliminated and the need for a large number of staff demonstrating a high potential for professional knowledge is reduced. Good work results are achieved with a much smaller number of engaged staff, and also with much less intellectual and physical effort on their part, as well as the efforts to find specialists in various fields. In order to use UAVs and achieve the best possible results, one simply needs to train well those who will operate the equipment. As far as the issue is concerned, the author's findings show that within the next few months, the training of particular groups of officers and representatives of other uniformed services will be provided free of charge by a world-famous Polish company producing, among others, unmanned aerial vehicles. A series of training courses is being conducted by the Police Academy in Szczytno, and this is a good solution for both the teaching staff and the trainees themselves. Such an initiative will undoubtedly translate into increased interest in UAVs, and especially into the incredible usefulness of these devices for the uniformed services. During the training, the teachers should sensitise the participants to the range of knowledge that must be appropriate to the needs, in order to record the reality safely, accurately and objectively. At this point, it is necessary to understand the necessity of installing the equipment in the correct way and operating it so that you can clearly see (often in troublesome conditions): places that are difficult to access, an intervention or situation that took place, behaviour of the people involved in a particular activity, lay-out of traces and/or material evidence at that time and then reaching the material, revealing it, securing it and carrying out all activities related to the case. The effort made during the recording of the subsequent stages of the activities allows the video to be replayed later, with careful observation of the location of the details (sometimes not recorded by the human eye), examination of the course of the activities, and thus achieving the desired effects. This undoubtedly provides the prospect of facilitating the work of those involved in security and shortens the time needed to create a conclusive version of the event (to be analysed, verified). However, the use of the latest generation of equipment, such as UAVs, involves the preparation of the staff, with a great deal of effort on the part of the cooperating parties; only then can we count on an increased sense of security on the part of society and an increase in the effectiveness of law enforcement. It is also worthwhile during the training to sensitise and prepare future operators to take into account: drones' disruptions, and criminal or foreign spy intelligence seeking to intercept them, or to eliminate them completely. Such practices should also be prevented by antidrone systems (based on the 'drone vs. drone' operating

[5] The Ministry of Infrastructure, together with the Polish Institute of Economics prepared the White Book of the Unmanned Aircraft Market, which presents a wide range of opportunities to use drones. The document shows how huge the potential of unmanned aviation is, where fast automation broadens the horizons of ever newer air spaces. *See:* U-space drony. *Electronic source:* https://www.google.com/search?q=u-space+drony, *accessed:* 21.07.2019.

principle[6]) introduced and continuously upgraded by manufacturers, which trainees are also required to know.

Focus on the issues related to the use of drones for security purposes

The opportunity to programme drones to translocate them and alter the mode of operation allow them to perform flight and support tasks that facilitate the maintenance of state security in accordance with a strictly specified range. Its area includes site observation from the expected starting point to the end point, with an opportunity to extend the spectrum of activities adjusted to needs. For example, UAVs offer the possibility of shortening various types of exploration actions, which are sometimes prolonged due to problems related to the course, continuation, negative influence of those responsible for making decisions, etc. From the point of view of the search, what is important is the endurance and predisposition of the human brain, which, with long-term observation to prove circumstantial evidence, gather data, evidence or traces, may have an incorrect reception of the remembered and therefore distorted image. Overwork and other disruptions lead to the recreation of a detail or something that the observer has not actually seen, and the reality related to the situational context has a completely different 'face'. Supporting oneself during such actions with unmanned aerial vehicles is most advisable; not only when complicated, but even simple tasks are carried out. Thus, recordings made with their use, by means of video and photographic documentation, related to scanning and/or mapping, can fulfill such functions as: preventive, operational, recording, detecting, evidential. The scope of monitoring includes remote, large, dangerous areas with high risk (against human life and health) mainly related to terrorist attacks, criminal activities, fire, pyrotechnic, toxic or radioactive agents, or other events with serious catastrophic consequences.

The construction and equipment of drones ensures safety in a wide range of tasks assigned to specific services, which are aimed at maintaining order. This is particularly important for forensic activities[7] and related fields, where the desired effects are achieved through UAVs during:

1) combating: organised crime groups (e.g. dealing with illegal smuggling, human trafficking); terrorist groups; increased migration of the population, where increased controls, through the secret registration of documents, luggage and personal appearance, facilitate the identification

[6] The National Police Headquarters informed (…) about the tender for the supply of unmanned aerial vehicles (UAVs) with equipment and training drones, and at the same time wants to acquire new anti-drone systems, in order to be able to intercept and potentially neutralise drones up to 5 kg. *See:* Raubo J, 'Rewolucja' dronowa u bram bezpieczeństwa wewnętrznego. *InfoSecurity*, 2018, No. 24.

[7] As defined by Włodzimierz Gutekunst: '*Forensic science is the science of tactics and techniques for committing crimes, of crime investigation tactics and techniques and of crime prevention tactics and techniques*', *see:* Kędzierska G, Kędzierski W (Eds), Kryminalistyka…, *op. cit.*, p. 19.

and apprehending of suspects. For this purpose, the described equipment is used for secret monitoring: at different times of day and year, in unfavourable weather conditions, in terrain (inaccessible, threatening to life and public safety), in border areas, including environments with increased activity of criminals, or criminals, who pose a real threat to others due to their previous involvement in acts of terrorism. The designated counterterrorist units are also involved in this kind of observation. This happens in situations of hostage-taking, pursuit, reaching the hiding place of perpetrators and finding proceeds of crime or tools used to commit crime (e.g. evidence from the crime used to commit it; especially dangerous for human life and health). Information obtained in this way is analysed and verified in order to create a version to determine the functioning of a given criminal group, i.e. its members, hierarchy, structure, interconnections, external contacts (e.g. drug dealers, sex offenders). Thanks to the personal recognition of individual members of the group, one acquires knowledge about their: appearance, place of residence, work, lifestyle, relations within the family and environment, friendships, attitudes, worldview, interests, ambitions, achievements, leisure activities, habits, addictions, tendencies, conflicts (especially with the law). The abovementioned data and situational data of an entity which is of interest to law enforcement authorities are accompanied by control of their: belongings, documents, contents of consignments, parcels, etc., in order to make it easier to reach a person, to be able to detain him/her and to initiate preparatory proceedings to prove or exclude them from the circle of guilty parties[8]. For these purposes, appropriately camouflaged, small-sized drones (e.g. nano- or micro-class) are suitable, which increase the security of hidden operators, other officers or agents involved in activities against organised criminal activities. Thanks to UAVs, without the need to introduce stationary or mobile observation points, in the vicinity of the indicated places or in the area of criminal activity, it is possible to obtain the applied knowledge, as well as to effectively intercept elements related to mutual communication that are subject to observation (e.g. when they use smartphones, telephones, computer equipment, parcels, various documents). For this purpose, the equipment is included as a platform with applications for the latest solutions in the field of data collection, not only in the area of image analysis (Imagery Intelligence: IMINT), but also in the broadly understood intelligent signal for special tasks (Signals Intelligence: SIGINT). In addition, larger-sized drones are also introduced, which, as unmanned machines (adapted to be more loaded with observation systems and to transmit data from places to be secured or to be observed, etc.), can remain in the air for longer when compared to flying, manned equipment. In such cases, the effectiveness of activities is increased, in terms of an on the spot and well-prepared intervention of the detached unit, and the number of officers deployed, and amount of necessary equipment is significantly reduced;

[8] Merkisz J, Nykaza A, Zastosowanie bezzałogowych statków powietrznych w kryminalistyce rozpoznawczej i wykrywczej. *Bezpieczeństwo i ekologia*, 2016, No. 6, p. 297–301.

2) response to dangerous incidents, for example: crime, kidnapping, arson, after detonating explosives, where recording makes it easier to identify those involved in the action, by providing support:
   — in the coordination of rescue and firefighting or search and rescue operations[9];
   — enabling control of the danger by reaching hazardous areas, unseen, still burning or suffering further explosions;
   — conducting tasks on the site of a fire or ground zero of detonated explosives, together with recording the documentation of losses after these events and natural disasters.

   Current drones are also used for disarming dangerous devices, and bombs, and transmitting images at a distance of up to 10 km. They have access to the VMS platform, with the possibility of viewing what has been recorded in the field in real-time on a screen in the control centre. The use of such equipment is extremely helpful in the course of firefighting and rescue operations (e.g. sending information on the location of places where people requiring immediate assistance are present), as well as carrying out visual inspections. This is because it enables the directing, at a distance, of vehicles transporting equipment and crews designated to carry out operations (firefighters, rescuers, police officers, the army, other services) and receiving victims evacuated from the affected area.
3) conducting preparatory proceedings referring to the performance of various activities, inter alia, during the course of securing the site of an incident until the time of the examination, observation of the manner of conducting the examination, reconstruction of the course of the incident, the site inspection and other stages related to the investigation of criminal cases (especially when, during the investigation, it is required to synchronise activities in several places).

As previously mentioned, the methods developed for the use of unmanned aerial vehicles are increasingly capable of revealing and securing various forms of traces and material evidence associated with a crime. This reinforces, in the longer term, the proper recognition and identification of research material. It also urges those involved in the process, who are aware of being monitored, to pay particular attention to ensuring that the site is properly secured until the time of the inspection, which has so far been a problem, and which has been greatly improved (avoiding access by animals and people, so that new traces, damage or complete destruction may occur). It is obvious that sometimes the traces and material evidence is unknowingly obliterated or destroyed by the victims themselves. Sometimes they want to leave the rooms clean so that the officers who are to arrive do not consider

[9] Unmanned aerial vehicles are a technology with great potential to facilitate the work of rescuers, as they can improve rescue and firefighting or search and rescue operations and, as a result, save the lives of many victims and notably increase their sense of security. Such an important factor is conducive to the subsequent positive prognosis of recovery for those affected and, as regards the implementation of detection activities, is conducive to the investigation of the case.

them to be messy or not keeping sanitary conditions or hygiene rules. Another issue is the intensive washing of victims after a sexual offence, where the victim wants to 'wash away all evil'. Thus, under the influence of emotion and mental breakdown, they remove identifiable material from the body and/or clothing, thus unwittingly making it impossible to analyse it, acting in favour of the perpetrator. Such conduct involves the public unawareness with regard to the rules of conduct before reporting a crime, for which they are not responsible and cannot be blamed. There are also undesirable situations, when in the heat of battle with a fire and carrying out a rescue and firefighting operation, trained firefighters destroy everything, including the traces that can be secured. This is sometimes justified, but in practice, there have been cases of inexplicable exaggeration in removing material suitable for further investigation. This is usually the case when extinguishing fire with an excessive amount of water or other means, or when the rescuers are not able to move properly and trample traces relevant for the outcome of the case. It is even worse when police officers make unforgivable mistakes at the stage of securing the scene until the examination, making it difficult or even impossible to continue the detection process. Until the arrival of the Crime Scene Investigators, it is absolutely necessary to keep the scene of the incident unchanged, as the essence of success is to record any changes directly related to it. This is all the more true when there is a suspicion of the presence of traces (presumed to be present in some place) and difficulties in noticing them in normal conditions. It is advisable to use UAVs equipped with day cameras (allowing observation as if the operator was watching and recording the area from the air) and designed to observe changes invisible to the naked eye. In such cases, thermal or night vision cameras should be used[10]. In the case of searching for corpses, with the assumption that they are under the surface of the ground, a ground-penetrating radar is also used to 'look deep into the ground'[11]. For this task, drones equipped with a GPR (Ground Probing Radar) should be used, preferably multirotor drones for searching the ground and finding buried bodies (living people, corpses), without much physical effort. The knowledge, experience, concentration and correctness of the tasks carried out by the operator and the officers who arrived, which include immediate disclosure, proper securing of evidence and control materials if necessary, are more useful and play a greater role here. As it has been pointed out, those participating in scene examination, who have an understanding of 'spying' by drones, will focus strongly on the activities, which will facilitate the subsequent stages of the proceedings.

[10] Thermal imaging cameras focus infrared light from objects whose temperature differences, being sources of heat received by the sensors, give an image of details allowing, e.g. lockers, hiding people, shallowly buried corpses, etc., to be found; night vision cameras use scattered light from the stars or the moon, by increasing its power to the value of several thousand times greater; to work e.g. in fog, at night, with little light in caves, bunkers, etc, Kamery termowizyjne i noktowizyjne. *Electronic source:* https://legalna-bron.pl/myslistwo/kamery-termowizyjne-i-noktowizyjne/, *accessed:* 3.09.2019.

[11] A mobile geophysical method based on the emission of electromagnetic waves from the short to ultra-short radio waves and the recording of reflected waves from layers characterised by changes in dielectric properties. Processing of such measurement data is carried out with the use of software which allows an image resembling a section through the examined object to be obtained, *see:* Merkisz J, Nykaza A, pp. 300–301.

With considerable effort on the part of the UAV's operator and security personnel, they can capture the original image of a trace or evidence with traces, and with this, they will select the lighting, pay attention to details and invisible elements, and with proper material identification tests, there is a high probability of achieving the desired detection results.

In the course of preparatory proceedings, emphasis is also placed on the recording of activities in the field, such as: search, procedural and forensic experiments. In particular, in cases of search operations where running time is crucial and services need to identify the area as quickly as possible and reach the missing persons or objects, the use of unmanned aerial vehicles becomes invaluable[12]. Scanning with them provides great possibilities; for example, due to the fact of unfavorable weather or conditions where the human eye is not able to perceive: small objects constituting the surrounding environment, changes taking place, facial expressions and behaviour of the people involved in the search, or a visit to the crime scene (especially of the perpetrator). After completion of the activities, the recorded stages and elements can be repeatedly reproduced, then analysed for the resolution of the case, and at the same time, an investigative version can be created in a short period of time that is appropriate to the reality.

4) implementation of the registration function enables identification examinations, as well as comparative tests during the analysis of recorded images; thus, it is a kind of technical documentation revealing, and at the same time preserving the characteristics of traces or properties of material evidence (poorly visible or invisible to the human eye) or phenomena in the form of absorbent substances stratified on objects, or reflecting light differently from the background (e.g. related to fingerprints or trace evidence, banknote security features or various types of documents);
5) the prevention of crime and accidents through continuous surveillance of the space, which is essential for risk assessment; especially with a limited number of law enforcement officers, it is necessary to introduce drones to monitor state borders, communication and tourist routes with particular attention to sensitive places (with frequent robberies, burglaries or those which, due to their status, must be regularly patrolled; e.g. surveillance of long bridges, large facilities), subject to land[13], water or air traffic obstructions, or related

[12] People can go missing, for example: by losing spatial orientation, sudden (amnesia after a traumatic shock) or permanent illness (Alzheimer's disease, mental handicap), accident (accidental falling out of the means of transport, falls in the mountains), as well as during attempts to commit suicide, murder or escape from law enforcement or justice. Here, it is necessary to take into account, among other things, the fact that people wishing to take their own life or killers usually choose places that are difficult to 'access, and often far away from population centres. Therefore, the use of drones in the search phase significantly shortens the necessary time, reduces the number of services involved in the action, which is not always enough to be carried out on a vast mountain or forest area, water reservoir or excavation, where it is very difficult to find the missing persons, and yet it is possible to rescue the persons searched for using this type of equipment', *see:* Merkisz J, Nykaza A.

[13] Polish legal regulations, together with the road infrastructure, are renewed, improved and extended every year, however, they are not adapted to the constantly growing number of inland transport vehicles. The scale of continuous growth in the number of high speed

to: fire hazards (e.g. areas of woodland, with high voltage lines, flammable industrial areas, storage areas) or explosions (e.g. mines, landfills for waste or hazardous minerals, mined areas) [14], organisation of mass events (e.g. identification of drug dealers), and large gatherings or protests (e.g. identification of perpetrators of thefts or behaviours disturbing public order)[15].

Legal regulations related to the use of unmanned aerial vehicles

One of the basic principles of our country's political system is that of the rule of law. It results directly from the Constitution of the Republic of Poland adopted by the National Assembly, where Article 7 refers to the obligation of public authorities to act on the basis and within the limits of the law[16]. Similarly, the rule of law

vehicles is so high that the changes taking place do not keep up with the real threat to safety. Therefore, the number of road accidents in Poland is very high and often they are fatal. This situation entails the need to introduce measures to reduce crime, the rate of accidents and prevent dangerous incidents and disasters in land traffic. A good solution proved to be the mobile movement of drones, which record e.g. the image of the escaping perpetrator in a vehicle, effectively record the course of road disruptions, and rescue operation and other activities, especially in difficult places to access, taking into account the different perspective of the observed targets and participants in the activities.

[14] In situations hazardous to human life and health, where there is a risk of an explosion, fire, or air contamination in the environment, drones with installed specialised sensors check the area before the entry of the bomb squad, appropriate epidemiological, fire-fighting, rescue and research services. In addition, they remove explosives, for which people and animals were previously used, as well as specialist robots. Their task was to detect and detonate charges, but they proved to be very expensive and slow during operation. For this reason, a Hexacopter is now proposed with 3 interchangeable arms, one of which has a metal detector for mine search and a device for disarming them. On the other two arms, a high resolution camera is installed, which records the work and related circumstances. For example, the Mine Kafon model is suitable for the following tasks: terrain mapping, detection of a suspected mine area (even buried in the ground) and remote detonation of dangerous cargo, *see: Electronic source:* https://forbot.pl/blog/mine-kafon-dron-w-sluzbie-bezpieczenstwa-id16966, *accessed:* 3.07.2019.

[15] The Mass Event Security Act lists, among other things, the various types of mass events that should be secured by the security services designated by the event organiser. The entity is obliged to present the regulations of the event's course, where the following rules are specified: participation (e.g. appropriate age, prohibition of bringing psychoactive substances), use of certain devices or maintaining order on the event site, evacuation plan, information about the person responsible — the head of security — to whom you can report faults, complaints, etc., *see:* Ustawa z dnia 20 marca 2009 — O bezpieczeństwie imprez masowych. Dz.U. 2009, No. 62, item 504, as amended. Drones designed to ensure safety at various gatherings and mass events mainly include those of industry-level, *see: Electronic source:* http://www.systemywizyjne.pl/mw/nws/drony-dahua-x820-w-sluzbie-bezpieczenstwu-publicznemu, *accessed:* 3.07.2019.

[16] Konstytucja Rzeczypospolitej Polskiej z dnia 2 kwietnia 1997. Dz.U. 1997, No. 78, item 483, as amended.

is also referred to in Articles 6 and 7, Chapter 2 of the Code of Administrative Procedure[17], as well as in Article 5.1 and 2 of the Act on the Police[18]. In the document referred to above, the legislator marked the manner in which the Police carry out all activities in the course of the provisions as law-abiding, based on the provisions of law and supported by provisions placed in relevant ranked legal acts. The same is true for the other services which focus on preserving the internal security of the state. It is also absolutely essential that the legal basis for the use of UAVs is established. The current focus is therefore on activities aimed at maintaining the highest level of air traffic safety in the operating manned aviation system. The aim is to create legal regulations that are adapted to those already in place for the use of aviation and ICT infrastructure. These should include issues related to the low altitude space that is reserved for unmanned aerial vehicles intended to perform tasks both for internal security and for use by private parties. For this reason, in September 2018, an agreement was signed in Katowice to launch the Central European Drone Demonstrator Programme (CEDD), the first stage of which allowed for the integration of the environment interested in the work of UAVs in the area of Upper Silesia and Zagłębie Dąbrowskie. The CEDD programme was recognised as the first knowledge-exchange platform in Poland covering progressive automation and increase in drone applications, as well as communication between air traffic management entities. This involves the joint conduct of technological tests, proposals for changes in flight organisation, safe space management, supervision and coordination of the planned undertakings. The adopted level of agreement is to ensure legal and operational security of actions and cooperation with the market to systematically eliminate barriers to modern UAV solutions[19].

Since February 2019, new regulations have been in force in our country facilitating flights of unmanned aircraft beyond line of sight, and allowing for automatic flights. As the Ministry of Infrastructure points out, the introduced changes are the government's support for new directions of using the abovementioned devices in the areas of state internal security[20]. The new rules allow automatic flights where drones take off and land at a designated point and fly along a programmed route when the operator is only remotely supervising the operation, while retaining the ability to take immediate control or take other action in the event of an emergency.

[17] 'Art. 6. Public administration bodies act on the basis of legal regulations. Art. 7. In the course of the proceedings, public administration bodies shall uphold the rule of law, ex officio or at the request of the parties, take all necessary steps to clarify the facts of the case and to deal with the matter, taking into account the public interest and the legitimate interests of citizens', *see:* Rozdział 2 Ustawy z 14 czerwca 1960 — Kodeks Postępowania Administracyjnego, Dz.U. 1960, No. 30, item 168, as amended.

[18] 'Art. 5.1. The central body of government administration, responsible for the protection of people's safety and maintenance of public security and order, is the Commander-in-Chief of the Police, subordinated to the minister in charge of internal affairs. 2. The Commander-in-Chief of the Police is the superior of all police officers', *see:* Ustawa z dnia 6 kwietnia 1990 r. o Policji, Dz.U. 1990, No. 30, item 179 as amended.

[19] *Electronic source:* https://ulc.gov.pl/pl/publikacje/wiadomosci/4465-powstal-centralnoeuropejski-demonstrator-dronow-cedd-na-slasku, *accessed:* 3.07.2019.

[20] *See more: Electronic source:* https://www.infosecurity24.pl/rewolucja-dronowa-u-bram-bezpieczenstwa-wewnetrznego, *accessed:* 3.07.2019.

Automatic flights will make it possible to carry out, among other things, routine inspections at scheduled times, in a designated area without human intervention, use newer and newer technologies, deliver shipments, etc. Regulations aimed at maintaining security also introduce additional supervision and certification by the Civil Aviation Authority of operators who wish to operate drones beyond line of sight[21]. The consequence of the legal status is the situation concerning the use of drones during observation and control carried out as part of operational and reconnaissance activities referred to in art. 29 and art. 31 of the Act of 9 June 2006 on the Military Counterintelligence Service and the Military Intelligence Service (hereinafter: MCS Act), as well as in Article 31 of the Act of 24 August 2001 on the Military Police and Military Police Authorities (hereinafter: MP Act). In addition, drones may be used as technical means of recording images or sound, in the course of performing the so-called controlled purchase and secretly supervised shipment, referred to in Article 33 (MCS Act, Article 32 of the MP Act) (Article 34 of the MCS Act with the obligation to obtain court approval, and Article 33 of the MP Act)[22].

In Article 119 of the Act of 16 November 2016 on the National Revenue Administration (hereinafter: NRA Act), where the legislator, in regulating the possibility of secret recording of the so-called 'controlled purchase' with the use of devices recording images or sounds (including drones), used the content of regulations binding in the Acts on MP and MCS, but art. 120 of the NRA Act did not provide for the possibility of recording the activity of secretly supervised shipment.

In the case of the intention to use drones within the framework of the activities described in the publication, the commanding officer of the abovementioned uniformed services must plan in detail the place of their use in order not to lead to exceeding their authority. If it is a public place, i.e. accessible to an unspecified number of people (e.g. a shop, cinema, stadium, street, square, park, means of transport)[23], the ordinance is issued by the 'Head of Military Counterintelligence Service'. However, when the plan of operation assumes recording with the use of a drone in a place other than the public one (e.g. a house, an apartment), its use is ordered by the court, and its implementation is handled by the MCS. However, no restrictions on where unmanned aerial vehicles may be used apply to Military Police officers who carry out detection process activities.

Conclusions

• It can be seen from the above that the introduction of UAVs into the activities of the services designated to ensure an adequate level of internal security of the state may increase people' sense of security. A great advantage of using UAVs in complex actions is the possibility to obtain the necessary documentation

[21] *See more: Electronic source:* https://www.infosecurity24.pl/drony-po-nowemu-rzad-zmienia-przepisy-dotyczace-bezzalogowcow, *accessed:* 3.07.2019.

[22] *See:* Ustawa z dnia 9 czerwca 2006 — O Służbie Kontrwywiadu Wojskowego oraz Służbie Wywiadu Wojskowego. Dz.U. 2006, No. 104, item 709 as amended and Ustawa z 24 sierpnia 2001 — o Żandarmerii Wojskowej i wojskowych organach porządkowych. Dz.U. 2001, No. 123, item 1353 as amended.

[23] Wyrok SN z 9.11.1971 ., sygn. akt VKRN 219/71, OSNPG 1972, No. 2, item 25.

of places where, for example, a dangerous event has occurred, where there are people who are injured or searched for various reasons. Through the comprehensive use of drones, it will be possible in the future to solve criminal cases much faster and more precisely, therefore increasing their participation in the activities of officers will also enable an increase in the level of security in a given country.

• The result of the work done by the security actors depends not only on people (education, commitment, skills, experience, training), but largely on the type, quality, quantity and condition of their technical equipment. The introduction of unmanned aerial vehicles in many areas of human activity has resulted in various findings being made quickly, objectively and relatively cheaply, which can measurably reduce the time needed to carry out the tasks which law enforcement agencies and other services of our country are facing. It is important that the legal regulations are consistent and that drones can be used freely, for which, like cameras or video cameras, no additional equipment such as tripods, flashes, lighting lamps or time-consuming conditions are necessary. The quality of the tasks performed is often affected by previously unpredictable factors, i.e. atmospheric and environmental conditions, and thanks to the use of unmanned aerial vehicles, some inconvenience can be eliminated. Realistically speaking, even the best-prepared officer may not be able to perform the tasks properly and according to good practice, within the scope of the recommended duties, during fog, blackout, rainfall, wind, low temperatures, after an explosion, or on a site after a fire, where black, grey and brown shades predominate. Reference should also be made to the time needed to carry out the activities properly, and there are unfavourable circumstances verifying the principle of carrying them out as soon as possible. The situation will be different when a designated officer will be in a convenient, safe place, at a distance controlling the drone in a way that allows the best possible work results to be achieved.

• The current regulations do not yet allow the full potential of unmanned aerial vehicles to be used in medical emergencies, which should be changed. The basis for the use of these devices, operating beyond the operator's line of sight, can be derived from Article 126(4) of the Aviation Law[24]. Such flights may be performed in areas separated from airspace open to the public. The problem is that the notification should be submitted to the Polish Air Navigation Agency not less than 120 working days before the planned activity. It should therefore be stressed that under the current legal framework, the use of UAVs, in particular by emergency services, is not legally permissible, except in the case of a prior designation of a specific airspace area. In addition, flights by autonomous unmanned aerial vehicles are not explicitly allowed to operate under the current regulations. It is therefore particularly important to prepare appropriate legal solutions within aviation law to enable the use of drones operating beyond the operator's line of sight (with adequate lifting capacity) as part of medical rescue operations. Unmanned aerial vehicles may be an important element of State Medical Rescue equipment, increasing its effectiveness and efficiency of operation. In the context of legal regulations strictly related to medical rescue, it is a matter of adding appropriate regulations on equipping this system with UAVs and on a training system.

[24] Ustawa z dnia 3 lipca 2002 — Prawo lotnicze. Dz.U. 2019, item 1580 as amended.

• In conclusion, it should be stressed that the modification of working methods along with the introduction of new technologies for safety, such as drones, is necessary and still current. Understanding these conditions is important not from the position of a single entity involved in security measures, but as a systemic approach on the part of all cooperating institutions and even the whole society. Undoubtedly, the consequence of joint efforts should be a clear increase in detection and significant actions to save human life and health, which will make it easier for the administration of justice and many other services to take decisions in a much shorter time and in accordance with the facts, and thus increase the sense of security of the citizens of our country.

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***Streszczenie.** Artykuł powstało dzięki upodobaniom autorki do poznawania coraz nowszych technologii, które są w stanie zwiększyć potencjał bezpieczeństwa wewnętrznego państwa. W ostatnim okresie wzrosło na świecie zainteresowanie rejestracją przestrzeni (trudno dostępnej, niebezpiecznej, poddawanej obserwacji w niesprzyjających warunkach pogodowych, monitorowanej z uwagi na realizację zadań przez stosowne służby), rozwojem metod umożliwiających przekazywanie różnych materiałów na odległość oraz wykonywaniem innych skomplikowanych czynności. Do tego celu zaczęto wykorzystywać wszechstronne pod wieloma względami bezzałogowe statki powietrzne (tzw. drony, BSP). Autorka zauważyła konieczność rozpowszechnienia na rodzimym gruncie tak innowacyjnych urządzeń, zwłaszcza do korzystania z nich w wielokierunkowym wzmocnieniu sfery bezpieczeństwa. W tej materii swoją obecność zaznaczyły już polskie firmy produkujące BSP dla wielu odbiorców zagranicznych. Osiągnięcia konstruktorów są na tyle imponujące, że skłania to do docenienia rozwoju naszej myśli technicznej, przede wszystkim zaś korzystania z dronów w celu zapewnienia ładu i porządku publicznego w Polsce. Cykl szkoleń prowadzi już Wyższa Szkoła Policji w Szczytnie, co jest dobrym rozwiązaniem zarówno dla szkolących kadrę, jak i samych szkolonych. Taka inicjatywa przełoży się bez wątpienia na wzmożenie zainteresowania dronami, zwłaszcza zaś na niebywałą przydatność tych urządzeń dla służb mundurowych i innych podmiotów.*

***Zusammenfassung.** Der Atricel wurde dank von Präferenzen des Autors erstellt, immer mehr neue Technologien zu erlernen, die das Potenzial der inneren Sicherheit des Staates erhöhen könnten. Letztens hat die Interesse an der Registrierung von Räumen (schwer zugänglich, gefährlich, bei widrigen Wetterbedingungen überwacht, aufgrund der Ausführung von Aufgaben durch relevante Dienste überwacht), Entwicklung von Methoden, die die Übertragung verschiedener Materialien aus der Ferne ermöglichen und andere komplizierte Aktivitäten ausführen zugenommen. Zu diesem Zweck wurden unbemannte Luftfahrzeuge (sogenannte Drohnen, BSP) eingesetzt, die in vielerlei Hinsicht vielseitig einsetzbar waren. Der Autor bemerkte die Notwendigkeit, solche innovativen Geräte auf heimischem Boden zu vertreiben, insbesondere um sie zur multidirektionalen Stärkung der Sicherheitssphäre einzusetzen. Polnische Unternehmen, die BSP für viele ausländische Kunden herstellen, sind in dieser Angelegenheit bereits präsent. Die Leistungen der Designer sind so beeindruckend, dass wir die Entwicklung unseres technischen Denkens und vor allem den Einsatz von Drohnen zur Gewährleistung der öffentlichen Ordnung und Ordnung in Polen schätzen. Die Polizeihochschule in Szczytno führt bereits eine Reihe von Schulungen durch. Dies ist eine gute Lösung sowohl für Personalausbilder als auch vor allem für die Auszubildenden selbst. Eine solche Initiative wird zweifellos zu einem erhöhten Interesse an Drohnen und insbesondere zu dem unglaublichen Nutzen dieser Geräte für uniformierte Dienste und andere Einheiten führen.*

Резюме. *Статья написана благодаря стремлению Автора познавать все новые и новые технологии, которые способны повысить уровень внутренней безопасности государства. В последнее время во всем мире растет интерес к фиксации пространства (труднодоступного, опасного, находящегося под наблюдением в неблагоприятных погодных условиях, контролируемого в связи с выполнением заданий компетентными службами), к развитию методов, позволяющих передавать на расстояние различные виды грузов, а также к проведению других сложных видов деятельности. С этой целью начали применяться универсальные во многих отношениях беспилотные летательные аппараты (так называемые дроны, БСП). Автор отметила необходимость распространения таких инновационных устройств на национальном уровне, особенно для использования в сфере многонаправленного повышения уровня безопасности. Польские компании, производящие БСП для многих зарубежных заказчиков, уже заявили о своем присутствии в этом вопросе. Достижения строителей настолько впечатляют, что они дают нам возможность оценить развитие инженерно-технической мысли, особенно использование беспилотных летательных аппаратов для обеспечения общественного порядка в Польше. В настоящее время обучение уже проводит Академия полиции в Щитно, что является хорошим вариантом как для обучения персонала, так и для самих слушателей. Такая инициатива, несомненно, приведет к росту интереса к беспилотным летательным аппаратам, особенно к чрезвычайно полезной роли этих устройств для силовых структур и других субъектов.*