THE POSSIBILITIES AND CHALLENGES OF UAV IMPLEMENTATION IN SERBIAN POLICE

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Abstract: Police officers are engaged daily on collection of the data necessary for carrying out tasks within their responsibilities. Sometimes this data has to be collected immediately (e.g., police intervention is in progress), while in other situations there will be more time available for data collection. In both cases an aerial perspective can be of great value in gathering critical information for law enforcement.

For a long time aerial support to police operations was provided by manned aircraft (usually helicopters). Because of technology development during the last decade, law enforcement organizations are turning more and more to cheaper, smaller and stealthier unmanned aerial vehicles popularly called drones. They proved themselves as beneficial to various police branches – from traffic and border police, to tactical units and forensic units. At the same time, their implementation into policing raises significant privacy concerns. Hence their implementation must be followed by strict legal provisions which will regulate the way they can be used. Having this in mind this paper explains the most common ways UAV can complement or substitute existing helicopter unit in Serbia and legal challenges their implementation poses.

Keywords: air support, drones, UAV, sUAS, helicopters, safety, privacy protection.

INTRODUCTION

It is expected that the police, by the way it is organised and performs its function in the society, increases the probability of providing immediate protection of life, integrity and property of citizens whenever the need arises. Preventing and resolving crimes, traffic control, search for a fugitive or missing persons, securing the large-scale public events are only some of the duties police perform daily. In
these and other situations, in order to facilitate rapid response and collect critical information from aerial perspective, air units can be asked to assist.

During the last decade in the field of the air support to policing, one “player” is taking prominent place – unmanned aerial vehicles (UAVs). Slowly but with a steady pace, they are becoming an integral part of everyday policing. They proved themselves as beneficial to various police branches – from traffic and border police, to tactical and forensic units (Milojkovic, 2015: 8). At the same time, equipped with powerful cameras, their implementation into policing raises significant privacy concerns (Bentley, 2018: 274-287). That is why their implementation must be followed by strict legal provisions. Having this in mind this paper explains advantages UAVs have over manned aircraft, the ways UAVs can complement or substitute existing helicopter unit in Serbia and legal challenges their implementation poses.

**UAV TERMINOLOGY**

The terminology used today for UAV is still not clear and/or universally defined (Vasiljević, Vasiljević, Đurić & Pavlović, 2017: 493). Over the years, the term “UAV” dominated by the expert literature. At the same time in the everyday life the term “drone” is more prevalent. In addition to these terms, other terms like the remotely piloted aircraft system (RPAS) or aircraft (RPA) also exist, making confusion for those who are outside of aviation field, especially because these terms are usually used interchangeably.

There are two main groups of drones: those that are remotely piloted and those that are autonomous. The term UAV is used to mean an unmanned, autonomously functioning aircraft, while the term RPA means an aircraft controlled remotely by a third party. If we take into account that in both cases there is no human pilot on-board and that UAVs may operate with various degrees of autonomy: either under remote control by a human operator or autonomously via preprogrammed flight path, than “less autonomous” UAVs could be considered as RPAs (in this case RPA may be considered as UAV’s subcategory). The term ‘drone’ is military in origin but now firmly established in public parlance for both UAV and RPA (Official Journal of the European Union [EUR-Lex], 2014).

Terms like unmanned aerial system (UAS) or remotely piloted aircraft system (RPAS) involves much more than just an aircraft (UAV/RPA) - they encompass everything that makes a UAV/RPA to operate: the ground control station, communications, support equipment etc. This terminology confusion deepens even more by the lack of terminology standardisation. For example, *European Union Aviation Safety Agency* considered several terms such as Unmanned Aircraft Systems (UAS), Remotely Piloted Aircraft Systems (RPAS) (a UAS subcategory), but finally followed the general usage of the term ‘drone’ with the following definition: “Drone shall mean an aircraft without a human pilot on board, whose flight is controlled either autonomously or under the remote control of a pilot on the
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ground or in another vehicle” (European Aviation Safety Agency, 2015). At the same time, International Civil Aviation Organisation (ICAO) does not use the term drone, but the terms RPAS and UAV (EUR-Lex, 2014). Finally, the drone industry does not stand still, but is growing so rapidly that some new terms appear and some older ones have to be redefined.

UAS can be categorized in a variety of ways based on vehicle attributes including the type of aircraft (fixed wing or rotorcraft), flight altitude (high, medium, low), weight, speed, etc. In the police practice, UASs that weigh no more than 25 kg are the most common. According to aviation industry standards, these UASs are categorised as small unmanned aircraft systems (sUAS). The most popular sUAS are small vertical-lift aircraft that are lightweight and easily transported but have enough power to carry a high-quality camera, a sensor package and a technology package that can include a global positioning system (GPS), allowing the aircraft to be programmed to fly a route without remote pilot control (Valdovinos, Specht & Zeunik, 2016: 7). Typical flight time for these devices can range from 10 minutes to 45 minutes. When it comes to policing, these aircraft is commonly used, so in the rest of this paper, the term sUAS will be used.

sUAS AS A PART OF AIR SUPPORT TO POLICING

Air support units have existed in police practice over decades1. Usually these units are equipped with helicopters, but also there are examples of law enforcement agencies that are using other types of aircrafts (e.g. fixed-wings aircraft, police blimps). The use of police air units is associated with:

- substantial cost of buying, operating, and maintaining manned aircraft (usually helicopters) which presents a huge obstacle to their use on a widespread or regular basis2

- the arrival time - police officers cannot always rely on helicopters because it takes too long for them to arrive. For example, in the UK during the year 2016, the requests for helicopter support were cancelled during transit to an incident on over 40 percent of occasions with the main reason incidents are often over before air support can arrive (Her Majesty’s Inspectorate of Constabulary and Fire & Rescue Services, 2017: 6).

- they are too noisy to be used in tactical situation where information needs to be collected covertly because the effect of surprise is needed.

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2 Approximately $25 per hour cost to operate a drone, while traditional manned aircraft cost between $256 and $600 per hour. Drones suited for use by law enforcement can be obtained for a cost between $1,000 and $50,000, depending on the features sought, while manned aircraft can cost between $600,000 and $1 million. Drones cost $0 to store while manned aircraft can cost $300-$500 per month to store (Mary, 2017: 7).
On the other hand, not only that sUAS are more affordable (both in terms of buying, maintaining and operating them) compared to manned aircraft, they offer greater operational flexibility:

- They are portable and can be assembled and launched in minutes which allows rapid deployment;
- They could be used in incidents that are too risky or are beyond the technical capabilities of manned aircraft (e.g. active-shooter incidents, response to and assessment of hazardous materials etc.);
- They can be valuable support to policing in the activities that traditionally didn’t involve any form of air support (e.g. crime scene documenting etc.).

Prior to implementation of sUAS in policing, police officers could only get air support from helicopters. Nowadays each police patrol may have its own “air support” in the trunk of a patrol car and may use it when the need arises. Although the benefits of sUAS are obvious and confirmed by many successful cases of their use in police practice\(^3\), they should not be considered as a replacement for traditional manned aviation, but rather as their supplement (Shinnamon & Cowell, 2019: 5).

Despite their everyday growing capabilities, sUAS cannot perform all the functions of manned aircraft, such as medical evacuations, rescue operations, and the deployment of high-powered search lights to illuminate large areas (Shinnamon & Cowell, 2019: 5).

For larger agencies, a sUAS is essential addition to their air units that may expand their aerial support to situation which are not convenient for traditional aircraft or to perform other regular tasks but with considerably lower costs. For smaller agencies, sUAS may be the only option to have an airborne support to everyday policing.

**PUBLIC SAFETY APPLICATIONS OF sUAS**

With constantly decreasing cost of sUAS, they are becoming more common in police practice. Law enforcement agencies are using them in various situations: in hostage negotiation, crime scene investigation, search and rescue missions, active shooting scenarios, apprehension of dangerous criminals, border protection with drones searching for illegal crossings, traffic control by monitoring drivers breaking traffic laws etc. Apart from these situations, sUAS are especially useful when there is a need to send officers to locations which are difficult to approach or too risky. These examples are just an overview of the most frequent ways law enforcement currently uses sUAS in their work. As time passes and UAS technology advances, some new opportunity for sUAS implementation into policing practice will arise.

In Serbian police practice the advantages of sUAS are not yet recognised nor exploited. Aerial support to police officers is provided exclusively by helicopter unit. The engagement of helicopters is mainly focused on providing transportation services (not only to police officers, but other civilian subjects), providing support to special units (mostly for the purposes of air landing), border protection (detection of illegal border crossing) and traffic police activities (traffic condition monitoring), crowd monitoring, search and rescue missions and firefighting support. By the use of the sUAS air support policing activities in Serbia may be complemented in many ways, but the following areas could be the most beneficial: crime scene investigation and forensic photogrammetry, search and rescue missions, tactical operations and traffic enforcement. The way sUAS can be used in these situations is described below.

Crime scene investigation and forensic photogrammetry

One of the most common task police do is documenting crime scene. The use of sUAS in crime scene processing turned out to be beneficial especially in those situations where crime scene entails huge areas (e.g. airplane crash, natural disaster etc.). With the improvements of imaging systems, GNSS technology and advancement in photogrammetry, aerial pictures become “intelligent” and able to document the precise locations of objects (evidences) scattered on the scene. This is particularly useful in forensic investigations of traffic accidents that involve many vehicles. In these cases collecting evidences can be time-consuming process. At the same time, there is a huge pressure to collect evidence as soon as it is possible in order reopen the road and to preserve safety of those officers who are processing the scene and/or traveling citizens. When sUAS is utilized to map the crash scene, research has shown that the time taken to clear a crash scene and reopen the road can be reduced by 56% to 73% when compared to other measurement tools. Furthermore, the time officers were at risk in the roadway was reduced by approximately 28 minutes (78%) (Gambold & Freeborn, 2015; cited according: The Johns Hopkins University Applied Physics Lab, 2017:19,20).

Once obtained, photogrammetric images makes the reconstruction process more effective as examiners are no longer constrained by decisions (measurement) made by investigators at the scene. Photogrammetric data make it possible to return to the scene repeatedly and to measure the distance between any two points at any stage of the reconstruction. According to Iain Lopata drones are particularly good at locating and capturing fluid trails from crashed vehicles, which can be difficult to spot via other methods of accident reconstruction. In the large scale crime scene a UAS could save investigators hours of time in photographing the scene while providing a detailed visual that can be later used during prosecution (Zercoe, 2018).

Although recent studies showed that images captured by sUAS can provide measurements with generally acceptable levels of errors using photogrammetric
techniques (Jurkofsky, 2015: 136-152), in order to get a better insight into accuracy of measurements using sUAS with photogrammetry, additional researches are needed. The future research effort should not be conducted in controlled environment using a mock crash scene, but in a real situation with the aim of determining equipment, software, environment, and weather factors that may impact measurement accuracy (The Johns Hopkins University Applied Physics Lab, 2017). Until solid research evidence is not obtained in regard to accuracy of measurement using sUAS, their use will be reduced to merely obtaining aerial photographs of the scene.

Search and rescue

Regardless of whether children are lost in inaccessible terrain, a fugitive is on the run, or building is collapsed because of earthquake, police may be called to intervene. In such situations every second counts. Children may be freezing, fugitive is about to reach his shelter, person inside collapsed building may be seriously injured and the search and/or rescue operation must begin as soon as possible. In this situation sUAS can be launched instantly from just about anywhere without being hampered or impeded by the terrain. By using thermal imaging sensors, the ability to identify and locate victims/target is enhanced.

By covering large areas in a short period, a UAS can help save a life by locating a person much more quickly than could be accomplished on foot and minimize the amount of force that would otherwise be required.

There are certain situations in which a stranded person might be at an unreachable position and can’t be reached by helicopters. In such cases, because of its smaller size sUAS are more useful in comparison to helicopters. They can easily reach this area and, if there is a need, to deliver supplies like radios, first aid kit, medicine and similar.

The small size of sUAS allows them to get through narrow spaces for example, inside of a building that has collapsed. They can be sent inside the building to locate trapped persons, to better understand what obstacles exist and develop a strategy to avoid or overcome them.

Tactical operations support

Advantages of sUAS compared to traditional manned aircraft are particularly visible in situations where police officers are expected to serve a search warrant, conduct raids, arrest barricaded suspect and during the hostage situations. In these situations data from aerial perspective can be valuable for achieving situational awareness. sUAS can provide more data, faster than sending in a (reconnaissance) team of police officers with less risk for their safety. Helicopters due to the noise they produce are not convenient means of collecting information
sUAS are capable of collecting information in different phases of police engagement. In the planning phase they can aid law enforcement in more accurately assessing the nature of the threat presented by the shooter. They can collect information (intelligence) about location, providing valuable information about access and escape points (doors and windows), animals that could alert the suspect of approaching officers, trip hazards, suspect(s)/others moving about inside the building, and lighting (interior and exterior) conditions (Shinnamon & Cowell, 2019: 17). Aided by powerful cameras officers could be informed about the number of suspects, types of weapons they use and to determine the position of the shooter(s). The unique capabilities of unmanned aircraft—particularly those equipped with multi-rotor systems, allow operators to approach elevated or difficult to reach positions with ease. Areas that would typically be impassable or inaccessible on the ground could be quickly accessed and evaluated from an unmanned aircraft (Wallace & Loffi, 2017: 6). During the entry phase, sUAS can provide real time video from aerial perspective or from inside the apartment, to officers and command post simultaneously, so they can react and make necessary and timely decision. In situations where decision should be made quickly, availability of real-time data is of the utmost importance. Should the suspect(s) attempt to escape, the sUAS can be used to detect such a movement and to alert officers in charge of perimeter security. In case suspect decides to surrender, sUAS can be sent to verify that he/she put his weapon down, so he/she could be approached more safely.

**Traffic safety**

By enforcing laws to curtail unsafe/illegal driving practices the main objective of traffic police is the reduction of traffic related injuries and fatalities. Recently, in order to increase the traffic police’s omnipresence and reduce costs, police organisations worldwide started to implement drones into their traffic policing practice. The major advantage of sUAS compared to traditional traffic enforcement resources (e.g., police cars and speed cameras) is their ability to provide both a “bird’s eye view” of drivers as well as their flexible mobility, which are not restricted to traveling on the road network and conditioned by traffic congestion (Rosenfeld, 2019: 199-206). Using the police can enhance monitoring and reporting suspect traffic violations. For example, they can easily spot people driving in the emergency lane a driver who does not stop at stop signs, reckless overtaking and other illegal behaviors on the roads. The results show that drivers perceive traffic enforcement sUAS as significantly more efficient and deterring compared to current aerial traffic enforcement resources (i.e., police helicopters) and comparable in quality to speed cameras (Rosenfeld, 2019: 199-206).
In case a car is pulled over, a sUAS can be sent to check if the driver is injured, ill or just suffering car trouble. Based on info received from sUAS, tow trucks can be alerted and they can be given instructions about the best way to get to the scene. Similarly, drones can provide important information during major traffic accidents by visualizing the magnitude of the accident and its impact on traffic flow. This information can help redirect traffic, as well as to help incoming emergency units to respond more effectively (Werner, 2015).

LEGAL ASPECTS OF THE USE OF UNMANNED AERIAL VEHICLES IN POLICE WORK

Aided by surveillance technology, sUAS can collect various information about spaces, facilities and people, thereby violating their privacy. The use of sUAS without surveillance technology (e.g. cameras), just as the very use of a helicopter, basically does not constitute interference with fundamental human rights. The extent of the impact on privacy primarily depends on the equipment they have and the purposes for which such equipment is used (Brezpilotni letalniki, 2015: 5). For example, the use of a sUAS’s camera for the photogrammetric recording of a scene does not carry the risk of human rights violation. At the same time, recording a person at a public gathering can have implications for human rights.

In our national frameworks, the right to privacy, other human rights and freedoms are guaranteed by the Constitution of the Republic of Serbia. By guaranteeing the protection of personal data, the Constitution protects citizens from the unauthorized and unlawful collection of their data, prescribing thus for the collection, storing, processing and the use of personal data to be regulated by law (Article 42, paragraph 2).

Personal data protection is guaranteed to any person, regardless of nationality and residence, race, age, sex, language, religion, political and other belief, nationality, social origin and status, assets, birth, education, social position or other personal characteristics (Article 1 paragraph 1 of the Serbian Law on Personal Data Protection)

This right, like any other citizen's right, may be denied by a public authority only in cases grounded in law. So, public authorities may process data about a

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4 UAVs may have installed devices for biometric face recognition, video recording, photographing, infrared, thermal and UV cameras, recording equipment, radars, automatic number plate recognition and vehicle speed measurement systems, arming and passivation systems (e.g. tear gas) and other means that could violate the constitutionally protected human rights.


6 Personal data means any information relating to a natural person. See more in Article 3 par. 1 point 1 of the Law on Personal Data Protection.

person\textsuperscript{8} without his/her consent if processing is necessary in order to realise tasks from their competence determined by law or other regulation for the purpose of realising the interest of national or public security, state defence, prevention, detection, investigation and prosecution for criminal offences, economic or financial interests of the state, protection of public health and morals, protection of rights and freedoms and other public interest, and in other cases on the basis of data subject's written consent (Article 13 of the Law on Personal Data Protection). This means that any data processing must have legal grounds in the law that will be specified with a defined goal and purpose for which personal data is processed.

The police, as a public authority, can collect or process personal data in various ways including the sUAS only after legal prerequisites are met. For the accomplishment of this and other tasks, the police have authorities envisaged by the Law on Police\textsuperscript{9}. Authorities from the Law on Police do not provide legal possibilities for the police to collect or process personal data with the help of sUAS. Thus, any use of the sUAS by the police for the processing of personal data would constitute a violation of the right to privacy,\textsuperscript{10} the actions of which are incriminated by the provisions of the Criminal Code\textsuperscript{11}.

The positive practice of the world policing community on the use of sUAS in carrying out police tasks, as well as the efficiency and lower operational costs associated with their use, are factors that justify their introduction into Serbian police practice. In this view, the Law on Police should first create the legal grounds for their implementation. The legal regulation of the use of sUAS in the Law on Police for the processing of personal data can be established in two ways. The first would imply envisaging the possibility of collecting personal data using appropriate technical means within the scope of the already existing authority – the collection of information. Appropriate technical means would include not only sUAS but other means the police would use depending on the specific nature of an event. This solution can cause dilemmas and leaves space for possible abuse of certain technical means for different purposes.

\textsuperscript{8} Data processing is any action taken in relation to data such as collecting, noting, rewriting, reproducing, copying, transferring, searching, sorting, uploading, separating, crossing, merging, appropriating, modifying, securing, using, submitting for review, disclosing, publishing, disseminating, recording, organizing, storing, adjusting, disclosing by transmission or otherwise making available, concealing, removing and otherwise making unavailable, as well as carrying out other actions in relation to the above data, regardless of whether it is done automatically, semi-automatically or otherwise (Article 3, paragraph 1, point 3 of the Law on Personal Data Protection).


\textsuperscript{10} Violation of the right to privacy exists in cases where the restriction of the right to privacy is applied contrary to the provisions of the existing law. Also, the violation will exist even if there is no domestic regulation that regulates a certain type of right restriction. This rule was highlighted in the case of Taylor-Sabori v. the United Kingdom from 2002 when the applicant complained his pager was surveilled, although at the time there was no relevant regulation that allowed eavesdropping of this means of communication (Sindelčić, 2012: 30).

For the sake of avoiding any dilemma, the legal provision on the use of sUAS should be defined with a precise aim and purpose, and it can read: The police may use sUAS for collecting data about spaces, facilities, events and persons while performing anti-terrorist tasks, establishing a disrupted public order on a larger scale, arresting terrorist, criminal groups and individuals, securing public gatherings, certain persons and facilities of particular importance for the Republic of Serbia, searching and rescuing missions, and providing assistance in case of natural disasters and other emergency situations. Moreover, it should be envisaged that the police can use sUAS to perform other police tasks in case a task cannot be performed using other means and methods, or this would be difficult or associated with considerable difficulties and delays.

The data collected using sUAS could not be used as evidence, like the data collected through other informal measures in accordance with Criminal Procedure Code.

From the organizational aspect, it is possible to entrust the use of sUAS to individual members of organizational units who, by the nature of their jobs, can find themselves in a situation requiring the use of sUAS and who would undergo proper training and certification, in accordance with applicable regulations (for instance, uniformed police officers in a police directorate, Special Anti–Terrorist Unit specialists, gendarmes in the Gendarmerie, police officers in the Criminal Police, etc.) or to entrust these tasks to an existing organizational unit that carries out technical support activities. In resolving this dilemma, one should consider the type, urgency, riskiness, and complexity of the tasks to be performed. Thus, the complexity and risk of tasks, the secrecy of operations and the urgency of action of the Special Anti–Terrorist Unit, the Gendarmerie and the Criminal Police justify the equipping of these organizational units with sUAS, while other not so risky and complex tasks could be performed by organizational units for technical support in police directorates. Such a solution would be completely justified and acceptable, as the Special Anti–Terrorist Unit, Gendarmerie, and Criminal Police could use sUAS independently in case of a need for rapid and urgent action, while on the other hand, the technical support unit would use sUAS in carrying out regular tasks for the needs of the police directorate.

The beginning of the use of sUAS in Serbia for commercial and non-commercial purposes was followed by the adoption of regulations regulating the ways and conditions for their use. Thus, based on the Air Transport Law, the Rules on Unmanned Aircrafts (hereinafter: the Rules) were adopted defining the conditions for the safe use of unmanned aircrafts, their classification, recording, maintenance, as well as the conditions that must be met by persons using unmanned aircrafts.
aircrafts. The Rules state that its provisions do not apply to aircraft used by the police, army, and customs (Article 1).

Along with establishing legal grounds in the law for the use of sUAS, bylaws should also regulate the issues related to the rules and procedures for using sUAS by police officers, issuing approvals for the use of sUAS, training police officers for handling and use of sUAS, issuing and extending licenses, conducting regular training, controlling the use, keeping records etc. in more detail.

The use of sUAS should be based on defined procedures, rules, and conditions and entrusted only to trained police officers. The normative framework, defined procedures, rules, and training system constitute the factors for the legal, proper, and safe use of UAVs.

CONCLUSION

During the last decade the use of sUAS attracted huge popularity worldwide. Not only are they used by hobbyists or commercial enterprises, but also from government agencies too. Numerous cases of successful use of UAS in police practice showed that they can increase operational efficiency and improve officer and community safety. They can, among other benefits, help find lost persons, protect police officers during searches for armed suspects, decrease time needed to process crime and accident scenes, and aid traffic safety efforts. While the sUAS has significant potential to improve public safety, there raise legitimate citizens’ concerns about privacy risks. In order to overcome public-acceptance challenge, carefully devised legal frameworks must be implemented which will regulate who is allowed to deploy drones and where, under which circumstances and other issues related to how to collect, use, and disclose imagery obtained through the use of a UAS.

In Serbian police practice UAS can complement existing helicopter unit and make air support to policing more accessible. In order to do that, some legal steps need to be taken in order to change Law on Police in order to institute a legal base for sUAS use by police and define policies related to their practical use (how to incorporate them into existing organization, training, certification etc.). Finally, the benefits of sUAS are not only recognised by police, but from criminals too, so along with sUAS’ implementation into police practice, there is a need for implementation of counter-drone systems.
REFERENCES


Legal acts


