Drone – A Tool of Modern Terror

Władysław Leśnikowski

War Studies University

ABSTRACT

The Unmanned Aerial Vehicle (UAV), commonly known as a drone, has evolved beyond its military and commercial applications, emerging as a potential threat to various facets of modern society. This manuscript explores the prospect of deliberate terrorist use of drone technology, fueled by its low cost and easy accessibility in commercial markets, making it available to a wide range of groups, both state and non-state entities.

Keywords: unmanned aerial vehicle, drone technology, terrorism, artificial intelligence, case study, DAESH autonomous weapons, killer robots, security threats, countermeasures.

Classification: LCC Code: UG1242.D7

Language: English

Great Britain Journals Press

LJP Copyright ID: 573345
Print ISSN: 2515-5785
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 24 | Issue 2 | Compilation 1.0

Drone – A Tool of Modern Terror

Władysław Leśnikowski

ABSTRACT

The Unmanned Aerial Vehicle (UAV), commonly known as a drone, has evolved beyond its military and commercial applications, emerging as a potential threat to various facets of modern society. This manuscript explores the prospect of deliberate terrorist use of drone technology, fueled by its low cost and easy accessibility in commercial markets, making it available to a wide range of groups, both state and non-state entities.

Delving into the historical context, terrorism, characterized by the willingness to use violence for individual gain or political power, has persisted throughout human history. The manuscript raises the pertinent question of whether this threat remains imminent. The revolutionary advancements in artificial intelligence (AI) and drone technology present a grave risk to humanity, potentially automating large-scale killing processes. This convergence of technologies offers terrorist groups the capability to acquire and develop deadly autonomous weapons, colloquially referred to as "killer robots." Such weapons could significantly escalate the magnitude of incidents causing mass destruction, particularly in Western countries.

The manuscript draws insights from a case study on the activities of the terrorist organization DAESH, highlighting their grassroots efforts to master drone technology. This home-based initiative reflects a strategic shift, elevating the use of drones in terrorist attacks to a higher level. As the intersection of AI and drone technology evolves, the manuscript underscores the pressing need for comprehensive countermeasures to mitigate the potential threats posed by these advancements.

Keywords: unmanned aerial vehicle, drone technology, terrorism, artificial intelligence, case study, DAESH autonomous weapons, killer robots, security threats, countermeasures.

Author: Civil Aviation Management Institute, Faculty of Management and Command, War Studies University, gen. Chruściela "Montera" 103, 00-910 Warsaw, Poland.

I. INTRODUCTION

The modern world is one "global village"[1], as Herbert Masshal McLuhan said, where changes occur rapidly and information is transferred at a truly light speed from one end of the globe to the other, just like in a small mountain village where everyone knows everything almost in an instant. Rapid globalization and technological progress, combined with asymmetric and terrorist threats, have a profound impact on how we perceive our security and what threats they pose to modern society.

Aviation, like no other technology before its creation and since, is responsible for creating the definition of a "global village". Aviation is the ability to reach any part of the world by air in a previously unimaginable short time. In the past, international travel was the privilege of a wealthy elite or adventurers, while the modern world is available to everyone, for religious pilgrimages, business trips, recreation, but also for groups of terrorists who can use manned and unmanned aviation technology for their nefarious purposes. In short, aviation has changed the way we live, think and what is possible in the world.

[1] Global village - a term introduced in 1962 by Herbert Marshall McLuhan in his book The Gutenberg Galaxy, describing the trend in which mass electronic media are breaking down time and space barriers, enabling people to communicate on a mass scale. /https://pl.wikipedia.org › wiki › Globalna_wioska, [accessed on November 27, 2023]

Aviation and the aviation industry - this is one large area of global security, and also an area of threats. Starting from threats of terrorist attacks, cyber threats and cyberattacks to geopolitical pedestals that tend to be involved in creating threats, including from terrorist groups using aviation, unmanned aviation, i.e. drone technology.

An aviation safety incident is a term given to a safety incident that affects or may affect the safety of the crew, passengers, ground staff or the entire society. Analysts of threats to civil aviation have defined the greatest challenge in the area of its security, namely the changing nature of these threats.

Airlines are threatened by cyberattacks, which may lead to loss of financial revenues, loss of passengers and may cause significant damage to the reputation of a given brand. As a result of cyberattacks, suppliers and external suppliers may also lose business to competitors who have implemented much stronger cybersecurity measures.

One of the main targets of terrorist attacks is also the aviation industry, with its systems that are critical to conducting air operations, where time is a very important factor. Such terrorist attacks could result in massive operational disruptions, large financial losses and potential security risks.

Why would Civil Aviation be a target for attacks by terrorist groups?

Civil Aviation is an extensively interconnected international infrastructure, interconnecting the world and spanning almost every country on earth. Civil Aviation Infrastructure is extraordinarily dependent on computer-telecommunications information systems; i.e. air traffic control, navigation, reservations, aircraft flight control.

Civil Aviation Infrastructure is highly dependent on computer and telecommunications information systems; i.e. air traffic control, navigation, reservations, aircraft flight control, therefore it is an easy and tasty target for terrorist groups to perform cyberattacks.

A possible breakdown of public trust in Civil Aviation security in the event of poor protection against terrorist attacks will have serious global economic and social consequences.

New, innovative technologies change the nature of wars and military operations, and expand the possibilities of activity of entities, both state and non-state, and at the same time they also change the nature of threats and make them dependent, e.g. on cybersecurity.

Modern technology brings with it the so-called democratizing the ability to cause large-scale harm. Historical attacks involved only a few major states, but now they are becoming imaginable to a much wider range of entities and non-state actors.

Democratization of technology[2] refers to the process by which access to technology rapidly continues to become more accessible to more people.

Thomas Friedman argued that the era of globalization has been characterized by the democratization of technology, democratization of finance, and democratization of information. (Friedman, T.L. (1999). The Lexus and the Olive Tree: Understanding Globalization. New York: Random House).

The term "technological democratization" was created included Thomas Friedman and other scholars:

- The Internet, as a key role in modern life and the democratization of knowledge;
- Social Media has strengthened and enabled us to become creators and critics of technological development;
- Generative Artificial Intelligence tools have the potential to democratize the process of innovative improvement of individuals' ability to define and visualize ideas (How Generative AI Can Augment Human Creativity". Harvard Business Review. 2023-06-16. ISSN 0017-8012. Retrieved 2023-06-20);

[2] https://en.wikipedia.org › wiki › Democratization_of_tec... [accessed on November 27, 2023]

- The Open Source model allows direct participation in software development by contributing opinions (Jesiek, B.K. (October 6, 2003). "Democratizing Software: Open Source, the Hacker Ethic, and Beyond." First Monday, 8(10).)

The functioning of societies simultaneously in cyberspace and in the physical world creates new areas, the so-called vulnerabilities in security systems. The above-mentioned technological democratization has created the ability to wreak large-scale destruction corresponding to the connection of the virtual and real worlds. Activated remote terrorist attacks originating from cyberspace can cause major disruptions in our real world.

Modern systems supporting aviation operations are or could potentially be hacked by terrorist groups. Such potential aviation systems vulnerable to hacker activities, often in the service of terrorist groups, are:

- Reservation systems,
- Departure control systems,
- Air traffic management support systems,
- Access control systems,
- Control systems etc.,
- Carrier data storage systems in the cloud,
- Cargo handling and air operations systems,
- Hazardous materials transport management systems.

In addition to the above-mentioned ground-based aviation infrastructure systems, there are also many on-board and external systems interacting with the aircraft that are vulnerable to terrorist cyberattacks, e.g.

- Flight control systems,
- GPS navigation systems,
- Fuel condition and consumption indicators,
- Computer service, etc.

Cyberterrorism and Civil Aviation are interdependent. Terrorists are able to take control of the air traffic control system to cause a plane to crash or two planes to collide in mid-flight. Terrorist cyberattacks may target areas that are easier to target but could disrupt Civil Aviation operations on a large scale, such as energy distribution, communication lines, and administrative systems.

Aviation, including unmanned aviation, or individual unmanned aircraft, become targets for terrorists and often have special values, as well as tools to achieve their goals. In the modern world, it does not matter whether it is about nation states or the participation of non-state actors. In modern "conflicts", often called "hybrid war" or "hybrid operations", traditional actors on conventional battlefields do not take part, at least in their initial phases[3], and the "conflicts" spread also into civilian domains.

Drones have a significant place and share in this type of activities and are a desirable tool in current and future terrorist activities. Civil aviation is crucial to the functioning of every economy, and any disruption to its functioning as a result of terrorist incidents is intensified by the media, which rapidly disseminate information and disinformation, so it will likely remain a tempting target for attackers, terrorists who are driven by the goal of causing maximum disruption.

Mitigating and eliminating threats to civil aviation security can only be achieved through the concerted effort of aviation security regulators of all states. The flow of critical information exchange between countries on new and innovative methods aimed at Civil Aviation should be increased, and efforts should be made to develop systems that counteract or eliminate the terrorist threat.

The author defined the main problem in the form of a question; *Does the modern world, its globalization and technological democratization enable contemporary terrorist groups to use innovative technology in the form of a combination of AI and drone technology to achieve their terrorist goals?*

[3] W. Leśnikowski – *Air power in hybrid operations*, Publishing house Adam Marszałek, Toruń 2019, Poland, p. 115-120.

The research goal of this manuscript is: *To identify historical development, terrorism, threats to society in the process of rapid adaptation to modern conditions, as well as to create comprehensive systems to counter current and future threats resulting from the use of innovative technology by terrorist groups.*

II. TERRORISM AND ITS HISTORICAL PRESENCE IN THE LIFE OF SOCIETY

Terrorism is commonly defined as the unlawful use of violence in order to achieve political and statutory benefits of terrorist organizations. The history of terrorism is as old as humanity and is related to man's willingness to use violence to achieve individual gain or political power. Terrorism has many faces and it is difficult to define it clearly.

The author of this article prefers to adopt the following definition for further analysis. Terrorism is generally considered to be a social phenomenon characteristic of our age and its features result from the international system of nation states. The successes of terrorism are conditioned by the existence of mass media used to create and maintain an aura of terror, uncertainty, terror and fear among large groups of people.

The first acts of organized and documented terror come from antiquity, i.e. the 1st century. The Jewish group Sicaria[4] was one of the first organized groups of trained assassins to eliminate collaborators and Roman enemies, the rulers from Judea. The liquidation tools were small sicae daggers hidden in their cloaks, and after inflicting fatal blows, they blended unnoticed into the crowd.

Another terrorist group was the Hashhashin sect of Islamic assassins, which operated from the 11th to the 13th century in Iran and Syria. The victims of this small ascetic group were Seljumi, prefects, caliphs and crusaders, and the murder itself was a sacramental act for them.

The beginnings of "modern" terrorism date back to 1793, and the word terrorism itself became established during the reign of Maximilien Robespierre after the French Revolution. Robespierre justified his dictatorial, terrorist methods of operation by the need to transform the monarchy into a liberal democracy. The aim of his action was to subdue the enemies of freedom through the use of terror, and thus it is possible to create a better system. The continuator of this type of thought was the 19th century Narodnaya Volya, which wanted to end the tsarist rule in Russia with its terrorist actions.

At that time, the idea of terrorist activities was to counteract the existing public order.

After 1950, the role of non-state terrorism increases rapidly. The so-called guerrilla warfare tactics used by non-state actors. The initiating factors were: activation of ethnic nationalism, e.g. Basque, Zionist, Irish; the rise of anti-colonial movements in French, British and other colonies; the emergence of new ideologies, e.g. communism.

Terrorist groups with nationalistic overtones were created in many places around the world, e.g.; The Irish Republican Army, as well as the Kurds (Kurdistan Workers' Party, PKK) living in Turkey, Iran, Iraq and Syria, and the Liberation Tigers of Sri Lanka from Tamil Eelam adopted terrorist activities as a method of fighting for self-determination.

The years 1970-1990 are an image and period of international terrorism

The late 1960s was a time of preference for international terrorism and the use of kidnapping as a primary tactic. The Popular Front for the Liberation of Palestine is kidnapping in 1968, the El Al flight. Twenty years later, a catastrophic Pan Am flight over Lockerbie, Scotland occurs,

[4] Sicarii (Latin sicarii, Greek σικαριοι, sikarioi, from Latin Sica - short dagger) - a radical faction of zealots. The word means dagger sica and assassins or murderers who committed murders and killings with short daggers. It was a Jewish political party operating from the mid-1st century AD. until the fall of Masada in 73 A.D. They were led by Menachem ben Jair, grandson of Judas of Galilee, who was the leader of the Sicaria until his assassination. (His brother Eleazor replaced him). Their goal was to end Rome's direct rule over the Jews. https://ichi.pro› sicarii-piersi-asasyni-w-historii-1643..[accessed 09/12/23]

London Journal of Research in Humanities and Social Sciences

shocking the world. This period in the history of aviation is a time of theatrical acts, acts of violence with the participation of organized terrorist groups with political motives. An example of this type of activities are the events in 1972 during the Olympic Games in Munich. The Palestinian terrorist group Black September kidnapped and then killed the Israeli athletes who participated in those games. The end goal of these actions was to negotiate the release of Palestinian prisoners by using spectacular tactics to draw the attention of the international community to their cause.

The events in Munich had a radical impact on the United States' conduct in the area of terrorism, with counterterrorism specialist Timothy Naftali stating, "The terms counterterrorism and international terrorism have formally entered the Washington political lexicon".

Terrorist actions and violence were justified by the leaders of terrorist groups with a deep belief in the necessity and justice of their causes. The activities of the terrorist group were largely based on the black market and the production of Soviet light weapons, e.g. AK-47 assault rifles, which were mass-produced after the collapse of the Soviet Union in 1989.

Religious terrorism is a sign of the 21st century

The present age is troubled by religious terrorist threats. Islamist groups, e.g. Al-Qaeda, Hamas, Hezbollah, play an important role in this area. Not only do Islamist groups occupy a prominent place on this scene, but other religions such as Christianity, Hinduism, and Judaism also have their own forms of militant extremism.

Karen Armstrong, who is a religious scholar, argues that today's religious extremists have long since moved away from any true religious commandments and have become violent extremists, manipulating religious concepts for their own purposes.

As of 2002, according to the Institute for Economics & Peace, the largest percentage of global terrorist activities are conducted by four main jihadist groups - the Taliban, the Khorasan chapter of the Islamic State, ISIL, Boko Haram. The mentioned groups committed approximately 9,000 murders in 2018. 87% of all fatalities are the result of the activities of terrorist groups in the following countries; Afghanistan, Nigeria, Iraq, Pakistan, Syria, Somalia, Yemen, India, the Philippines and the Democratic Republic of the Congo.

III. TERROR AND ITS SHADES

Terrorism as a phenomenon is a very difficult term to define. This phenomenon is multi-faceted and cannot be defined in a clear approach or conceptual definition because it depends on a different point of view. The term "terrorism" has its roots in Greek and originally meant "to tremble, to be afraid" or "a terrible word, terrible news", but it also touches on the Latin verb terro - "to cause terror, to frighten[5]".

Generally speaking, terrorism can be defined as causing fear, terror, a sense of uncertainty, lack of security, as well as the entire spectrum of rape and violence.

According to experts on the subject, the objects of terrorist activities are largely people who do not have a direct influence on the achievement of the goals that terrorists or entire terrorist organizations want to achieve. Terrorist activities are aimed at achieving effective psychological effects and a large social and media effect.

Common definitions of terrorism are too general and do not allow us to authoritatively determine what is and what is not terrorism, as well as who can be called a terrorist. The analysis of a large number of existing definitions allows the author to conclude that they are insufficient to capture this extremely complex phenomenon - terrorism.

The lack of a uniform and generally accepted definition of terrorism creates serious difficulties in the legal area in the process of international institutional cooperation in the field of combating terrorism and imprisoning the authors of terrorist acts.

[5] Dictionary of the Polish language 1979, p. 239 https://sjp.pl › terrorism, [accessed 29/12/2023]

IV. CHARACTERISTICS AND CLASSIFICATION OF THE CONCEPT OF TERRORISM

Experts on the subject state that there are currently over two hundred definitions of terrorism. Common elements include concepts regarding the genesis, use of violence, force or the threat of its use, the process of planning actions, as well as the assumed goals to be achieved, political goals, creating an atmosphere of threat and fear, including mass media in these activities to publicize the activities, and also the unpredicta bility and unpredictability of the perpetrators' actions.

In Polish literature, there are views that terror means rape, violence of strong individuals against weaker ones, that terrorism means rape and violence of weaker people against stronger individuals. In the literature on the subject, you can come across the terms "terror" and "terrorism", which are often confused and this creates huge problems. in ultimately defining this phenomenon.

The phenomenon of terrorism is associated with various forms that depend on the place and time of its occurrence. Many phenomena are defined as terrorist acts, which ultimately makes it difficult to definitively define the phenomenon of terrorism legally.

As a result of terrorist activities, the victims may be politicians, policemen, military personnel, but also ordinary people, regardless of age, gender or education. This is the position presented by Szafrański[6]. When attempting to define the phenomenon of terrorism, the problem of the nature of a given state or organization as a "terrorist" arises, because when one begins to take into account the issue of sources of in weapons or other means of warfare of various types of organizations, official and unofficial, or terrorist groups. The problem in defining and assigning what is terrorism and what is not lies in the strong connections of this area with politics. Experts on the subject face a dilemma: whether an act of armed attack on politicians or police officers can be justified in some circumstances and whether it can be considered state terrorism? The answer to this issue depends to a large extent on the moral or political beliefs of citizens and is shaped to a large extent by the mass media.

Marian Flemming[7] also attempted to define the concept of terrorism, believing that "terrorism is intentional actions that constitute a violation of criminal law and are intended, through acts of violence or the threat of such acts, to intimidate state authorities or significant segments of society and to force a specific course of action".

When considering the term "terrorism", one must bear in mind its many types. According to experts on the subject, terrorism is also a specific tactic of perpetrators that can take various forms, e.g.; offensive, defensive and repressive. According to many opinions of experts on the subject in the area of terrorism one can distinguish:

- *State terrorism* - these are the actions of the state and state authorities in relation to their citizens, using various forms of involvement in activities of a terrorist nature with the involvement and financing of terrorist groups.
- *Anti-state terrorism* - actions used by movements, groups or individual persons aimed at destabilizing state structures and social order.

In order to fully define this phenomenon, the motivation criterion should be used:

- *Political terrorism* - this is the action of terrorists aimed at creating an atmosphere of intimidation with a political, possibly religious or ideological background. In the area of political terrorism one can distinguish;
- *Repressive terrorism* - these are the actions of the state and its repressive apparatus, often represented by the police, to restrain and subjugate society, groups or individuals,

[6] Szafrański J, *Contemporary threats of terrorism and methods of anti-terrorist activities*, Szczytno 2007, p. 18. Publishing house WSGE, University of Economics Euroregional them. Alcide De Gasperi, Special Units of Polish Police Szczytno, Poland, book chapter (305-324)

[7] Flemming M. (1996), *Political terrorism in international legislation*, Military Law Review No. 1

- *Sub-revolutionary terrorism* - this is an ideologically motivated action, often of small groups or individuals practicing violence for various purposes, such as intimidation, revenge, punishment, but not able to introduce fundamental changes,
- *Revolutionary terrorism* - its main goal is to carry out a revolution and introduce fundamental changes in the structure of the state.
- *Non-political terrorism* – this is an action that is not related in any way with politics or state power in terms of motivation for action, but can be distinguished:
- *Criminal terrorism* - including acts of common crime using methods of action aimed at profit,
- *Pathological terrorism* – these are terrorist activities of people with psychological and mental disorders that cannot be clearly classified, but are or may be the result of frustration, hatred towards the community, specific people or institutions.

In Polish national literature on the subject, you can also find many other classifications, e.g[8].:

- *Individual terrorism* - violence directed against the lives of specially selected individuals or marked groups,
- *Economic terrorism* - actions detrimental to economic relations, economic relations, property rights of owners of factories, enterprises, etc.,
- *Repressive terrorism* - activities carried out by the dominant group in a given community in order to protect threatened privileges,
- *Insurgent terrorism* - actions of an ethno-separastic-nationalist nature,
- Social-revolutionary terrorism - these are activities aimed at changing the political system.

In addition to the above-mentioned types of terrorism, some experts in this field classify terrorism according to the tactics of the perpetrators: *regressive terrorism, defensive terrorism and offensive terrorism*. This area also includes: direct terrorism, propaganda terrorism, domestic terrorism and international terrorism.

To sum up, terrorism, although a phenomenon known for centuries, is still a unique phenomenon, something difficult to understand, a complex, extremely dynamic problem, which makes research on it very difficult. This also confirms the problem with the adoption of a single, universal definition of terrorism by the United Nations, which still does not exist, which seriously hampers the effective fight against it.

V. THE BIGGEST EXPLORERS OF DRONE TECHNOLOGY IN THE WORLD OF TERRORISM - TERRORIST GROUPS, ARTIFICIAL INTELLIGENCE AND KILLER DRONES (DAESH CASE STUDY)

The modern world, the world of the 21st century, is increasingly subject to digitization, automation and globalization of life. In this world, there are also groups or entire organizations whose goal is to achieve their assumptions and status goals through terror, terrorist activities, through the use of innovative tools in the form of mines. drones and artificial intelligence.

The quasi-Islamic State of Iraq and the Levant (ISIL) launched a successful drone attack for the first time in 2016. As a result of this drone attack, two Peshmerga fighters were killed in northern Iraq. This successful attack resulted in more and more sophisticated technologies being used against their enemies, resulting in imitations around the world. Successes in the use of innovative technology, including drones and artificial intelligence (AI), pushed ISIL to create a "Mujahideen unmanned aerial vehicle" unit that operated in the field of drone development and use in combat as well as in weapons of drone technology.

The use of artificial intelligence (AI) as a weapon may prove to be a serious threat to humanity, it may allow adversaries, including non-state actors, to automate the killing process on a massive scale. The combination of knowledge and experience from drone technology and more sophisticated

[8] Pawłowski A. (1991), Typology of political terrorism, [in:] Political terrorism, (ed.) Muszyński J., PWN, Warsaw, p. 94

to automate the killing process on a massive scale. The combination of knowledge and experience from drone technology and more sophisticated artificial intelligence may provide terrorist groups with the ability to acquire or develop deadly autonomous weapons or "killer robots", which would dramatically increase their ability to create incidents of mass destruction of cities in Western countries.

It is August 4, 2018, at 5:41 p.m. local time, in the capital of Venezuela, Caracas, a celebration of the 81st anniversary of the creation of the National Guard takes place, during which the president of this country, Nicolás Maduro, addresses the gathered crowd. At some point, the sound suddenly stops and the wife, Cilia Flores, standing nearby, and the presidential entourage raise their heads, looking for something overhead. Two drones DJI M600s equipped with a kilogram of C4 explosive were intended to kill the Venezuelan president, but both were shot down by honor guard snipers before reaching their target. As a result of the explosions, one of which took place near the presidential platform, seven soldiers were injured.

"It didn't work today, but it's a matter of time," wrote a group identifying itself as "Flannel Soldiers," as "patriotic soldiers and civilians." The president of Venezuela accused the leader of Colombia, Juan Manuel Santos, and the United States was said to have financed this act of terror. It was probably the first such attack in the world. This attack ushered in a new and sinister era - unmanned aerial vehicle terrorism.

The ability of drones to avoid obstacles and reach places generally considered inaccessible or with very difficult access is clearly illustrated by the situation related to the German campaign in Dresden, during which they spoke; German Chancellor Angela Merkel and Defense Minister Thomas de Maiziere. During Merkel and the Minister of Defense's speech, a UAV Parrot quadcopter appeared on stage. Merkel was amused by the situation, but the security staff were not amused. The situation was very dangerous, because if it had been a terrorist attack, it would have ended tragically. Fortunately, the drone operator's intention was to draw attention to the topic of drone observations.

Source: Enlarge / German Chancellor Angela Merkel smiles as a Parrot AR drone comes in for a crash landing during a Christian Democratic Party campaign event September 15., SEAN GALLAGHER - 9/18/2013, arsTECHNICA.

Photo 1: UAV hovering near Chancellor Merkel

This situation proves that drone technology is able to provide terrorists with a very good platform for observing targets and carrying out terrorist attacks.

Drones have proven to be a very useful surveillance tool for many governments, and there is no reason to believe that terrorists could not use similar solutions in their terrorist activities. An example of surveillance was a US security conference in 2011, during which one of the speakers demonstrated "a drone that flew silently and identified and tracked people as targets using signals from their cell phones" (Hurby, 2012). These demonstrations of some of the many capabilities of drone technology show that once in the hands of terrorists, it poses a huge threat to high-risk targets such as political figures, business representatives, sports entertainment professionals and other citizens of our society.

The use of armed unmanned aerial vehicles by individuals or small groups who often identify themselves as proxies for nation states is no longer just a future concern, but is largely becoming a present. New, innovative technologies available to all have effectively dispersed the power previously presented by states to the lowest levels.

Current entry barriers are no longer a problem to gain access to the latest technology, the so-called off-the-shelf technology (available straight from the shelf), and which can ultimately be used by deadly units.

Lone actors or small cells of terrorists, criminals and rebels can effectively use the tactical flexibility of a small unmanned aerial vehicle in order to create an atmosphere of panic, wreak havoc, or even use such an unmanned aircraft to shoot down a manned aircraft.

Such situations are no longer just a scenario for science fiction movies, it is already happening, for example with Hezbollah or Hutu rebels, who used drones in their terrorist attacks to ram Saudi air defenses in Yemen. Certain terrorist groups have mastered drone technology without the help of state sponsors. During hostilities, in the civil war in Syria, the so-called The Islamic State has been very successful in using unmanned aerial vehicles to conduct surveillance and reconnaissance, as well as to conduct offensive operations such as dropping grenades or other explosives on enemy military bases.

Currently, many countries, and most recently Nigeria, Pakistan, Turkey - use armed drones in combat, due to such a situation falling into the wrong hands, the sophistication of such technology as drone technology is growing exponentially.

The modern world is a global village, everything is at your fingertips and by using, for example, the Internet, you can acquire appropriate knowledge and skills to use unmanned aerial systems to carry out terrorist attacks. Unmanned aerial systems are publicly available, and commercial, off-the-shelf technology is relatively easy to obtain. A terrorist group acquiring a drone is not a problem. It can be stolen, purchased from a dishonest state, or from corrupt military officials or intelligence units.

The fact that drones used in a terrorist attack reached a world leader at a public outdoor event in Caracas, Venezuela is testimony to how easily drones can be exploited, and how difficult it is to defend against them.

Drone technology is developing very dynamically and is widely available and is relatively easy to use. Drones are being miniaturized and drones are being created using nano technology. Drones are small, light and relatively easy to maneuver with just a little practice.

Technological development has brought machine learning and artificial intelligence to the modern world, and drones may soon become programmable and intelligent enough that their services can be used without human guidance and for increasingly nefarious purposes.

One of the more nightmare scenarios for society is the possibility of using a drone to deliver chemical or biological agents in a terrorist attack. Intelligence services have long been reporting that Al-Qaeda and other terrorist groups are trying to design a spectacular attack on Western civilization

using weapons of mass destruction. The possibility of using drones to spread deadly viruses and germs, e.g. in stadiums or other places of mass gathering, is a hellishly terrifying prospect of using drone technology. In addition to the physical effects of such a possible bioterrorist attack, it carries the possibility of perpetuating the psychological dimension of terrorism.

VI. INNOVATIVE TERRORISM – DAESH'S STRATEGY FOR USING DRONE TECHNOLOGY

What is *Innovative Terrorism*? Experts on the topic of contemporary terrorism are trying to find an adequate definition of this phenomenon. This phenomenon is defined as the introduction of a new method or the development of an existing technology by a terrorist group or groups.

When analyzing the phenomenon of changing terrorism, it is necessary to analyze its changing features and principles that current terrorist organizations have. This analysis should also take into account the nature and patterns of contemporary terrorism and the resources held by terrorist groups, e.g. DAESH, which is currently defined as the most dangerous organization threatening security and stability, both regional and international.

DAESH and its principles of warfare and methods of terror are based on a radical messianic discourse[10], and it has a powerful influence on activities that threaten the security of the entire world.

The mentioned DAESH and other terrorist organizations use the entire spectrum of opportunities offered by innovative technologies, including drone technology, globalization and the entire Western liberal world of markets. Such a global situation gives a strong terrorist message and radically increases the already large opportunities of terrorists. Terrorists from DAESH and similar terrorist organizations are involved in the process of innovative terrorism by using modern technologies and thus diversifying new types of threats. As mentioned earlier, one of the most dangerous and major threats is drone technology - unmanned aerial platforms.

Information from DAESH combat operations in Syria and Iraq makes us realize how serious a threat this terrorist group's use of drones is to the security forces, but also to civilian society.

When we talk about innovation, we mean, at the state level, the development of new military technologies, tactics or strategies used, or civilian technologies on which breakthrough changes are based. Experts on innovation in the military often call this process "adaptation", importing methods or new materials through the process of imitation, emulation[11]. It is right to point out that the technologies used by terrorist organizations or individual teams will never be state-of-the-art, but the appropriate term will be *adaptation* or *emulation*[12].

The term innovation in the context of the use of terror refers to the dissemination of the use of new technologies or techniques within terrorist groups, and it consists in the so-called *lesson learned*, i.e[13]. drawing conclusions from previous

[10] Messianism - a term for hope that first appeared in the religion of Israel, relating to the end of the world ("this age"). Its content is the coming Messianic era, which will be characterized by political freedom, moral perfection and earthly happiness for the people of Israel in their own land, as well as for all humanity. It is closely related to the expectation of the appearance of the Messiah who will save the world. The idea of messianism is present in the teaching of the Hebrew Bible and the Talmud. Messianism then became the main idea of Christianity, the very name of which means messianism (from Greek Christos - Messiah).. https://pl.wikipedia.org › wiki › Messianism, [accessed on December 17, 2023]

[11] Emulation – programmatic simulation of the operation of a specific software or hardware platform by another system or on another type of hardware. This process is performed using a special program called an emulator. https://pl.wikipedia.org › wiki › Emulation, [accessed 17/12/2023]

[12] Dolnik A., Understanding Terrorist Innovation: Technology, Tactics and Global Trends, (Routledge, New York: 2007), pp. 4-21.

[13] Maria J. Rasmussen and Mohammed M. Hafez, Terrorist Innovations in Weapons of Mass Effect: Preconditions, Causes and Predictive Indicators, (Defense Threat Reduction Agency Advanced Systems and Concepts Office Report, October 2010), Report No: ASCO 2010-019, pp . 2-10. Bleda Kurtdarcan and Barın Kayaoğlu, "Turkey Is on the Front Lines against ISIS's Bomber Drones," The National Interest, October 16, 2016.

terrorist attacks and introducing improvements and adaptations to planning and the execution of future terrorist attacks. To sum up, the name of innovative terrorism for terrorist organizations is the introduction of new methods of terror or the development of existing ones. Of course, large terrorist organizations with large financial resources can do this more easily and faster.

In such conditions, DAESH becomes a global threat by using all military tactics and by not respecting any norms or international humanitarian law and other legal principles. Modernized weapons or those developed by terrorist organizations, e.g. DAESH, significantly change the nature of the threat. Drone technology and its application to terror reveals the dangerous face of terror. DAESH developed its own program using home-made, commercial drone technology. In this way, this organization has increased its ability to carry out terrorist attacks using drones.

In 2015, Iraqi Armed Forces and Turkish units deployed in Bashika, northern Iraq, revealed that DAESH in Ramadi had engaged drones for reconnaissance, spying and intelligence gathering.

The models of fixed-wing drones with explosives on board, refined and modernized by DAESH, are proof of the use of new tactics. In addition to collecting information, drones were modernized, equipped with explosives and prepared for terrorist attacks. Drones have also been used to direct fire from mortars, cannonballs, rockets and to provide electrostatic counter-jamming to cells.

The first use of drones to attack the Turkish military, which was conducting Operation Euphrates Shield by DAESH, took place on September 27, 2016 in Syria. DAESH used a controlled drone to drop explosives on Turkish soldiers. Three Turkish soldiers were injured as a result of this attack. DAESH carried out another attack on October 2, 2016 against Peshmerga forces operating in Iraq as part of Operation Conquest. Fatah in Mosul. The result of this attack was the death of two Peshmergats and two French special forces soldierswere seriously injured as a result of an IED explosion.

Image 1: Drones and documents captured in a DAESH drone facility in Mosul, Iraq

At the end of 2016, DAESH intensified attacks on security forces participating in Operation Conquest in Iraq and against the PYD-PKK[14] as part of the Raqqa offensive in Syria[15]. A concern on the international security market is the gradual increase in the use of drone technology by terrorist groups as a means of attack[16].

The introduction of drones into DAESH equipment and their involvement in irregular warfare cause serious losses and create a new, international dimension of the problem[17]. In fact, Hezbollah, adversaries in Syria, and Hashd al-Shaabi in Iraq have begun using drone technology to carry out terrorist attacks. Houthis attacked a Saudi frigate loaded with bombs using an unmanned naval vehicle in Yemen, killing three soldiers in the attack[18].

VII. DRONES USED BY DAESH IN TERRORIST ACTIVITIES

DAESH used drone technology to fight in the city to identify snipers, who are largely responsible for large personnel losses. The analysis of available literature on the use of commercial drones after their reconstruction for combat purposes shows that both states and non-state entities want to develop this tactic. The author's task is to analyze and demonstrate how non-state forces and groups, including terrorists, operate drones and what level of danger this action takes for the community.

During the examination of materials acquired as part of Operation Conquest from four fronts[19], 10 workshops were identified where drones were produced and modernized on a home-made basis by DAESH in various locations in Mosul. It was revealed that DAESH was preparing to produce drones as weapons, had a systematic drone technology program and established an aviation sector supervision corroding the purchase and development of drones, and also had an airborne operations center to coordinate committed acts of terrorism using drones.

In 2016, DAESH already used 600 different types of drones, as opposed to 20 types known in 1999. DAESH purchased equipped quadcopters in professional Full HD cameras for around $1,000.

Examination of documents captured during Operation Conquest proved that drones operated by DAESH were modified to carry and drop explosives.

DAESH used two types of drones:

- Fixed-wing drones
- Multi-propeller drones

Photo 2 shows the types of fixed-wing and multi-propeller drones, both of which were often used by DAESH. Such drones have been modernized by the terrorist group for dropping explosives and were equipped with high-quality cameras. As a result, most could fly for a

[14] Kurdistan Workers' Party (Kurdish: Partiya Karkerên Kurdistanê, PKK), in 2002–2003 as KADEK, and in 2003–2005 as KONGRA-GEL - a political party and separatist movement of Turkish Kurds. The Democratic Union Party (Kurdish: Partiya Yekîtiya Demokrat (PYD) is a Kurdish left-wing political party founded on September 20, 2003 in northern Syria. It is a founding member of the National Body for the Coordination of Democratic Change and is described by the Carnegie Middle East Center as "one of the most important Kurdish opposition parties in Syria". It is the leading political party among Syrian Kurds. PYD was founded as the Syrian branch of the Kurdistan Workers' Party (PKK) in 2003 and the two organizations are still closely linked through the Kurdistan Community Union (KCK). https://en. wikipedia.org › wiki › De... ...[accessed 18/12/2023]

[15] IED (Improvised explosive device) An improvised explosive device is a bomb constructed and deployed in a different way than in conventional military operations. It can be constructed from conventional military explosives, such as an artillery shell, attached to a detonating mechanism. https://www.britannica.com›improv...[accessed 17/12/2023]

[16] Christopher Diamond, "DoD Prepares for More Advanced Armed Drones Amid ISIS Threat," C4ISR, March 30, 2017, http://www.c4isrnet.com/articles/dod-preparesfor-more-advanced-armed-drones-amid-isis-threat,...[accessed18/12/2023]

[17]Pomerleau Mark, "Counter-Drone is the New Counter-IED", C4ISR, March 21, 2017, http://www.c4isrnet.com/articles/counter-drone-is-the-new-counter-ied,...[accessed 18/12/2023]

[18] Rıfat Süleyman," ميناء الحديدة فرقاطة سعدية تتعرض لهجوم من قبل زوارق يقودها انتحاريون غرب ", RT Arabic, January 30, 2017.

[19] "قوات المشاركة و محاور عملية الموصل العسكرية .," Sky News Arabia, October 17, 2016.

maximum of about 20 minutes, with flight time reduced by the weight of the drone. These types of drones have become more dangerous to the public and security forces.

Image 2: Drones captured by the ISF

Fixed-wing drone

DAESH purchased Skywalkder XB and Skyhunter fixed-wing drones, which were used for surveillance, reconnaissance and intelligence gathering, as well as for dropping explosives. By using the Video Downlink system, the drone operator could control the situation on the ground from a safe location and target targets.

Image 2 shows DAESH fixed-wing drones that were intercepted by the ISF in Mosul. Analysis of the photo provides information on the intensity of use of this type of drones and demonstrates numerous modifications that increased capabilities such as height, speed and flight range.

Image 3: Fixed-wing munition-loaded drone

London Journal of Research in Humanities and Social Sciences

Image 4: Fixed-wing drones captured from DAESH

Image 3 shows fixed-wing drones modified by DAESH and ready to drop bombs. The drone is loaded with 40-millimeter ammunition from munition warheads. The drone presented in the photo contributed to the killing of two Peshmerga and injured two French soldiers. Drones of this type are adapted by DAESH to carry IED-type charges inside. Fixed-wing drones were favored by DAESH not only for their ability to carry IEDs, but also for their ability to carry and dropping up to four bombs.

Multi-propeller drone

DAESH prefers commercially available multi-propeller drones to carry out bombing attacks. Drones of this type are readily available on the commercial market and are relatively easy to modify to a strike version. They can even be obtained online and subjected to deep modification. Thanks to the ability of this type of drones to hover, you can very precisely perform a bomb attack on any target.

Image 5: Four-propeller drone captured by the ISF

London Journal of Research in Humanities and Social Sciences

DAESH's preferred drone model was the DJI Phantom series because it can pursue a selected target and provides live, high-resolution images streamed up to a distance of 5 kilometers. These drones can stay in the air for 30 minutes, detect obstacles and have the ability to avoid them.

Image 6: Munition-loaded four-propeller drone

The drone presented in Images 5, 6 is equipped with a camera that rotates 1,800 vertically and 3,600 horizontally, as well as mechanisms enabling the dropping of two 40-millimeter ammunition[20]. A plastic device was attached to the explosive charge and a tail tip to the end of the ammunition so that the charge could move linearly through space and fall to the ground. The simulated combat payload is also equipped with a servo motor for deceleration and was attached to the drone. The operator of such a drone drops explosive ammunition by opening the lock on which the charge is attached under the drone.

The drone presented in photo 6 is equipped with a camera that rotates 1,800 vertically and 3,600 horizontally, as well as mechanisms enabling the dropping of two 40-millimeter ammunition. A plastic device was attached to the explosive charge and a tail tip to the end of the ammunition so that the charge could move linearly through space and fall to the ground. The simulated combat payload is also equipped with a servo motor for deceleration and was attached to the drone. The operator of such a drone drops explosive ammunition by opening the lock on which the charge is attached under the drone.

[20] For details, see the company's official website: Da-Jiang Innovations Science and Technology Co., Ltd, https://www.dji.com/phantom-4, (Access date: December 18, 2023).

VIII. THE ADVISABILITY OF USING DRONES IN DAESH GUERRILLA-TERRORIST ACTIVITIES

Mosul and DAESH operations in the area were an ideal theater to use available commercial drones for guerrilla-terrorist operations against the Peshmerga and Iraqi Security Forces (ISF). The use of drone technology allows operators to easily identify and immediately attack a dedicated target. It is important when conducting military operations in an urbanized area, during hand-to-hand combat when targets are nearby. Guerrilla-terrorist operations were carried out by DAESH drone operators from mosques or homes, which made it impossible to distinguish them from civilians.

After an in-depth analysis of available materials regarding DAESH's activities and the use of drones, the author states that drones were used for two purposes:

- Causing as many casualties as possible and
- Presenting propaganda materials in the mass media.

To achieve these goals, DAESH used drones in three ways:

- Reconnaissance and surveillance activities for the purpose of collecting intelligence data,
- Coordinating suicide attacks to maximize casualties,
- Direct attack by dropping IEDs/bombs.

Figure 2: Depicts the instruments, methods and purposes in DAESH's drone

Strategy
Reconnaissance/Surveillance

At the beginning of its activity, DAESH used drones to obtain intelligence information regarding the ISF and Peshmerga, then it modified its tactics and began to perform, in addition to its current activities, also before and during attacks.

Image 7: Screenshot of a DAESH video

The screenshot presented in image 7, 8 comes from a wide-angle video taken by a drone. In the image, green dots mark ISF units and the roads leading to their location (blue dots mark), which were closed by blockades using private cars. In such circumstances, it is impossible for a suicide bomber to reach DAESH. DAESH's only alternative tactic in this situation is to use a drone to reach the target and carry out a terrorist attack on ISF units.

This tactic was used (right part of the photo) by DAESH when stopping an ISF convoy using a drone. A sleeper member of a DAESH cell found itself near a convoy crossing and a DAESH fighter used a drone armed with a combat payload to launch an attack on an ISF tank.

In its subsequent guerrilla-terrorist operations in Mosul, DAESH created a tactic of combining ground operations in the form of a suicide bomber with a payload, or a trap vehicle with an air drone patrol, where the operator was the decision-maker to detonate the explosive charge on the indicated target (see photos 16). It also becomes obvious that if the drone operator decides the timing of the attack rather than the suicide bomber, which has a limited view and is nervous, the death toll increases.

During military operations in eastern Mosul, DAESH carried out over 900 suicide bombings, resulting in approximately 40 percent of the Iraqi Special Forces (Golden Division) being killed[21].

[21] Hevidar Ahmed and Rebwar Qasim, "Iraq's Golden Division May Liberate Mosul, but at What Cost?," Rudaw, December 24, 2016.

London Journal of Research in Humanities and Social Sciences

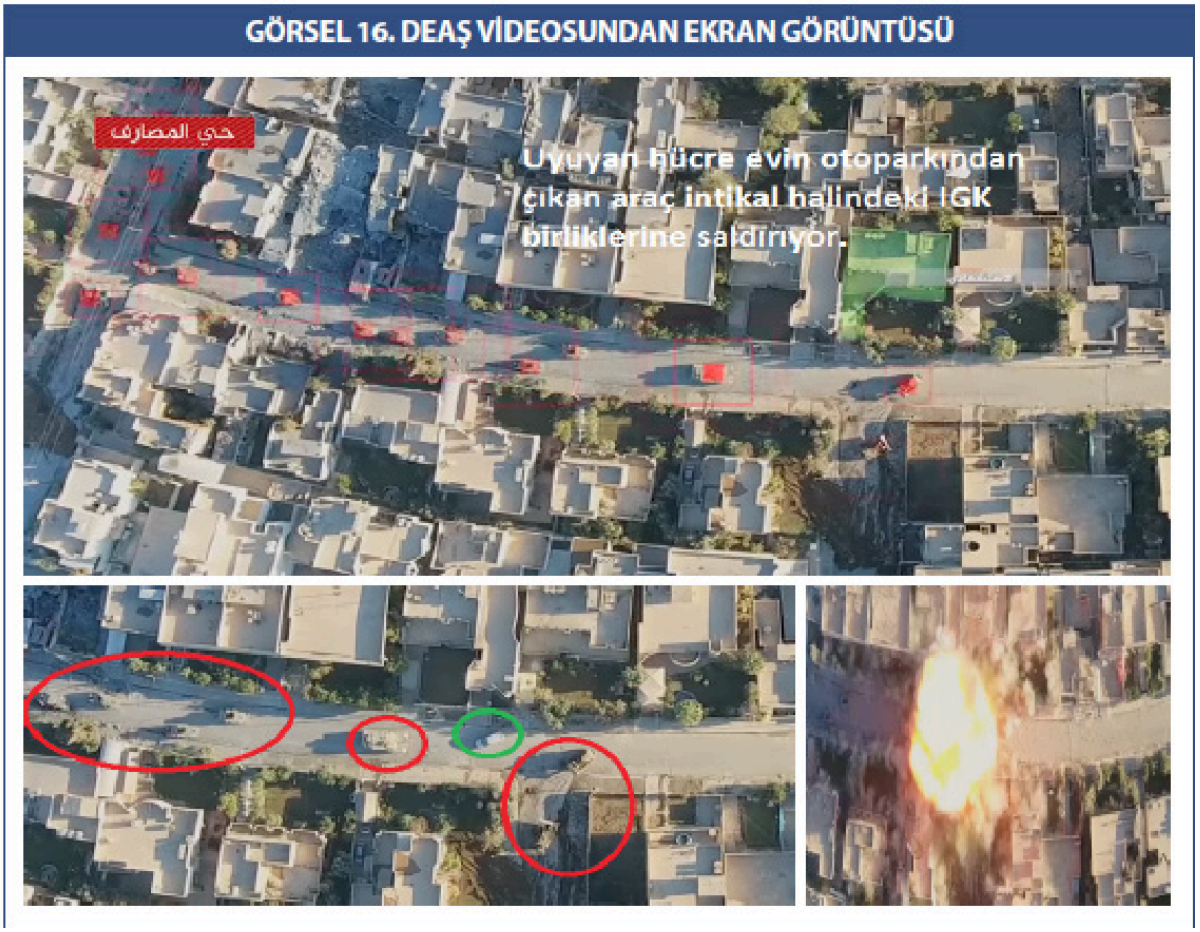

Image 8: Screenshot of a DAESH video

IX. DAESH CASE STUDY SUMMARY

- Diverse Drone Operations: DAESH's use of drones extended beyond reconnaissance and surveillance; they employed drones for air attacks by modifying ammunition and using them to strike designated targets. This highlights the versatility and adaptability of the group in utilizing drone technology for various purposes.
- Strategic Assumptions:** The strategic assumptions of DAESH involved modifying ammunition and placing it on drones to implement air attacks. This indicates a level of planning and innovation in their tactics, showcasing a willingness to adapt and leverage technological advancements for their goals.
- Weaponization of Drones: DAESH not only used drones for reconnaissance but also weaponized them, employing hand grenades, rocket warheads, and light ammunition. The availability of such ammunition was facilitated by the ongoing military operations in Syria and Iraq, providing a steady supply for the terrorist group.
- Chaos-Inducing Tactics: The tactics employed by DAESH aimed at causing chaos by conducting explosive attacks from drones. This strategy was evident in their use of grenades and other explosives, reflecting a desire to instill fear and disrupt civilian life and security forces.
- Major General Rupert Jones's Assessment:** The British general in charge of the area, Major General Rupert Jones, condemned DAESH's drone operations. He emphasized that the group used drones to drop grenades on civilians and security forces in Mosul, characterizing these attacks as inhumane and indiscriminate. This assessment underscores the severity of the threat posed by DAESH's drone tactics.

- Supply Sources: Obtaining drone loads was facilitated by the ongoing military operations in Syria and Iraq. The conflict zones provided ample opportunities for DAESH to secure the necessary equipment and ammunition for their drone operations.
- Insidious Threat:** Major General Rupert Jones highlighted the insidious nature of the threat posed by commercial drones in the hands of terrorists. As military operations in Iraq progressed, the exploitation of commercial drones by terrorist groups became an increasingly significant and challenging aspect of the security landscape.
- In conclusion, DAESH's drone operations represent a multifaceted and evolving threat, encompassing reconnaissance, surveillance, and weaponized air attacks. The group's tactics aimed at causing chaos through indiscriminate attacks on civilians and security forces, highlighting the urgent need for effective countermeasures against the weaponization of drone technology by terrorist organizations.

DAESH's drone operations did not only focus on conducting reconnaissance, surveillance and attack activities, but also used drones to carry out air attacks. In order to implement these strategic assumptions, DAESH modified ammunition and placed it on a drone to strike designated targets. The attacks used hand grenades, rocket warheads and light ammunition. Obtaining these drone loads was not a big problem, as military operations in Syria and Iraq were good sources of supply.

DAESH's tactics were based on causing chaos by carrying out attacks explosives from drones. The British general commanding the area, Major General Rupert Jones, stated that the militant group used drones to drop grenades on civilians and security forces in Mosul in inhumane and indiscriminate attacks. The general also stated that as the operation neared its end, commercial drones were everything and their exploitation by terrorists was becoming an increasingly insidious threat in Iraq[22].

What will be the role of drones in future terrorist attacks?

The Role of Drones in Future Terrorist Attacks:

Nowadays, a drone is not only a very useful technology in the military or commercial area, but also a kind of threat to many areas of functioning of modern society, including civil aviation.

Experts on the subject are convinced that there are possibilities of deliberate, terrorist use of drone technology not necessarily only in conflict zones, but also outside them.

The development of drone technology and its use by terrorist organizations is not only a current threat, but will also threaten future plans and actions of security forces.

The Role of Drones in Future Terrorist Attacks:

- *Emerging Threat Landscape*: The role of drones in future terrorist attacks is anticipated to expand beyond military and commercial applications, becoming a potential threat to various aspects of modern society, including civil aviation. Recent incidents, such as the one at Gatwick airport, underscore the disruptive potential of unauthorized drone intrusion into critical spaces.
- *Financial Implications:* Incidents involving unauthorized drone activity prompt authorities to invest in anti-drone technology, leading to substantial financial costs. The need to counteract potential threats posed by drones creates a significant burden on the budgets of organizations and institutions vulnerable to such intrusions.
- *Global Conflict Zones*: In conflict zones, terrorist organizations have already utilized drone technology for targeted attacks, posing a threat to national infrastructure. Examples include attacks on leaders and infrastructure in Saudi Arabia and the United States, showcasing the potential global impact of drone-enabled terrorism.

[22] Larissa Brown, "British General Issues Warning over Jihadis' Death Threat from Drones after ISIS Use Them to Drop Grenades on Civilians," *Daily Mail*, February 17, 2017.

- *Domestic Threats:* Experts highlight the potential for deliberate terrorist use of drones outside traditional conflict zones. FBI Director Christopher Wray emphasized the direct terrorist threat posed by drone technology in cities and society, underscoring the need for comprehensive security measures.
- *Future Threats:* The development and use of drone technology by terrorist organizations not only represent a current threat but also indicate potential threats to future security plans. The deployment of explosives on drones in crowded places is identified as a significant future threat, surpassing conventional security measures during public events.
- *Technological Advancements:* The development of anti-drone systems is crucial for mitigating the threat posed by unauthorized drone activity. However, current systems are not yet fully effective, and the rapid evolution of drone technology presents an ongoing challenge. The ability of a single operator to manage a fleet of drones, such as a swarm, adds complexity to countering the threat.
- *Future Drone Development*: Future drone development is expected to focus on achieving greater altitude, extended flight range, increased payload capacity, maximum speed, and heavier ammunition loads. These advancements may pose challenges to existing countermeasures and demand continuous innovation in security protocols.
- *Detection and Neutralization Challenges*: Locating and neutralizing drones remain challenging due to factors such as radar cross-section, visibility, and audible signatures. Traditional kinetic methods may be insufficient, necessitating the development of advanced anti-drone systems capable of addressing these challenges.

Nowadays, a drone is not only a very useful technology in the military or commercial area, but also a kind of threat to many areas of functioning of modern society, including civil aviation. The latest example is the incident at Gatwick airport, where drones were observed and classified as an unauthorized or unauthorized intrusion into the airport's space. The act of this unauthorized intrusion caused great confusion among airport managers, decision-makers and law enforcement agencies. The result of this intrusion was the cancellation of dozens of flights, and thus losses amounting to tens of millions as a result of the closure of the airport area and the airport.

Such incidents force managers to acquire anti-drone technology to counteract these incidents, which in turn generates further large financial costs. In conflict areas, drone technology is used to attack and kill leaders of the opposing side, for example, Hutu rebels killed Yemeni leaders. The victim of such action was broadly understood national infrastructure - Saudi Arabia and the United States. In 2012, a group operating in Virginia, USA and related with the Pakistani terrorist organization called Lashkar-e-Taiba attempted to obtain this type of equipment for other terrorist groups. A student studying at a renowned university was also caught in the United States and was planning to remotely attack government facilities and military installations using drones loaded with explosives.Experts on the subject are convinced that there are possibilities of deliberate, terrorist use of drone technology not necessarily only in conflict zones, but also outside them. In 2017, FBI Director Chritopner Wray stated that today, drone technology and drones in the hands of the wrong people pose a direct terrorist threat to our cities and to our society.

The development of drone technology and its use by terrorist organizations is not only a current threat, but will also threaten future plans and actions of security forces. Explosives placed on board a drone and used in crowded places are one of the greatest threats of the future. Explosives placed on a drone will easily defeat conventional security measures during outdoor sports, political or cultural meetings. The panic and terror of the crowd will be much greater than in the case of an explosion of an explosive dropped by a drone.

The threat posed by the use of drones can be reduced through development and use of advanced technology. We are talking about an anti-drone system, but it has not yet been

developed to be one hundred percent effective, and drone technology is developing very quickly. Currently, a single operator is able to manage an entire fleet of drones, e.g. a swarm.

When considering the future of drone development and the possibility of their use by terrorist groups, it should be taken into account that drone technology will develop to achieve better altitude, flight range with the maximum load on board, its maximum speed and the weight of ammunition that can be loaded.

A drone is a difficult object to locate, either by radar due to its cross-section and signature, or to neutralize it kinetically because it is visible to the naked eye from a distance of about 100 meters and audible from a distance of 40 meters. These parameters are not suitable for eliminating the threat posed by drones. Systems are used in two modes to neutralize unwanted drones and drones used by terrorist groups; stationary and mobile.

Such systems will be installed to protect critical places and in urban locations, and mobile phones operating in the systems will protect VIPs against possible assassination attempts. In addition, mobile systems will be implemented in important locations and during meetings on request or in the event of potential terrorist threats. As part of future preventive actions against possible threats of terrorist attacks, the following actions should be taken:

- Construction of systems with permanent location in critical places, such as the buildings of heads of state, parliaments, the most important cultural places of the state, the most important places of the Critical Infrastructure of the state and other important places for the existence of society.
- Building mobile anti-drone protection systems that are easy to install in the transport of VIPs.
- Surveillance of the commercial market for drone technology aimed at preventing acquisition in mass quantities for groups such as DAESH.
- Counteracting unauthorized drone flights over institutions, organizations and places critically important for the national and international security and military security zones; preventing terrorists from acquiring such aircraft for potential use in bombing attacks and conducting reconnaissance activities of possible locations for carrying out terrorist attacks against the security of the state and institutions and highly sensitive organizations, taking photos and videos of vomiting objects.
- Establishing a law according to which persons purchasing drones weighing 0.54-4 kg (category DRONE055) should be subject to the registration process, as is the case with other categories of drones.

Modern, innovative terrorism will be governed by new methods and will benefit from the development of new or existing technologies. Terrorism is changing its face and resources, its nature and patterns of using innovative terrorism. DAESH was such an example of the innovative use of a new technique, including drone technology, which became the most dangerous organization threatening regional and international stability.

DAESH's radicalism, its methods of terror and its ideology based on a messianic discourse that is assertive enough to influence the masses have made it the most dangerous terrorist organization threatening world peace. Similar organizations use the opportunities provided by modern technology, the globalization of our world, and the literal roars offered by society to increase the impact of terrorist messages and the effectiveness of terrorists. Innovative terrorism is weaponized into new technological platforms and gradually diversifies new types of threats. One such most striking new threat is unmanned aerial vehicles.

In his article, the author analyzed the use of drone technology by terrorist organizations, in the past on the basis of DAESH, as a Case Study, and tried to outline recommendations for the development of modern, innovative terrorism and the use of the latest technical and technological achievements to eliminate this problem and new threats to social security.

Image 9: Roman Durnev, Kirill Kryukov

REFERENCES

1. Ahmed Hevidar and Qasim Rebwar, *"Iraq's Golden Division May Liberate Mosul, but at What Cost?,"* Rudaw, December 24, 2016.
2. Aleksandrowicz T. (2008), *International terrorism*, Academic and Professional Publishing Houses, Warsaw.
3. Armstrong, Karen. "*Fields of Blood: Religion and the History of Violence.*" New York NY: Knopf Doubleday Publishing Group, 2014. Prints.
4. Atherton Kelsey D., "What We Know About ISIS's Scratch-Built Drones," *Popular Science*, November 8, 2016.
5. Bartnicki A. (2008), *Conflicts of the present*, [in:] *Conflicts of the contemporary world,* (ed.) Bartnicki A., PWN Scientific Publishing House, Warsaw.
6. Bolechów B. (2003), *Terrorism in the subpolar world. Reevaluations and continuations,* Adam Marszałek Publishing House, Toruń.
7. Brown Larissa, "British General Issues Warning over Jihadis' Death Threat from Drones after ISIS Use Them to Drop Grenades on Civilians," *Daily Mail*, February 17, 2017.
8. Capana E. (2007), *Terrorism and suicide attacks*: *a Muslim point of view*, Dialog, Warsaw.
9. Chaliand, Gérard and Arnaud Blin, eds. *"History of Terrorism: From Antiquity to ISIS."* Oakland: University of California Press, 2016. Prints.
10. Dolnik Adam, *Understanding Terrorist Innovation: Technology, Tactics and Global Trends*, (Routledge, New York: 2007), pp. 4-21.
11. Gayle Damien, "The Drone Catcher: Flying Net is Designed to Stop Terrorists from Flying Bomb-Laden Gadgetsi Nuclear Power Stations," *Daily Mail*, February 10, 2015.
12. George Susannah and Hinnant Lori, *"ISIS Using Drones, Other Innovating Tactics with Deadly Effect,"* The Associated Press, February 1, 2017.
13. Grosset R. (2009), *The essence of terrorism*, [in:] *Kill thousands, scare millions. Terrorist threats and opportunities for effective defense*, (ed.) Grosset R., University of Management and Law Helena Chodkowska in Warsaw, Warsaw.
14. Jaskiernia A. (2002), *Determinants of the effectiveness of combating terrorism in the light of the work of the Council of Europe*, "Information Bulletin of the Council of Europe" No. 1.
15. Laqueur, Walter. "*History of Terrorism*". London: Routledge, 2001. Prints.

London Journal of Research in Humanities and Social Sciences

16. Liedel K. (2003), *Combating aviation terrorism. International legal aspects*, Jurysta Publishing House, Warsaw.
17. Mahan, Sue and Pamala L. Griset. *"Terrorism in perspective"*. 3rd ed. Los Angeles CA: Sage, 2013. Prints.
18. Newton Jennifer, *"Iran Develops a 'Suicide Drone' Capable of Delivering Explosives and Skimming Water to Attack Targets on Land and Sea," Daily Mail*, October 26, 2016.
19. Rasmussen Maria J. and Hafez Mohammed M., *Terrorist Innovations in Weapons of Mass Effect: Preconditions, Causes and Predictive Indicators*, (Defense Threat Reduction Agency Advanced Systems and Concepts Office Report, October 2010), Report No: ASCO 2010-019, pp. 2-10.

Internet sources

20. Pomerleau Mark, "Counter-Drone is the New Counter-IED," C4ISR, March 21, 2017, http://www.c4isrnet.com/articles/counter-drone-is-the-new-counter-ied, (Access date: May 3, 2017).
21. Yakovlev Ivan, "Syrian Army Shoots Down 3 ISIS Drones Loaded with Bombs in Deir Ezzor," Almasdar News, December 12, 2016, https://www.almasdarnews.com/article/pictures-syrian-army-shoots-3-isis-dronesloaded-bombs-deir-ezzor, (Access date: May 3, 2017).
22. Pawlyk, Oriana "Air Force Works to Track ISIS Drones to the Source," Military, 27 February 2017, http://www.military.com/daily-news/2017/03/06/air-force-works-totrack-isis-drones-to-the-source.html, (Access date: May 3, 2017).
23. Krawczyk A. (2008), About the definition of terrorism, Histmag.org, https://histmag.org/Wokoldefinicji-terroryzmu-2399.
24. Drone terrorism is now a reality, and we need a plan to..., https://www.weforum.org › 2018/08, [accessed November 27, 2023]
25. Christopher Diamond, "DoD Prepares for More Advanced Armed Drones Amid ISIS Threat," C4ISR, March 30, 2017, http://www.c4isrnet.com/articles/dod-preparesfor-more advanced-armed-drones-amid-isis-threat,... [accessed 18/12/2023]
26. Pomerleau Mark, "Counter-Drone is the New Counter-IED", C4ISR, March 21, 2017, http://www.c4isrnet.com/articles/counter-drone-is-the-new-counter-ied, .. .[accessed 18/12/2023]
27. Da-Jiang Innovations Science and Technology Co., Ltd, https://www.dji.com/phantom-4, (Access date: December 18, 2023).
28. https://pl.wikipedia.org › wiki › Messianism, [accessed on December 17, 2023]
29. https://pl.wikipedia.org › wiki › Emulation, [accessed 17/12/2023]
30. https://www.britannica.com›improv...[accessed 17/12/2023]
31. https://ichi.pro› sicarii-piersi-asasyni-w-historii-1643..[accessed 09/12/23]
32. Dictionary of the Polish language 1979, p. 239 https://sjp.pl › terrorism, [accessed 29/12/2023]

This page is intentionally left blank