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EFFECTS OF TECHNOLOGY IN COMBATING TERRORISM: AN ASSESSMENT ON TÜRKIYE'S COMBATING AGAINST PKK

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Abstract

Terrorism, a concept as old as the history of humanity, surrounds the world in terms of the effect it has created, although it does not have a definition that everyone agrees on. However, all actors in the international system are trying to take some measures in order not to fall under the destructive effect of terrorism. For example, states in the international system are trying to implement many methods to combat terrorism. With the development of technology in recent years, counter-terrorism has gained an extra dimension, and some successes have been made. With the new devices and weapons that have emerged with the developments in technology, states have become able to fight terrorism with less loss of people and more easily. Thanks to this advantage gained by the states, terrorist organizations have faced significant losses. This study will also make an evaluation of these success examples. Recent developments in Unarmed Aerial Vehicles (UAV) and Anka Unmanned Aerial Vehicles (AUAVs) in Türkiye have caused Türkiye's counter-terrorism concept to change and gain an extra dimension. Parallel to the developments in technology, Türkiye achieved significant successes in counter-terrorism and brought end to PKK terrorist organization, while the PKK, on the contrary, suffered a serious loss of life and property. However, in the study, the importance of technology in counter-terrorism will be discussed through the example of Türkiye. The main question of the study is what kind of change has taken place in Turkish counter-terrorism policy and what success technological elements have brought about in the new approach to counter-terrorism. The study will be conducted through a descriptive method.

Keywords: Technology, Terrorism, Türkiye, PKK, Combating terrorism

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TERÖRLE MÜCADELEDE TEKNOLOJİNİN ETKİLERİ: TÜRKİYE'NİN PKK İLE MÜCADELESİNE İLİŞKİN BİR DEĞERLENDİRME

Öz

İnsanlık tarihi kadar eski bir kavram olan terörizm, herkesin üzerinde uzlaştığı bir tanımı olmasa da yarattığı etki açısından dünyayı etkisi altına almaktadır. Bu nedenle uluslararası sistem üzerindeki tüm aktörler terörizmin yıkıcı etkisine girmemek için bir takım önlemler almaya çalışmaktadırlar. Örneğin uluslararası sistemde yer alan devletler terörle mücadele için birçok yöntemi uygulamaya çalışmaktadır. Son yıllarda teknolojinin gelişmesiyle terörle mücadele yeni bir boyut kazanmış ve bazı başarılar elde edilmiştir. Teknolojideki gelişmelerle birlikte ortaya çıkan yeni cihazlar ve silahlarla devletler daha az insan kaybı ve daha kolay bir şekilde terörle mücadele edebilir hale gelmiştir. Devletlerin eline geçen bu avantaj sayesinde terör örgütleri ise önemli kayıplarla karşı karşıya kalmışlardır. Bu çalışma bu başarı örneklerinin bir değerlendirmesini de yapacaktır. Türkiye'de son dönemde İHA ve SİHA'lardaki gelişmeler Türkiye'nin terörle mücadele konseptinin değişmesine ve yeni bir boyut kazanmasına neden olmuştur. Teknolojideki gelişmelere paralel olarak Türkiye, terörle mücadele konusunda önemli başarılar elde edip PKK terör örgütünü bitme noktasına getiriken, PKK da tam tersine ciddi anlamda can ve mal kaybı yaşamıştır. Bu nedenle Çalışmada terörle mücadelede teknolojinin önemi Türkiye örneği üzerinden ele alınacaktır. Çalışmanın temel sorusu Türkiye'nin terörle mücadele politikasında nasıl bir değişim olduğu, yeni terörle mücadele konseptinde teknolojik unsurların nasıl bir başarıya sebep olduğudur. Çalışma betimleyici bir yöntemle ele alınacaktır.

Anahtar Kelimeler: Teknoloji, Terörizm, Türkiye, PKK, Terörle mücadele

INTRODUCTION

There is no single definition of terror and terrorism, a concept as old as human history, on which everybody comes to an agreement (Taşdemir, 2020). Derived from the Latin word "terrere", the concept of terrorism means fear and horror (UNODC, 2018). Terror is defined as an act of violence or threat of violence to create an atmosphere of fear against innocent people to achieve a political purpose (Tilly, 2005).

Terror is a symbolic act that uses violence or threatens to use violence. Acts of terror are strategic actions that frighten and horrify many people with the death of one person (Weimann, 2004). In this sense, terror is an act of violence by uncontrolled persons. It occurs spontaneously, unorganized and short-term (Council of Europe, 2002).

Terrorism, on the other hand, is derived from the Latin word "terror", which is defined as fear and threat due to a known and unpredictable threat (Goodwin, 2006). Terrorism also conceptually does not have a definition that everyone agrees on. So much so that between 1936 and 1984, more than 100 terrorism-related definitions were made (Netenyahu, 1995). Nevertheless, it is possible to define terrorism as an unlawful, planned violence or threat of violence to achieve political goals. Since not every violent event is terrorism, the threat of violence or use of violence must be made for a political purpose (US Department of Homeland Security, 2019).

The increase in terrorist acts has made it necessary to fight terrorism, develop counter-terrorism methods and make them avant-garde. However, the increase in acts of terrorism due to globalization has made the fight against terrorism more difficult. Because acts of terrorism are supported at national borders as well as internationally. Since what states understand about terrorism differs, these states support terrorist organizations in their own national interest (The

White House, 2021). For example, the International Criminal Police Organization (INTERPOL) was established in 1923 to catch the perpetrators of terrorist acts, but INTERPOL's work is slowed by the fact that states differ in their views on which incident is legal and which is illegal (Interpol, 2013). For this reason, states are fighting terrorism by regulating their own domestic laws. So much so that states conduct trials on international terrorism in their own courts. For example, the United States began to use this method after the terrorist acts of September 11, 2001 (Borelli, 2015). Therefore, states should take joint measures against counter-terrorism (Golder and Williams, 2004). Moreover, there should be cooperation between states on issues such as personnel, materials and education. From this point of view, there should be global cooperation in the fight against terrorism. For this purpose, organizations such as the United Nations (UN), the European Union (EU), the North Atlantic Treaty Organization (NATO) make and implement a number of decisions.

With the recent developments in technology, an important step has been made in the fight against terrorism. States that use the possibilities of technology have started to fight and succeed more easily in the fight against terrorism than in the past. This study was written with the effort to elaborate this situation. This study will also make an evaluation of these success examples. The study will deal with the importance of technology in the fight against terrorism with the example of Türkiye. The key question of the study will be why Türkiye's long-standing struggle with PKK has been more successful in recent times. The study will comprise two parts. In the first part, the relationship between the fight against terrorism and technology will be discussed, and in the second part, the success of technology in Türkiye's fight against PKK will be explained. The study will be conducted with a descriptive method.

1. IMPACT OF TECHNOLOGY IN THE FIGHT AGAINST TERRORISM

Terrorist incidents occurring in almost every period of history have become a global problem day by day. Technology has played a big part in the increase in terrorist incidents. With the development of technology, the ability of criminals to use technology has also improved. The implementation of end-to-end encryption methods, especially in some applications, prevents accessing the devices of these militants by the states. Criminals can even communicate without leaving their digital traces (Cronin, 2019).

In addition, terrorist organizations use images, audio and video files as propaganda tools. With the emergence and development of the Internet, these materials, which used to be distributed in print, are now quickly and easily available online on sharing sites and social media. Terrorists who need an audience for these files are taking advantage of technology and have recently spread their actions to a wide audience (Dülger, 2021). At the same time, terrorists use online tools to plan their attacks and monitor the news. For this purpose, they use various methods such as social media, classical media and search engines. In addition, terrorists often carry out their actions in groups, using technology to ensure communication between each other. Members of the organization tend to use encrypted and secure messaging using technological elements (Berman, 2019). For example, al-Qaeda members communicated by logging in via a common account instead of sending each other an email, saving the contents of the message they wanted to send as drafts and without sending any submissions (Fishman, 2019).

The development of technology is seen as an advantage for terrorists. Since the development of technology has become a significant advantage in counter-terrorism policies of the states, it also causes a disadvantage for terrorists. Especially with the recent development of information technology, developments in areas such as robotics and space technology have increased. This has also changed the nature of wars by taking part in the weapons, security and defense systems of countries' armies (United Nations Office on Drugs and Crime, 2012). In the new era, new types of war are fought by the use of smart weapons rather than the military structure based on manpower. Several systems and technological advances have been created such as Systems based Neuro Technology for Emerging Theraples (SUBNET) simulated training systems, which is developed to closely monitor the mental health of soldiers and learn their thoughts, computer-connected military weapons systems known as digital militarism, the development of human-machine mix structures such as unmanned aerial vehicles, the monitoring the actions of terrorists, the presence of remotely controlled unmanned aerial vehicles, the guidance of medium and long-range missiles by satellite signals, the development of special combat helmets (Gregory, 2011).

These technologies are used in the fight against terrorism, which threatens international security, regional security and state security. Governments have been trying to shed light on the future by doing studies on this issue for so long. For example, the Automated Serious Game Scenario Generator for Mixed Reality Training (AUGGMED) project has developed an online and multi-user training platform for counter-terrorism. On the platform where there is virtual reality, users can communicate with terrorists and civilians to be cool about real-life crimes and attacks. Since there are multiple users on the platform, people from different fields such as police, soldiers and medics can receive training at the same time. The people on the platform are from different areas, so they can work together in coordination. Moreover, virtual reality is used in many places from New Zealand to Singapore because it offers a cost-effective and fast education solution. This project has been implemented by police in the UK to respond to emergency calls and critical incidents (Adetunji, 2018).

Thanks to the Terrorism Reinsurance and Insurance Pool (TRIP), an application developed by the Netherlands, it is possible to track travel movements of terrorists. Although there are not many terrorist incidents in the Netherlands, the state is working hard to prevent terrorism. Britain's Home Office has developed a technology to detect videos spreading propaganda about terrorism in 2018. Accordingly, this system detects 94% of ISIS videos with 99.995% accuracy. In addition, when 1 million random videos are scanned, human control is needed for 50 of them, and other videos are stopped before they reach the Internet (HM Government, 2011). In addition, following the advances in technology and the effective use of technology by terrorist organizations, the UK has sought support from tech companies in the fight against terrorism. British Home Secretary Ambar Rudd indicated that, in order for intelligence agencies to access cryptographic messages on social media, cooperation was needed so that they could be more active in the fight against terrorism (Travis, 2017).

In China, new face recognition and walking analysis technologies are also trying to gather all kinds of information about citizens and analyze suspicious behavior (Chi, 2017). In Russia, Rosoboron export company has produced URAN-9 Robotank for use in operations to provide

firepower and reconnaissance in areas beyond the reach of soldiers. The URAN-9 is designed to provide remote reconnaissance and fire support to combined weapons to reconnaissance and counter-terrorism units. It consists of two reconnaissance and fire support robots, a tractor for their transport and a mobile checkpoint. The robots are equipped with a laser warning system and target detection, identification and tracking equipment. URAN-9 will be particularly useful during local military operations and counter-terrorism operations, including those in cities. Its use will significantly reduce staff losses (Rosoboron Export, 2015).

After the terrorist incidents in the United States on September 11, 2001, the United States intervened in Afghanistan and Iraq, and the American Full Spectrum Close in Layered Shield (FCLAS) Active Protection system was built when helicopters, tanks, and armored vehicles on the ground were attacked with RPG-7 antitank rockets used by terrorists. Thanks to the scanning devices, recently developed in the United States, it is possible to understandably illustrate people behind the walls, including whether they have a gun on them. Moreover, these devices can distinguish whether there are people behind the walls or an inanimate being (Crane, 2014). However, according to the report by the Counter-Terrorism Technological Support Office (CTTSO), U.S. embassy buildings overseas are threatened and under attack at any time, so they use wearable devices that do not make a sound, attract attention and inform security personnel (General, 1999). In addition, devices have been developed that allow the face of a target to be recognized even from a distance of 300 meters. Images taken thanks to these devices, which weigh 15 kilograms and fit in a backpack, are quickly compared to highway crossings, TV channels and other images on social media. Besides these, CTTSO works on making a night vision system that shows the colors exactly and can be mounted on helmets. The Office is trying to produce a hand detector that is under 1.5 kilograms, works without physical contact with the person with the aim of detecting objects hidden in the pocket, metallic or non-metallic ones. The United States has developed underwater drones to prevent mines and prevent a possible attack by enemy submarines (Smith and Damphousse, 2006). USA is currently trying to develop an underwater system compatible with drones that can be used at a depth of 30 meters. However, with GPS designed by the Defense Advanced Research Projects Agency (DARPA), it has become possible to design non-driver robot vehicles for the continuation of possible post-nuclear warfare communication. Designed in this context, military robot vehicles aim to eliminate the death of security forces fighting terrorism. In this context, the United States has produced unmanned military trucks and RIPSAM drone tanks (Rohrlich, 2019).

Türkiye, on the other hand, has developed a device similar to the American one that scans the back of the wall. The system, known as DAR Behind-the-Wall Radar and developed by Savunma Teknoloji Mühendislik AŞ (Defense Technology Engineering INC), aims to collect information about ultra-broadband radar signals and targets that do not have visual access. The system provides location information on the fixed or moving elements behind the wall or various obstacles (Sökmen, 2017). The remote-control system is used in hostage rescue, counter-terrorism and internal security operations, as well as in cases after various natural disasters such as fires. In addition, ASELSAN has developed an Active Protection System (AKKOR) for Altai Tank in Türkiye (Demir, Caymaz and Erenel, 2016). In addition, computer-based artificial intelligence and robotic technology have brought up the design of robot soldiers. Robots with superhuman

abilities will fight without fear, reducing combat casualties and overall damage (Defense Technology Engineering, 2021).

2. IMPACT OF TECHNOLOGY IN TÜRKIYE'S FIGHT AGAINST PKK

2.1. Technological Developments in the Fight against Terrorism in Türkiye

With the advances in technology, states in the international system have started to use a number of new methods in the fight against terrorism and achieve great success. Türkiye has also started to use new methods in the fight against terrorism. Türkiye, which has been fighting PKK for years, uses the latest technology as an important element in the fight against terrorism and has achieved significant success (Kantemir and Özkıl, 2016). For example, with advances in technology, more affordable and accessible drones are increasing in popularity today. Thanks to these developments, drones have become valuable tools to understand how to more effectively ensure the security of urban spaces by becoming a platform that allows security forces (police, army, etc.) to capture data with accuracy, precision and ease and can be used to intervene when the time is right (Aras, 2021).

Türkiye's interest in drones began in the 1980s. IHA-X1 Şahit, which was started and developed by Turkish Aerospace Industries Inc. (TUSAŞ) in 1990, became the first domestic unnamed aerial vehicle (UAV) prototype. However, despite the fact that test flights were made in 1992, mass production was not started. The first domestically produced unmanned aircraft to enter the Inventory of the Turkish Armed Forces (TAF) was the Turna Target Aircraft produced in 1995 (Akyurek, Yılmaz and Taşkıran, 2012).

In 1994, when the fight against terrorism was underway and domestic security operations were carried out, medium-altitude high-endurance type GNAT-750 UAVs consisting of 6 drones and 1 system were supplied from Atrial Septal Defect 7 (ASD-7) company. In 1998, 2 higher version I-GNATs and 1 more ground control station were supplied, and then removed from inventory after 2008. By 2004, the Presidency of Defense Industries (PDI) had signed an agreement with the main contractor Turkish Aerospace Industries (TAI) for the project, which will be called ANKA within the scope of the Turkish Unique Unmanned Aerial Vehicle Development Program to meet Turkish Armed Forces (TAF)'s UAV needs (Karaağaç, 2014).

As of 2006, various projects were started to be developed in Türkiye such as Bayraktar and Malazgirt aircraft with Kale-Bayraktar company, Efe and Arı aircraft with Vestel Defense company, Guventurk aircraft with METU, and Globiha mini-UAVs with Global Technical company (Özlü, 2022). Companies that made breakthroughs in the mini-UAV category continued the work of tactical UAV systems at the same time. Following Vestel products Efe and then Karayel, other Çaldıran Tactical UAVs, produced by Bayrak, made their first flights in 2009 and was called to the Tactical UAV tender opened in PDI in 2010 (Terkan, 2015).

The contribution of UAVs to intelligence, reconnaissance and surveillance activities and their effectiveness in the fight against terrorism led Türkiye towards production efforts both within TAI and domestic production in 2004. In 2005, 10 HERON drones were ordered through TUSAŞ. In 2007, the Heron UAV and 2 ground control stations were leased from the contractor and

purchased with 3 Aerostar Tactical UAV systems from Israel's Aeronautics Defense Systems due to the need. Heron supply took place in 2010 and was received. ANKA's tests also started in 2010 and test flights began (TUSAŞ, 2020).

The ANKA-S UAV, which made its first flight in 2016, was included in the TAF inventory in February 2018. Following the contract signed between PDI and Kale-Baykar for tactical UAV in 2011, Bayraktar TB made its first flight in 2014 and entered the inventory in the same year. Between 2015 and 2016, with the operations called Hendek operations, UAVs and UCAVs were used to fight PKK terrorist group in northern Syria and Iraq. In this process, the UAVs carried out artillery forward surveillance, advanced air controller and fire attack missions (Mevlütoğlu, 2020).

Aksungur, which was produced by TUSAŞ as a twin engine capable of carrying 1 ton of fuel on its wings with a length of 24 meters, made its first flight in March, 2019. Aksungur is planned to be used for reconnaissance, surveillance and offensive missions (TUSAS, 2022). Karayel-Su, which belongs to the defending developed by Vestel and developed on the tactical UAV Karayel aircraft, which has been flying in TAF for a long time, has been made capable of carrying a large amount of ammunition load (Şahin, 2019).

Soldiers from the lowest rank to the highest rank in the military field want to see drones as part of military action in all kinds of combat and conflict environments. UAVs have relieved soldiers by taking on many of the most difficult and exhausting tasks of previous years (Lee, 2012). Governments that are satisfied with the successful and conclusive missions of soldiers through UAVs show the same reputation for these vehicles that adapt to today's conflict conditions (Nolin, 2012).

However, UAVs, Drones and model aircraft of small diameters and sizes can be dangerous and loss-making for states in terms of carrying explosives or bombs on them (Erdinçler, 2021). The ability to use it by remote control or preprogramming technique, the ease of placing explosives on aircraft, can encourage terrorist organizations to commit acts of terrorism (Ak, 2017). Terrorist and criminal organizations choose these vehicles to attack hard-to-reach areas in terms of terrain, to increase the mortality rate in the casualties they can inflict, to hide thanks to the remote conduct of the attack, to reach a reasonably priced technology, and to fly low and get rid of the air defense systems of the countries (Kudelka, 2018).

In addition to mixing, blunting, technological developments as methods of protection against small-scale UAV, drone and model aircraft attacks, it is adopted to apply network capture and similar methods by evaluating that the technological developments may have energy weapons such as lasers or electromagnetic cannons against these vehicles or bombs with NBC-R warheads on them (Sütcüoğlu and Alay, 2019). The UAVs used in domestic security are closer to small-scale UAVs used in the civilian sector than military drone technology (Turkish Ministry of Interior General Directorate of Security, 2019).

In Türkiye, security forces have produced technological devices to prevent drone attacks from PKK terrorist group. Because PKK terrorist group has a drone program other than using drones (Ergül, 2014). On May 19, 2021, the attempted attack by drones on the 8th Main Jet Base

Command in Diyarbakır was eliminated by the security forces before it reached its goal, and when the drones were examined, multi-frequency brain cards were found that made it difficult to detect against anti-drone technology (Kasapoğlu and Ülgen, 2021). Accordingly, Türkiye has also started to take a number of measures against attacks by PKK. The first is the RF Jammer device. This device is based on the principle of disconnecting the signal between the drone and its user. This method is ineffective because there is no such communication in autonomous systems. The drone, which has been disconnected from its user, lands where it is or returns to the location where it is originally sent. Today, it is one of the most widely used method together with GPS jamming. With the developing technology, it can be said that drones will be used less in the future with the programmability and increased ability to perform autonomous missions (Sütcüoğlu and Alay, 2019). The second device is the GPS Jammer device. This device disables the drone by preventing it from receiving GPS signals from the satellite. The drone lands where it is, hangs in the air or returns to the location where it is sent. This method, which is widely used, is ineffective in the face of drones that do not have satellite connectivity and operate autonomously (Sütçüoğlu and Alay, 2019).

The third device is the Infrared/Thermal Camera. With this device, the transformation of information obtained from infrared energy emitted from objects and not perceived by the human eye is provided by thermal imaging technology. It is classified as a passive system. The fourth device is Laser. With this device, it is aimed to shoot down the drone by directing a laser beam. The laser blocks a drone's vision (camera) by transmitting intense light to its image chip. The effect of laser on a drone can be likened to a person who has been indoors for a long time suddenly seeing the outside very brightly because its eye cannot immediately get used to the light when it comes out. The biggest risk in this method is that helicopter or aircraft pilots can also be mistakenly targeted (Rozman, 2019).

The fifth device is Weapon. By firing normal or special ammunition with the weapon, the drone is damaged and neutralized. However, this method is generally considered more primitive but is widely used today. The riskiest aspect of the method of shooting down a drone by firing a gun, which is more precise than many systems, is that it is very dangerous. Bullets that bounce off a drone or miss a drone can damage the environment. The sixth device is the ASELSAN Anti-Drone System. This device is an anti-drone system developed by ASELSAN to neutralize mini and micro-UAV threats in urban and rural environments. The İhtar Anti-Drone System, which can undertake tasks such as protecting critical facilities, border security and ensuring the security of crowded areas, can be used in different configurations (fixed, portable, etc.). The seventh device is the METEKSAN Trap Drone Warfare System. Trap Drone Warfare System can perform drone detection and tracking tasks with a radar system and thermal/day cameras. At the same time, it can destroy drones with RF mixer and optional laser countermeasure system. The Trap Drone Warfare System, which can detect drones up to 2.5 km and destroy drones with a laser from a distance of 500 m, can also identify the target in low visibility conditions and at long distances where it is difficult to detect with the camera thanks to its radar system. This system, which can also be integrated with existing security systems, is unlikely to be detected. Retinar OPUS environmental surveillance system developed by METEKSAN operates as the basic sensor of the Trap Drone Warfare System with its optimized design. Trap Drone Warfare System can be used

in different configurations with different active and passive systems to obtain the most suitable solutions for the characteristics of a protected area. Finally, Türkiye has developed a robot sentry system to reduce the casualties caused by PKK terrorist groups attacking outposts. This system, called IMTAKS, has an effect that can be controlled remotely and can track the target, as well as the ability to fire when necessary (South, 2019).

In addition, Türkiye has developed different and new technological methods for underground tunnels and caves used by the terrorist organization. That is because the tunnels used by the terrorist organization are difficult to detect. In general, the most appropriate method for underground tunnel and cave threats is to destroy them or trap them instead. Thermobaric weapons are used to destroy these aerial environments (Haydock, 2016). Tunnel detection devices are widely used in the fields of archaeology, construction and mining. Sonars that can be used with penetrating radars can also be employed with such objectives (Solescu, 2020).

2.2. The Impact of Technological Developments in Türkiye on the Fight against Terrorism

Together with the technological weapons being built in Türkiye, significant achievements have been made in the fight against PKK terrorist organization. In the operations carried out, the ground and air elements of TAF were successfully planned, and successful operations were carried out. For example, the background to the success of the Spring Shield Operation carried out by TAF is the experience gained by the use of UAVs and UCAVs in the fight against terrorism in recent years, the weapons systems produced by the Turkish defense industry and the experience of the land and air forces acquired by TAF in the fight against terrorism for many years (Mevlütoğlu and Korkmaz, 2020). Considering Türkiye's influence on its combat capabilities, domestic production UAVs were successfully used in the Fırat Kalkanı (the Euprahates Shield), Zeytin Dalı (Olive Branch), Barış Pınarı (Peace Spring) and many other counter-terrorism operations against the terrorist group PKK in southeastern Türkiye and the North of Iraq between 2016 and 2019 (Düz, 2020).

However, UAV and UCAV systems are used in situations such as providing aerial support to the possible operations to be carried out after the discovery of quarters, caves and shelters, transit routes, collaborative meeting points, etc. of terrorists operating at home and abroad by UAVs together with reconnaissance and surveillance of these places; in cases of danger when special operations and commandos carry out reconnaissance activities in secret where the deployments in the countryside are likely to be deciphered and possible discoveries will be made; finally in case of providing aerial support to security units in residential area operations (TRT Haber, 2020).

Türkiye has been carrying out continuous reconnaissance activities in the north of Iraq with its UCAVs and its increasing technology. For this reason, PKK terrorist organization is trying to take measures against the increasing technology in Türkiye's defense industry. Due to the losses given, instructions are given to be careful of the members of the organization, especially against UAV technology. Thermal umbrellas and thermal suits are used against UAVs (Demir, and Yalçın, 2021).

PKK terrorist group is working to identify photo trap devices placed in the countryside by security forces. The group also tries to listen to the security forces' conversations in the operational situation with Yaesu hand-held radios. In particular, technical devices are placed in materials that terrorist organization wants from collaborators by the internal security units, and a detector has been sent to the terrorist organization for the purpose of detecting devices in such a situation. In addition, the organization can find out if there are cameras, audio recorders and phones in their environment by using analog and digital signal detection devices by scanning the frequency. PKK terrorist organization uses paramotors specifically at the border for the purpose of committing acts, transferring terrorist-materials and money (Hurriyet, 2008). Furthermore, the use of small-sized UAVs for attack purposes by terrorist organizations has increased due to the fact that they are low cost and easy to obtain. Frequency jammers in the hands of terrorist organizations can cause drones to become ineffective. Especially for Bayraktar TB2, which performs the flight mission through the role that is heavily involved in the fight against terrorism, anti-jammer system has been installed and measures have been taken against frequency jammers (Kurt and Üni, 2015).

Importance of UCAVs for the country's policies and military operations, their low loss of life rate and significant economic costs are among the positive elements in the fight against terrorism. It is clear that the use of UCAVs will be further encouraged in the coming years thanks to these opportunities provided to states. Despite this interest in vehicles, evaluations in a legal and ethical context are slower. The lack of this interest is due to the changing characteristics of conflicts internationally, the diversity of political and military use of UCAVs, especially counterterrorism options for states, and the rapid course of technology (Ak, 2019).

Armed Bayraktar TB2 and Anka UCAVs played a major role in neutralizing terrorist elements, especially in mountainous terrain, by detecting and tracking them. The separatist terrorist group's ability to maneuver and act on the ground has been significantly eliminated. In addition, logistical infrastructure, shelters and warehouses were detected and destroyed, and their presence within the border was largely prevented. UAVs also played a key role by taking active roles across borders during long air stays during point air attacks against PKK terrorist group's executive staff (Mevlütoğlu, 2022). Operations in Southeastern Anatolia and Northern Iraq, a mountainous and rugged region, have been low-resulted by field bombardment in the past, while today great successes are achieved with point target destruction. F16 fighter jets had been used effectively in the fight against terrorism until the time the UCAVs entered the inventory. These aircraft were designed for air superiority and then became multi-rolled, reaching the capacity to perform air-ground missions. However, although the success of the aircraft is high, this limited its effectiveness and increased the cost of use. With the increase in the use of counter-terrorism UAVs and UCAVs, both operational costs have decreased and Türkiye has achieved higher operational successes with point target destruction. However, unwarranted loss of life and property can be prevented in the region, and the personnel assigned for the operation can neutralize any risks without damage (Ak and Avaner, 2019).

When the UAVs were first used by Türkiye, it was reported that Bayraktar neutralized 6 PKK terrorists and that armed drones killed 72 PKK fighters in Hakkari region in a two-month period.

Over time, success in the fight against terrorism has continued to grow (Slijper, 2017). In 2021, UCAVs flew for 44,000 hours, and of the 159 terrorists neutralized in 2021, 32 were neutralized by UAVs, UCAVs and Manned Reconnaissance Aircraft (MRAs). As a result of the operations against PKK terrorist organization, there were left 162 terrorists at home and 2.685 abroad (TRT Haber, 2022).

In the North of Iraq, the logistical and operational mobility of the organization was restricted with the cooperation of TAF-Peshmerga, and the logistics lines between Haftanin, Metina, Gara, Kandil, Mahmur and Sincar regions, which are the recapitulation zones, were significantly cut. Moreover, in cooperation with TAF and MIT (National Intelligence Organization), mountainous areas and strategic hills parallel to the border were brought under control, while PKK was forced to retreat further south in the North of Iraq. TAF carries out conventional military operations; MIT contributed to this cooperation by liquidating the leaders of the organization with effective intelligence and UAV/UCAV operations (Düz, 2022).

In 2016, with the changing concept within the scope of fight against terrorism, together with the will of decision makers, the domestic production in the inventory of TAF, Gendarme and Police forces, together with the introduction of UCAVs and domestic production munitions, created a force multiplier that as much power as a battalion force could do. With the continuous operations carried out at home, the number of members of the organization decreased every year, critical points that were seen to have been liberated by the terrorist organization were cleared, and new military base zones were established to establish territorial dominance and the mobility of the terrorist organization was restricted. It is necessary to note that, in 2017, the biggest change in the fight against terrorism occurred within the framework of the effective use of air force elements such as Unmanned Aerial Vehicles (UAVs), Armed Combat Aerial Vehicles (UCAVs) and Manned Reconnaissance Aircraft (MRAs). The expansion of domestic production UCAVs and also ammunition has created an important force multiplier in the fight against terrorism, especially PKK, and has given great impetus to the fight. As a result of both the increase in the amounts of UAVs and MRAs and their effective use; it has been observed that members of PKK terrorist organization are neutralized across the border before they can enter our country, that the movements of PKK terrorists at home are restricted, that they start to act in small groups of 2-3 people, and that they avoid conflicts because they cannot form large groups (Bural, 2017).

Türkiye's surveillance, reconnaissance and armed aerial vehicles have had a major impact against PKK terrorist group in both Iraq and Türkiye. Between 2015 and 2021, the ratio of PKK casualties associated with conflicts to losses in Türkiye increased from 1.5 times to 6 times (International Crisis Group, 2022). Thanks to these technological developments, there has been a decrease in the number of terrorists. In 2016, the number of terrorists in Türkiye decreased from 2,800 in 2016 to 48 in 2022. At the same time, the number of PKK actions has decreased. In 2021, the number of actions of PKK terrorist group decreased from 2,495 in 2016 to 133 in 2021. In 2021, Türkiye carried out more than 110,000 operations at home and abroad and neutralized 73 militants including both low- and high-profile militants (Gökçe, 2022).

A study by the International Crisis Group uncovered a number of data on operations from 2016 to 2019. Accordingly, there was a rate of neutralizing 1.65 PKK militants per security guard

in 2016, compared to 2.22 in 2017, 3.22 in 2018 and 3.36 in 2019. However, in 2019, it was revealed that the Turkish army carried out 76 cross-border operations in and around Qandil, known as the headquarters of the organization, and by July 2019, 87 high-ranking PKK militants had been neutralized. It was also revealed that 361 PKK terrorists were killed in Türkiye and in the North of Iraq between July 2018 and July 2019 (Mandıracı, 2022).

Launched in the North of Iraq in 2019 and advancing with the ongoing Pençe operations, TAF is settling in a way that establishes territorial dominance at the critical points it has captured and is settling until it advances to the next critical point. The biggest factor is domestic UCAVs, Atak combat helicopters and domestic munitions as operations move forward with certain steps. Türkiye, which has significantly reduced its dependence on foreign affairs with domestic production, has become a self-sufficient power. The most important weapon that members of the terrorist organization can use abroad domestically is guided anti-tank missiles supplied by foreign countries to this terrorist organization (Yıldız, 2021).

It is not the first time that the terrorist group has lost its grip on the area, with two Gendarmerie base areas in Hakkari that opened to the Çukurca Kazan valley, which is vital for the terrorist organization, and equipped with technological surveillance, reconnaissance and defense weapons with domestic facilities. In 2021, Koç Hill, Mahya Hill and Bemiro base areas were established by the Gendarmerie for the terrorist organization operating in the Kato mountains and using this region as a distribution point, ending the organization's territorial dominance and bringing reinforcement activities from abroad to the point of completion (Harmancı, 2020).

The UAVS used by Türkiye started to carry out the screening of thousands of soldiers on the ground with much less cost and zero risk and more accurate results. The biggest problem in the fight against terrorism is finding a terrorist. Thus, the drone, which provides intelligence, reconnaissance and surveillance, allows it to capture the terrorists it locates with point operations and with several teams without the need for thousands of troops. UCAVs or Warplanes can destroy targets in caves or deep valleys with smart missiles against detected terrorist elements. While the cost of operations for Türkiye decreases after the use of UAVS and UCAVs, the terrorist organization, which has completely lost the initiative, has already only had to hide in deeper caves, losing its human resources (Ertürk, 2021). The monitoring, sighting and firing capacity of UAVs and UCAVs led to Türkiye's strategic supremacy in the fight against terrorism, and PKK took a defensive position. That is because PKK's range of action has narrowed, the safe zone for PKK has disappeared, and UAVs and UCAVs have damaged everywhere (Özcan, 2019).

CONCLUSION

Recent developments in technology have seriously affected the whole world and almost all workplaces. Technology has also had a significant impact in the fight against terror and terrorism. Terrorist organizations that have successfully used the latest technology have taken significant successes and steps in their fight against other actors in the international system. Members of the terrorist organization enable their fighters to communicate with the encryption methods they use without leaving a trace. At the same time, terrorist organizations that have begun to use files such as images and audio files as propaganda tools have found it easier, faster and cheaper to expand

their sphere of influence thanks to the development of technology. But terrorist organizations, which benefit greatly from the possibilities of technology, also plan and carry out their attacks with the help of technological elements. Actors who are aware of this situation and who are harmed by the actions of terrorist organizations have also started to use technology effectively in their fight against terrorism and have not even given terrorist organizations and militants the opportunity to escape with state-of-the-art devices. This situation has changed the nature of today's wars, making them asymmetrical and digital. The intelligent weapons developed in the new era have begun to replace humans. Many states, from the US to the UK, have begun to use and develop this new concept in the areas of defense and security. This has enabled states to intervene in asymmetric threats more easily and with less loss of life.

Türkiye has been one of the countries that has used technology effectively in the fight against terrorism recently. Türkiye has achieved significant success both at home and abroad by actively using the devices produced with the latest technology. With the systems and radars it has developed, Türkiye can easily recognize the elements behind various obstacles during operations and intervene depending on the situation. In this way, it increases its success and self-confidence in operations. However, today, combat and operation training has begun to be given through simulations. In this way, security forces were allowed to be more conscious and calm in the face of real-life attacks.

With UAVs and UCAVs Türkiye has produced, the country has started to act more actively in its fight against PKK, which it has had to fight against for many years. In addition, Türkiye has significantly reduced both the cost and loss of life in the fight against terrorism by using technological devices. In such an environment, there has been a decrease in the number of PKK actions against Türkiye as well as a significant increase in casualties. Therefore, recent research has seen a decrease in the rate of participation in this terrorist organization. For example, no one from Hakkari in Türkiye joined the terrorist organization in 2021. Moreover, the rate of militants fleeing from the terrorist group and surrendering to the State’s security forces has started to increase. When this situation is considered from Turkey's perspective, Türkiye's job in the fight against terrorism has become easier. Thanks to Türkiye's weapons and AI tools, the domestic industry can develop without high costs. Moreover, Türkiye has started to gain an important economic and diplomatic advantage by exporting these devices to other actors. In fact, Türkiye has recently become one of the most important and powerful countries in military diplomacy. The advancements in technology and defense industry have allowed people to work in more productive areas. It has also increased the public's trust in the state in Türkiye. These advancements have boosted Türkiye's diplomatic effect, enabling it to pursue a more proactive and assertive foreign policy in the international system.

Almost all of those the terrorists surrendered reported that the organization had no room for maneuver due to the UAVs and UCAVs produced by Türkiye, and that they could not even meet their basic needs, and that they surrendered because they saw that the presence of UAVs and UCAVs was harming them. Türkiye's use of technology as a fundamental element in the fight against terrorism has dealt a significant blow to the organization's manpower.

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