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EFFECTS OF AUTONOMOUS WEAPON SYSTEMS OVER NEW GENERATİON WAR: INSTANCE OF ARAMCO ATTACK

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ABSTRACT

The military technology that has been developing since the early ages is the most important element that shapes the world order. With the developments in the military field, the power balances between states are also shaped in connection with this development of military field. Today, developments in the military industry reveal artificial intelligence supported weapon systems. These systems, called autonomous weapon systems, represent new military elements of our age. In today's wars, the functioning of wars changes with the decreasing human impact. The use of unmanned aerial vehicles, known as semi-autonomous weapon systems, in combat areas has revealed the deficiencies of states in defense systems for this area. With the semi-autonomous weapon systems used in the attack on Saudi Arabia's Aramco oil facilities; Riyadh that spend serious money on the defense budget rendered helpless.

This thesis study focuses on the effects of autonomous weapon systems on the new generation war over the attack on Aramco oil facilities in 2019. It has been determined that there are not enough academic studies on the effect of autonomous weapon systems on today's wars. Therefore, this thesis is intended to fill this gap in the academic field.

From the concept of war, which is divided into classes, to the autonomous systems that are the military elements of the new generation war, the process has been evaluated. The effect of autonomous systems, which constitute the main subject of the thesis, on the new generation war, is examined on the example of Aramco attack; It was tried to draw attention to the effects of new weapon systems.

It was concluded that the states did not have the necessary defense systems against artificial intelligence supported autonomous systems that emerged with the new generation war and that these systems, which carried out the operations independently from the human operator, would lead to 'humanless' (not any human on the battlefields) of the battlefields in the following years.

Key Words: New Generation War, Artificial Intelligence, Autonomous Systems, Aramco Attack

INTRODUCTION

The wars throughout the history of humanity have emerged as the main actor that determines the mutual balance between societies and states. With each technological development, we clearly see that there is a transformation in the concept of war and there is a differentiation in the way wars are performed. War methods shaped according to the requirements of the age; has always made those who follow the new in the field of combat superior. Prussian General Clausewitz's statement that war is the continuation of policy with other tools clearly reveals that we cannot remove the concept of war from our lives (Arslan, 2003). The fact that the war has entered into different patterns as a continuous transformation with the knowledge acquired from the past has transformed itself as well as its actors.

Human civilization continued its development with the appearance of wars and was able to carry it to a higher level. Each war marks a destroyed order and a new system to be built. The technological developments experienced with the war could not only affect the military industry, but also affect all areas of life. After the conquest of Istanbul, the power of gunpowder had been realized and it was moved to Europe and the destruction of feudal structures; It is one of the clearest indicators of the impact of the war industry on social life.

From the conquest of Istanbul to the peace agreement of 1648 Westphalia and from the 1789 French Revolution to the wars between nation states on the European continent, the technology of war used had changed. These periods, which are expressed in the international relations literature with the separation of wars into generations; it is useful in understanding the developing methods of war and their effects on today's wars. The transformative effects of technological developments on the war as of the 21st century we are in; is described as Fourth Generation War. States application to groups called 'proxy' in order to achieve their political and economic goals, benefiting from developments in communication technologies, benefiting from units with high mobility; constitutes the parameters of the new generation war. Throughout history, the ways in which war was fought changed in direct proportion with technology; it also transformed the actors of the war. As in the early ages, from the wars made by the mobilization of all resources; There was a transition to non-state actors fighting for the interests of states. The struggle of proxy elements, which are the main actors of the war in the field, reflects the new generation understanding of war in our age.

With the new generation of war, proxy elements have reduced the responsibilities of states to fight their soldiers on the ground. We are now facing a technological development

that will completely eliminate this responsibility. This new development is autonomous weapon systems that can move independently from the human operator and are shaped with artificial intelligence. One of the serious examples of this is the autonomous attack by the Houthis[1] against Saudi Arabia's Aramco oil facilities in 2019.

Therefore, the insufficient academic studies on the impact of autonomous weapon systems on wars cause some deficiencies in our understanding of the effects of today's combat vehicles. Based on this, the attacks carried out using autonomous technology against Aramco oil facilities constitute the main subject of this thesis.

[1] Community of the Shiite sect, the essential element of Yemen and capturing the capital Sana after the Arab Spring.

FIRST CHAPTER

1. UNDERSTANDING THE WAR THAT TRANSFORMED

The history of wars that started with humanity is in a state of transformation that does not stop in the process of accumulation. Each era started with the knowledge gained from the previous period and it revealed new understandings of war. Actors who managed to adapt to the new war concept in this process that continued for centuries; It is known that they took their place in the international system as a founding actor. The concept of war, which has been transformed depending on the technological possibilities of the period from the tools of war to the forms of war, is a rational policy tool according to Clausewitz. The Prussian general drew the most understandable lines of the concept of war, defining it as the art of making requests to the enemy (Eker, 2005a).

In the international relations literature, war consists of a hard reflection of the power struggle between states. The phenomenon of war has been transformed with each technological development. The difference in the means and forms of warfare according to the requirements of the age has revealed the necessity of classifying the war.

1.1. First Generation War

The realize of the destructive effect of gunpowder on the walls and castles after the conquest of Istanbul had ignited the wick of the transformation in Europe. Gunpowder, the new technology of the period that moved to Europe, caused the collapse of feudal structures and paved the way for the emergence of nation states.

With the nation-state structure that gained strength with the peace of Westphalia in 1648, the period of wars with regular armies had begun. The period of principalities and kingdoms came to an end with the 1st generation wars that were accepted to start as of the mid 17th century; It was a period in which the nation-state understanding was dominant and that included the struggles with the permanent armies (Mevlütoğlu, 2016a). The main weapon systems used during this period were mouth-filled rifles and mouth-filled field guns. Unlike today's wars, in 1st generation wars, battles were carried out on wide plains. It was a period when the troop with the ability to maneuver quickly and effectively between the two enemy side won (Mevlütoğlu, 2016b).

1.2. Second Generation War

The innovations in the military field brought by the Industrial revolution and the process after the French Revolution constitute the main dynamics of the 2nd generation war. With the invention of machine guns, the increasing destructive effect of wars brought front line wars as of the 19th century. In addition to the effects created by the advancing military technology and the increasing range of guns and rifles on the battlefield, there have been some developments in communication and reconnaissance technologies (Mevlütoğlu, 2016c).

In the period that started as of the 19th century and was called as 2nd generation war, struggles that we can define as chest to chest collisions were given on the battlefields. The American civil war that started in the 19th century and the First World War that started in the early 20th century constitute an example for the 2nd generation war.

1.3. Third Generation War

Unlike the first two generations, the 3rd generation war created a war period based on the detection of weak spots and the rapid maneuvering, rather than the struggle with the enemy (Mevlütoğlu, 2016d).

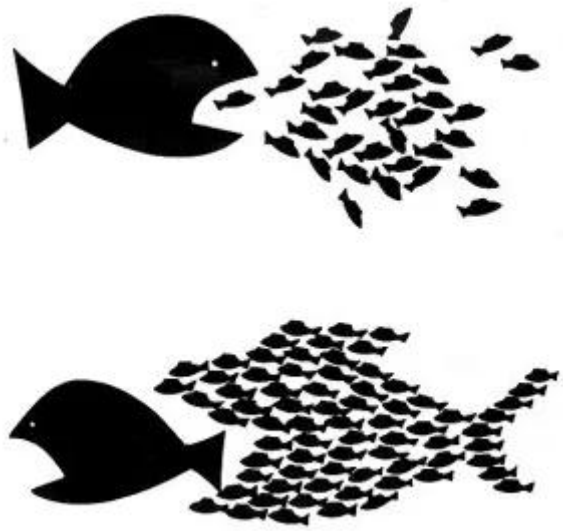
Non-state armed actors, which emerged from the middle of the 20th century to the beginning of the 21st century, caused radical changes in the concept of war. In the bipolar world order where the cold war took place, the states did not want to confront, instead they were in a power struggle through their proxies. Therefore, the 3rd generation war came up as the period when non-state actors started to become a part of the war.

The Vietnam war during this period, the 1967 6-day wars, the 1991 gulf wars were examples of the 3rd generation war (Mevlütoğlu, 2016e).

1.4. Fourth Generation War

With the developing technology, some innovations have been experienced in the fields of communication and intelligence. With the continuation of the non-state actors that started to emerge with the 3rd generation war in combat areas, the end of the cold war and the start of globalization, the new generation war came up with another form of expression, the 4th generation war. Reflecting today's war, this new generation war marks a period in which the influence of armies diminished and armed groups, called proxy, started to take more roles in the field of struggle. As war strategies, the struggles that are described as scattered and guerrilla type attacks come to the fore rather than a regular attack. As well as changing the

war strategies, there have been some changes in the battlefields. The combat areas of the new generation war have become residential areas and regions that require a messy opposition. As in the 1st generation war, the battles are not carried out on wide plains. The new military elements brought by technology are in the 4th generation war; cyber warfare, psychological warfare and autonomous weapons systems (Mevlütoğlu, 2016f).



In 4th generation war, small fish can defeat big fish.

Image 1: Pinterest

As of the 21st century, we clearly see the effects of the 4th generation war on the battlefields. The confrontation between the Taliban and the US forces, which we can define as non-state actors in the conflicts in Afghanistan, clearly reveals the radical change in the struggling elements. It is possible to see all the examples of the new generation war in Libya and Syria, where the internal rebellions were experienced with the effect of the Arab Spring. The irregular warfare of the armed groups, which are in a weak position compared to a regular army, against the state, constitutes the outlines of the war period that we are in.

SECOND CHAPTER

2. NEW GENERATION WAR

We are at the last link of the knowledge that each past century has passed on for the next generations. If we consider that the elements of war one or more centuries later, the methods of war will proceed in parallel with technological development, it seems likely that it will be at a very different point from the military sense of the present day. Compared with the old wars, mechanization increased in the battlefields; It is clearly seen that human influence has started to decrease to some extent. In addition, political problems such as terrorism and identity search have emerged. The idea from the 1648 Westphalia treaty, which defends the idea that the power to use power belongs to the state, has changed (Eker, 2015b). All of these are important points of the new generation war. Along with mechanization, armed groups or 'military proxy'[2] that shape their actions in line with the interests of the states may cause the time limit of the new generation wars to be uncertain.

Despite the intervention of the Soviets in Afghanistan in 1979, the USA's support for the Taliban; It constitutes an important example of military proxy. The fact that the Taliban has a significant say throughout the country with the support provided by the USA shows that the new generation war is shaped on the basis of non-state armed organizations. Another example is Syria, where the civil war broke out after the Arab spring in 2011. In terms of the effect it has created, the weapon systems used and the warfare methods applied, the Syrian civil war has a feature that includes all the parameters of today's wars.

Today's wars, defined as the new generation war or the 4th generation war, have subheadings that shape the battlefields. Supporting proxy-based attacks with psychological and cyber-based attacks reveals a versatile war practice. This method of war, called hybrid warfare, refers to the absence of traditional combat methods by using all combat vehicles within the battlefield (Duygulu, 2019a). The fact that the hybrid war strategy contains cyber, psychological and electronic warfare titles clearly shows that today's wars have gained an asymmetrical effect. The concept of asymmetric warfare has emerged with the low impact elements that applying the irregular warfare conditions. Accordingly, Saudi Arabia, which has spent billions of dollars on its defense budget, was attacked with lower cost unmanned aerial vehicles, and this is one of the most effective examples of the irregular war. The fact that the

[2] The reason for depicting the proxies military is due to the fact that they exist in the countries that support the state, which they are under the umbrella of politically or economically. Such states reveal their political and economic support rather than being on the military field.

attack was carried out with a semi-autonomous armed unmanned aerial vehicle shows that the artificial intelligence-based military industry has developed. Therefore, understanding the cyber wars, psychological wars[3] and of course the autonomous weapon systems that are the main topics of the new generation war will be beneficial in terms of taking the necessary measures against these new threats.

2.1. Cyber Wars

The evolving technology of war has transformed the Internet into an offensive platform and has become one of the new combat methods of our time. It is frequently used today due to the fact that it is difficult to follow the attacks using internet connection compared to other attack methods (Duygulu, 2019b). Cyber attacks can cause serious damage in terms of the effect it has, but low cost. Therefore, cyber attacks are a clear example of the impact of the information age we are in on the battlefields.

Proxy wars, which occupied the world agenda with the mid-19th century, introduced the concept of 'Cyber Proxy' in integration with the cyber attack logic. Instead of armed groups struggling for the state it serves on the battlefield, cyber proxies emerge attacking the corporate infrastructure of the target country. This gives clues that the new threat elements will be low in cost and high in impact.

2.2. Psychological Wars

It is possible with a psychological war to harm the side that is defined as an enemy in the new generation war without using any military elements. It is an effective method that states are using today to influence societies' minds and direct them for a specific purpose (Tarhan, 2019). The most effective weapon of psychological warfare is a set of messages known as black propaganda that can mobilize communities in a certain direction, rather than right and wrong. The best example of propaganda was the image called Uncle Sam, with a poster saying 'I want you for the American army' during World War II. It is clearly seen that psychological warfare has gained importance in parallel with the evolving communication opportunities with this poster which has a great impact.

[3] Although psychological wars are in every period of the age, their influence has increased with the technological possibilities developed in the new generation war.

2.3. Autonomous Weapon Systems

The new generation of war; The military element supported by artificial intelligence, which is incomparable with the old weapon systems, is autonomous weapon systems. These systems, which are regarded as one of the important breakthroughs of the 21st century, act independently from the human operator and fulfill the coded task with a high level of precision. Today, there is no common opinion on the definition of autonomous systems. It is defined as systems requiring limited human intervention or systems that do not require human intervention after activation once according to the statements of the US Department of Defense, and fulfill their functions.[4]

With the increasing autonomy in weapon systems every day, the effectiveness of soldiers in the battlefields is decreasing. Countries that can successfully integrate artificial intelligence technology with their military elements will be the new winners of the battlefields. Autonomous weapons systems that give states the possibility of performing operations without causing military losses; It is described as the third revolution in the military field after gunpowder and nuclear (Yakar, 2019).

Although today's, autonomous weapon systems are not used in battlefields, the rapid advancement of technological developments in the field of artificial intelligence may lead us to see these systems in the battlefields in the future (Duygulu, 2019c). The fact that the states, who want to protect their power in the international system, make serious investments on the new generation war elements can lead to an armed race based on artificial intelligence. Therefore, we come across the conclusion that autonomous weapon systems may be the new balance determining factor between states.

It is stated that autonomous weapon systems, which are considered to be an indispensable element of modern war in the near future, have brought along some damages. Artificial intelligence experts and some states who argue that the autonomized military element's ability to self-learn will put human life at risk; It is known to fight against these systems under the slogan 'no to killer robots'. Noting that these military systems, which will have increased learning, decide who will die and who will live will seriously endanger human life; A number of studies are being carried out to ban the use of these systems in the military field.

[4] US defense ministry. (2012). Autonomous weapon systems

Autonomous weapon systems, often confused with unmanned aerial vehicles, are a different new generation combat element. While UAVs need human intervention from a distance, autonomous weapon systems can act independently from the human operator. These systems, which can act by distinguishing whether any object they encounter are friends or enemies, have different features than UAVs (Duygulu, 2019d).

In the literature on international relations, it has been emphasized in the previous sections that the classification of wars will benefit the understanding of the phenomenon of war. In order to understand autonomous weapon systems, it is crucial to classify them according to their functions. Accordingly, the US Department of Defense divides autonomous weapons systems into three classes (Özer, 2020a).

2.3.1. Semi-Autonomous Weapon Systems

These are weapon systems that can be controlled by the operator in the field by the remote control system, select targets and have the ability to apply force when necessary (Özer, 2020b). The 'fire and forget' type rockets used today are semi-autonomous weapon systems that fall into this class. Another example is the unmanned aerial vehicles produced by few countries in the world. As mentioned in the previous section, unmanned aerial vehicles do not have full autonomous features. In order for a weapon system to be autonomous, there should be no external intervention. Therefore, unmanned aerial vehicles should be evaluated within the scope of semi-autonomous weapon systems.

2.3.2. Human Supervised Autonomous Weapon Systems

In human-controlled autonomous systems, as in semi-autonomous weapon systems, there are automatic systems whose functions are predetermined instead of remote control, even though they are human in the process. 'Automatic sentry weapons' placed in border posts is one of the best examples (Özer, 2020c). Such autonomous systems have access and intervention options at all levels of human operator. Therefore, these systems are the autonomous systems that contain the least artificial intelligence.

The high level of artificial intelligence of the two autonomous systems mentioned is the fully autonomous system that does not require human operator intervention. Systems, which we can call a full autonomous or autonomous weapon system, have not yet landed on the battlefields. However, given the technological developments, the fact that the battlefields will be shaped autonomous weapon systems in the near future appears. Although we do not

see autonomous weapon systems on the battlefield, we are witnessing the landing of semi-autonomous weapon systems, which are a sub-branch of these systems, on the combat areas. A recent attack on Aramco oil facilities clearly shows us that the process of landing autonomous systems has begun.

THIRD CHAPTER

3. AUTONOMOUS VIEW OF ARAMCO ATTACK

The Middle East, which has been transformed with the 2011 Arab Spring, has experienced many changes in the political, economic and military fields. Revolts in Arab countries caused the change of policies towards the region by overthrowing or weakening the sovereign regimes in the countries. Yemen, which was a country where civil wars took place even before the Arab Spring; It was dragged into a new conflict with the wave of rebellion that started. Representing about thirty-five percent of the country, the Houthis; Their capture of many regions, including the capital Sana, opened up a new front to the Saudi-Iranian tension.[5]

The Houthis who control many parts of the country; They made many attacks on Saudi Arabia. The most striking of their attacks was the attack against Aramco oil facilities, which they carried out using herd SİHA technology in 2019.

Saudi Arabia, which spends billions of dollars on its defense each year, remains helpless in the face of a low-cost attack; countries have raised the question of how ready for the next generation of war is war elements. Of course, we need to look at the effects of the semi-autonomous weapon systems used in the attack, rather than by whom the attack was carried out. Armed unmanned aerial vehicle technology controlled by remote control system by human operator; It constitutes the most important asymmetric weapon of the battlefield. Considering the possibilities it has, the Houthis, which we can state as the weak side; The success of their attack on the strong side of the Saudi army shows us that the concept of strong and weak changed with the new generation war. After the Aramco attack, the institutions that managed to combine knowledge with the military industry would become a superior side in the wars.

[5] The fact that the Houthis belonged to the Shiite sect made them close to Iran. These close relations established between the Houthis and Iran and the military equipment support provided by Iran to the Houthis; It has been perceived as a threat by Saudi Arabia.

Ten armed unmanned aerial vehicles used in the attack were directed in a coordinated direction.[6] Combined attacks and the use of new generation military elements in connection with the target can cause serious target damage.

After the oil facilities were severely damaged, Saudi officials went to stop oil production. One of the worst consequences of states not determining the threats to changing war conditions has been the attack on Aramco oil facilities. The attack carried out with semi-autonomous weapons systems at a time when the Riyadh administration never expected; it was felt in Saudi Arabia as the harshest example of changing war conditions. The Houthis that we can define as non-state actors; In 2015, seized Yemeni military equipment and developed these equipment through the modernization process with the support of Iran. This development paved the way for the transition of Houthis to semi-autonomous weapons systems (Balkan, 2019).

In the following process, the Houthis, by developing the unmanned aerial vehicles; Systematic attacks were carried out on missile ramps belonging to Saudi Arabia. High-cost defense systems of military technology have been rendered unusable with lower-cost weapon systems. From this point of view, we clearly see the impact of the military elements of the new generation war that non-state actors may have.

In general, the fact that Aramco oil facilities belonging to Saudi Arabia faced a semi-autonomous attack by a non-state actor revealed the necessity of understanding the battlefields of the future. The wars that have been transformed with the changing military technology open the door to new battlefields for us. The relationship of these new battlefields with autonomous weapon systems and the new generation war; It is a reality that countries should attach importance to in the security of the future.

[6] Suudi petrol tesislerine İHA ile saldırı. (2019). Retrieved from: https://www.dw.com/tr/suudi-petrol-tesislerine-iha-ile-saldırı/a-50431735

FOURTH CHAPTER

4. BATTLEFIELDS OF FUTURE: AUTONOMOUS SYSTEMS AND NEW GENERATION WAR

The phenomenon of war has undergone a serious transformation from past times to today. After the war adventure of mankind that started with sword and spear, gunpowder guns appeared. Then, with the information age, we came across autonomous weapons systems equipped with artificial intelligence. As mentioned in the previous chapters, although autonomous weapon systems have not landed on the battlefields, it is thought to be on the battlefields in the near future in parallel with the developing technology.

Parallel to the development of military technology, the changing of the battlefields has been a reality that we have encountered throughout the history of wars. From war on vast lands to a war without borders were passed. The introduction of wars into civil life and the availability of weapon systems used created new threats. The emerging new threat factor; is a non-state armed actor who can attack the city with his semi-autonomous weapons system.

Autonomous weapon systems will be the most important military elements of the next generation of war, which has developed with artificial intelligence. These weapon systems, which do not require human intervention in any way, can fulfill their duties without any human feelings during the operations.[7] Although there are no autonomous weapon systems in today's battlefield, the future battlefields will be shaped by autonomous weapon systems. In parallel with the arms race that started with the discovery of firearms, the developments in the field of autonomous weapon systems are among the states; can be reveal an artificial intelligence based race. It is known that the countries have invested in knowledge and the importance that they place on artificial intelligence. With the reflection of the developments in these areas on the military technology, the wars carried to the regions where civilians live now; will be done through autonomous systems.

Of course, as the most important actors of the future battlefields, we come across non-state armed actors. Taking these responsibilities over the states and struggling in the field in line with the interests of the states; The development in the weapon industry, which started with the use of semi-autonomous weapon systems, continues. The semi-autonomous weapons systems used in the Aramco attack clearly show that the attack capacities of non-state armed

[7] Autonomous weapon systems act by carrying the responsibility to fulfill the task given to its without showing any signs of indecision during the operation.

elements have expanded. Armed unmanned aerial vehicles; It has given the ability to resist armed groups that are not capable of engaging in a conventional conflict with states. The active use of armed unmanned aerial vehicles, which are defined as semi-autonomous systems, on the battlefields and the lack of a defense mechanism for these systems causes states to use in high cost air defense systems (Duygulu, 2019e). States that are vulnerable to the attacks of semi-autonomous systems should take steps to improve their defense systems in this area.

The need for new defense mechanisms emerges with each changing war. In the early ages, this need showed itself as a shield against the arrow. Today's, the need for defense is provided by missile systems. Using these high cost systems against new weapon systems are increasing the cost of the war.

Today, there is a knowledge-based, interstate race. With this race leading to some innovations in the field of artificial intelligence, the developments in the field of military industry will seriously reflect on the global power balances. States entry into an arms race centered on autonomous weapons systems; can lead to autonomy of wars. Autonomy of wars; It means that the human operators in the field are replaced by weapon systems with artificial intelligence. With the autonomy of wars, the understanding of war in transformation will have reached a new ring. With this new ring, it will be imperative for states to do some innovations in military tactics. Some of these innovations are that,

1) To have an effective air defense system against autonomous weapon systems

2) To integrate the developments in artificial intelligence studies with the military industry

3) Instead of operations carried out with regular armies; Creation of operational units supported by autonomous systems that will organize frequent and scattered attacks

As of the 21st century, the new concept of war, which we are in, requires states to make some military innovations. As mentioned above, states in the new generation war; they need to develop air defense systems to prevent attacks from autonomous weapon systems. The air defense systems currently used by the countries are not designed to be used against the new generation weapon systems. Therefore, for the autonomous systems of the new generation war as new generation weapon systems; The development of air defense systems is of great importance.

On the other hand, states need to increase their investments in this field, leading the developments in the field of artificial intelligence. The years ahead will be the years when countries that can integrate artificial intelligence into the military industry will significantly change their power balances within the global order.

Wars with the regular armies of the past will now be replaced by attacks that are shaped by a new generation of warfare and supported by autonomous systems. In the new generation war, the reduction of human operator influence will enable states to make easy decisions because they do not lose soldiers in declaring war.

CONCLUSION

The changing nature of the concept of war has put the warring elements and the phenomenon of war into a transformation. The process that started with the sword and shield in the early ages revealed the technology of firearms with the discovery of gunpowder. With the changing military technology, the battlefields where wars were fought also entered a transformation. The wars, which were previously carried out on wide plains, were replaced by battles without a certain limit. The fact that artificial intelligence-assisted autonomous weapon systems will lead the wars of the future has emerged during the period called the new generation war.

Autonomous systems that can perform their functions without human operator intervention, armed unmanned aerial vehicles known as semi-autonomous systems, although they have not landed on the battlefields today, are actively used. The attacks carried out with armed unmanned aerial vehicles against Aramco oil facilities in 2019 clearly show that the semi-autonomous weapon systems are used in the battlefields.

With the emphasis on the understanding of war transformed in the first part, the fact that war is a phenomenon that develops by carrying the accumulation of every generation has emerged. Then, with the second part, it was concluded that today's wars became unmanned based on artificial intelligence. Of course, it was stated that the changing war conditions during this process caused the states to need some innovations; The effects of autonomous systems on the new generation war have been tried to be determined. Accordingly, it was concluded that states need effective air defense systems against autonomous systems, developments in artificial intelligence studies should be integrated with the military industry, and that an unmanned battlefield with autonomous systems is today's new reality.

The current thesis study has attempted to increase the interest in this field by drawing attention to the lack of academic studies in the field of the effects of autonomous systems on the new generation war.

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