The Effect Of Aı-Controlled Autonomous Weapons In The Wars Of The Future

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SUMMARY
The three most important factors triggering the change and transformation process in the world are artificial intelligence, informatics technologies and developments in robotic science. Since artificial intelligence-controlled autonomous technology is constantly updated and offers better, it has become driverless, that is, unmanned operations in many areas such as cars, robots, planes, ships, UAVs and the defense industry. The defense industry is one of the areas most affected by the transformation in the world. New generation weapon systems are autonomous weapon systems with artificial intelligence supported military elements that cannot be compared with old weapon systems. These systems act independently of the human operator and fulfill the task coded to them with a high level of precision.
In this study, the advantages and disadvantages of artificial intelligence controlled autonomous weapon systems were investigated.
Key Word: *Artificial Intelligence, Autonomous systems, Robots, UAVs*

I. Introduction

Autonomous weapon systems can reduce casualties by distracting human warriors from dangerous missions[1]. Unmanned Systems Roadmap, 2007-2032, provides additional reasons to pursue autonomous weapons systems. These include that robots are better suited than humans for "boring, dirty, or dangerous" tasks[2]. "(deadly autonomous robots) have the unique potential to operate at a faster pace than humans can reach and deliver lethal strikes even when communication links are lost," adds Major Jeffrey S. Thurnher of the US Army[3]. The 2014 Army Aviation Symposium said the Army could eventually reduce the size of a brigade from four thousand to three thousand soldiers without a simultaneous reduction in effectiveness, with greater reliance on "support robots"[4]. In 2012, the Defense Science Board identified six key areas where advances in autonomy would provide significant benefit to an unmanned system. Perception, planning, learning, human-robot interaction, natural language understanding and multi-agent coordination[5]. Perception or perceptual processing means sensors and sensing. Sensors include hardware and detection software[6]. However, Pryer puts aside the question of whether it is ethically ethical to wage war through robots[7]. In July 2015, an open letter was published at an international joint conference on artificial intelligence, calling for a ban on autonomous weapons. The letter warns: "Artificial Intelligence (AI) technology has reached a point where the deployment of such systems is legally, if not practically possible, over decades, not decades, and the risks are high[8]. He concludes by insisting that "decisions regarding the use of violent force should not be delegated to machines[9]. Allowing AI to decide on targeting will likely result in civilian casualties and unacceptable collateral damage[10]. Lawyers Kenneth Anderson and Matthew Waxman argue that regulation should emerge with technology, as they believe that morality will evolve with technological development[11]. Therefore, arguments about the irreplaceability of human conscience and moral judgment may need to be reconsidered[12]. Judge advocates in the US Army, Lieutenant Colonel Shane R. Reeves and Maj. William J. Johnson states that there are battlefields where there are no civilians, such as underwater and space, where autonomous weapons can reduce the possibility of suffering and death[13]. Michael N. Schmitt makes a distinction between illegal weapons per se and the illegal use of illegal weapons[14]. One definition used by the Defense Science Board sees autonomy as only high-level automation[15]. An autonomous system can make a decision based on a set of rules and/or limitations[16]. The International Committee of the Red Cross defines autonomous weapons as "weapons that can independently select and attack targets, that is, have autonomy in "critical functions" such as acquiring, pursuing, selecting and attacking targets[17]. "Human weapons in the loop are robots that can select targets and apply force with just a human command"[18].

"Non-loop human weapons are robots that can select targets and apply force without any human input or interaction"[19]. This type of autonomous weapon system is a cause for much concern about "killing

machines"[20]. For example, an oppressive dictator might deploy emotionless robots to kill a population without worry and instill fear among them[21].

2. What are lethal autonomous weapons?

Also called "deadly autonomous weapon systems" or "killer robots" are weapon systems that use artificial intelligence (AI) to identify, select and kill human targets without human intervention. In the case of unmanned military drones, the decision to take a life is made remotely by a human operator, while in the case of lethal autonomous weapons, the decision is made only by algorithms. When the gun encounters someone that the algorithm detects as suitable for the target profile, it fires and kills[22].

Figure 1. Autonomous aircraft

3. Transforming War Understanding

The history of wars that started with humanity is in a state of transformation that does not stop in the accumulation process. Each era reveals new understandings of war based on the knowledge gained by the previous era. In this process that has been going on for centuries, the actors who managed to adapt to the new war concept; It is known that they take their place in the international system as order-building actors[23].

In the international relations literature, war consists of a harsh reflection of the power struggle between states. The difference in war tools and forms according to the requirements of the age has revealed the necessity of classifying war.

3.1. First Generation War

With the conquest of Istanbul, the realization of the destructive effect of gunpowder on the walls and castles also ignited the wick of the transformation in Europe. Gunpowder, the new technology of the period brought to Europe, caused the collapse of feudal structures and paved the way for the emergence of nation states. With the 1st generation wars, which are accepted to have started in the middle of the 17th century, the period of principalities and kingdoms came to an end, the understanding of the nation-state was dominant, and it was a period that included struggles with permanent armies. The main weapon systems used in this period were muzzle-loading rifles and muzzle-loading field guns. Unlike today's wars, battles in the 1st generation wars were fought on wide plains[24].

3.2. Second Generation War

The process after the French Revolution and the innovations in the military field brought by the industrial revolution constitute the main dynamics of the 2nd generation war. With the invention of machine guns, the increasing destructive effect of wars started frontal wars as of the 19th century. In addition to the effects of cannons and rifles, whose range has increased with the developing military technology, on the battlefield, there have been some developments in communication and reconnaissance technologies [24]. In the period called 2nd generation warfare, which started as of the 19th century, struggles that we can define as hand-to-hand combat were fought on the battlefields. The American civil war that started in the 19th century and the 1st World War that started in the early 20th century are examples of 2nd generation warfare.

3.3. Third Generation War

The 3rd generation war created a war period based on the detection of weak points and their siege with quick maneuvers rather than hand-to-hand combat with the enemy. The non-state armed actors that emerged in the period from the middle of the 20th century to the beginning of the 21st century have caused radical changes in the concept of war. In the bipolar world order, states avoided confrontation and instead entered into a power struggle through their proxies. The third generation war was the period when non-state actors started to become a part of the war. The Vietnam War, 1967, 6-day wars, 1991 gulf wars, which took place in this period, are the wars that set an example for the 3rd generation war[24].

3.4. Fourth Generation War

With the developing technology, innovations in the fields of communication and intelligence, the continuity of non-state actors in the battlefields that started to emerge with the 3rd generation war, the end of the cold war and the beginning of globalization brought the 4th generation war to us. This new generation of war is a period in which the influence of the armies has diminished and the armed groups called proxies have begun to take a greater role in the field of struggle. As war strategies, the struggles, which are characterized as scattered and guerrilla type attacks rather than a regular attack, have come to the fore. In addition to the changes in warfare strategies, there have been some changes in the fields of combat. The battlefields of the new generation war have been inhabited areas and regions that require dispersed resistance. The new military elements brought by technology are in the 4th generation war; cyber warfare, psychological warfare and autonomous weapon systems[24].

The confrontation between the Taliban, which is a non-state actor, and the US forces in the conflicts in Afghanistan clearly reveals the radical change in the fighting elements. All the examples of the new generation war can be seen in Libya and Syria, where internal revolts took place with the effect of the Arab spring.

4. Next Generation War

We are in the last circle of the knowledge that each century has passed on to the next generations. Considering that the elements of war one or a few centuries later will progress in parallel with the technological development of warfare methods, it seems likely that they will be at a very different point militarily from today. Compared to the old wars, mechanization increased in the fields of struggle; It is clearly seen that human influence has begun to decrease to some extent. In addition, the emergence of political problems such as terrorism and the search for identity, the change in the doctrine from the 1648 Westphalia treaty, which advocates the idea that the power to use power belongs to the state, constitutes the important points of the new generation war[23]. Today's wars, which are defined as the new generation war or the 4th generation war, have sub-titles that shape the battlefields. Supporting proxy-based attacks with psychological and cyber-based attacks reveals a versatile war practice. This method of warfare, which is called hybrid wars, refers to the use of all warfare tools in the battlefield and not to use traditional warfare methods[25]. The fact that the hybrid war strategy includes cyber, psychological and electronic warheads clearly shows that today's wars have gained an asymmetric effect. The concept of asymmetric warfare has emerged with the use of unconventional warfare military strategy by the elements whose effect is less from the opposite side, which is defined as the enemy.

4.1. Cyber Wars

Turning the internet into a platform for attack has become one of the new combat methods of our age. It is frequently used today due to the fact that it is difficult to follow the attacks carried out using the Internet connection when compared to other attack methods [25]. Cyber attacks, which are low in terms of attack cost but can cause serious damage to the attacked party in terms of the impact they create, constitute a clear example of the impact of the information age we live in on the battlefields.

4.2. Psychological Wars

In the new generation war, harming the party defined as the enemy without using any military element is possible with psychological warfare. Influencing the minds of societies and directing them towards a specific purpose is an effective method that states have applied today[26]. The most effective weapon of psychological warfare is the set of messages, known as black propaganda, that can mobilize communities in a certain direction rather than their correctness and falsity.

5. Autonomous Weapon Systems

New generation weapon systems; The military element supported by artificial intelligence, which cannot be compared with the old weapon systems, is autonomous weapon systems. These systems act independently of the human operator and fulfill the task coded to them with a high level of precision. It is defined as systems that require limited human intervention or, according to the statements of the US Department of Defense, once activated, do not require human intervention, select targets and perform their function [27].

Countries that can successfully integrate artificial intelligence technology with their military elements will be the new winners of the battlefields. Autonomous weapon systems that enable states to carry out operations without military losses; It is described as the 3rd revolution in the military field after gunpowder and nuclear[28]. Artificial intelligence experts and some states, who argue that the self-learning ability of the autonomous military element will put human life at risk; It is known to fight against these systems under the slogan of 'no to killer robots'. He states that the decision of who will die and who will live by these military systems, which will have augmented learning, will seriously endanger human life. While UAVs require human intervention from a distance, autonomous weapon systems can act independently of the human operator. These

systems, which can act by distinguishing whether any object they encounter is friend or foe, have different features from UAVs[25].

In order to understand autonomous weapon systems, it is of great importance to classify them according to the functions they have. Accordingly, the US Department of Defense divides autonomous weapon systems into three classes[29].

5.1. Semi-Autonomous Weapon Systems
They are weapon systems that can be controlled by the operator in the field with a remote control system, select targets and have the capacity to apply force when necessary[29]. The 'fire and forget' type rockets used today are semi-autonomous weapon systems in this class. Another example is the unmanned aerial vehicles produced by the few countries in the world. Unmanned aerial vehicles do not have fully autonomous features. For a weapon system to be autonomous, there must be no outside interference.

5.2. Human Supervised Autonomous Weapon Systems
In autonomous systems controlled by humans, as in semi-autonomous weapon systems, although there is a human in the process, there are automatic systems with predetermined functions instead of remote control. It is one of the best examples of 'automatic sentry guns' placed in border posts[29]. Human operators have access and intervention options at all levels to such autonomous systems.

6. Countries Using Autonomous Systems
Top five world leaders in lethal autonomous weapons development; USA, China, Russia, South Korea and the European Union (EU)[30]. Apart from these countries, other important contenders in the AI arms race are India, Israel and Japan.

6.1. United States
It is not surprising that the US is the world leader in the development of the deadly AWS[31]. The United States is by far the leader in autonomous hardware development and investment capacity. By 2010, the United States had invested $4 billion in research into AWS, and another $18 billion will be invested in autonomy development by 2020[32].

Although the United States has more than 20,000 autonomous vehicles, it is estimated to spend $17 billion on drones by 2021, including 3,447 new unmanned land, sea and air systems[33]. In addition to having the most AI companies in the world, the United States has the most AI-related publications, the most AI patent applications and accepted AI patents, and the largest pool of talented AI researchers for a single country.

6.2. Chinese
China is a clear rising contender in deadly AWS and AI development, and it has stated in its 'Next Generation Artificial Intelligence Development Plan' that it plans to use AI on the battlefield together with AWS[34-35]. China's weapons development capacity is high, with an estimated annual budget of $250 billion and an estimated spending of $4.5 billion on drone technology by 2021[33]. Most impressively, Chinese companies are testing swarm technology with more than 1,000 synchronized flying eyes (drones)[35].

China aims to become the world leader in artificial intelligence development by 2030[34]. The State Council of China estimates that artificial intelligence industries will reach $22 billion in 2020, $59 billion in 2025, and $150 billion in 2030. Despite the delay in total publications, between 2011 and 2015, Chinese scientists published almost twice as many AI (41,000) papers as the US in the same period[36]. Moreover, Chinese investment and financing of AI projects between 2013 and 2018 is estimated at 60 percent of all world financing of such projects.

6.3. Russia
Russia leads the deadly race for AWS, despite scoring low on various measures of capacity and expertise. Russia clearly wants to get people out of the decision-making cycle and does not intend to comply with any international effort to restrict or ban the use of AWS in war[37]. In line with Russia's programs 'Creation of Possible Military Robotics by 2025 and Concept of Deployment of Robotic Systems for military use by 2030', it plans to have autonomous systems protecting weapon silos by 2020, and by 2030, thirty percent of its combat forces will be autonomous. aims to be [37-38].

In 2017, Russian President Vladimir Putin publicly announced that the leader in artificial intelligence will "become the ruler of the world." Russia's annual domestic military spending on AI is estimated to be as low as $12.5 million per year, only 0.01 percent of the unclassified AI budget for the US military[37].

6.4. South Korea
South Korea is a disproportionately strong player in the development of the deadly AWS and the world leader when it comes to autonomous sentry weapons. They have the highest density of robots in the world, with a ratio of 631 robots to every 10,000 human workers[39]. Despite being under the American security umbrella, South Korea's own weapons development capacity is still high and spends $41 billion annually on defense. The world's first stationary autonomous robotic turret, the Samsung SGR-A1, was developed in South Korea in

2006[40]. Beyond that, Korean weapons manufacturer DoDAAM has developed the Super aEgis II, a long-range turret that can detect, track and fire targets autonomously.

AI expertise development is a key focus in South Korea. Two days after world champion Go player Lee Sedol lost to Google's DeepMind Alpha Go AI system, South Korea has pledged nearly $1 billion in AI research. With nearly 70,000 artificial intelligence patents, more than 50,000 artificial intelligence publications and more than 2,000 artificial intelligence experts, South Korea is a major player on the world stage[41].

6.5. European Union
Currently, the EU's focus is industrial artificial intelligence and robotics. The biggest obstacle to the EU becoming a dominant actor in the deadly AWS development is the mixed intentions of its members. France, Germany, the United Kingdom, Sweden and Italy are all developing autonomous military robotic systems, but some members remain undecided and Austria joins calls to ban the use of AWS[42]. With the world's second-largest combined defense budget totaling $281 billion and projected spending on drone procurement of at least $8 billion by 2021, the EU has the capacity to develop world-class AWS hardware. The EU even surpassed the US in some AI metrics. EU member states have published a total of more than 425,000 AI-related articles, with the second highest numbers when it comes to artificial intelligence patent applications at over 233,000[43].

7. Concerns About Autonomous Systems With the Ability to Kill
At the beginning of 2017, 116 technology companies from different countries signed a call titled "An Open Letter to the United Nations Convention on Certain Conventional Weapons"[44]. After emphasizing that the control of lethal autonomous weapons systems is more challenging than ever with the advances in Artificial Intelligence technology, the Open Letter said that this situation should be handled carefully by developers and governments, ethically regulated and AI with the ability to kill should be banned. The signatories expressed their concern that a process that will result in disaster for humanity will be entered into when autonomous system technologies gain the ability to kill. Concerns usually center on two interpretations. The first emphasizes that civilians can be killed as a result of accident, while the other argues that after a while, Artificial Intelligence can destroy the human race.

8. Why Should Lethal Autonomous Weapons Be Banned?
 While the survival debate focuses on the moral and legal issues of autonomous weapons, killer robots pose a threat to all of us. In reality, the threat comes from within, it is the threat of war. Even more horrified at the idea of replacing the operator with artificial intelligence and sending autonomous weapons to hunt and kill without further human intervention. They question whether AI will always be incapable of distinguishing civilians from combatants, even making reasonable trade-offs between military gains and risk or harm to civilians. What if intelligently used autonomous weapons could actually save the lives of soldiers and civilians? Autonomous weapons can malfunction, kill innocents, and no one can be held responsible. These technologies are most strongly followed by nuclear armed countries[47].

II.   CONCLUSION
The essence of the artificial intelligence process is to give the computer the ability to act intelligently. One of the issues we need to manage here is to find a solution to the question of how we can make robots a structure that will serve human beings. Because soon, robots will be our closest friends and helpers from whom we will receive supportive service. Artificial intelligence (AI) is poised to play an increasing role in military systems. There is an urgent need for citizens, policy makers and leaders to distinguish between acceptable and unacceptable uses of AI. People agree that the decision to take human life should never be delegated to a machine. There is a moral component to this position, that machines should not be allowed to make vital decisions, where no one or anyone else is to blame. Lethal autonomous weapons, which select and attack targets without human intervention, can have very serious consequences such as mistakes made, loss of life of innocent civilians, shooting of non-military targets and friendly fire if they fall into the hands of terrorist groups. It destabilizes dangerously for every country and individual.

Autonomous weapons are a prominent starting point in an arms race fueled by technology that puts everyone at risk. That's why we need to ban them as quickly and harshly as possible.

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