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THE EVOLUTION OF UNMANNED AERIAL VEHICLES (UAVs) AND THEIR SIMILARITIES WITH PROXY GROUPS

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Abstract

Unmanned Aerial Vehicles (UAVs) have been replacing more expensive and manned aircrafts in particularly asymmetric operations to minimize costs and death risk of pilots. This article elucidates the evolution of UAVs in detail and proposes two hypotheses: (1) armed drones have similar functions as proxy groups in proxy wars, and (2) they are evolutionary but not revolutionary. As proxy groups act on behalf of principal states, proxy weapons surrogate jets. However, despite many benefits it contributes to air forces, armed drones are hardly believed to be game-changers. Instead, they are seen as evolutionary and complementary to manned aircrafts. In addition, UAVs are beneficial mainly in asymmetric warfare since they can not be used in the air space of a country with advanced air defense systems. There may be more drones employed by armies in the future but they may not prevail over piloted aircrafts as human factor is still decisive in combats. This study is expected contribute to literature with its arguments about UAVs. Methodologically, literature review was made for the study.

Keywords: *UAVs, Proxy Wars, Air Forces, Arms, Jet Fighters*

İNSANSIZ HAVA ARAÇLARININ (İHA'LAR) GELİŞİMİ VE VEKİL GRUPLARA BENZERLİĞİ

Öz

İnsansız Hava Araçları (İHA'lar) maliyetleri azaltmak ve pilotların ölüm riskini en aza indirmek için insanlı hava araçlarının yerine kullanılmaya başladılar. Bu makale İHA'larin gelişimini incelemekte olup iki hipotez önermektedir. Birincisi, silahlı İHA'lar işlev olarak vekalet savaşlarındaki vekil gruplara benzerler. İkincisi, İHA'lar evrimsel olabilirler ve fakat devrimsel olamazlar. Vekil (proxy) gruplar büyük güçlerin yerine savaşırken, İHA'lar da jetlerin yerini almaya başladılar. Ancak hava kuvvetlerine yaptıkları onca katkıya rağmen İHA'lar yine de tam olarak oyun değiştirici değildirler. Ayrıca, İHA'lar sadece asimetrik savaşlarda etkili olup iyi bir hava savunma sistemine sahip bir ülkenin hava sahasında kullanılamazlar. Gelecekte çok sayıda insansız hava aracı hizmete sokulabilir ve fakat pilotlu uçaklardan daha çok öneme sahip olmayabilirler. Çünkü insan faktörü savaşlarda halen en belirleyici faktördür. Bu çalışma öne sürdüğü argümanlarla literature katkıda bulunmayı amaçlamaktadır. Yöntem olarak literatür taraması yapılmıştır.

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Anahtar Kelimeler: *İHA'lar, Vekalet Savaşları, Hava Kuvvetleri, Silahlar, Savaş Uçakları*

Introduction

The use of unmanned vehicles in warfare has become common in recent decades, particularly from the 1990s onwards. As a result of technological developments, steering a vehicle, whether it is aerial, ground or surface, has become easier and its utilization has increased because of its new functions. Employed for surveillance, reconnaissance or intelligence at the beginning, unmanned vehicles for military use now carry missiles and attack their targets through remote control or autonomously. Almost one hundred countries possess UAVs (hereafter drones interchangeably), a quarter of which also have armed drones. While the serial production of drones does not go far back, their remarkable use has a history of fewer than 30 years, and Israel and the US are the leading two countries introducing them to battlefields. Yet, China's fast entrance to the market, followed by countries such as Turkey, Iran, France, Austria, and even Armenia, filled airspaces with thousands of drones (Bergen, et al, 2019). Except for some advanced ones, UAVs are cheap to buy, and easy to acquire and operate by states and non-state organizations. Due to its high contribution to military forces with low-costs, the number of UAVs over war fields is increasing and are providing an asymmetric advantage for the possessing side against its adversary.

This study argues that armed and non-armed drones resemble 'proxy weapons' in terms of their use, which is similar to that of proxies used by principals. As will be explained below, for the user state, drones reduce the cost of the war in terms of human power and economics. Instead of sending a manned vehicle to fight, opting for UAVs facilitates the combat of the principal, and makes policymakers less accountable and even favorable in their societies. However, whether drones are game-changers or just complementary to air forces must be discussed. Besides, the issue how effective drones are/will be is another matter that should be clarified. In other words, are drones revolutionary or evolutionary? Whether drones are complementary to fighters and their use is a new phase in the evolution of jets are two other issues that must be clarified. This study also questions the claim that the sixth-generation fighters will be unmanned since air-defense systems are advancing fast and all belligerents can easily acquire drones, thereby reducing the effectivity of UAVs. Moreover, obtaining drones has facilitated attacks of terrorist organizations as well. As a result, drones are changing the character of terrorism and obstruct tackling with the terrorist groups. Thus, damages stemming from the use of drones by malicious non-state structures should not be downplayed. Finally, by analyzing reports, statistics and articles in academic literature, this study aims to contribute literature with its projections about the future of UAVs and the proxy nature of them.

Our study will begin with the historical evolution of drones and their current employment. Then the advantages and disadvantages of UAVs will be analyzed. Aftermath, a comparison between drones and proxy wars will be made. Finally, UAVs will be generally assessed before the conclusion. Since UGVs and USVs are less used by armies, both vehicle types will be only briefly mentioned.

1. THE EVOLUTION OF UNMANNED AERIAL VEHICLES (UAVs)

When the first drones or drone-like weapons were began to be used is uncertain. Akyürek (2014: 4) argues that the first drone-like vehicle was invented by Charles Perley, an American scientist, in the late 19th century. It was a balloon carrying bombs and dropping them on troops at a pre-determined time. Then the US Navy could fly a training jet without a pilot for about 80 kilometers in 1917. Efforts for producing an unmanned plane continued and the British developed a gait drone called *Queen Bee* that was used for deceiving the enemy's anti-aircrafts in the 1930s (Cole, 2014). On the other hand, Hitler's Germany produced the first bombarding UAV, V-1, thus moving one step ahead of its adversaries. Armies continued to work on pilotless aircrafts in the 1950s and 1960s. While the US Navy tested a remotely controlled helicopter, land forces deployed UAVs in Eastern Europe (Blom, 2010: 2). Aftermath, during the Vietnam War, the US Army used thousands of drones for reconnaissance purposes. Simultaneously, the Soviet Union was also producing drones and supplying them to its allies. While China was a customer to the Soviets, it later began to develop its drone program through reverse-engineering in the 1960s (Hsu, 2013: 3). The drone it copied was American-made *Firebee,* which it captured in North Vietnam. Hence, deploying thousands of UAVs by Americans in Vietnam led to the emergence of China's UAV program. On the other hand, being on continuous alert against its Arab neighbors, Akyürek (2012: 12) says that Israel entered the market fast and effectively in the 1970s, and used drones in the Yom Kippur War of 1973. Nevertheless, it benefitted from UAVs mostly during the Lebanon War in 1982. In the 1980s, Israelis were even one step ahead of Americans in terms of UAV technology that the US Army got some know-how from Israeli drone producers. When Pentagon re-focused on drones in the 1990s, it ordered drone manufacturers such as General Atomics to develop more sophisticated drones to use for reconnaissance, surveillance, and intelligence (New York Post, 2014). The US began to use its indigenous drones in Bosnian and Kosovan Wars. Yet, none of drones were armed in mentioned wars. The first armed drones appeared in 2001 and were used in

Afghanistan and Yemen (Bergen, et al, 2019). Since then, besides US Army, Israel, China, Turkey, Iran, and as many as thirty more countries have armed UAVs. Interestingly, Russia, which is known for its mortal weapons, lagged behind its rivals. Russians could enter the unarmed UAV market in 2010s and have just begun to develop sophisticated armed drones as of 2019. Yet, their brand new drones in the testing process show that they may catch up with other countries quite soon.

There are various statistics about numbers and economics of drones. According to Kasapoğlu and Kırdemir (2018), the number of American UAVs rose from 170 in 2001 to over 14.000 in 2014. In addition, the number of manufacturers was around 200 in 30 countries. While top sellers are the United States, China, and Israel, top buyers are the United Kingdom and India (Bergen, et al, 2019). As opposed to 20 drone types in 1999, there were more than 600 types in 2019, including civilian ones (Balkan, 2017: 15). Among the top 10 combat drones, besides US-made drones, China, Turkey, Israel and the UAE each has one model (Army Technology, 2019). Besides 90 countries that possess armed or non-armed UAVs, non-state actors and terrorist organizations such as Houthis, ISIS, PKK, Al-Nusra, Hezbollah, Hashd Shaabi, Syrian Rebels, Libyan Rebels, Russian Rebels of Ukraine, FARC, and so many other groups own drones and have actively used them in terrorist attacks. According to Bakeer (2019), Hezbollah alone had 200 drones, given by Iran or locally produced, including civilian ones. We should note that drones can be easily armed by loading bombs. Therefore, it is difficult to make a difference between armed and non-armed drones. Regarding the economics of drones, the UAV military market is expected to have a revenue of $13 billion by 2025 (Woodhams, 2018: 5). On the other hand, non-military drone market size is around $5 billion and is expected to reach $15 billion in the next decade (Reuters, 2019). The US Department of Defense (DoD) alone allocated $10 billion for UAVs and associated technologies in its 2019 budget and the amount is expected to rise year on year (Miller and Chadwick, 2018: 13). In addition, Israel's export revenues from drone sales between 2005 to 2015 were estimated to be $5 billion while China generated $7 billion revenue from military and non-military drone sales. In general, military and civilian drone market is projected to have $30 billion by 2030. As total revenue is the accumulation of prices of drones, the cost of each UAV is decisive on the drone market. For example, the price of MQ-9 Reaper is around $14.5 million, RQ-4A Global Hawk $220 million, Israeli Heron UAV $10 million, Chinese Wing Loong II $1 million, and Turkish Bayraktar TB2 $3 million. On the other hand, terrorist organizations such as ISIS preferred to use cheaper drones whose prices start from $600.

Yet, additional equipment such as munitions and better quality cameras raise their prices. Besides, analysts are doubtful that drone prices will remain low since the more drone technology advances, the more its cost increases as the new sophisticated equipment are expensive (CSS, 2010: 3). Therefore, it is likely that some countries may not afford to procure advanced UAVs due to their prices.

Besides their technology, the type of UAVs is also important for their functions and prices. The below table shows the classification of UAVs.

Table 1: UAV Types

Type	Weight (kg)	Range (km)	Altitude (m)	Endurance (hour)
μ (Micro)	< 5	< 10	250	1
MINI (Mini)	< 20/25/30/150	< 10	150	2
SR (Short Range)	50-250	30 - 70	3000	3-6
MR (Medium Range)	150-500	70 - 200	5000	6-10
MRE (MR Endurance)	500-1500	> 500	8000	10-18
LALE (Low Altitude Long Endurance)	15-25	> 500	3000	24-30
MALE (Medium Altitude Long Endurance)	1000-1500	> 500	5000-8000	30-48
UCAV (Unmanned Combat Aerial Vehicle)	>1000	+/- 1500	12000	2
HALE (High Altitude Long Endurance)	2500-5000	> 2000	20000	24-48

As the table shows, various drones are flying overhead to 20 km altitude. In case of drone wars, one factor, but not the least, that will be decisive in victory will be the types of drones used. Thus, countries with more advanced drones will be more advantageous in the war. However, possessing sophisticated UAVs will not be enough as anti-drone defense systems are developing fast (see below).

Meanwhile, armies are trying to develop unmanned ground (UGV), surface (USV) and underwater (UUV) vehicles to minimize their risks and costs. The first attempt to produce a UGV was launched by Pentagon in the late 1960s. While the first UGV called 'Shakey' was a failure, the know-how obtained from it was used in civil industries like mobile robots (Gage, 1995: 2). Yet, many armies possessed UGVs in 2010s thanks to the developing technology such as GPS (Jasth, et al, 2018: 13189). According to Pomes (2008: 89), the US Army employed thousands of UAVs and UGVs in Iraq in 2008. On the other hand, the duties that UGVs are expected to do vary from

army to army. For example, the US Army focuses on self-driving trucks for logistical purposes. In contrast, Russians try to produce combat UGVs to reduce the number of casualties (Gao, 2018). In general, UGVs are used for military duties such as reconnaissance, surveillance and even combat (Nguyen, et al, 2009: 6). As for USVs, unlike other unmanned vehicles, they are new and have limited functions such as observation and mine countermeasures (Savitz, et al, 2013: xiv) (Yan, et al, 2010: 452). In addition, only semi-autonomous USVs are in use due to some numerous challenges (Liu, et al, 2016: 1). Currently, the market is dominated by American manufacturers and mostly the US Navy uses them. By the way, US Navy requested $628.8 million from the Congress to buy three unmanned ships "being 180 feet to 300 feet in length and having a full load displacement of about 2.000 tons (CRS, 2019). It is also known that the US Navy is working on a 50-meter-long ship with 4500 nautical miles range (LaGrone, 2019). This shows that more USVs will be used in the future by the US Navy, and such a move will probably provoke other countries to invest in them.

2. ADVANTAGES AND DISADVANTAGES OF UAVs

Since there are many benefits of UAVs for militaries, more states have begun to produce or procure them. If advantages of drones are listed, the following brief list will come into being;

- The production and procurement of drones are cheap. Thus, any state and even non-state can own them with a small budget except for those more sophisticated types that are quite expensive to buy.
- A ground operator can steer more than one drone, thereby reducing the number and the cost of personnel. Since the UAV is pilotless, there is no death risk for pilots. Besides, it reduces the cost of reconnaissance and intelligence, which previously required the live presence of personnel in enemy territories or the flight of manned aerial vehicles (Bone and Bolkcom, 2003).
- UAVs can fly over places where there is the risk of radioactive, biologic or chemical diffusion like Fukushima (Nolin, 2012: 2).
- The cost of training a UAV operator is less than that of a pilot.
- Drones fly at 60.000 feet altitude and endure 48 hours or more. Whereas, a pilot, who is bounded with fatigue, eating, relieving and drinking, can not stay so long (Heatherly, 2014: 28). New developments show that drones endure more thanks to the advancing technology and the capability of fueling in the air by tankers. Besides, real-time surveillance enables identifying the right target (Davis, et al, 2014: 11)

- UAVs cause more psychological distress among enemies due to invisible and sudden attacks (International Human Rights And Conflict Resolution Clinic (Stanford Law School) And Global Justice Clinic (Nyu School Of Law), 2012).
- With technological developments, the range and the payload of UAVs have increased. While drones can conduct overseas operations through satellite communication, more weapons are loaded to them.
- Drones have temporal dominance. Since they continuously monitor the target, they can attack whenever they want (Zegart, 2017: 22). This is not the case for manned fighters as pilots have limited time to find and attack the target.
- Drones are beneficial particularly in asymmetric wars. For instance, Turkey claims that while it killed 1.891 terrorists between 2009 and 2015, after using armed drones, the number between 2015 and 2019 rose to 15.647. Yet, it should be noted that the Turkish army fought and killed many of them when it intervened in Syria, where terrorist groups were fighting in the front instead of guerilla tactics. However, the contribution of drones for Turks should not be underestimated. Since being used by the Turkish army effectively, the PKK, a Kurdish separatist designated terrorist group, was almost paralyzed in Turkish territories.
- Perhaps, one of the best benefits of UAVs is the average cost per flight hour. As the below table shows, manned fighters are 10 times costly than UAVs. Global Hawk should be regarded as an exception since it is equipped with state of art hardware and software that can screen 100.000 km2 a day.

Table 2: Average cost per flight hour

Aircraft	Per Hour Flight Cost
F-22	$33.500
F-35A	$28.400
F-16	$8.000
F-15C	$23.000
Blackhawk helicopter	$5.200
Predator B	$3.200
TAI Anka	$1.000
Global Hawk	$30.000

On the other hand, UAVs also have burdens and limits on users. Some disadvantages can be listed as follow;

- While drones reduce the risk and the cost for soldiers such as pilots, they increase the number of civilian casualties. The number of top-level targets killed in drone attacks such as leaders and commanders of terrorist groups is as low as 2% while the majority of total casualties are civilians (International Human Rights and Conflict Resolution Clinic (Stanford Law School) And Global Justice Clinic (Nyu School of Law), 2012).
- The physical distance between drone operators and targets make killing easy and merciless as casualties do not cause a psychological warning in conscience. Some people associate drone warfare to PlayStation games, asserting that killing with drones dehumanizes operators (Shkurti, 2016: 62).
- There is also the allegation that wars become permanent with drones as the military and politicians will feel no public pressure on themselves since casualties force policymakers to end the war. Yet, if there are no casualties and the war has little impact on the budget, fewer people question drone warfare. Hence, there is no difference between peacetime and wartime.
- Drones also changed the character of terrorism, which is termed as 'innovative terrorism' (Balkan, 2017: 7). Since terrorist groups can obtain drones and arm them, it has become more difficult to stop their attacks. In line with this, more high-level people have been killed and more important facilities have been assaulted by terrorist groups and non-state actors. For instance, Saudi Aramco's facilities had been attacked in September 2019, causing an increase in oil prices and a high cost to the Saudi government.
- Drones do not have self-defense systems. Thus, they can be downed if intercepted. Drone producers are working on such systems but anti-drone technology is one step ahead of drone technology. In addition, operators rarely detect threats around drones since they are far away.
- UAVs can not fly in bad weather conditions when compared to manned jets.
- Drones are vulnerable to cyber-attacks. In other words, it is possible to control an enemy drone by accessing its software and use it against the possessor.
- Drones are becoming more expensive due to the newly introduced technologies. Hence, more benefits come with more costs.

- Their capabilities are not as good as those of manned aircrafts. For example, they are slower and can not make tactical maneuvers.
- Because of their low cost, small size and some other advantages, their misuse is more likely than manned aircrafts (Boulanin and Verbruggen, 2017: 123). In association with that, there are no legally binding regulations for the use of armed drones (PAX, 2017: 1). Thus, their illegal use goes unpunished.
- The accident rate of drones is 100 times higher than manned aircrafts (Bone and Bolkcom, 2003).
- Drones cause strain in communication systems as they need much bandwidth. For example, the bandwidth Global Hawk used during the Afghanistan War was five times bigger than all US forces used (CSS, 2010: 2).
- Since the majority of victims are noncombatants, people get radicalized against the attacking country. Civilians incur psychological trauma and anxiety due to drones. Hence, it is not a coincidence that most of the Pakistani people have negative views about the United States[2].

3. UAVs AS PROXY WEAPONS VS PROXY GROUPS

Human beings have always used tools to kill each other from the beginning of history. For instance, the first tools were stones until sharp metallic ones were developed. In addition, armies began to use horses, elephants, camels, and some other animals to facilitate their combat. When guns were invented, the character of weapons and warfare changed as enemies could be killed from far distances. From another aspect, rifles were seen deceptive, immoral and dishonest. In the early years of the invention of rifles, a Turkish poet said in one of his poems that "There has been no bravery/manhood since the iron with a hole (rifle) was invented", implying that those using rifles escape from a face-to-face fight, thus being coward. With the invention of engines, vehicles such as cars, tanks, ships, and aircrafts were introduced to battlefields, thus wars became more destructive. Then missiles described as 'not repeatedly used unmanned weapons' were invented, minimizing the death risk of their launchers. Finally, UAVs were developed in the second half of the 20th century. With the beginning of the 21st century, thanks to the developments in communication systems, drones became widely used by militaries as well as various groups including terrorist organizations. Briefly, manhood surrogated the duty of killing to tools, animals, and weapons while simultaneously distancing themselves from each other in wars. From another perspective, there was an evolution from 'men with weapons' to 'weapons without men'. If the process

[2] The US conducted drone attackts from 2004 to 2018 in Pakistan.

continues as it is, we will talk about ‘weapons against weapons’ in warfare soon.

Broadly speaking, unmanned military vehicles look like proxies of weapons and troops. Mumford (2013: 11) argues that “Proxy wars (conducted by proxy groups) are the indirect engagement in a conflict by third parties wishing to influence its strategic outcome”. Likewise, UAVs resemble proxy groups in many aspects. However, before comparing similarities, this study does not argue that (armed) UAVs carry all characteristics of proxy groups. There are indeed differences. For instance, drones have no will of accepting or refusing proposals of the principal. In addition, even a spear can be assumed as a proxy since it facilitates the job of warriors. Yet, drones are still proxies in terms of financial costs, casualties, effectiveness in assymetric wars, so on.

If we compare proxy groups with UAVs that we call proxy weapons, first, in wars of proxies, there is a principal and a dependent proxy state or group that fights with the support of the former. The principal does not send troops to the battlefield except for training purposes or logistics. Therefore, since proxy army fights, the principal minimizes its casualties and lowers its risks. Similarly, regarding armed drones, an army or intelligence service does not have to send its personnel to gather information in the adversary's territories. Nor it has to send fighters to bomb enemies. Because the fighter might be downed and the pilot might be killed. Instead, UAVs are sent to fulfill the duty of classical fighters. In addition, second, losing a 100 million USD fighter like F-35 is an unbearable loss and damages the prestige of the possessor. Therefore, sending (armed) drones on behalf of fighters and bombardiers is more reasonable as, in this way, the cost of the duty is reduced. Third, both proxy groups and proxy weapons prolong wars and blur the line between peacetime and wartime. Since war costs are low and there are few casualties, decision-makers are not in a hurry to end the war, thereby maintaining the war has no effect on domestic politics. This is the case for the use of UAVs as well. Particularly, during asymmetric wars, killing terrorists with drones even increases the popularity of politicians and nobody questions how long the war will continue. Fourth, while the principal hides behind the proxy, thereby immunes itself from any legal and moral accusations, drones open an escaping door from any charges as the UAV operations are generally secretly conducted. Therefore, both proxy groups and weapons have a problem of legality and legitimacy.

In association with illegality, fifth, civilian casualties are more than high-level targets. Unfortunately, non-accountability ignores targets, and a holistic war strategy against the adversary is adopted during the war. Sixth, because of similarities with proxy groups, proxy weapons might be used more in proxy wars as they are complementary to each other. In this way, the cost of war will be lowered. For instance, it is in the interest of the US Army to support its proxies against terrorist groups with UAVs and UGVs. Seventh, proxies, regardless of being a group or a weapon, are no different

than properties, as the principal is the owner of the weapons or does not use its troops in the war. Therefore, they are cheap, sacrificial and replaceable, thus their loss is not of much concern. Eighth, where there are proxies, there is no confrontation. While the principal opts for proxies to avoid a confrontation in particularly a third country, proxy weapons, namely UAVs, are employed not to combat the enemy directly. Ninth, proxies are harmful if the connection is lost. As for proxy groups, they may be hired by other states, turn against the principal or evolve into a terrorist group. This was the case when Al Qaeda separated from the United States. On the other hand, if the enemy captures proxy weapons, it might copy them with reverse-engineering. This is how China developed its UAV program by capturing a US drone. Moreover, Iran has drones very similar to US drones, which it got by downing it in its air space.

4. THE FUTURE OF MILITARY UAVs

Security analysts claim that the next generation fighters (from the 6th generation onwards) will be unmanned. US Navy Secretary Ray Mabus said in one of his speeches in 2015 that F-35 Joint Strike Fighter will probably be the last manned aircraft they will ever buy (Zegart, 2017: 2). For this goal, the US Department of Defense has already got some unmanned jets produced to some aircraft manufacturers. For example, Northrop Grumman's combat aircraft X-47B and Boeing's unmanned tanker MQ-25 are the results of this policy. On the other hand, China copied X-47B to produce its combat drone. Besides, Russian air forces' new stealth drone performed its first flight on September 2019. Turkish producer TAI is also equipping its Anka drone with air-to-air missiles. Such developments prove that the new generation drones are faster (more than 1000 km per hour) and have a longer range (3000 km). They also have as much as 1.5-ton payload and can fight with enemy drones and other aircrafts in the sky besides dropping bombs. Therefore, if the developments continue at the current level, skies will be dominated by unmanned fighters in the next decades.

However, there are various views about the contribution, functions and the position of UAVs in air forces. As also this research argues, drones are evolutionary more than being revolutionary (CSS, 2010: 1). For a weapon platform to be revolutionary, it must precede its predecessor and have more advanced capabilities. Currently, drones fulfill only some limited functions of fighters, and there is much time to replace manned aircrafts. For example, while drones are good at reconnaissance, intelligence gathering and surveillance, they lag behind fighter jets in terms of speed, payload, fighting skills, defense systems, and so on. When a drone is intercepted by radar, it has very little chance to escape from the other side's missiles. Even terrorist groups are capable of downing many of drones at the moment. Perhaps, in the future, drones will have a more sophisticated technology that will screen threats around itself but since anti-drone defense systems are used by humans, an unmanned vehicle will rarely be able to escape from shots.

Overall, the defense capacity of drones is weaker than its attack capacity. In addition, air-defense systems are developing faster than drone technology. You may have the best drone in all terms but it may turn into debris by a very old missile produced in as back as the 1960s. For example, Iran downed a 220 million USD Global Hawk at a 55.000 feet altitude over Hurmuz Strait with its indigenous 'Khordad 15' missile, whose cost is probably less than $1 million. Moreover, this example shows that drones are less efficient in symmetric wars but rather doing well in asymmetric warfare where there are poor air defense systems. It is reasonable to use armed drones against terrorist groups and weak states as they do not have air defense systems. That is why the US used UAVs to kill Al Qaeda and ISIS militants in Afghanistan, Somalia, and Yemen. However, the same US drones can not conduct similar operations in a relatively strong country like Iran as they will be shot. What is more, it allows the adversary to copy the state of the art drone. Furthermore, as mentioned above, the more drones become sophisticated, the more their technology becomes expensive. Some drones already cost more than $200 million, e.g. Global Hawk. While such drones are quite beneficial, their being defenseless makes them vulnerable against enemy fire. Perhaps, they may be protected if they are stealth but even such a single feature costs millions of dollars. Therefore, production costs are significant for drone projects. There are rumors, for example, that US Navy's X-47B drone project might be abandoned permanently just because of its costs, which is $405 million per unit. The cost will probably decrease during serial production but the drone will still be expensive. Moreover, the emergence of drones in the war field does not make the world more secure. Sometimes it even causes a more insecure environment as they end up in the hands of the terrorist groups. In other words, drones are not pure beneficial and peaceful. As mentioned above, since they prolong the war, whether they should be used or not might be discussed more in the future. Furthermore, when all sides (countries) have the same weapons, their benefit decreases. As there is a race to produce better drones not only between superpowers but also middle powers, it may not be possible to utilize from the advantages of having drones that will have more or less the same capacity and capability. Therefore, drones may not feature as the top actor but quite a conspicuous actor in a supporting role.

Consequently, as findings, we can argue that one reason for opposing the idea that (armed) drones are not the game changers is that being unmanned is an advantage as well as a disadvantage. If we simply compare a man (human being) with a (semi)-autonomous drone, we can see that the man is cleverer and stronger than a man-made drone. Therefore, except for asymmetric wars, in fact, unmanned drones are fighting against men. What is more, men have air-defense systems such as missiles, against which drones have less chance to escape. In other words, in current wars, there are men with advanced weapons on one side, and drones without men onboard on the other side. Probably, there will be UAVs on both sides in the future

but such an evolution will turn warfare into a dehumanized video game. Therefore, drones' role in warfare will be only a force multiplier both today and tomorrow (CSS, 2010: 1). In other words, they may not be utilized effectively if they are used independently. Instead, operating them as complementary vehicles/weapons to manned vehicles might make them more efficient, and there seems no other option for now. Meanwhile, precision-guided munitions and cruise missiles may still prevail as the most important unmanned weapons of the future. At the moment, missiles can not be repeatedly used due to their technology. Yet, if their flying and endurance capabilities are improved, they may loiter for long periods, and speed up or slow down at any time. If it happens, then the duty of UAVs and ordinary jets might be to carry such missiles or munitions and launch them without crossing the air space of the enemy. Perhaps, that is why some analysts argue that it will be better for the defense industry to develop more sophisticated missiles and dedicate more budget for their R&D.

However, despite that drones are not revolutionary, their benefits should not be downplayed. Even if they are more influential in asymmetric wars, armies need vehicles and weapons that will bring victory in the end. In addition, thanks to drones, terrorist groups are attacked in their caves and many terror attacks are prevented before happening. Also, they help fighters by (1) marking which location to bomb or (2) carrying out attacks that will be costly if manned jets are used, thereby undertaking some duties and co-operating with manned aerial vehicles. The next step should be to prevent their misuse by terrorist groups and states through legal regulations and control their sales. If the producer states can permit sales of non-armed drones only on certain conditions, they may not end in the hands of terrorists or states with a bad record of human rights. As discussed above, most of the victims of drone attacks are civilians. This shows that the advanced technology that is developed for the well-being of human beings are used for their deaths. Thus, like the invention of planes and nuclear energy, drones should not be tools that destroy humans, either.

Conclusion

This article explained the evolution of UAVs in detail and proposed two hypotheses; (1) armed drones have similar functions as proxy groups, and (2) they are evolutionary but not revolutionary, i.e. not game-changers. In conclusion, the article suggests that while civilian drones are facilitating people's life, armed drones are helping armies to defeat their enemies on the battlefield. Yet, while civil-use drones are beneficial in almost all terms, military UAVs, besides their benefits, also create and trigger new problems when employed in warfare. Drones are distinctive due to being unmanned or uninhabited, thus they save the lives of soldiers. However, somebody is killed at the end of the course and most of them are civilians. Therefore, it is the possessor of drones that enjoys the benefits of drones while civilians are unfairly killed together with high-level targets. From another perspective,

drones are a phase in the evolution of aerial military equipment. They are not literally game-changers but a good player in the game. Their efficiency will increase not when used independently but when used in coordination and together with other vehicles. Since they are unmanned, theh look like proxy weapons as they are surrogates of more expensive manned jets. However, like proxy groups, proxy weapons are not decisive for winning wars. Besides, they even prolong wars and create a continuous state of wartime. Finally, this study claimed that since armed drones have a supporting or complementary role, the defense industry may divert to new ways to find more decisive weapons. On the other hand, as air defense systems are an antidote to attacking weapons, defensive technology should not be ignored.

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