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Drones' contribution to the transformation of contemporary warfare

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Abstract: The introduction of unmanned aerial vehicles (UAVs) in contemporary battlefields constitutes a transformation in warfighting. The consequences of such an innovation can be traced not only to the level of strategy but also in political, economic as well as ethical terms. So far, UAVs have demonstrated decisiveness in non-military contested environments and in conflicts that involve failed states. UAVs, however, have been proved to be militarily effective, but not militarily decisive in conventional wars. Simultaneously, a series of limitations makes over-reliance on them to look faulty. Time will tell whether their further technological advancements will be able to revolutionise the conduct of war.

Keywords: war, UAVs, strategy, effectiveness, limitations, potential

1 Introduction

There is no doubt that the successful incorporation of a new technology in the conduct of war triggers developments in a series of domains that do not encompass only military but also political, economic, legal, societal, technological as well as ethical and philosophical aspects. Undeniably, the introduction of drones in contemporary warfare is such a case. It has already being argued that drones will 'revolutionise' the conduct of war,[1] that they 'mark a substantive shift in war fighting'[2] and that they constitute 'a turning point in military history.'[3] As a result, their introduction in contemporary battlefields is depicted as parallel to that of airplanes, submarines and tanks. Within this context, war structure is expected to change as well as its strategies and procedures. But is this the case in reality?

It is indeed true that the successful use of drones in the wars in Iraq, Libya, Syria, Nagorno-Karabakh and, to a certain extent, Ukraine highlighted their potential for a drastic transformation in the conduct of war. At the same time, the aforementioned examples pointed out to states or other international actors that do not so far possess drones and that they will be left at a disadvantage, if they do not do so. After all, 'military organizations that did not adapt in a rapidly changing, highly competitive environment have declined, often quite quickly.'[4] In other words, a domino effect of continuous advancements in drones and in anti-drone technology is expected in the years ahead.

As a result, this study provides a general overview of the consequences of the introduction of drones in contemporary battlefields. By focusing on the study of unmanned aerial vehicles (UAVS), this study argues that regardless of whether they have been militarily effective or militarily decisive undeniably is transforming the way modern-day war is being fought. In this context, the UAVs' impact in political, economic, strategic, ethical and technological terms is evaluated before presenting not only their great potential but also their demonstrated limitations.

2 Definitions and historical evolution

Drones of military use are referred to unmanned vehicle battlefield systems in air, space, sea or land. Those systems are not 'unmanned in the sense that human beings are not in the decision or control loop. Rather, "unmanned" here

1 Glade, D. (2000). UAVs: Implications for military operations, occasional paper No. 16. Center for Strategy and Technology, Air War College, Maxwell Air Force Base, VII.

2 True, D. (2014). Disciplining drone strikes: Just war in the context of counterterrorism. In: Bergen, P., & Rothenberg, D. (eds.), *Transforming Conflict, Low and Policy*. Cambridge University Press, pp. 285–299, p. 285.

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3 Frantzman, S. (2021). *Drone Wars: Pioneers, Killing Machines, Artificial Intelligence, and the Battle for the Future*. Post Hill Press, USA, p. xv.

4 Krepinevich, A. (2008). Cavalry to computer: The pattern of military revolutions. In: Mahnken, T., & Maiolo, J. (eds.), *Strategic Studies: A Reader*. Routledge, pp. 364–376, p. 364.

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refers solely to "remote-piloted," in which the pilot and weapons controllers are not physically on board.'[5]

Undoubtedly, currently, aerial drones are the most developed and advanced amongst drones. However, there is also ongoing development of drones utilised at sea and at land. Thus, a series of countries are already developing offshore patrol vessels (OPVs) or unmanned surface vehicles (USVs).[6] At the same time, unmanned ground vehicles (UGVs) are already in use.

Given the widespread use of aerial drones, this study will focus on their analysis. According to the US Department of Defense: 'Unmanned aircraft is an aircraft or balloon that does not carry a human operator and is capable of flight under remote control or autonomous programming, while an unmanned aircraft system is the system whose components include the necessary equipment, network and personnel to control an unmanned aircraft.'[7]

As Ian Shaw[8] points out, the historical emergence of military drones can be traced back to the 18th century. In 1849, for example, the Austrians used 200 pilotless balloons containing bombs against the City of Venice. Less than 2 decades later, in the US Civil War, both sides used balloons for reconnaissance missions. 'The advantage of balloon reconnaissance was that it gave bird's eye view of the area, allowing scouts to see and detect the enemy miles away.'[9] Also, in the 1898 Spanish–American War, the US military fitted a camera to a kite, producing one of the first aerial reconnaissance photographs.[10]

Drones were also used during Second World War (WWII). The German V1, also known as flying bomb, is an early representative example of a 'kamikaze' UAV. Despite the fact, however, that in the 20th century 'the first major combat use of UAVs was during the Vietnam War',[11] it was not until 1982, when Israel successfully used UAVs to face Syrian air defence in Lebanon, which lead defence analysts like Robert Frank Futrell to claim that this was 'tomorrow's war.'[12] In that war, real-time videos of Syrian air defence were sent back by Israeli drones, and the Israeli air force went back and destroyed them.[13] Drones were also used in the Gulf War in 1991, to help with naval targeting and further intelligence collection. They were also used for similar tasks in Bosnia in 1994, and in Kosovo in 1999.[14]

3 The weaponisation of UAVs

The main use of drones until that time was for surveillance, intelligence, reconnaissance, post-strife surveillance, acting as decoys and conducting electronic interceptions. But 'these decoys, targets, and surveillance had never transformed war'.[15] On the contrary, it is widely argued that the transformation of war is taking place since drones were armed, meaning that they acquired lethal capabilities. The USA, within the context of its war on terror, was the first country in 2001 to weaponise drones and many other countries followed. Since then, there is an 'Unmanned Revolution' that is taking place.[16] By 2020, there were more than 20,000 military drones in use around the world.[17]

From June 2005 to June 2006, for example, the US air force being the first to regularly conduct drone strikes, by using the 'Predator' UAV carried out 2,073 missions, following 18,490 targets and conducting 242 attacks.[18] In

5 Andesron, K. (2010, 23 March). Rise of the Drones: Unmanned Systems and Future of War, Written Testimony Submitted to Subcommittee on National Security and Foreign Affairs, Committee on Oversight and Government Reform, US House of Representatives. Subcommittee Hearing. 111th Congress, 2nd Session.

6 See, Vivenot, E. (2011, December). Drones navals. Systems en service et a l etude, Défense et Sécurité Internationale, No. 76.

7 US Department of Defense (2010, 8 November), Joint Publication 1-02, DOD Dictionary of Military and Associated Terms, Available at http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf [accessed 27 March 2014], p. 278. In more detail a UAS is comprised of an unmanned aircraft (UA), payload, human operator, control element, display communication architecture, life cycle logistics, and the supported Soldier. Quoted in *U.S. Army Unmanned Aircraft Systems Roadmap 2010-2035*, (2010), Available at https://rosap.ntl.bts.gov/view/dot/18249 [accessed 5 March 2022], p. 1.

8 Shaw, I. The Rise of the Predator Empire: Tracing the History of US Drones, Understanding Empire, Available at https://understandingempire.wordpress.com/2-0-a-brief-history-of-u-s-drones/ [accessed 20 February 2022].

9 Chan, H. Civil War Ballooning: The First U.S. War Fought on Land, at Sea, and in Air, Available at https://www.faa.gov/sites/faa.gov/files/about/history/pioneers/Civil_War_Ballooning_Article.pdf [accessed 3 November 2023].

10 Shaw, I. Ibid.

11 Derek, G. (2011). From a view to a kill: Drones and late modern war. *Theory, Culture and Society*, *28*, p. 189.

12 Futrell, R. F. (1989). *Ideas, Concepts, Doctrine, Basic Thinking in the US air Force 1964-1984*, Vol. II, Air University Press, Maxwell Airforce Base, December 1989, Alabama, p. 556.

13 Frantzman, S. (2021) Drone Wars: Pioneers, Killing Machines, Artificial Intelligence, and the Battle for the Future,Post Hill Press, USA, 2021, p. 6.

14 Ibid. pp. 9–10.

15 Ibid. p. 13.

16 See Stulberg, A. (2007). Managing the unmanned revolution in the U.S. Air Force. *Orbis*, *51*(2), pp. 251–265.

17 Frantzman, Drone Wars, p. xv.

18 Frantzman, Drone Wars, p. 43.

addition, by 2006, there were 32 countries developing drones, and there were more than 250 models.[19]

The transformative effects in the conduct of war by the introduction of armed UAVs were demonstrated in several cases. In May 2019, for example, Iran used a swarm of 25 drones that flew 650 km, combined with cruise missiles, to attack the United Arab Emirates' Abgaia oil facility. The Iranian UAVs hit their target despite the fact that this particular oil facility was protected by a patriot battery, an Oerlicon GDF 35-mm cannon with Skyguard radar and a French Crotale Shahine system. As a result, 5% of the world's oil supply was disrupted. This was the first use of a swarm of drones in the battlefield.[20]

Two more cases were the recent Azerbaijan–Armenian conflict in 2020, and the Turkish–Syrian engagement in the province of Idlib in the same year. In both these conflicts, the UAVs were able to destroy targets immediately after detecting them. As far as the first conflict is concerned, the effective and innovative use of drones by Azerbaijan enabled it to win the war in 6 weeks. In this particular conflict, the effects of the use of drones at all levels of strategic analysis, such as technical, tactical, operational, theatre and high strategy, became apparent.[21] As Shaza Arif points out:

> *This decisive role of drones has exposed the vulnerability of ground forces, expensive tanks, large artillery guns and even air defense systems. Drones have also emerged as effective and low cost SEAD (Suppression of Enemy Air Defenses) platforms against low-to-mid range air defenses. They have also proven their worth in intelligence gathering, psychological operations and propaganda in military conflicts. Such platforms not only enabled timely battlefield damage assessment, but timely sharing of videos and pictures of Armenian military equipment being destroyed, and shown on electronic and social media also helped raise the national and military moral of Azerbaijan.*[22]

However, as Antonio Calcara et al. argue, the great success of UAVs in the Azerbaijan War against Armenia is mostly due to the superiority of the Azeri army. In particular, they present three main reasons for this success. First, the lack by the Armenians of a layered integrated air defence system. Second, the lack of the necessary skills by the personnel of the Armenian military forces. Third, the obsolescence of the Armenian surface-to-air missile batteries.[23]

Alongside the reasons on which the military defeat of Yerevan is attributed, what is of great importance is that the use of drones in this particular conflict played a decisive role in the outcome. The 'Azerbaizani UAS' high-operational tempo destroyed more than 40 Armenian main battle tanks (mostly T-72 variants), more than 15 infantry fighting vehicles and armoured personnel carriers and more than 30 pieces of multiple-launch rocket systems and artillery systems.'[24]

As far as the second conflict is concerned, from 27th February to the 5th March 2020, Turkey was involved in a war against the Syrian Army in the Idlib province. The province of Idlib covers an area of 4,054 square kilometres. During that conflict, Turkey successfully used swarms of UAVs operated within its territory. As a result, it managed to gain the control of the airspace of the aforementioned province. Simultaneously, in this particular conflict, Ankara, managed to destroy targets such as soldiers, weapons systems and infrastructure, immediately after detecting them.

> *'Within almost a week, the Turkish military, predominantly drones in kinetic strikes and ISTAR (intelligence, surveillance, target acquisition and reconnaissance), eliminated some 3,136 Syrian regime manpower, 151 tanks, 47 howitzers … 8 air defense systems, 52 multiple rocket launchers, 12 anti-tank weapons, 24 armored personnel carriers, 27 armored combat vehicles, 34 armored pick-ups and 4 mortars.'*[25]

Nobody can claim with certainty that Turkey, despite the fact that it carried out these missions against poorly equipped adversaries, would have been able to face the challenges of this conflict without the extensive use of armed UAVs. 'The geopolitical aftermath of the conflict in the Idlib de-escalation zone is that Turkey managed to keep Idlip Province under Ankara's control, which would have been impossible without the

19 Ibid. p. 44.

20 For the whole incident and its consequences see Frantzman, S. (2021) Drone Wars: Pioneers, Killing Machines, Artificial Intelligence, and the Battle for the Future, Post Hill Press, USA, 2021, pp. 109-110. See also Safi, M., & Borger, J. (2019, 19 September). How did oil attack breach Saudi defences and what will happen next? The Guardian.

21 See Luttwak, E. (2003). *Strategy the Logic of War and Peace*. The Beklnap Press of Harvard University Press, Massachusetts.

22 Arif, S. (2021, 27 January). How drones in Azerbaijan won the war against Armenia, center for aerospace and security studies, Available at https://casstt.com/post/how-drones-in-azerbaijan-won-the-war-against-armenia/292 [accessed 30 April 2022].

23 Calcara, A. Gilli, M. Marchetti, R. Zachanini, L (2022, Spring). Why drones have not revolutionized war: The enduring hider-finder competition in air Warafare. *International Security*, *46*(4), pp. 130–171. See also Calcara, A. et.al. (2022). Will the drone always get through? Offensive myths and defensive realities. *Security Studies*, *31*(5), pp. 791–825.

24 Casapoglu, C., & Ozkarasahin, S. (2022, April). *Drone Warfare: Drone Wars, Defense Economics and Turkey's Way*. Centre for Economics and Foreign Policy Studies, Istanbul, p. 28.

25 Ibid. p. 26.

use of UAV's.'[26] Furthermore, in this particular conflict, another effective use of UAVs was witnessed. That of 'sniper missions'. 'Aside from traditional strategic or tactical roles, the UAV's were used to conduct so-called "sniper" missions, liquidating targeted groups and specific persons of interest.'[27]

Similar 'sniper' missions were conducted at the beginning of the war in Ukraine by the Ukrainian army against Russian generals in 2022. Undoubtedly another representative example was the assassination in Iraq by a US-armed UAV of the commander of the Iranian Revolutionary Guard Corps Quds Force in 3 January 2020.[28]

From the above examples, a basic consequence that can be drawn is that the division in case of war between a safe zone, a war zone (the points of the conduct of conflict) and an enemy zone due to the use of drones becomes blurred. 'In the case of UAV use, the Idlib episode showed perfectly that soldiers' mind-sets are ruined because from now on, they cannot feel secure in their supposed safe zone with drones sneaking into the rear, striking soldiers, weapons systems, and infrastructure.'[29]

4 The UAV's current status

The aforementioned evolution of drones undoubtedly implies multi-level effects in the conduct of war. Gradually, aerial drones, owing also to their easy use, are becoming holistic defence systems with a great variety of capabilities and strong potential for further improvements.

The UAV's unique Intelligence, Surveillance, Spying and Reconnaissance capabilities are commonly accepted. Their capability of high-altitude flights and extended surveillance in combination with their collecting ability of full-motion video day or night provides military commanders with high-value real-time information.

'The Unmanned Aircraft Systems (UAS) serve as unique tools for the commander, which broaden battlefield situational awareness and ability to see, target, and destroy the enemy by providing actionable intelligence to the lowest tactical levels.'[30] Major O Barclay, the Commander General of the United States Army Aviation Center of Excellence, points out that:

> *We can send a UAS to look down alleys, around buildings in backyards, or on a roof to see what's up there, dramatically increasing soldier protection and preserving the force—a vital force multiplier in this era of persistent conflict.*[31]

Furthermore, UAVs constitute an improved replacement of manned spying aircrafts for broad area surveillance, which were used during the Cold War. Despite the fact that more than 60 years have passed, the memory of the incident of the Soviet air-defence system shooting down an American U-2 spy plane, while performing mission over soviet territory, is still alive. In this Cold War incident, the capturing of the US pilot caused also a great political embarrassment to the United States. Bearing this example in mind, it can be argued that given drones' ability of extended endurance and high-altitude surveillance, their usage will become increasingly paramount. In addition, they do not imply psychological constraints on their users in the same extent as they did with the American U-2 case and, more importantly, in case they get shot down, the life of their "pilot" is not at risk. Despite this, however, a series of recent studies pointed out that drone pilots also 'face important psychological issues which may effect their mental health and operational efficiency'.[32]

It is within this context that the Training and Doctrine Command of the United States prepared a documented entitled 'US Army Unmanned Aircraft Systems-Roadmap 2010–2035' aiming to provide a broad plan for how the American army will develop and employ drones across the full spectrum of operations. According to this document by 2035, "Command, Control and Communications missions as well as 95% of Reconnaissance missions will be provided only by drones."[33]

26 Urcosta, R. B. (2020, 31 August). The revolution in drone warfare: The lessons from the Idlib de-escalation zone. *The Air Force Journal of European Middle Eastern and African Affairs*, Available at https://www.airuniversity.af.edu/JEMEAA/Display/Article/2329510/the-revolution-in-drone-warfare-the-lessons-from-the-idlib-de-escalation-zone/ [accessed 1 May 2022].

27 Ibid.

28 For the legal aspect of this "sniper mission," See, D'Amico, G. (2021, Autumn). The assassination of Iranian general Qasem Soleimani: A case study in the American warfare practice. *Strife*, *15*(16), pp. 71–78.

29 Urcosta, R. B. The revolution of drone warfare, op.cit.

30 *U.S. Army Unmanned Aircraft? Systems Roadmap 2010-2035*, (2010). Available at https://rosap.ntl.bts.gov/view/dot/18249 [accessed 5 March 2022]. p. 1.

31 Quoted in *U.S. Army Unmanned Aircraft Systems Roadmap 2010-2035*. (2010), Available at https://rosap.ntl.bts.gov/view/dot/18249 [accessed 5 March 2022].

32 Saini, R. K., V K Raju, M. S., Chail, A. (2021, October). Cry in the sky: Psychological impact on drone operators. *Industrial Psychiatry Journal*, *30*(Suppl 1), pp. S15–S19. doi: 10.4103/0972-6748.328782.

33 *U.S. Army Unmanned Aircraft Systems Roadmap 2010-2035*, (2010). Available at https://rosap.ntl.bts.gov/view/dot/18249 [accessed 5 March 2022].

In other words, drones are emerging as the defence system of choice for a variety of missions in the years ahead. These missions include not only reconnaissance, surveillance and target identification but also, as the aforementioned examples pointed out, close compact and interdiction attack as well as strike missions.[34]

5 Cost efficiency

Alongside UAV's tactical and operational advantages in the battlefield, their cost-efficiency both in personnel and financial terms also highlights their potential. 'A predator costs $4.5 million and presents little to no risk to personnel while a F-22 Raptor fighter jet approaches $150 million and requires an ample amount of technical experience.'[35] In other words, UAVs are cost efficient compared to military aircrafts, given that their cost of production and operational cost is much lower because they consume much less fuel. Most important perhaps is the fact that they expose their pilots to much lesser risk when compared to conventional military aircraft. Also, their operator's training cost is much lower compared to that of fighter jets, given that it is much easier and faster to learn to flight a drone than a jet. As a result, because also of their cost efficiency, the UAV's employment is bound to increase in the years ahead.

6 Drones and terrorism

What has also been observed over the last 15 years is that non-state actors and insurgents have managed to get access to drone technology and carry out varied missions. This fact is mostly the case with terrorist organisations that have built or used UAVs. This includes the Islamic State of Iraq and Syria (ISIS) and the palestinian Islamic Jihad. A major example is also the Houthis that by 2019, became both drone master-operators. They used suicide drones against Patriot radar and air defence. They successfully evaded Saudi air defence to strike deep into the kingdom.[36] Undoubtedly, the use of drones by non-state actors and terrorist organisations devolved the belief that only hi-tech countries have access to UAVs. Also, ISIS back in 2016, started using drones in Iraq by attaching grenades and warheads to them. ISIS also used drones '¼to monitor their own mortar fire and to make it more accurate and to help guide vehicles laden with explosives.'[37]

On the other hand, however, drones became the main weapon of choice by the United States in its conflict against global terrorist organisations. Afghanistan, Pakistan and Iraq are the main examples where the United States used UAVs to eliminate terrorist targets. Owing to high-altitude flight ability of UAVs in combination with the absence of effective air defence and cyber warfare capabilities by terrorists made the use of UAVs in the war on terror an effective choice.[38]

A report drafted by the Stimson Center in Washington pointed out that the use of UAVs in the war on terror enabled the United States to claim the legal right 'to kill any person it determines is a member of al-Qaida or its associated forces in any state on Earth …'[39] Despite the legal and ethical issues that this fact raises, which will be analysed below, the report recognises the effectiveness and the potential of such a weapon, both on political and operational terms, on such form of war. As the report underlines: 'The seemingly low risk and low-cost missions enabled by UAV technologies may encourage the United States to fly such missions more often, pursuing targets with UAVs that would be deemed not worthy pursuing if manned aircraft or special operation forces had to be at risk'. For instance, according to The Bureau of Investigative Journalism, a non-profit news organisation, the United States has conducted more than 14,000 drone strikes in Afghanistan alone.[40]

34 Ibid, pp. 3–4.

35 Wallestand, J. (2011, 17 October). *Drones: A New Chapter in Modern Warfare*. Institute for Near East and Gulf Military Analysis (INEGMA), Fall 2011, Available at http://www.inegma.com/e-report-detail.aspx?rid=47 [accessed 15 May 2022].

36 Frantzman, Drone Wars, 85, See also Stein, A. (2019, 11 January), *Low-Tech, High-Reward: The Houthi Drone Attack*. Foreign Policy Research Institute, Available at https://www.fpri.org/article/2019/01/low-twch-high-reward-the-houthi-drone-attack [accessed 20 December 2022].

37 Ibid. p. 86.

38 See David, J., & Lahra, S. (2011, December). Are drone strikes effective in Afghanistan and Pakistan? On the dynamics of violence between the United States and the Taliban, Paper No. 6262. Institute for Study of Labor.

39 Abizaid, J. P., (US Army, Ret) & Brooks, R. (2015). *Recommendations and Report of the Task Force on US Drone Policy*. Stimpson, Available at https"//www.stimson.org/wp-conntent/files/file-attachements/recommendations_and_report_of_the_task_force_on_us_drone_policy_second_edition_pdf [accessed 20 December 2019].

40 Quoted in Karyoti, V. (2021, 8 September). 9/11's legacy of drone warfare has changed how we view the military, Global policy, Available at https://www.globalpolicyjournal.com/blog/08/09/2021/911s-legacy-drone-warfare-has-changed-how-we-view-military [accessed 20 December 2022].

7 Facing drone threats

As is always the case with military technology, the introduction of UAVs in the modern battlefield, if it has not been done already, is bound to trigger the development of weapon systems able to interdict them. At the beginning, this does not seem to be an easy task. The examples that were mentioned above indicated that 'a complete defense was difficult because of the size, speed, and material drones are made of.[41]' The major challenge in an anti-drone fight is detecting them. The Saudi Arabia oil field case indicated that lack of 360° of radar coverage was the main reason that made the drone's attack successful.[42] Following from that, electronic warfare, new sensors and improved targeting tech are required to tackle drone threats.[43] At the same time, a cost-efficient approach demands the development of new weapons against drones. Using expensive missiles like Patriots and flying jets and helicopters for their interdiction may be an interim limited solution. The 2016 incident when two Israeli Patriots failed to hit a Hezbollah drone and a jet also missed finding it was a clear indication of the growing threat of drones.[44] It is constantly becoming obvious that more sophisticated and cost-efficient weaponry is required to face a swarm of drones in a complicated battlefield. Given that drones may also be guided by their own optical systems or artificial intelligence, the only choice for anti-drone technology is to shoot them down.

Within this context, the best weapon of choice is to use lasers.[45] Lasers do not require to replenish their ammunition "and aside from negating targets are providing long-range precision sensor capabilities that complement radar and other systems."[46] At the end of the day, 'military technology also reflects process of interaction.'[47] The US Navy has already successfully tried a solid-state laser against a drone.[48] As a result, technological advancements in both drone and anti-drone technology are expected in the years ahead.

8 Post-homer –post-heroic war ethos

At the same time, the introduction of drones in contemporary battlefields is changing not just how wars are fought, but also the politics, economics, laws and ethics that surround war itself.

As far as the ethos of war is concerned, in many respects, it can easily be observed that it is changing and has nothing to do with that described by Homer. Drone operators, for instance, participate in war without having to leave their homes. Their contact with the enemy and their war experience is through the screen of the UAV's control system and, in many respects, resembles the experience of playing a video game. Despite this, however, as the examples of Turkey, Azerbaijan and Iran demonstrated, drone operators became combat-effective and vital part of the battles. As a result, the issues of space, distance and even time are overcome.

In many respects, drone wars are depicting Edward Luttwak's 'post-heroic' form of war given that no man-to-man fights are required, and thus no heroic actions are needed.[49] One basic rational of 'Post-Heroic' form of war is the minimisation of losses. Owing to UAVs and new weapon technology (stealth technology, cruise missiles and satellite surveillance), a combination of strategies of direct and indirect approaches, i.e. diplomatic and economic sanctions together with use of force without resorting to a conventional war that will require the employment of ground forces, is possible. The avoidance of deployment of ground forces minimises losses. In other words, the UAV's war obeys the strategy to 'kill your enemy at least risk to your personnel.'[50]

At the same time, on a political level, this form of warfare reduces anti-war demonstrations and electoral cost for those in power. This is in many respects true, given that western societies have been characterised as

41 Statement by Tal Inbar at the UAV Research Center at the Fisher Institute for Aid and Space Strategic Studies. Quoted in Frantzman, Drones War, 106.
42 Ibid. p. 112.
43 Ibid. p. 107.
44 Ibid. p. 106.
45 Ibid. pp. 109–112.
46 Ibid. pp. 112, 115.
47 Cohen, E (2007). Technology and warfare. In: Baylis, J. (ed.), *Strategy in the Contemporary World*. Oxford University Press, Oxford, pp. 141–160.
48 United States Navy, (2021, 15 December). USS Portland tests high energy laser weapon system in Gulf of Aden, Available at https://www.navy.mil/Press-Office/News-Stories/Article/2873919/uss-portland-tests-high-energy-laser-weapon-system-in-gulf-of-aden/ [accessed 6 November 2023].
49 Luttwack, E. (1995). Post-heroic warfare. *Foreign Affairs*, *74*(3), pp. 109–122. See also Peter, S. (2009). *Wired for War: The Robotics Revolution and Conflict in the Twenty-First Century*. Penguin, USA. Bennjamin, M. (2012). *Drone Warfare: Killing by Remote Control*. OR Books, New York and Enemark, C. (2014). *Armed Drones and the Ethics of War: Military Virtue in a Post-Heroic Age*. Routledge, London.
50 Anderson, K. (2010, 23 March 23). Rise of the Drones: Unmanned Systems and the Future of War. Written Testimony Submitted to Subcommittee on National Security and Foreign Affairs, Committee on Oversight and Government Reform, US House of Representatives. Subcommittee Hearing. 111th Congress, 2nd Session.

'post-war' societies. Societies, in other words, that do not want to get involved directly in any kind of war and also do not want to see their fellow citizens to be killed in various battle fields across the world. As Luttwak notes, '*The one thing that the US officer corps did learn and continues to apply is that US civil society likes lots of military power … but only if not used, or used only in short and victorious wars with few or no casualties.*'[51] This public opinion perception also became apparent during Barak Obama's administration when a great majority of Americans expressed their support for aggressive use of drones overseas.[52] In other words, the use of drones as the weapon of choice in 'postwar' societies increases permissiveness and provides a form of tacit consent for their governments to resort to the use of military force. To put it differently, the incorporation of UAVs to the conduct of post-heroic form of war enables political and military leaders to reach areas politically or practically impossible for their traditional military forces.

In addition, the use of drones enables the reduction of killing of civilians and of causing collateral damages. Precision strikes enabled by the use of UAVs, especially on the war on terror, prevent the unintended death of civilians. As a result, the use of drones is more compatible with the law of armed conflict and its theoretical precepts. 'Just War as justice in war tends to see drones as a moral weapon precisely because of its comparative advantage in distinguishing between combatants and non-combatants.'[53]

9 Criticism limitations

Despite the fact, however, that drone technology has been characterised as a 'humanitarian step forward'[54] due to its contribution to the elimination of losses and of civilian casualties, there were instances that this was not the case and various ethical as well as legal issues have been raised. There were several cases that have asserted that drone attacks have erroneously killed or injured civilians on too many occasions. According to the aforementioned 2015 Stimson Center report for instance, 'between 2004 and 2014, US UAV strikes in Pakistan are estimated to have killed approximately 2,000 to 4,000 people, while US strikes in Yemen are estimated to have killed several 100 people.'[55]

Alongside the ethical aspect of the collateral damages caused by UAVs, this fact undoubtedly raises legal issues as far as an armed conflict and humanitarian international law – the set of laws governing armed conflict – is concerned. The President of the International Committee of the Red Cross (ICRC), which deals with the armed UAVs, claims that '… while drones are not unlawful in themselves, their use is subject to international law.' As a result, this legal fact implies also the responsibilities of drone operators: 'the fact of their being 1,000 km away from the battlefield does not absolve drone operators and their chain of command of their responsibilities, which include upholding the principles of distinction and proportionality, and taking all necessary precautions in attack.'[56]

Within this context, Amnesty International while investigating allegations of violations of international humanitarian law because of the death of innocent civilians by US drone strikes in Pakistan argued that: 'Based on its review of incidents over the last 2 years, Amnesty International is seriously concerned that these and other strikes have resulted in unlawful killings that may constitute extrajudicial executions or war crimes.'[57] On the other hand, the United States claims that its drone operations are based on reliable intelligence, are extremely accurate and that the vast majority of people killed in such strikes are members of armed groups such as the Taliban and al-Qaida.[58]

At the same time, operational limitations of drones have been pointed out in many occasions by various military experts and analysts. Cloudy skies and bad weather

51 Luttwack, E. Post-heroic warfare and its implications, p. 132.

52 See Brown, A., & Newport, F. (2013, 24 March). In U.S., 65% support drone attacks on terrorists abroad, Gallup.com, Available at http://www.gallup.com/pol/161474/support-drone-attacks-terrorists-abroad.aspx [accessed 22 December 2022].

53 True, D. (2014). Disciplining drone strikes: Just war in the context of counterterrorism. In: Bergen, P., & Rothernberg, D. (eds.), *Drone Wars, Transforming Conflict, Law and Policy*. Cambridge University Press, pp. 285–299.

54 Anderson, K. (2010, 23 March). Rise of the drones: Unmanned Systems and the Future of War. Written Testimony Submitted to Subcommittee on National Security and Foreign Affairs, Committee on Oversight and Government Reform, US House of Representatives. Subcommittee Hearing. 111th Congress, 2nd Session.

55 Abizaid, J. P., (US Army, Ret. Gen) & Brooks, R. (2015, April). *Recommendations and Report of the Task Force on US Drone Policy*. Stimson, Available at https://www.stimson.org/wp-content/files/file-attachments/recommendations_and_report_of_the_task_force_on_us_drone_policy_second_edition.pdf [accessed 7 January 2023].

56 ICRC, The use of armed drones must comply with laws, Interview with Peter Mauer, the president if ICRC, Available at http://www.icrc.org/eng/resources/documents/interview/2013/05-10-drone-weapons-ihl.htm [accessed 7 January 2023].

57 Amnesty International, (2013). *Will I Be Next? US Drone Strike in Pakistan*. Amnesty International Publications, Available at https://www.amnestyusa.org/reports/will-i-be-next-us-drone-strikes-in-pakistan/ [accessed 7 January 2023].

58 Ibid.

conditions have been presented as a serious obstacle for the conduct of a drone operation. 'The serious weakness of the UAV is a high-level of dependence on fair weather.'[59] Simultaneously, in various occasions, it has been demonstrated that UAVs are weak in air-to-air compact.[60] Furthermore, they carry a very low weight of bomb or ammunition[61] causing great difficulties for their operators in contested environments.[62] This fact also became apparent in the recent War in Ukraine, where UAVs were initially used, but gradually the conflict became 'largely a battle of tanks and artillery in which both sides exchange heavy and often unguided fire as they fight over increasingly small amounts of territory.'[63] As a result, the use of UAVs had a military decisiveness in failed states like Syria, Iraq, Afghanistan and in military-obsolete Armenia, but not necessarily in highly contested military environments like Ukraine. Dan Sabbagh writing about the war in Ukraine argues that: 'The TB2s (drones) are clearly military effective – and are used for all their propaganda worth. But it is not obvious they are militarily decisive.'[64] This means that overreliance on UAVs should not be the case for any serious military planning.

10 Conclusions

In conclusion, it can be argued that the introduction of UAVs in contemporary battlefields undoubtedly constitutes a multi-level change in warfighting. Whether their use becomes military effective or decisive depends on the kind of war they are employed.

The acquisition of lethal capabilities by UAVs undoubtedly changed drastically the way one thinks, plans and conducts war. An armed UAV, combined with its unique surveillance, spying and reconnaissance capabilities that broaden battlefield situational awareness, enables not only close compact and interdiction attack but also strike missions. All these advancements render UAVs a very promising weapon system. As has been pointed out in many instances, UAVs have exposed the vulnerability of ground forces, expensive armaments and surface vessels. Also, UAVs became the major weapon of choice in the war on terror. Simultaneously, alongside their tactical and operational advantages in the battlefield, their cost efficiency in political, personnel and financial terms is also obvious. As a result, UAVs today are depicted as able to transform the way contemporary war is conducted.

The development of drones and their constantly increasing usage in contemporary battlefields are bound, as has always been the case, to lead to the development of weapons able to interdict them. Emphasis on electronic warfare, the production of new sensors and the improvement of new targeting technology, in a cost-efficient way, is what is expected to be seen in the near feature.

At the same time, the introduction of drones in contemporary battlefields is accompanied with a drastic change in the way military virtue is conceived. There will be few to disagree that drones belong to a post-Homer-post-Heroic form of war given that no man–to-man fights have to be conducted. As it was argued, this new form of war entails some positive and negative ethical as well as legal issues. It also implies greater responsibility not only for their operators but also for the whole chain of command that is involved in the conduct of their missions.

It has also been argued that so far, high-level of dependency on drones for the conduct of conventional war is not recommended. A series of limitations have been pointed out. Nobody denies the fact, as has been noticed in various conflicts, that drones in general and UAVs in particular are military effective, but it has also been observed that in a highly contested military environment, their military decisiveness has been limited. Azerbaijan's success against Armenia has been attributed to the obsolete of the Yerevan's armed forces. The same goes for the case of Turkey at Idlib. At the War in Ukraine, UAVs so far have been proved to be effective in a tactical level. In such a contested military environment, conventional armed forces have been the protagonists.

It should also be borne in mind that wars where drones had an important contribution to their outcome have already been fought, and their repetition in a similar

59 Urcosta, R. B. (2020, 31 August). The revolution in drone warfare: The lessons from the Idlib De-Escalation Zone. *The Air Force Journal of European Middle Eastern and African Affairs*, Available at https://www.airuniversity.af.edu/JEMEAA/Display/Article/2329510/the-revolution-in-drone-warfare-the-lessons-from-the-idlib-de-escalation-zone/ [Accessed 1 May 2022].

60 Frantzman, op.cit. p. 42. See also Reed, J. Predator drones 'useless' in combat scenarios-air force general, Available at https://foreignpolicy.com/2013/09/19/predator-drones-useless-in-most-wars-top-air-force-general-says/ [accessed 8 January 2023].

61 Frantzman, Drone Wars, p. 111.

62 Reed, J. Predator drones 'useless' in combat scenarios-Air Force general, Available at https://foreignpolicy.com/2013/09/19/predator-drones-useless-in-most-wars-top-air-force-general-says/ [accessed 8 January 2023].

63 Sabbagh, D. (2022, 15 May). War-enabling, not war-winning': How are drones affecting the Ukraine war? The Guardian, Available at https://www.theguardian.com/world/2022/may/15/war-enabling-not-war-winning-how-are-drones-affecting-the-ukraine-war [accessed 8 January 2023].

64 Ibid.

way should not be expected. It is indeed true that, 'In war, militaries tend to train to fight the previous war,'[65] but as far as the evolution of military technology is concerned, this is not the case. Anti-drone weapons are bound to be developed at an unpresented pace, making drone operators and manufacturers to reach their limits if not able to fuel innovation and further advance their product.

All in all, it can be argued that the introduction of armed UAVs in contemporary battlefields has altered the way war has been conducted not only in operational but also in political and ethical terms. It remains to be seen whether their evolution will move forwards or will be interdicted by the development of their counter weapons. For the time being, there is no doubt that UAVs constitute both a militarily effective and militarily decisive weapon system, depending on the kind of war being deployed.

65 Frantzman, Drone War, p. 89.

Author biography

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