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From reconnaissance to Combat: The multifaceted role of drones in the Russia-Ukraine War

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Abstract

The research article examines the impact of Unmanned Aerial Systems (UAS), or Drones, in the Russia-Ukraine conflict and its broader implications for modern warfare. In the 21st century, technological advancements have revolutionized the defense sector, leading to the deployment of sophisticated weaponry, such as drones. Drones are pilotless aircraft operated via remote control or satellite connection, capable of conducting intelligence, reconnaissance, surveillance, and target acquisition (ISRT) operations without risking human lives. This capability makes them valuable in air, ground, and naval warfare. The article highlights the evolving nature of warfare through the use of drones in conflicts like the Russia-Ukraine war. Russia and Ukraine, sharing a common heritage and once part of the Soviet Union, have been embroiled in conflict since Ukraine's shift towards Europe and NATO, which Russia perceives as a threat. This conflict, ongoing since February 24, 2022, has increasingly seen the utilization of drones. Initially, drones played a minimal role, but their significance has grown over time, becoming crucial for both sides in seeking victory. The article suggests that drones serve as force multipliers, enhancing the capabilities of military forces without exposing soldiers to direct danger. Their use signifies a shift in warfare tactics, emphasizing the importance of technological superiority and remote operations in contemporary conflicts. Overall, the article underscores how the integration of drone technology into military strategies has altered the landscape of modern warfare, provided strategic advantages, and reshaped traditional combat methods. The Russia-Ukraine conflict serves as a key example of this transformation, illustrating the critical role of UAS in achieving military objectives.

Keywords: UAS, drone, warfare, intelligence, surveillance, reconnaissance, combat

Introduction

Two mighty powers in Eastern Europe, two ancient regions of the Soviet Union Russia-Ukraine share a common boundary, common culture, and heritage at the same time are treated as the two children of one mother named the Soviet Union (Mankoff, 2022) ^[16], suffered from one of the most bloodshed and horrific battle that starts from February 2022 and continue till now. The Russia-Ukraine Crisis which erupted in 2014 and escalated significantly in 2022, has profoundly impacted global politics, security dynamics, and international law (Mankoff, 2022) ^[16]. Undoubtedly the Russia-Ukraine conflict started with Russia's annexation of Crimea and its subsequent backing of separatist movements in Eastern Ukraine, Particularly in the Donbas Region (Pifer, 2019) ^[19]. The conflict was further fuelled by Ukraine's interest in joining the North Atlantic Treaty Organisation. This confrontation escalated into a full-fledged war when Russia launched a full-scale invasion of Ukraine on February 24, 2022 (Mankoff, 2022) ^[16]. This conflict marked one of the most severe military engagements in Europe since World War II the central theme of this invasion was the use of advanced army technology, particularly unmanned aerial Vehicles, commonly known as Drones. It can be argued that drones have revolutionized warfare tactics and strategy by providing unprecedented surveillance, intelligence, and precision strike capabilities which symbolize the evolving nature of military strategy and the increasing importance of technological superiority in contemporary conflicts (Sherr, 2015) ^[23].

Etymologically speaking "Unmanned System" is a system that operates through a remote process or automatically in the absence of a pilot within it. It can be remotely controlled or can be navigated autonomously based on the pre-programmed plans or a more complex dynamics automation system (Thomas James Gleason & Paul Gerin, 2012) ^[28].

Sebastian Pop defined the term unmanned system as “An unmanned system is a machine or device that is equipped with necessary data processing units, sensors, automatic control, and communications systems and is capable of performing missions autonomously without human intervention” (Thomas James Gleason & Paul Gerin, 2012) [28]. An unmanned Aerial system is defined as an electromagnetic system in which there is the existence of certain preplanned Programmes and by using these programs an operation can take place without endangering the life of the pilot. Drones have emerged as a crucial element in a modern-day military operation that offers capabilities from reconnaissance to targeted strikes. It is because drone provides real-time intelligence, surveillance, and reconnaissance capabilities, it has transformed the tactical and operational landscape of warfare (Sadat, 2012) [29]. Use of the drones in military operations started notably in Afghanistan and Iraq, where predator and reaper played pivotal roles that attracted other nations to quickly recognize the potentiality of this technology. Thereafter it became popular, for instance In the Russia-Ukraine Crisis both the Side utilized drones extensively to gain success in war (Sadat, 2012) [29].

The origin of the Russia-Ukraine crisis can be linked to the Soviet Union’s dissolution in 1991, which led to Ukraine becoming an Independent State. Ukraine's strategic location, its complex history with Russia, and its ambitions to integrate more closely with Western institutions such as the European Union and NATO have been points of contention (Robinson, 2022) [21]. In 2014, these tensions reached a peak when Russia annexed Crimea after a disputed referendum, and conflict erupted in the Donbas region as pro-Russian separatists declared independence from Ukraine (Robinson, 2022) [21]. The conflict persisted for years with occasional escalations and ceasefires, but the situation dramatically changed in 2022. Russia's large-scale invasion was driven by multiple factors, including geopolitical strategy, historical grievances, and security concerns. The invasion led to widespread destruction, significant civilian casualties, and a massive displacement of people, drawing international condemnation and resulting in severe economic sanctions against Russia (Singh, 2023) [23-24].

Drones have been employed in various missions ranging from ISR missions to Combat engagement in Both parties of the war. Turkish-made Bayraktar drone has become symbolic of Ukraine’s resistance to carrying out successful SEAD operations (Chávez, 2023) [4-5]. On the other hand, Russia has also utilized drones for reconnaissance and to enhance its artillery and missile targeting accuracy. The Orlan-10 has

become the supreme hero drone that Russia deployed in the conflict (Chávez, 2023) [4-5]. So in this premise, this paper tries to analyze the role of Drones in warfare by taking into one case study which is the Russia-Ukraine crisis.

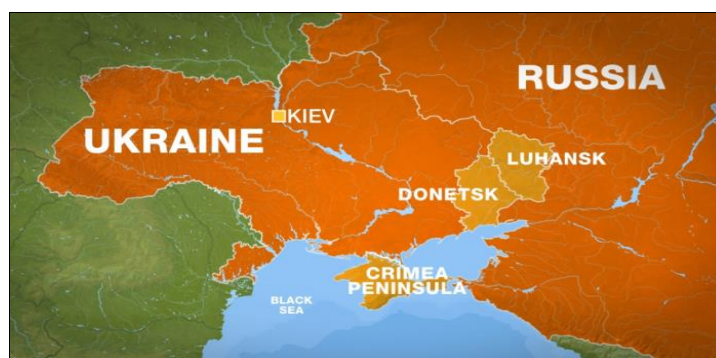
Objectives and Methodology

This paper is based on two major objectives which are to find out the relevance of drones in warfare by taking into account the Russia-Ukraine case and the second objective is to find out how has the nature of warfare changed with the use of drones in Warfare. To attain the above goal this paper took the help of Descriptive, analytical methods and was based on a purely qualitative research design. This paper uses a systematic approach to the literature review to best reflect the current state of the field. To ensure accurate and impartial data search and retrieval this paper used the snowballing approach. Data are collected from secondary sources such as books, “Journal articles, newspaper articles, periodicals”, and different search engines like DTU Findit, Google Scholar, Semantic Scholar, and Scopus. “The entire paper is divided into three sections first section deals with the introduction, second section highlights objectives and methodology, third section deals with Result and Discussion”.

Discussion

Geopolitics of Russia and Ukraine

As former parts of the Soviet Union, Russia and Ukraine share centuries of Cultural, Linguistic, and Familial ties. Ethnically, Ukraine has deep connections to Russia, and this shared heritage is a sensitive issue that has been leveraged for both political and military purposes (Mozur *et al.*, 2023) [18]. Russia is the world's largest country based on territory expanding around 1700 Square kilometres connected with two major continents such as Europe and Asia. This territory expands 800 kilometers from east to west and 3200 kilometers from north to south (Larrabee, 2010) [12]. It shares its northeast territory with Norway and South East territory with North Korea (Larrabee, 2010) [12]. Ukraine has a long history and controlled by different groups for hundreds of years. From the 17th century to till disintegration of the Soviet Union, Ukraine was a part of the Soviet Union until it gained independence following the Soviet Union’s collapse in 1991 (Svarin, 2016) [26]. It borders Russia to the east, Belarus to the North, and Poland, Slovakia, Hungary, Romania, and Moldova to the West. With this Ukraine is rich in natural resources, such as oil and gas, making it strategically significant for Russia (Kuzio, 2018) [11].



Source: Aljazeera

Fig 1: Russia-Ukraine Geopolitical Map

Reason behind the Conflict

One of the major factor in the Ukraine Crisis was the country's separation from the Soviet Union, which led both Russia and the West to compete for greater influence in Ukraine to maintain their regional power balance (Kuzio, 2018) ^[11]. Ukraine's geographical location is another significant factor in the crisis. It is because it serves as a buffer between the US and the European Union, both of which are increasingly committed to preventing Russian control over Ukraine (Calcara *et al.*, 2022) ^[3]. The Black Sea holds strategic importance for the entire region, as it is a crucial route for Russia to export natural gas and oil to European Countries. With this, the denial of the Ukrainians to access its territory was also another reason for the Conflict.

Ukraine's refusal to the Euromaidan Movement is another reason for the conflict. In November 2013, a public protest erupted in Kyiv's Maidan Nezalezhnosti against the Ukrainian government's decision to halt the signing of an associate agreement with the European Union, opting instead for closer ties with Russia and the Eurasian Economic Union. (Magen & Stein, 2022) ^[14]. The 2014 separatist movement in Ukraine caused the war. This is because the Donetsk and Luhansk regions of Ukraine have a pro-Russian attitude and want to separate from Ukraine and become independent. The separatist forces battling the Ukraine government consist of 15 percent to 80 percent Russian Government personnel and Russian paramilitaries (Magen & Stein, 2022) ^[14]. In 2014 another incident annexation of Crimea took place in the aftermath Of Ukraine also fueled the conflict between the two countries. Russia seized Crimea from Ukraine and deployed its military on this region, which before the invasion was a part of Ukraine. Russia's seizure of Crimea has provided it with a strategic maritime advantage in the area (Robinson, 2022) ^[21].

After a lot of warnings from Russia, Ukraine urged to make its alliance with NATO, on the other side Russia condemned this attitude of Ukraine and declared this move as "Redline". on the other side, Ukraine's alliance with NATO puts an internal security threat to Russia because all the Balck Sea countries are members of NATO. Article 5 of the NATO principles argues that any kind of threat against the NATO countries will be treated as an attack against NATO.

Role of the Drone

Drones otherwise known as the UAS have appeared as a piece of military hardware in modern warfare from the last two decades. After the conduct of successful operations in Syria, Libya, Nagrono-Karabhak, and Yemen, the emergence of this technology has become a significant cause for worry among nations engaged in military conflicts worldwide (Chávez, 2023) ^[4-5]. The Russia-Ukraine conflict marks the initial major war where both military and commercial drones have seen widespread use. It is a weapon that can be deployed for various missions such as Early warning, reconnaissance, spying, and destroying land and aerial targets (Chávez, 2023) ^[4-5]. So unsurprisingly it can be argued that the country with having most powerful drone will most likely have an advantage. For instance, in the Russia and Ukraine Crisis, Ukraine proliferated the Byrektor TB2 drone from Tureky and such drones were also operated by Ukraine and the result is all of the Russian weapons and defense systems particularly the Pantsir defense system

became outperformed (Sankaran, 2024) ^[22]. Along with this in the Armenia and Azerbaijan war, the TB2 drone destroys 120 tanks, 53 armored vehicles, and 143 artillery pieces. Basically, in the Russia-Ukraine war Drone or UAS system is used for precise payload delivery such as dropping explosives, surveillance-for instance scouting out enemy position to send a mortar or otherwise coordinate an attack, and lastly loitering or cyber hacking enemy network to hack in via a drone and degrade the network (Robinson, 2022) ^[21].

Ukraine has played a critical role in the warfare by using its domestic and proliferated drones. Ukraine got a Phoneix Ghost drone from Washington. This drone, capable of Vertical launch and nighttime operation using infrared sensors, enables the recipient country to penetrate SEAD operation (Kunertova, 2023) ^[10]. Along with this United States also supplies 700 Switchblade drones that have a range of 25 miles and fire intensified ammunition at ground targets. Latvia Provided 300 reconnaissance drones to Ukraine, the result is the country successfully reconnaissance the activities of the Russian soldiers. For striking ground targets, the Ukraine army also employs various domestically manufacture drones such as Spectator-M1, Uj-22, Punisher, and Leleka-100 (Kunertova, 2023) ^[10]. For the non-combatant operation, Ukraine also used 6000 drones that were used by a variety of factors including the country's official security (Kim & Cho, 2023) ^[9].

On the other hand, Russia in the initial days does not rely on drone technology, but in the initial phase, Moscow highly depends upon traditional methods (Chávez & Swed, 2023) ^[4-5]. As the conflict advanced, there was a rising need for drones from both nations, and at the initial phase of the war, Russia deployed drones for intelligence, monitoring, and reconnaissance purposes. It is noticed that while Russian drones are quickly and directly destroying the Ukraine forces on the other side Ukraine drones lack the necessary weapons and systems to find and shoot down drones. For instance, Russians have used several drones, the most common is the Oraln-10 multipurpose drone used for reconnaissance and surveillance (Calcara *et al.*, 2022) ^[3]. With this Russia also used the KUB-BLA suicide drone that can hold missiles and can deploy for heavy target bombardment. Another drone used by Russia is the Kamakaze UAS, which is developed domestically by Russia. This drone is specifically a game changer for the host country because this UAS has come up with Artificial Intelligence that helps in locating targets and spotted images in the Ukrainian theatre (Kunertova, 2023) ^[10]. It is difficult for Ukraine's air defense system to identify the Kamikaze drone because of its small size which makes conventional air defense system to detect it (Kunertova, 2023) ^[10]. Lancet drone provides greater benefits to Russia in to fight against Ukraine. It is because the drone has come up with the AI, especially designed for ground-based destruction. By this UAS, Russia was able to do DEAD operations as well as destroy hostile drones by launching airburst ammunition and booby-trapping methods (Magen & Stein, 2022) ^[14]. According to the report of the MOD of Russia, around 1188 Ukrainian drones have been shot down by the anti-aircraft defense mechanism of Russia (Magen & Stein, 2022) ^[14] including 12 Turkish Bayraktar UAVS. On the other side, it is difficult for Russia to identify small electronic drones used by Ukraine for ISR operations such as Switchblade and Spectator (Magen & Stein, 2022) ^[14].

Tactical and Strategic Implications of Drone

The use of drones in the Russia-Ukraine war has underscored several key tactical and strategic implications. Firstly, drones provide a force multiplier effect, allowing smaller or technologically inferior forces to challenge more powerful adversaries. This has been evident in Ukraine's ability to disrupt Russian operations and inflict significant damage despite being outgunned. Secondly, drones can enhance prior situational awareness and battlefield transparency (Bahinskyi & Zaiets, 2023) ^[1]. For instance, real-time ISR capabilities enable commanders to monitor battlefield transparency, and enemy movements, assess battlefield conditions, and make informed decisions swiftly. Thirdly, the psychological impact of drones cannot be underestimated. The persistent presence of UAVs in the skies creates a constant threat, disrupting enemy operations and lowering morale. The precision strikes carried out by drones also have a strategic deterrent effect, demonstrating the capability to target high-value assets and personnel with minimal risk to the operators (Bahinskyi & Zaiets, 2023) ^[1].

Impact or lesson for India

The first and foremost lesson for India is to develop its self-reliance in the Defence sector. No doubt India is growing towards Make in India and Atma Nirbhar Bharat but still there is a lacuna in fulfilling the heavy demand and modernizing its defense arms and ammunitions. For instance, there is a Lacuna in India for the development of armed drones for which it depends on countries like Russia, Iran Turkey to enhance its drone capability (Singh, 2023) ^[23-24]. The second lesson is that technology is a great leveler and acts as an equalizer in present-day warfare situations. It is because nowadays technology plays a force multiplier and plays a decisive role in the victory of a nation and also reduces the gap between two adversaries. Technology represents a good balance when the military differs between two major enemies. For instance, it is because of drone capability that Ukraine's military has successfully conducted 4444 heavy attacks against Russian Tanks (Blanchette *et al.*, n.d.). However, it is argued that before the war, Ukraine did not have the capability of drones but it used the drone technology to its advantage. So it is important for India to develop and modernize its warfare technique and introduce technology in order to defeat its immediate enemy. Along with from this warfare India should learn military technology that must be aligned with the national doctrine (Blanchette *et al.*, 2024 n.d.) ^[2]. It is because India should adapt technology suits to its military doctrine, rather than subscribing to a one size-first-all approach. Energy can be treated as living blood for the smooth running of a country. Being two hub centers of natural energy faced a boldly war India along with other natural energy depends countries faces problems in the form of a hike in the price of oil and natural gases and a shortage in the export of natural gases. So, India should be always ready the tackle this problem and must focus on Atmanirbharata for natural energy.

Conclusion

After the discussion, it is concluded that the Russia-Ukraine crisis that began with Russia's Annexation of Crimea in 2014 and became a full-scale invasion in February 2022, has become one of the most significant geopolitical conflicts not only in Europe but in whole world history. This conflict has border implications for modern warfare that signifies a shift

towards more technology-driven combat where UAS or drones play pivotal roles. Drones have been a defining feature of this conflict which demonstrates its effectiveness and transformative impact on modern-day warfare. Notably, this warfare has a lesson to the world nations that the deployment of drones in warfare will shape future military engagements and push the world countries to develop unmanned technologies. Further, the conflict highlights the need for continued adaptation and innovation in military tactics and the importance of international cooperation in addressing the challenges posed by modern warfare. In the initial phase of warfare, both countries focused on the old warfare methodology and technique, with time Ukraine started using drones in warfare, thereafter both countries relied on technology in warfare. So also drone plays a decisive role in this conflict. It is because drones are not only employed for Surveillance and intelligence but also have become instrumental in monitoring Russian Troop movements, assessing battlefield conditions, and planning strategic operations. Along with this drones have played a crucial role in offensive operations, especially for combat operations. For instance, Turkish-made Bayraktar TB2 to carry out precision strikes on high-value Russian Targets. So also, lastly, it is argued that with the advancement and application of modern technology, the nature of warfare has changed and nowadays warfare is not taking place only on the battlefield but is conducted through remote control or the tapping of a switch, the example is the recent Russia-Ukraine Conflict.

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