DRONE WARFARE – EVOLUTION OR REVOLUTION IN MILITARY AFFAIRS?

Major General Florin-Marian BARBU
Chief of Operations Directorate, Defence Staff

English version by **Iulia SINGER**.

The ongoing revolution in science and technology, which began in the late 19th century, continues to shape the entire field of military science, both theoretically and practically. As a consequence, with the current technological advancements in weaponry, their variety, the complexity of their effects, the expansion of operational areas and their typology, the complexity of the international security environment and not only, we find ourselves at a turning point in defining future directions and are headed towards a period when strategies, concepts, plans, theories etc. will be continuously redefined and realigned.

Weaponry, organisation of armed forces, operational procedures or relations between humans and combat technologies have been significantly adapted, acquiring new and important features depending on the technological evolution. One can assess that the current techno-military revolution influences the relations between humans and technology, and understanding these implications is crucial for addressing the challenges posed by modern warfare and the development of military science.

One of the most evident changes in modern warfare is the widespread use of advanced technology. Cyber technology has become a crucial tool in current conflicts. Cyber attacks can disrupt critical infrastructures such as power grids, financial systems and communication networks, without traditional military intervention. Moreover, drones and autonomous vehicles have also revolutionised military tactics, enabling precise operations with minimal risk to military personnel.

In recent conflicts such as the Nagorno-Karabakh one, the global war on terrorism (GWOT), and particularly the Ukraine conflict, drones seem to have a significant tactical and operational impact, but a limited strategic one. This has prompted significant discussions worldwide within armed forces and various security

structures about their role in combat operations. The extent, use and proliferation of drone capabilities across all operational domains (air, land, sea, space and cyber) are obvious. Therefore, every nation or defence coalition must consider these identified lessons in future defence-planning efforts both by rethinking the military equipment procurement strategy and by reshaping certain force structures. However, do drones represent what is called a revolution in military affairs or are they just a step in the evolution of technology, with direct influences on military tactics and strategy?

Drones Alone Cannot Ensure a Decisive Effect for Winning the War

In the mentioned conflicts, especially in the Ukraine conflict, drones have proved highly effective at the tactical level of warfare. They have enabled cheap precise strikes either by directly attacking an enemy or, more often, by directing artillery shells to the desired target. Drones seem to have the most significant impact when interconnected (in swarms) and operated by ground fire units. Even though such a combat network exists at tactical levels, examples of such networks are rudimentary, still relying on operators manually inputting data and making decisions through commercial communication channels such as WhatsApp and Google Meet.

In the Ukraine conflict, both sides have used drones on an unprecedented use. The main gain seems to be situational awareness on the ground using eyes in the sky. Equally important, drones have exponentially boosted the precision of artillery fire, which seems to be the dominant weapon in this war. Drone operators make it possible for imprecise indirect fire weapons to have precision effects. When drone operators use command and control networks to share information with artillery units, they can significantly accelerate targeting cycles, achieving repeated and precise strikes. Small FPV (first-person view) kamikaze drones cost a fraction of other weapons price and enable combatants to attack moving targets beyond their line of sight. Moreover, Ukrainian and Russian forces use long-range kamikaze drones as cheap cruise missiles to conduct strategic attacks. Likewise, the use of naval drones has brought relevant successes

for Ukraine against the Russian fleet in the Black Sea. Russia has also used drones to destroy Ukraine's critical infrastructures or attack civilian targets in order to demoralise the population and the enemy armed forces. Individually, these are notable advances, but not even cumulatively can they represent a revolution in military affairs.

It is likely that this pattern will continue as the war lengthens. Yet, it is clear that drones alone cannot determine the outcome of the conflict, although they will certainly play a prominent part in the ongoing war in Ukraine and on future battlefields.

Drones Are Vulnerable Systems

Most of the drones currently used and lost are relatively cheap military or commercial drones with limited resistance, range and payload and are vulnerable to countermeasures, particularly to EW (electronic warfare). Most drones are easy to detect: they fly at relatively low speeds and thus their navigation features can be easily identified.

Instead of investing in strengthening these systems, both sides simply buy or produce more. Moreover, most drones are remotely piloted and are not completely autonomous. Autonomy can be used in some systems and could become more widespread, but drones are currently tied to human operators. Ukrainian forces have widely used drones to gain an asymmetric advantage over a superior Russian military force.

Russian forces have quickly adapted and imitated Ukraine's use of commercial drone to a surprising extent, considering the Russian Ministry of Defence's reluctance to officially adopt private sector technologies. Russian forces have used drones as part of the reconnaissance process, increasingly enabling their firepower.

Throughout the war, there have been rapid adaptation cycles, because both sides have learned from one another, adopting successful tactics and technologies and developing tactics and procedures to improve their defences. Especially that the use of drones, kamikaze ones included, has forced the identification of efficient protection measures. It would not be operationally sustainable or financially

practical to use complex surface-to-air missile systems, such as Patriot, to neutralise a small-value commercial drone adapted to deliver a combat payload. Accordingly, as countermeasures develop, these will increasingly work against the technological advantage drones currently enjoy.

Drones Will Not Replace Current Military Doctrines, But Will Adapt Them

Revolutions in military affairs are so disruptive, that they make old weapons, modes of warfare and organisational structures obsolete. Thus, revolutions require more than the widespread adoption of new technologies. Moreover, armed forces must develop new operational concepts, integrate new capabilities into wider military systems and adapt their organisational culture and structure. This kind of change is difficult to achieve during war, because combatants are focused on immediate combat and tactical adaptations, without reviewing doctrine and organisation. In the Ukraine war, we witness rapid cycles of tactical innovation, emulation and the development of new capabilities. In time, these cycles may lead to more profound changes in operational concepts and the way in which Russian and Ukrainian forces are organised, which could really revolutionise warfare. According to this standard, the conflict in Ukraine represents, at best, the early stages of a revolution, because the effect of drones has been rather more evolutionary so far.

When a legitimate military revolution occurs, this is usually characterised by a symbiotic interplay between technology and doctrine. As these two variables interact, a dynamic unfolds that creates transformative change, which alters the very nature of war – which makes a technology revolutionary. This kind of events represents a fundamental advance in technology, doctrine and organisation, which renders existing methods of warfare obsolete. Consequently, a genuine revolution in military affairs requires not only new technology, but also a doctrinal component adapted to new technologies. In the previously mentioned conflicts, drones have proved they can perform various types of missions, including air surveillance, precision strikes, real-time intelligence and enhanced

situational awareness for C2 (command-control) architecture. This implies that, instead of leading to changes of current doctrines, drones are more of a force multiplier that strengthens existing practice. A capability that produces an effect when added and used by a combat force significantly enhances the combat potential of that force and thus increases the probability of successfully accomplishing the mission. An example of a technology that represented revolution in military affairs is the atomic bomb. Due to its destructive power, this weapon changed the stakes of war, deterrence strategies and international relations. Another example is the aircraft carrier, which, by interconnecting multiple technologies, provides the capability to project power over long distances, thus playing a decisive part in the course of war.

Measures Implemented by the Romanian Armed Forces

In this context, in which the use of drones on the battlefield has become a necessity, the Romanian Armed Forces is making efforts, together with the allies, to adapt to the new reality. Among the measures taken or being implemented are both the acquisition of drone-type combat systems and anti-drone systems, the development of such capabilities through ACTTM – the Agency for Research on Military Technology and Techniques – and the establishment of combat units equipped with drone-type systems.

Recently, Romania has been directly affected by this drone war, with components coming from several such devices used in the Ukraine conflict crashing on our territory, near the border. Even though the incidents are isolated, the drone parts fallen in Romania increase the risk of misunderstandings, including between Russia and NATO, prompting the Romanian Armed Forces to enhance security in the area to protect the civilian population. Among the implemented measures, one can include the following: increasing the number of soldiers assigned in missions in this area to implement additional measures, including intervention subunits that can act as needed; EOD teams ready to intervene whenever possible drone parts are investigated on the spot; more observation

points and ground sensors installed; increased patrolling on the Danube with the river flotilla; construction of shelters for the civilian population.

In April 2023, Romania and Türkiye signed a contract for the acquisition of 18 Bayraktar TB2 drones (6 platforms with 3 drones each), which will be integrated into the Romanian Land Forces this year. In December 2022, the Ministry of National Defence and Elbit Systems signed a contract for the acquisition of 21 Watchkeeper X drones (7 systems of 3 drones and one command centre each) for the Romanian Armed Forces. Alongside Patriot and Himars systems, the Romanian Armed Forces are expecting to receive their first KP-SAM Chiron-type MANPAD systems (Man-Portable Air-Defence Systems) from South Korea. These are light anti-aircraft weapon systems designed to protect soldiers and equipment on the battlefield from aircraft, drone or helicopter attacks. The Romanian Armed Forces will receive in the coming years more advanced 35 mm cannon systems, including against drone swarms, produced by Rheinmetall, and are considering the acquisition of naval drones.

Moreover, at the end of 2022, the acquisition process was launched for 18 SHORAD – VSHORAD air defence systems, for the beginning. These are short and very short range anti-aircraft missile systems, with a total desired acquisition of 30 such systems.

As part of a joint effort to bolster deterrence and defence measures in the Black Sea, the US Army deployed an M-LIDS system in Romania to combat drone threats. M-LIDS includes an electronic warfare system against drones, a command and control system, an infrared camera, direction-finding sensors, and an AN/TPQ-50 radar. The system also features a 30 mm XM914 cannon. The protection systems developed on the wheeled platforms on which the system is mounted are state-of-the-art and resistant to mines and ambushes.

Romania's defence industry is also adapting to the new reality imposed by the use of drones on the battlefield. The Romanian company BlueSpace Technology announced last year the launch of a new groundbreaking product, the UAS drone combat system, the first of its kind manufactured in Romania. The BS-JDP01 model

is a non-kinetic, portable, independent defence equipment designed to neutralise unmanned aerial vehicles (UAVs) by disrupting the main signals used by commercial UAS and S-UAS systems.

Conclusion

The use of drones in the Ukraine conflict has provided valuable lessons that have influenced modern military tactics and strategies. Continuous surveillance, precise attacks, use of commercial and improvised drones, vulnerabilities to electronic warfare, the need for effective countermeasures, and the psychological and economic impact are all essential in understanding how drones have changed the landscape of modern warfare.

Moreover, the use of drones has significantly changed warfare tactics, providing the armed forces with critical advantages in surveillance, precise attacks, rapid response and integration into complex information networks, all while reducing the risks and costs associated with traditional military operations.

Drones have also significantly changed the strategic conduct of warfare, offering advantages in power projection, operational efficiency, reducing political and humanitarian risks and adaptability in asymmetric and cyber warfare. These changes have redefined many aspects in planning and carrying out modern military operations. Therefore, we can state that drones have become an increasingly important tool, although they have not revolutionised warfare.

For Romania, adapting its military strategy to incorporate drones is crucial for responding to modern security challenges and maintaining a strategic advantage. Investments in technology, training, and doctrine development are essential steps for effectively integrating drones in the Romanian military arsenal, thus ensuring an increased capacity to rapidly and efficiently respond to contemporary threats.

These lessons will continue to shape future military doctrines and strategies, as drone technology evolves and becomes even more integrated into global military operations.