THE INFLUENCE OF TECHNOLOGICAL LEAPS ON MILITARY COMBAT CAPABILITY: THE CASE OF DRONES

Major Sînziana IANCU, Ph.D*

Abstract: *In the current geopolitical context, where armed conflicts are increasingly based on technological superiority, drones represent a determining factor in gaining strategic advantage. The rapid evolution of this field requires states to invest heavily in autonomous systems and AI-integrated solutions to remain competitive on the battlefield. Romania, for example, has modernized its UAV fleet by acquiring advanced drones, thus strengthening its defense capabilities. The future of warfare will increasingly depend on the ability to integrate drones into combat structures, maximizing attack efficiency and reducing risks for military personnel. Therefore, understanding this field is not just a technological necessity but also a strategic imperative for national and global security.*

Keywords: *conflict, UAV, drones, technology, FPV.*

DOI https://doi.org/10.56082/annalsarscimilit.2025.1.19

I. INTRODUCTION

FPV (First Person View) drone technology has completely revolutionized military combat capabilities, significantly influencing operational strategies, force organization, and battlefield efficiency. This material highlights several key dimensions in which drones are profoundly reshaping the paradigm of modern warfare.

FPV drones have been and continue to be used in Ukrainian military operations against Russian Armed Forces[1], as well as by Russian forces in their own military operations. These drones are equipped with cameras that transmit real-time footage to goggles or headsets, providing a first-person view (*from the drone's perspective*) [2]. They can reach flight speeds of up to

* 1st Maneuver Support Brigade „Argedava", email: iancu_sanziana@yahoo.com

1 Global Defense News. 2024. *Ukraine Demonstrates Efficiency of FPV Drones Against Russian BM-27 Multiple Rocket Launcher*, available at https://armyrecognition.com/focus-analysis-conflicts/army/conflicts-in-the-world/ukraine-russia-conflict/ukraine-demonstrates-efficiency-of-fpv-drones-against-russian-bm-27-multiple-rocket-launcher, accessed on 08.02.2025;

2 The concept of "First Person View" (FPV) in the context of drones refers to the fact that the drone operator has a visual perspective from the drone itself, as if they were on board. More specifically, the drone is equipped with a video camera that transmits real-time footage to goggles or a headset worn by the pilot. This allows the pilot to see exactly what the drone "sees", providing an immersive experience and more precise control, similar to

120 km/h and have a range of up to 10 km without requiring a signal repeater. The typical flight duration is between 7 and 10 minutes, necessitating careful time management during missions. Operating FPV drones requires highly trained pilots due to their complex and rapid maneuverability. The flexible design allows for quick adaptation to various configurations and resistance to electronic warfare.

The number of UAVs (Unmanned Aerial Vehicles) used on the battlefield is growing exponentially. Drone activity in the air has led to decentralization and a reduction in frontline troop deployments[3]. Instead of deploying a full platoon, only a small group of soldiers may be deployed, supported by drones. In frontline areas, reconnaissance drones, attack drones, and FPV crews rotate sectors to conduct surveillance in preparation for action. Some drones search for targets, while others strike them.

From a tactical standpoint, drones are used to detect and neutralize teams operating *kamikaze* drones[4]. They also participate in logistical missions, including the delivery of ammunition, water, and supplies via heavy and robotic drones. The advantages of FPV drones include: instant response and total operator control; high maneuverability and speed (up to 120 km/h); resistance to electronic warfare due to modularity; flexible design to adapt to different tasks; a flight range of up to 10 km. At the same time, there are also different disadvantages of FPV drones that should be taken into account, such as: the need for extensive operator training; a limited operational range of 10 km; an average flight time of 7–10 minutes and, in some cases, a launch preparation time of approximately 2 minutes.

II. THE IMPACT OF DRONES ON MILITARY TACTICS AND ORGANIZATION

Technological leaps in the field of drones have enabled the decentralization of armed forces, transforming how military units are deployed on the battlefield. This shift has resulted in reduced frontline troop deployments, increased efficiency in reconnaissance and attack, and greater operational flexibility. Specifically, drones allow small groups of soldiers to execute missions that previously required entire units. A platoon can now be

driving a car or piloting an aircraft. This technology is commonly used in drone racing, aerial filming, and reconnaissance missions.

[3] Mykhailo Samus. 2024. New Strategy Center, *Lessons learned from the war in Ukraine. The impact of drones*, available at https://newstrategycenter.ro/wp-content/-uploads/2024/02/Lessons-Learned-from-the-War-in-Ukraine.-The-impact-of-Drones-2.pdf, accessed on 08.02.2025.

[4] David Wennerholm. 2024. *Uppsala Universitet, Institute for Russian and Eurasian Studies, Above the trenches, Russian military lessons learned about drone warfare from Ukraine, Master's thesis*, available at uu.diva-portal.org/smash/get/diva2:1932309/-FULLTEXT01.pdf., accessed on 08.02.2025.

replaced by a smaller team supported by UAVs, thereby reducing risks to troops.

FPV drones are integrated into surveillance and attack operations, utilizing strategies such as “free hunting”, “FPV swarms” and “assault group escorting.” This approach enables rapid and effective strikes on enemy targets. Additionally, drones provide the capability to conduct various tactical operations, including direct attacks, ambushes, combined strikes and infiltration behind enemy lines.

II.1. Operational advantages of FPV drones

The main operational advantages of FPV drones stem from their rapid response capability, high strike precision, resistance to electronic warfare and ability to conduct sabotage and infiltration missions. Therefore, from the rapid response capability **point of view,** FPV drones can reach speeds of up to 120 km/h and have a flight range of up to 10 km, allowing for immediate reactions to battlefield changes. Operators can engage targets in real time without exposing military personnel to direct danger. Regarding the high strike precision, techniques such as the “double impact” and “FPV-bomber combination” enhance target destruction. These methods involve using drones in tandem **-** either to penetrate shelters or to neutralize enemy forces inside protected areas. The resistance to electronic warfare is seen in the FPV drones’ adaptability and modularity, allowing them to be equipped with electronic countermeasure-resistant systems. This ensures operational control even under active electronic warfare conditions. As to sabotage and infiltration capabilities, FPV drones can be used for discreet mine placement (“FPV miner”), infiltration behind enemy lines (“FPV saboteur”) and psychological warfare through audio message broadcasts or leaflet drops (“FPV swearing speakers”).

II.2. Limitations and vulnerabilities of drones in combat

Operating FPV drones requires extensive training, as their high maneuverability demands continuous and precise learning, making them heavily dependent on well-trained operators. The flight duration of an FPV drone ranges between 7 and 10 minutes, limiting its autonomy and requiring efficient time management during missions. This constraint can pose challenges for longer operations.

At the same time, enemy forces are actively developing both offensive and defensive counter-drone strategies, including:

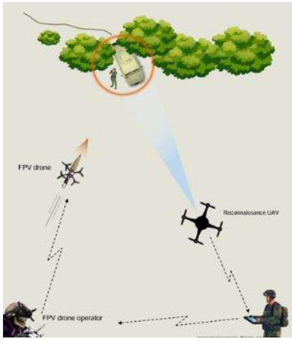
- **Electronic Warfare** – jamming radio and GPS signals to disrupt operator control.
- **Anti-Drone Systems** – using firearms, capture nets, or laser devices to neutralize drones.

- **Camouflage and Fortifications** – deploying anti-drone nets, creating smoke screens or simulating false targets to mislead drones.

II.3. Examples of FPV drones in combat[5]

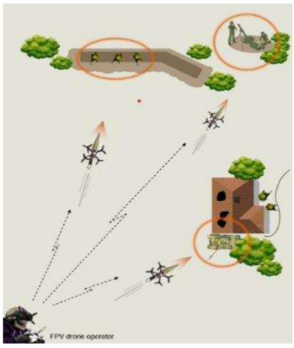
1. **“Classic” –** *target identification and destruction*

This is the most common combat application. It involves detecting a target using a reconnaissance UAV, transmitting the coordinates to the FPV drone operator, and then launching the FPV drone to destroy the target. The reconnaissance UAV records video footage of the destruction.[6]



2. “**Free Hunting**” **-** *FPV strikes on pre-detected targets.*

This method relies on independently striking enemy positions and objects that have been previously identified. The FPV drone operates without real-time reconnaissance assistance.[7]

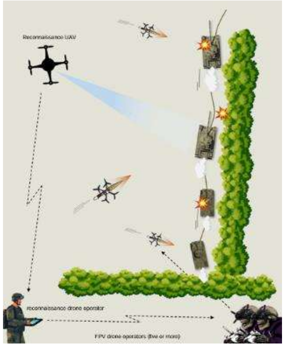


3. **FPV** “**Swarm**” **-** *coordinated group attacks*

In this strategy, a reconnaissance UAV identifies targets, followed by a massive attack using *kamikaze* FPV drones to destroy them. Typically, 5–12

[5] Endoacustica. s.a. *FPV Drone Tactics and Countermeasures*, available at https://www.-endoacustica.com/fpv-drone-tactics.php, accessed on 08.02.2025;
[6] Idem.
[7] Idem.

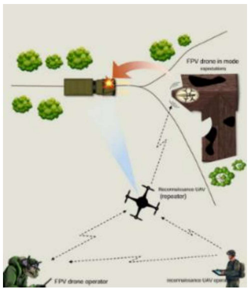
drones are used per operation. A reconnaissance drone records the impact and FPV drone strikes can be combined with artillery and mortar fire for enhanced effectiveness.[8]



4. "**Escorting the attack of the assault group with FPV drones**" - *fire support for advancing units*. This method involves the sequential targeting of enemy positions using FPV drones during the advance and offensive actions of an assault group. Coordination between units and FPV drone operators is managed through a reconnaissance UAV. FPV drone attacks can also be combined with artillery and mortar fire for increased battlefield effectiveness.[9]

5. "**FPV-drone in ambush**" - *landing, waiting, observing and surprise attack.*

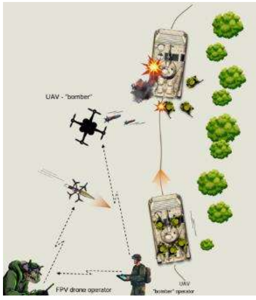
This tactical method relies on an FPV drone landing and hiding near roads, intersections or areas where enemy personnel and equipment may concentrate. The drone remains in position before launching a surprise attack. It operates in tandem with a repeater UAV (reconnaissance drone) and can be deployed at depths of over 5 km with a waiting time of up to 6 hours. At night, attacks can be executed using vehicle headlights or an FPV drone equipped with thermal vision.[10]



6. "**Combination Strike**" - *FPV strike on target – fire attack from a bomber (assault) drone.*

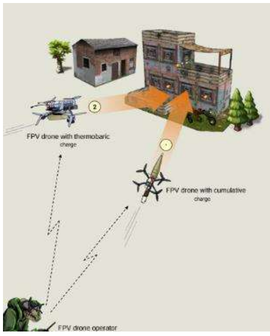
[8] Idem.
[9] *Idem.*
[10] Idem.

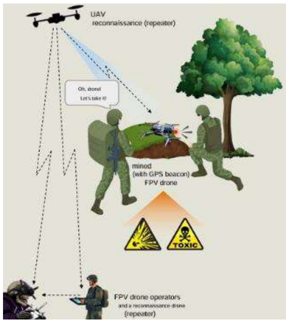
This method addresses the common challenge of combining FPV drones and bomber UAVs to inflict significant damage on identified targets. After destroying or disabling armored vehicles, the bomber drone launches an additional attack on enemy forces during their evacuation, maximizing battlefield impact.[11]



7. "**Double Impact**" - *using two or more FPV drones with different payloads to breach a shelter and eliminate enemy forces.*

To neutralize enemy forces in fortified shelters, multiple FPV drones are deployed in succession. The first drone, equipped with a cumulative warhead, is used for penetration, while the second drone, carrying a thermobaric or fragmentation payload, delivers a follow-up strike to inflict maximum damage on enemy forces inside.[12]





8. "**FPV Trap**" - *countermeasures when an FPV drone is captured by enemy forces*

If an FPV drone is seized by enemy forces, the operator can initiate a controlled detonation via a reconnaissance UAV. Several types of FPV Trap exist, as the following:

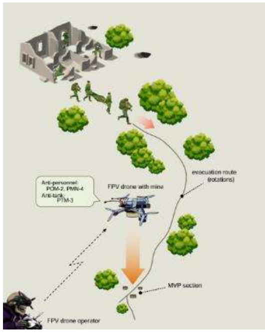
- ➢ autodetonation upon movement: If the drone's position changes due to an anti-drone device (e.g., a "Jonik" jammer), self-destruction is triggered.

[11] Idem.
[12] Idem.

- explosive payload integration: The drone is embedded with 20–50g of explosives in its structure, which detonates upon disassembly.
- GPS tracking: The drone is equipped with an integrated GPS system, allowing friendly forces to track its location via signal detection.
- toxic coating: The FPV drone's casing is treated with highly toxic substances that act upon skin contact, posing a threat to those handling it.[13]

9. "**FPV Miner**" **-** *delivery and deployment of anti-personnel (anti-tank) mines and concealed IEDs on rotation and evacuation routes.*

This tactical technique involves the covert installation of anti-personnel mines, anti-tank mines and concealed IEDs using FPV drones. These devices are strategically placed along rotation routes, evacuation paths, or near enemy positions to target and eliminate enemy forces.[14]



10. "**FPV-sapper**" – *deploying charges on mines*

FPV drones can be used to neutralize visible or uncamouflaged mines by placing explosive charges on them or by dropping munitions from the drone itself. The FPV drone is equipped with a specialized mechanism to deploy explosive payloads on mines, vehicles, or other high-value targets.[15]

General process:

1. Drone equipment: the drone is fitted with a release mechanism and compatible munitions (typically grenades, small explosive charges, or specially adapted payloads).

2. Target identification: the drone operator locates the target (e.g., surface or uncamouflaged mines) using the drone's real-time camera feed.

3. Flight and positioning: the operator guides the drone precisely over the target.

[13] Idem.
[14] Idem.
[15] Idem.

4. Munition deployment: the operator activates the release mechanism, dropping the payload accurately onto the target.

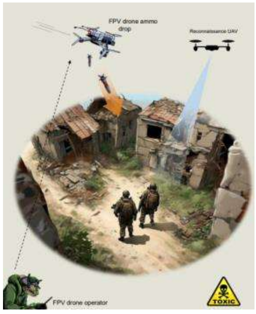
5. **Target neutralization**: the impact either detonates the mine or triggers a controlled explosion to destroy the hazardous device.

Advantages:

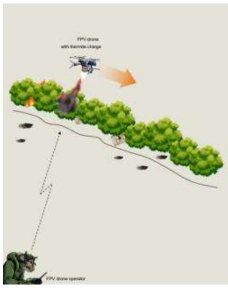
- **Safety**: enables the operator to neutralize mines and other threats remotely, minimizing risk to personnel.
- **Precision**: FPV drones offer high maneuverability, allowing them to hit small targets like exposed mines with great accuracy.
- **Efficiency**: drones can cover large areas quickly, neutralizing multiple threats in a short timeframe.

This method is frequently used in conflict zones and demining operations where mines are visible and do not require excavation or complex removal procedures.

11. "**FPV reset**" **-** *dropping explosive munitions on target*



This tactic involves deploying explosive munitions from an FPV drone to eliminate enemy forces in open areas or poorly protected shelters (e.g., trenches or foxholes). A reconnaissance UAV guides the FPV drone to the target for precision strikes. There have been cases where munitions containing toxic substances were used in such operations. Additionally, this method is often employed to deliver essential supplies, such as ammunition or provisions, to allied troops.[16]



12. "**FPV dragon**" **-** *incendiary mixture spraying over enemy positions*

To ignite fires and neutralize enemy forces, exposed equipment, ammunition, and assets, FPV drones equipped with thermal payloads (based on 120mm incendiary artillery munitions) are used. The average altitude for spraying the incendiary mixture is 20–50 meters, with a burn duration of up to 2 minutes and temperatures exceeding 2300°C.[17]

How it works?

- **Drone equipment**:
  - The drone is fitted with a thermal payload containing a highly flammable chemical mixture capable of burning at extreme temperatures (over 2300°C).

[16] Idem.

[17] Idem.

  - The payload is often derived from incendiary artillery munitions, such as adapted 120mm shells, making it drone-compatible.
- **Drone mission**:
  - The FPV drone is guided by an operator to hover over the target, which could be shelters, enemy equipment, vehicles, ammunition depots, or other exposed assets.
  - Upon reaching the optimal altitude (20–50 meters), the drone releases the incendiary mixture in a spray-like manner.
- **Fire effects**:
  - The incendiary mixture generates extreme heat, capable of melting metals, destroying equipment, and setting enemy positions ablaze.
  - The burning process lasts up to 2 minutes, causing significant human casualties and structural damage to enemy positions.

Advantages of this method

1. **Destruction of strategic targets**:
   - Can rapidly disable armored vehicles, artillery, ammunition depots or other critical enemy assets.
2. **Remote use**:
   - Reduces risk to friendly forces since the attack is conducted remotely via the drone.
3. **Psychological impact**:
   - The incendiary effect induces panic and confusion among enemy troops.
4. **Effectiveness against exposed assets**:
   - Particularly useful against unprepared targets such as outdoor depots or lightly fortified shelters.

Limitations and risks

1. **Drone vulnerability**:
   - FPV drones are susceptible to countermeasures, including anti-drone weapons, electronic jamming or gunfire.
2. **Precision requirement**:
   - The operator must be well-trained to guide the drone accurately and release the payload at the right moment.
3. **Collateral damage**:
   - Fires can spread uncontrollably, endangering nearby areas, including friendly forces, if not properly coordinated.
4. **High costs**:
   - Manufacturing and deploying a drone equipped with thermal payloads can be expensive, especially if the drone is lost during the mission.

Strategic applications

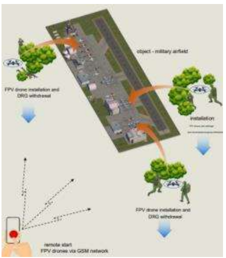
This tactic is particularly useful in asymmetric warfare and can be applied to:

- Neutralizing enemy ammunition and fuel stockpiles.
- Sabotaging enemy infrastructure (vehicles, electronic equipment, logistical depots).
- Creating strategic fires to distract or block access routes.

13. “**FPV PVO**” - *FPV drone in attack*

FPV drones are used to counter reconnaissance UAVs, including fixed-wing aircraft and hexacopters. When UAVs are detected via radio-technical means (operating altitude up to 3 km, speed up to 110 km/h), FPV drones are launched to intercept and destroy them. Enemy UAVs are neutralized either by detonating a fragmentation charge nearby or through direct impact.[18]

14. “**FPV-saboteur**” **-** *covert deployment of sabotage and reconnaissance drones behind enemy lines with remote activation*



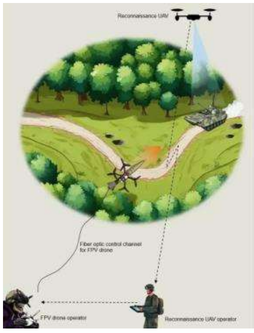
This FPV drone deployment method is utilized by sabotage and reconnaissance teams to destroy or disable enemy military equipment and infrastructure. After covertly placing kamikaze drones (4-6 units) near the target, at a distance of 2-3 km, the drones are set to “standby mode”. These UAVs are then remotely activated via a GSM network signal, allowing them to strike preloaded target coordinates with precision.[19]

15. “**FPV-on the uterus**” **-** *increasing combat range*

[18] Idem.
[19] Idem.

To extend the operational range of FPV drones, “mother” UAVs are used, either in the form of aircraft or copter-type drones. The total carrying capacity is two or three FPV drones. At the same time, their operational range (depending on the type of "mother" UAV) can reach up to 60-70 km. Additionally, unmanned boats (UBC) can also act as “mothers” for FPV drones.[20]

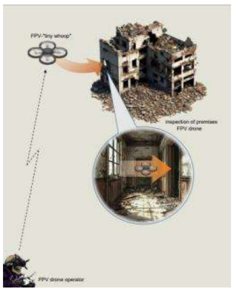
16. “**FPV-on wire**” – *ensuring stable drone control*



To ensure stable control of FPV drones against the impact of electronic warfare systems and to guarantee target destruction at distances of up to 10 km (and up to 25 km for some models), UAVs connected via fiber optic cables are introduced. A distinctive feature of their use is the clarity of the video image up to the final point of the route. Usage specifics include avoiding sudden maneuvers and preventing fires along the route**.**[21]

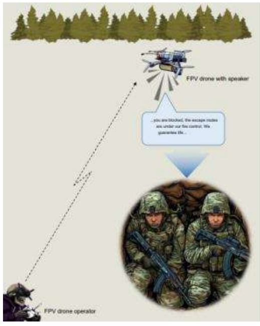
17. “**Inspection of buildings**” **-** *Indoor Space Control*

For enemy detection and building interior control during assault operations, short-range FPV drones of the “tiny whoop” type (microcopters with propeller guards) are used. General performance characteristics: diameter: up to 100 mm; weight: up to 50g; flight time: up to 4 minutes; communication range (*inside buildings*): up to 500 m.[22]



[20] Idem.
[21] Idem.
[22] Idem.

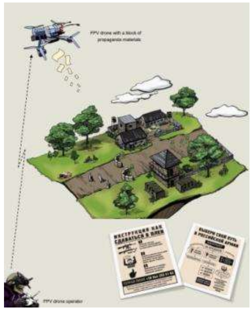
18. "**FPV – swearing speakers**" – *informational and psychological impact on the enemy*



To lower the morale and psychological resilience of enemy forces and compel them to surrender, FPV drones equipped with speakers are deployed to broadcast audio messages over enemy positions. These drones can hover at altitudes of up to 50 meters**.** [23]

19**. "Flying" -** *dropping leaflets from an FPV drone over enemy positions*

As part of psychological and informational warfare tactics, FPV drones are used to drop leaflets over enemy positions. This strategy aims to demoralize opposing troops and influence the civilian population. These drones, capable of carrying up to 2 kg of printed materials (approximately 200 leaflets), fly over target areas and release the leaflets, spreading propaganda or informational messages.[24]



Additional Details:

- **Technology and capabilities:** FPV drones are equipped with video cameras, allowing operators to control flights in real time for precise leaflet delivery.
- **Advantages:**
  - **Precision:** enables direct distribution in targeted areas.
  - **Safety:** reduces risk for personnel by eliminating the need for manned aircraft in hostile airspace.
  - **Efficiency:** can rapidly cover large areas, ensuring wide message distribution.
- **Limitations:**
  - **Payload Capacity:** the maximum weight limit restricts the number of leaflets that can be dropped in a single mission.
  - **Weather Conditions:** strong winds or precipitation can impact both drone flight and leaflet dispersion efficiency**.**

[23] Idem.
[24] Idem.

- **Countermeasures:** drones can be detected and neutralized by enemy defense systems.[25]

II.4. Countering FPV drones

Protection against FPV drones requires both active and passive measures, which must be implemented at both the unit level and individually by each soldier.

Active Measures*[26]*:

1. **Identifying and eliminating FPV drone operator teams:**
   - locating potential launch areas: presence of antennas, specially prepared FPV launch zones, traces of unpacked ammunition, packaging and boxes, suspicious passenger vehicles, drones positioned on high buildings or other infrastructure elements.
2. **Early UAV drone detection:**
   - **Visual:** direct observation.
   - **Auditory:** recognizing the distinct sound of a drone.
   - **Receiving notifications** from commanding officers, observation posts, or nearby personnel about the presence of a drone in the operational area.
3. **Electronic suppression:**
   - using electronic warfare (EW) systems to jam the radio frequencies used by drones for control, video transmission and satellite navigation.
4. **Reducing time spent in high-risk areas:**
   - utilizing fast-moving vehicles to minimize exposure.
5. **Firepower engagement:**
   - destroying drones with firearms at ranges of up to 50 meters.
6. **Mechanical countermeasures:**
   - capturing drones using specialized devices such as “net launchers” at short distances (20-30 meters).
7. **Maneuvering and dispersal:**
   - actively moving and spreading out forces in open areas to avoid drone strikes.
8. **Future developments:**
   - disrupting drone optics by using a wide-beam laser device to blind FPV cameras.

[25] Idem.
[26] Idem.

Passive Measures*[27]*:

1. Additional position fortification:

- preparing anti-drone trenches, building zigzag entryways into shelters, and installing nets and suspended barriers for protection.

2. Camouflaging positions and equipment:

- using camouflage nets with irregular geometric shapes, placed 0.3-0.5 meters away from equipment, in tree shadows or near destroyed buildings.
- utilizing thermal protection cloaks and monitoring visible exposure indicators that could be detected by drones.

3. Creating decoy positions:

- placing heat and light sources to simulate activity.
- constructing fake military equipment and transport models, including non-functional units.

4. Installing protective nets:

- deploying fishing nets along rotation routes to facilitate personnel evacuation and supply deliveries while obstructing drones.

5. Setting up suspended protective elements:

- using canopies, tarps, or anti-drone "domes" to shield sensitive equipment.

6. Aerosol and smoke curtains:

- generating smoke sources at positions to obstruct drone visibility.

7. Adapting to environmental conditions:

- planning active operations and movements based on weather conditions, terrain, and time of day to minimize drone detection.

III. THE FUTURE OF DRONES AND IMPLICATIONS FOR NATIONAL DEFENSE

Romania has made significant investments in modernizing its UAV fleet, acquiring advanced drones such as Bayraktar TB2, Watchkeeper X, and Hermes 450. These investments indicate a clear shift toward integrating drones into the national defense strategy. Future trends include: * ***extending operational range*** – using "mother" drones to transport and launch FPV drones at distances exceeding 60 km; * ***automation and AI*** – developing autonomous drones capable of executing missions without direct human intervention; * ***integration with other combat systems*** – combining FPV drones with artillery and ground units for coordinated strikes.

[27] Idem.

The **Romanian** Army has taken significant steps in modernizing and diversifying its drone fleet[28], integrating both foreign acquisitions and local developments. Below is an overview of the main drones currently in use by the Romanian Armed Forces:

Bayraktar TB2

In April 2023, **Romania** signed a $321 million contract to acquire 18 Bayraktar TB2 drones, along with logistical support and training packages. The first systems began arriving in June 2024.

Watchkeeper X

At the end of 2024, the Ministry of National Defense (MApN) signed a contract with Elbit Systems Ltd. for the acquisition of eight counter-UAV combat systems. The Israeli company announced the deal, valued at approximately $60 million, with deliveries planned over the next three years. The agreement includes the delivery of ReDrone multi-layer counter-UAV systems, integrating: DAiR advanced radar; data collection sensors; signal intelligence (SIGINT) capabilities for decryption, interpretation and analysis; electronic warfare (EW) countermeasures; electro-optical payloads for day and night operations; advanced electronic attack capabilities.[29]

Hermes 450

Elbit Systems has proposed the Hermes 450 drone, with plans for production in **Romania**[30]. This UAV features: length: 6 meters; speed: up to 176 km/h; operational altitude: up to 5,500 meters; range: up to 300 km.

---

[28] Anca Grădinaru, 2025. *Ministerul Apărării Naționale cumpără opt sisteme antidronă de 60 de milioane de dolari*, available at https://romania.europalibera.org/a/ministerul-apararii-nationale-cumpara-8-sisteme-antidrone-de-60-de-milioane-de-dolari/33265166.html, accessed on 08.02.2025.

[29] Idem.

[30] Umbrela Strategică. 2022. *Contractul privind achiziția drone pentru Armata Română: Elbit Systems a depus soluția tehnică și așteaptă decizia finală*, available at https://umbrela-strategica.ro/contractul-privind-achizitia-drone-pentru-armata-romana-aproape-de-semnare, accessed on 08.02.2025.

Tactical Heron

In October 2021, Israel Aerospace Industries (IAI) and **Romanian** Aeronautical Industry (IAR) signed a partnership to manufacture the Tactical Heron drone in Brașov. The agreement also includes training programs for specialized operators and technicians.

Phoenix 30

Romania has received **Phoenix 30 drones**, quadcopters weighing approximately **14 kg**, with a **maximum speed of 55 km/h**. These drones are equipped with **Dragon View sensors** for enhanced surveillance and reconnaissance capabilities.

IV. CONCLUSIONS

FPV drones have fundamentally changed the dynamics of modern warfare, influencing both military tactics and the organization of combat units. They enable rapid and precise operations, reducing troop exposure while maximizing strike efficiency. However, their effective use requires rigorous training, and their vulnerabilities necessitate the development of robust protection strategies.

Due to their high speed, flexibility, and resistance to electronic warfare, FPV drones play a crucial role in reconnaissance, precision strikes, and logistical support. Their integration into military operations has led to new tactical approaches, such as coordinated swarm attacks, combined strikes, and sabotage or infiltration missions. However, FPV drones also have vulnerabilities, including: dependence on skilled operators, limited operational range, exposure to electronic and physical countermeasures.

In the future, armies that successfully integrate drones with artificial intelligence (AI), automation, and flexible combat structures will gain a decisive advantage on the battlefield.

The essential advantages of drones for Romanian military operations consist in enhancing the ISR capabilities of the Romanian Army, increasing efficiency in threat detection, improving tactical response in hybrid conflicts where rapid attacks and precise information are essential, as well as adaptability to different scenarios – from border patrol to coordinating aerial attacks.

BIBLIOGRAPHY

ENDOACUSTICA. s.a., *FPV Drone Tactics and Countermeasures*, available at https://www.endoacustica.com/fpv-drone-tactics.php.;

GLOBAL DEFENSE NEWS, 2024, *Ukraine Demonstrates Efficiency of FPV Drones Against Russian BM-27 Multiple Rocket Launcher*, available at https://armyrecognition.com/focus-analysis-conflicts/army/conflicts-in-the-world/ukraine-russia-conflict/ukraine-demonstrates-efficiency-of-fpv-drones-against-russian-bm-27-multiple-rocket-launcher;

GRĂDINARU A., 2025, *Ministerul Apărării Naționale cumpără opt sisteme antidronă de 60 de milioane de dolari*, available at https://romania.europalibera.org/a/ministerul-apararii-nationale-cumpara-8-sisteme-antidrone-de-60-de-milioane-de-dolari/33265166.html.;

SAMUS M., 2024, New Strategy Center, *Lessons learned from the war in Ukraine. The impact of drones*, available at https://-newstrategycenter.ro/wp-content/uploads/2024/02/Lessons-Learned-from-the-War-in-Ukraine.-The-impact-of-Drones-2.pdf.;

UMBRELA STRATEGICĂ, 2022, *Contractul privind achiziția drone pentru Armata Română: Elbit Systems a depus soluția tehnică și așteaptă decizia finală*, available at https://umbrela-strategica.ro/contractul-privind-achizitia-drone-pentru-armata-romana-aproape-de-semnare;

WENNERHOLM D., 2024, Uppsala Universitet, Institute for Russian and Eurasian Studies, *Above the trenches, Russian military lessons learned about drone warfare from Ukraine*, Master's thesis, available at uu.diva-portal.org/smash/get/diva2:-1932309/FULLTEXT01.pdf.