

SMALL DRONES AND BATTLEFIELD TRANSPARENCY: ISR-STRIKE INTEGRATION IN MODERN MILITARY OPERATIONS

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Abstract: *The article examines the influence of unmanned strike systems and video-audio surveillance technologies on military operations at the tactical, operational, and strategic levels. Drawing on recent conflict analysis — particularly the Russo-Ukrainian war — and on a qualitative case study conducted during the joint combined-arms exercise Cadet 2025, organized by the Nicolae Bălcescu Land Forces Academy of Sibiu, the research argues that small drone platforms equipped with integrated video-audio sensors have fundamentally reconfigured the ISR-to-strike chain. The study demonstrates that such systems accelerate the decision-making cycle, enhance battlefield transparency, and extend organic reconnaissance capabilities to the lowest tactical echelons. A key finding is the functional interdependence between surveillance and strike: the same platform can sequentially observe, identify, transmit, support command decisions, and engage priority targets. The article further analyses differentiated effects across multiple branches — infantry, artillery, reconnaissance, engineers, armour, CBRN, logistics, and mountain troops — an analytical angle underrepresented in existing literature. At the strategic level, mass drone employment reshapes perceptions of information superiority and operational cost. The conclusions underscore that doctrinal, organizational, and educational adaptation is not optional but essential for future military effectiveness.*

Keywords: Unmanned Aerial Systems, Battlefield Transparency, ISR-Strike Integration, Decision Cycle Compression, Military Transformation

1. Introduction

The rapid proliferation of unmanned aerial systems and video-audio surveillance technologies has fundamentally altered the conditions under which military operations are planned and executed. As Kunertova has demonstrated, the security studies community significantly underestimated the extent to which small, lightweight drones could deliver tactical outcomes, overlooking their potential for large-scale deployment down to the level of individual soldiers.[1] This transformation is no longer prospective; it is actively reshaping contemporary conflict. Yet a gap persists in the literature: while operational and strategic-level effects of unmanned systems are well documented,

their differentiated impact across all combat arms branches at the lower tactical echelons—and their empirical testing within the training environment of a small NATO-member military academy—remains insufficiently examined. This article addresses that gap. To our knowledge, no existing study combines empirical testing in a small NATO-member state military academy using commercially assembled drone platforms with a simultaneous analysis of ISR-strike integration effects across all combat arms branches.

In an operational environment characterized by volatility, uncertainty, complexity, and ambiguity, anticipating technological developments has become an essential

condition for strategic success. [2] Accordingly, the integration of unmanned systems and video-audio surveillance technologies represents not merely a technical modernization effort, but a necessary adaptation of the military instrument of power to the new realities of contemporary confrontation.

Where the acquisition of strategic intelligence once depended exclusively on observation satellites, manned aerial platforms, SIGINT/ELINT systems, and naval reconnaissance assets, today an unprecedented expansion of these capabilities toward the lowest tactical echelons—platoon, squad, and specialized small team—can be observed. Molloy (2024) describes this process as one in which small FPV drones have become force multipliers, providing soldiers with real-time video feedback that enables them to track enemies, direct artillery, and make informed decisions without exposing themselves to danger. [3]

This article analyses the influence of unmanned strike systems and video-audio surveillance technologies on military operations at the tactical, operational, and strategic levels. It draws on the existing literature, lessons from the Russo-Ukrainian war, and empirical observations from the joint combined-arms exercise *Cadet 2025*, conducted at the Perii Dăii training area near Sibiu, Romania.

2. Conceptual Landmarks on Unmanned Strike Systems and Video-Audio Surveillance Technologies

Unmanned strike systems and video-audio surveillance technologies form part of a broader transformation in the collection, processing, and operational exploitation of information in military operations. From a doctrinal perspective, these capabilities fall within the ISR framework -- Intelligence, Surveillance and Reconnaissance -- regarded by NATO as a fundamental pillar of military operations. Situational awareness, defined as the perception of

elements in the environment, their meaning, and their projected status [4], has always conditioned decision quality; what has changed is the echelon at which it can be generated and the speed at which it translates into action.

2.1 From Strategic Assets to Tactical Echelons

In earlier decades, strategic intelligence collection depended on satellites, manned platforms such as the Boeing E-3 Sentry, SIGINT/ELINT systems, and naval reconnaissance assets. What Raska identifies as the sixth Revolution in Military Affairs is characterized by the diffusion of advanced dual-use technologies, developed commercially and then spun on to military applications.[5] The earliest unmanned systems - the British Aerial Target (1917) and the American Kettering Bug (1918) - established the concept; the Cold War Ryan Firebee/AQM-34 demonstrated operational ISR value in Vietnam; subsequent advances in communications, sensors, and data processing enabled the transition from reconnaissance toward direct target engagement. Today, capabilities once reserved for operational-level formations are accessible to platoons and squads.

2.2 The Democratization of ISR

Small and very small unmanned systems have introduced advanced video-audio surveillance and persistent reconnaissance into the tactical battlespace. Kunertova documents that small drones have proven useful in ground combat, giving units down to the platoon level their own airborne capability for real-time imagery reconnaissance.[1] FPV systems are described by Molloy as cruise missiles in a backpack - a force multiplier with the capacity both to achieve precision strikes and to offer real-time video feedback, providing soldiers with information to track enemies, direct artillery, and make informed decisions without exposure to danger.[6] Commercial platforms - compact, rapidly deployable, equipped with thermal sensors and AI-assisted analytics - complement

purpose-built systems such as the RQ-11 Raven and the 70-gram Black Hornet 4. Military literature confirms that UAVs are employed not only for reconnaissance but also for target designation and direct engagement.[3]

2.3 ISR-Strike Integration and Decision Cycle Compression

Integrating surveillance and strike generates a qualitative change in operational tempo. Kunertova provides the key benchmark: digitized command and control connecting drones and artillery batteries can reduce engagement time from detection to strike to just a few minutes, whereas the same operation without drones can take half-an-hour and have less accuracy. Molloy substantiates this with the Ukrainian Kropyva system, in which drone-relayed coordinates were automatically converted into firing data. On the Russian side, Watling and Reynolds document the refinement of the Reconnaissance Fires Circuit to make it more responsive and flexible, with axis commanders retaining a permanent UAV orbit above the fighting.[7] This structural convergence transforms the OODA cycle from a sequential loop into a near-simultaneous process in which the same platform can observe, identify, transmit, support the decision, and - under certain conditions - engage the target.

2.4 Battlefield Transparency as a Systemic Effect

The cumulative effect of ubiquitous low-cost ISR is a restructuring of the relationship between visibility and freedom of action. Kunertova captures this concisely: drones, cheap and ubiquitous, are changing the character of warfare itself, and their presence encourages the tactics of deception and dispersal. Watling and Reynolds quantify this environment: between 25 and 50 UAVs from both sides typically operate over each 10-kilometre stretch of frontage. Commercial drones equipped with thermal imaging extend this transparency into night and obstructed terrain. The consequence is that concealment, surprise, and freedom of

action - foundational assumptions of classical doctrine - can no longer be taken for granted at any echelon.

2.5 Doctrinal Implications and the Research Gap

This transformation demands deliberate doctrinal, organizational, and educational adaptation. Molloy (2024) observes that preparing humans to partner with machines requires major adjustments to military institutions and their processes, including how people are recruited, trained, educated, and incentivised. Raska (2020) situates the challenge systemically: diffusion of AI-enabled capabilities demands new operational constructs and force structures. Watling and Reynolds (2023) illustrate the cost of delayed adaptation: Russian fire-control simplification was driven by operational failure, not proactive doctrinal innovation. The international literature establishes a solid framework for ISR democratization, kill chain compression, and battlefield transparency. What remains less explored is the application of this framework within small NATO member-state armed forces using commercially sourced equipment -- and the differentiated effects across all branches simultaneously. It is this gap that the present research addresses through empirical evidence generated during the *Cadet 2025* exercise at Perii Dăii Training Area near Sibiu.

3. Methodology and research hypotheses

Based on the conceptual landmarks outlined above, this research is built upon the following main hypothesis: *Small drone platforms equipped with integrated video-audio surveillance systems enable the acquisition of real-time data on the enemy, terrain, and friendly forces, thereby contributing to the formulation of an appropriate, rapid, and proportionate tactical response to the operational situation.*

From this primary hypothesis, several secondary hypotheses can be derived:

- *The employment of small drones at the lower tactical level reduces commanders' uncertainty by rapidly providing imagery, acoustic information, geolocation data, and indicators regarding enemy intentions;*
- *The integration of video-audio data into command and control processes accelerates the Observe–Orient–Decide–Act (OODA) cycle and enables more precise target engagement;*
- *Close aerial surveillance contributes not only to enemy observation, but also to the assessment of friendly force disposition, tactical discipline, camouflage effectiveness, vulnerabilities, and unit reactions in the field;*
- *The effectiveness of these systems depends on personnel training, information transmission procedures, communications protection, and commanders' ability to convert raw data into tactical decisions.*

To verify these hypotheses, the research adopts a qualitative illustrative case study approach centred on the joint combined-arms tactical exercise *Cadet 2025*, conducted at the Perii Dăii Training Area near Sibiu, and organized by the academic staff of *Nicolae Bălcescu* Land Forces Academy. Empirical observations were collected through structured instructor field notes recorded during exercise execution, post-exercise debriefing sessions conducted with subunit commanders, and direct assessment by academic staff present throughout all phases of the exercise. The case study methodology is appropriate here because it enables in-depth examination of a bounded real-world context—specifically, the integration of small commercial drones into multi-branch combined-arms training—where quantitative measurement is neither feasible nor the primary analytical objective. As Yin [8] argues, case studies are particularly suited to research questions asking how and why phenomena occur in their natural settings, and to contexts where the researcher has limited control over events. The hypothesis that close aerial surveillance accelerates the decision-making

cycle is itself anchored in a well-established analytical framework: the Observe–Orient–Decide–Act loop, which, as Bode and Watts note, "*helps to visualise the relationship between the human and the system in specific situations when targets are selected and engaged*".[4] Applying this framework to the case study context provides a theoretically grounded basis for evaluating the compression of the observation-to-action timeline within the exercise scenarios.

The exercise scenario integrated structures representing multiple branches and military specialties—including infantry, artillery, reconnaissance, armour, combat engineers, CBRN defence, logistics, and mountain troops—thereby providing a realistic environment for evaluating both the main research hypothesis and its derived working hypotheses. Within this case study setting, small drones equipped with video sensors and real-time observation capabilities were employed for route reconnaissance, simulated enemy force identification, surveillance of tactical areas of interest, battle damage observation, and the rapid transmission of information to command echelons. The information obtained enabled continuous updating of the operational picture, reduced uncertainty regarding enemy intentions, and facilitated the rapid adaptation of friendly force disposition in accordance with the evolving tactical situation.

The combined-arms and joint character of the exercise enabled hypothesis testing within a complex operational environment in which information collected by unmanned aerial platforms was exploited in differentiated ways: for target detection and localization in artillery fire support; for manoeuvre guidance of infantry and mountain units; for obstacle reconnaissance and fortification assessment in engineer support; for identifying CBRN risks; and for protecting logistical elements and lines of communication.

Preliminary case study results demonstrated that the integration of video-audio

surveillance systems on small tactical drones contributes significantly to enhanced situational awareness, compression of the observation-to-reaction timeline, improved tactical decision quality, and increased force protection. At the same time, the exercise showed that such capabilities can no longer be regarded merely as auxiliary reconnaissance tools, but rather as operational components directly contributing to the synchronization of manoeuvre, fires, force protection, and logistical support in modern military operations.

Several methodological limitations should be acknowledged. The case study is based on a single exercise session conducted in a specific training environment, which constrains the generalizability of findings to other operational contexts, force structures, or geographic conditions. The absence of quantitative performance metrics—such as measured engagement times or target accuracy rates—means that conclusions rest on qualitative observation and instructor assessment rather than on systematically collected numerical data. These limitations are consistent with the exploratory and illustrative character of the study, which aims to validate the logical coherence of the research hypotheses rather than to produce statistically representative findings.

4. The Functional Interdependence Between Strike and Surveillance Capabilities

The interdependence between surveillance and strike capabilities represents one of the defining structural features of contemporary military operations. This relationship is not incidental; it reflects a deeper transformation in the organisation of the kill chain. As Watling and Reynolds observe in their analysis of Russian tactical adaptation in Ukraine, the refinement of the Reconnaissance Fires Circuit—the Russian term for the kill chain—has made it *"more responsive and more flexible in delivering fire to support manoeuvring forces"*.^[7] This

observation points to a broader principle: the value of a surveillance asset is no longer confined to the information it generates, but extends to the speed and precision with which that information can be converted into a targeting decision and, ultimately, into a strike effect.

This compression of the observation-to-strike interval has been quantified in recent conflict analysis. Kunertova notes that *"digitized command and control connecting drones and artillery batteries can reduce engagement time from detection to strike to just a few minutes. The same operation without drones can take half-an-hour and have less accuracy"*.^[1] The implication is significant: what was formerly a multi-echelon, time-consuming process—target detection, report, verification, fire mission submission, authorization, and execution—is collapsing into a single integrated loop operating at a speed that fundamentally alters the tempo of tactical engagement. At the heart of this loop is the unmanned aerial platform, which functions simultaneously as a sensor, a relay node, and, under certain conditions, a strike asset.

The dual function of surveillance and strike within a single platform is no longer a theoretical construct. At present, unmanned aerial platforms no longer perform exclusively observation, reconnaissance, or battlefield imagery transmission roles; they may also become means of direct target engagement. Thus, the same platform can successively perform several operational functions: it observes, identifies, tracks, transmits information, supports the commander's decision-making process, and, under certain conditions, contributes to the neutralization of the target considered to be of highest priority.

This functional relationship was tested empirically during the joint combined-arms exercise **Cadet 2025**, conducted in the Perii Dăii training area near Sibiu, Romania. During the exercise, a low-cost commercial drone—assembled by a military student from components procured through

commercial online channels—was initially deployed in a video-audio surveillance role. The platform provided real-time data on the disposition, commands, and observable intentions of subunit commanders operating in the field. Its reduced dimensions permitted discreet operation without immediate detection by the simulated opposing forces.

In accordance with the exercise scenario, the platform subsequently shifted its operational role. Having provided continuous surveillance of infantry subunits, the drone was redirected to observe enemy armoured elements. Based on the transmitted data and a rapid assessment of the threat presented, the commander decided to transform the platform from a reconnaissance asset into a kamikaze-type strike means, directing it against the target assessed as posing the greatest tactical risk: a tank. The strike was symbolically marked by means of a flour bag, a solution that enabled the impact to be clearly indicated without the use of real destructive means.

The experiment confirmed the primary research hypothesis: video-audio surveillance systems integrated on unmanned aerial platforms enable the acquisition of real-time data on the adversary and can generate an appropriate tactical response within a compressed decision cycle. In the case analysed, the value of the drone did not reside solely in its capacity to observe, but in the fact that the information obtained altered the commander's decision calculus and enabled the rapid reorientation of action against a priority target. The chain of *observation — identification — assessment — decision — strike — effects verification* was executed without interruption, by a single low-cost platform assembled outside the formal defence procurement system.

From a doctrinal and organizational perspective, this experiment demonstrates that small commercial drones, although not initially designed as military strike systems, can acquire genuine operational value

through their integration into command and control processes. Such integration is not automatic: it requires clear employment procedures, adequate operator training, and a rigorous prior assessment of tactical, legal, and ethical risks. The experiment does not generalize to all operational contexts; it represents a controlled, illustrative case study conducted within the specific conditions of a combined-arms academic exercise in a NATO member state with limited resources.

Nevertheless, the logic it demonstrates is consistent with observations from contemporary conflicts: the interdependence between surveillance and strike redefines the role of small tactical subunits, which may benefit from a significantly higher degree of informational and operational autonomy than in previous conflicts. The commander at the lower tactical level—squad, platoon, or company—no longer depends exclusively on information transmitted by higher echelons, but can directly acquire, interpret, and exploit data from the proximity of the battlefield, transforming information into decision and decision into measurable effect. The differentiated manifestation of these dynamics across distinct branches and force elements is examined in the following section.

5. Effects on Military Operations at the Tactical, Operational, and Strategic Levels

Small drones equipped with video-audio surveillance capabilities produce differentiated but cumulative effects at the tactical, operational, and strategic levels of military action. At each level, their contribution is distinct in nature and scope, yet the three levels remain functionally interconnected through the common logic established in the preceding section: observation enables decision, and decision enables effect.

At the tactical level, the impact is the most immediate and visible. The drone functions as a forward organic sensor for the subunit,

providing close aerial perspective ahead of troops, over dangerous areas, and around covered or concealed positions, without exposing personnel to direct risk.

For infantry, these means allow route reconnaissance, ambush detection, building surveillance, identification of firing positions, flank observation, and assessment of the adversary's reaction. As Kunertova notes, *"small drones have proven useful in ground combat, giving units down to the platoon level their own airborne capability for real-time imagery reconnaissance"*.^[1] The squad or platoon thus gains a close aerial perspective that improves movement security and the quality of the commander's decision.

For artillery, small drones play an essential role in target detection, identification, and fire adjustment. They can determine target coordinates, establish the nature and characteristics of targets, confirm enemy positions, and observe the effects of strikes. Molloy documents that, in Ukraine, when targets are spotted, *"their coordinates are relayed to commanders through secure messengers and entered into an Automatic Tactical Management System, 'Kropyva', that allows commanders to enter target coordinates into a tablet, and then the direction of firing and the distance to the target are calculated automatically"*.^[6] This integration reduces artillery response time dramatically, enabling more accurate fire with lower ammunition consumption.

For reconnaissance subunits, the experiment demonstrated that small drones extend the observation range of patrols and reduce the risk of exposing personnel. Watling and Reynolds document that, in active combat sectors, *"it is typical for there to be between 25 and 50 UAVs from both sides operating over the contested area between the forward line of own troops and forward line of enemy troops at any given time for each 10 km of frontage"*,^[7] illustrating the degree to which small drones have saturated the lower airspace as a reconnaissance tool.

For tank and mechanized infantry subunits, mini-drones can identify nearby threats, anti-tank positions, terrain favourable to manoeuvre, and areas where armoured vehicles may become vulnerable. The experiment conducted during Cadet 2025 highlighted that a small commercial drone can shift from discreet surveillance to the symbolic engagement of an armoured target assessed as a priority — a shift consistent with Kunertova's observation that *"using consumer quadcopters to drop grenades can give individual soldiers on both sides a limited precision combat capability"*.^[1]

For engineer subunits, drones support obstacle reconnaissance, the identification of fortification works, damage assessment, and route verification. They can assist in selecting crossing points, checking bridges and roads, and monitoring works carried out by friendly troops, thereby accelerating decisions on mobility, counter-mobility, and protection.

For CBRN defence subunits, drones can be used to observe contaminated or suspected areas, verify the direction of movement of toxic clouds, or limit personnel exposure. During the Cadet 2025 experiment, a commercial agricultural drone was also employed for the transport and spraying of decontamination substances — demonstrating a direct operational application beyond mere reconnaissance. For logistics, the experiment confirmed that small drones can support convoy protection, surveillance of supply routes, identification of blockages, and monitoring of staging areas. Given that logistics represents a priority target in modern conflicts, these means contribute to preventing surprise and maintaining continuity of support. For mountain troop subunits, which operated in the Crinț area of the Cindrel Mountains, drones proved particularly valuable in difficult, fragmented, or forested terrain. They enabled the observation of valleys, ridgelines, passes, ambush areas, and alternative routes, reducing both physical effort and patrol exposure risk.

At the operational level, the effects of small drones are reflected in the improved coordination between branches, the real-time updating of the operational picture, and the acceleration of command and control processes. Data transmitted by tactical drones — imagery, geolocation, acoustic indicators — can be integrated, with artificial intelligence support, into a common operational picture that supports target prioritization, the synchronisation of manoeuvre with fires, and the protection of critical assets. As Raska observes, the networking of varying command, control, communications, computers, intelligence, surveillance, and reconnaissance architectures enables novel situational awareness capabilities across an extended area of operations.[5] Information collected at the tactical level thus becomes directly relevant for operational planning, particularly when it indicates enemy main effort directions, vulnerabilities in the adversary's disposition, or rapid changes in the situation.

At the strategic level, small drones contribute indirectly to shifting the conditions of warfare by increasing battlefield transparency, multiplying information sources, and altering the calculus of risk associated with maintaining large, visible, and expensive platforms in the area of operations. Their massed, dispersed, and integrated employment can influence perceptions of information superiority and the cost-effectiveness of conventional force structures. In contemporary conflicts, they have contributed to the identification of high-value targets, the documentation of strike effects, and the shaping of public discourse through real-time imagery from the battlefield. Kunertova captures the systemic character of this transformation: *“drones, cheap and ubiquitous, are changing the character of warfare itself. Their presence in the sky with onboard sensors and data processing encourages the tactics of deception and dispersal”*. [1] A synthetic overview of the principal effects identified across branches and levels of action is presented in Table 1 below.

Table 1 Synthetic overview of the principal effects of small drones by level of action

Level of Action	Principal Effect of Small Drones	Source
Tactical — infantry	Observation without exposure, ambush detection, route reconnaissance	Kunertova (2023)
Tactical — artillery	Reduction of the engagement cycle from 30 min to 3–5 min	Molloy (2024)
Tactical — reconnaissance	Extended observation range, reduced personnel exposure	Watling & Reynolds (2023)
Tactical — armoured units	Identification of threats and vulnerabilities; symbolic strike capability	Cadet 2025
Tactical — engineers	Obstacle and fortification reconnaissance, route verification	Cadet 2025
Tactical — CBRN	Observation of contaminated areas, decontamination agent spraying	Cadet 2025
Tactical — logistics	Route surveillance, convoy protection, staging area monitoring	Cadet 2025
Tactical — mountain troops	Observation in fragmented terrain, reduced patrol exposure	Cadet 2025
Operational	Updated operational picture, synchronisation of manoeuvre with fires	Raska (2020)
Strategic	Battlefield transparency, multiplication of information sources	Kunertova (2023)

In conclusion, small drones should not be regarded merely as auxiliary reconnaissance assets, but as tactical instruments with cumulative operational and strategic effects. As illustrated in Table 1, they establish a direct link between information, decision, and action at all levels of military command — a link whose character and speed are examined in the lessons drawn from recent conflicts in the following section.

6. Results and Lessons Learned from Recent Conflicts

The lessons drawn from the Russo-Ukrainian war provide the primary empirical validation for the hypotheses formulated in this study, confirming that small drones enable real-time data acquisition, reduce commanders' uncertainty, accelerate the decision-making cycle, and generate appropriate tactical responses across all branches of service.

A first lesson is that close aerial surveillance has descended to the level of the smallest subunits and has simultaneously imposed fundamental behavioural change on all forces operating in the observed space. Small drones proved useful in ground combat, giving units down to the platoon level their own airborne capability for real-time imagery reconnaissance. Persistent aerial observation modifies adversary behaviour in equal measure: concealment, dispersion, short-duration movement, and avoidance of grouping become conditions for survival rather than optional tactical choices. Battlefield transparency thus operates in both directions — enhancing situational awareness for the observing force while constraining freedom of action for the observed one.

A second lesson concerns the compression of the artillery engagement cycle. Digitized command and control connecting drones and artillery batteries can reduce engagement time from detection to strike to just a few minutes, whereas the same operation without drones can take half-an-hour and have less accuracy. Molloy (2024) adds a concrete Ukrainian example: when targets

are spotted, their coordinates are relayed to commanders through secure messengers and entered into the Kropyva automatic tactical management system, which calculates direction of fire and distance automatically.[6]

A third lesson relates to the functional interdependence between surveillance and strike. Both Russian and Western sources describe FPV drones being used not only for reconnaissance and fire correction but also for direct target engagement. Watling and Reynolds document the refinement of the Russian Reconnaissance Fires Circuit to make it more responsive and more flexible in delivering fire to support manoeuvring forces.[7] This sequence — reconnaissance, electronic warfare support, FPV strike, manoeuvre occupation — replicates at operational scale the logic demonstrated in the Cadet 2025 experiment, where a commercial drone shifted from surveillance to a symbolic strike against a tank, the impact marked with a flour bag. The conflict in Ukraine confirms that heavy armoured platforms are vulnerable to cheap, small, and difficult-to-detect drones regardless of the scale at which this logic is applied.

A fourth lesson covers reconnaissance, engineer, and logistics structures, where the primary drone effect is reduction of personnel exposure. For reconnaissance, Watling and Reynolds report that between 25 and 50 UAVs from both sides are typically operating over the contested area between forward lines at any given time for each 10 km of frontage,[7] making force disposition and movement increasingly difficult to conceal. For engineer troops, drones enable rapid obstacle and fortification reconnaissance without direct personnel exposure, as demonstrated at Cadet 2025. For logistics, analysis of Ukrainian lessons learned for NATO member-state armies indicates that battlefield saturation with drones complicates even medical evacuation and requires the use of unmanned systems for logistics and extraction.[9]

A fifth lesson relates to electronic warfare and countermeasures. Watling and Reynolds document that the Russian military has rolled out counter-UAS capabilities to each platoon, including directional jammers and arrays for hijacking UAVs.[7] Reuters has reported that Ukraine is developing layered defence systems against drones, integrating interceptor drones, electronic warfare, and conventional air defence means.[10] The effectiveness of small drones therefore depends critically on communications resilience, signal protection, and the pace of technological adaptation — a constraint that applies equally to the low-cost COTS platforms tested at Cadet 2025.

A sixth lesson concerns doctrinal and organizational adaptation. Ukraine has created dedicated unmanned systems structures and moved toward mass production, while NATO member states are actively extracting Ukrainian lessons regarding counter-drone defence and technological adaptation. Molloy frames this as a necessary but difficult cultural evolution requiring major adjustments to military institutions, including how people are recruited, trained, educated, and incentivised.[6]

In conclusion, the six lessons drawn from the Russo-Ukrainian war confirm all four hypotheses formulated in the paper. Small drones acquire real-time data, reduce uncertainty, accelerate the commander's decision-making process, and enable appropriate tactical responses across multiple branches of service. The Cadet 2025 experiment validates, at a qualitative illustrative scale, the same logic observed in recent operational experience: close aerial video-audio surveillance can be rapidly transformed into decision and, when the situation requires it, into strike effect.

Conclusions

The analysis confirms that unmanned strike systems and video-audio surveillance technologies fundamentally transform the

planning, command, and execution of military operations. The main research hypothesis was validated both through the examination of the Russo-Ukrainian war and through the qualitative case study conducted during the joint combined-arms exercise Cadet 2025 at the Perii Dăii training area. Real-time data acquired via small drone platforms enhanced enemy identification, terrain observation, force protection, and the quality of tactical decision-making across all branches involved.

The article offers two original contributions to the existing literature. First, it provides empirical grounding from a small NATO-member state military academy operating with limited resources and commercially assembled drone platforms — a perspective absent from the major reference sources. Second, it analyses the effects of these systems simultaneously across all combat arms (infantry, artillery, reconnaissance, armour, engineers, CBRN, logistics, and mountain troops), an angle not covered by any single reference work in the corpus.

Several limitations must be acknowledged: the findings derive from a single exercise session conducted in a specific operational context, which constrains generalizability. Future research should examine multi-session replication, quantitative performance metrics, and the integration of counter-drone measures into training scenarios.

As Molloy notes, "*changing programs of education and training to prepare humans to partner with machines is a necessary but difficult cultural evolution*".[6] Success in future operations will depend on commanders' capacity to transform battlefield data into decision and effect — and on institutions willing to build that capacity systematically.

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