

MANNED-UNMANNED WARFARE IN MOUNTAINS: ASSESSING LATEST TRENDS

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Abstract

The Ukraine conflict has thrown up a number of challenges to ways of conducting war, as also thrown open windows to gain asymmetric leaps against formidable capabilities. This discussion draws some lessons especially in teaming manned and unmanned assets. This is examined in a mountain template with specific focus on helicopter-UAV teaming, a multi-domain context, and newer concepts in a fast-changing and adaptive character of war. Many recommendations are made along the discussion **and the short scenario depicted.**

INTRODUCTION

The Russo-Ukraine conflict has questioned many fondly-held western concepts and tactics of conducting military operations. While it has thrown up many questions on existing platforms on land, sea and air, airpower employment, or rather the lack of it as perceived, has generated the largest critique. For example, a vexing issue is the size and integration of vulnerable manned platforms and a growing expendable unmanned component, both combat and its support, in such intense and contested battlefields. This article explores the analyses from both sides of the battle-lines, and suggests some lessons for India especially against the Chinese Military (PLA) context

across the mountainous Line of Actual Control (LAC) with emphasis on helicopter/UAV teaming.

In an environment of false narratives, lack of credible data and hyper-marketing strategies of the military-industrial complexes, it is important to see through the fog of technological promises, and grasp the nuances of the complex, uncertain and fast-changing ways of military campaigns. This is important so that large investments in capability-building are not laid waste tomorrow. **The issue of armed one-way drones** and manned-unmanned teaming (MUT) in a conflict against China along the LAC could be a game changer.

TACTICAL AIRPOWER LESSONS FROM RECENT CONFLICTS

Changing Paradigms and Doctrinal Shifts

The NATO campaigns of 1990s including wars in Gulf, Bosnia and Kosovo, altered military doctrines by signalling airpower as a primary instrument for force-projection and geo-strategic interventions. It was only a matter of time before nations not having such full-spectrum airpower capabilities would evolve asymmetric means to counter. This dominance of airpower is increasingly being questioned after almost two decades in the form of low-cost and easily procurable air-denial capacities. Just as proponents advocated air supremacy or even favourable air situation in time and space, asymmetric adversaries are touting air-denial in similar dimensions. The situation in Ukraine is testimony that despite far superior air power capabilities and sweeping control of the air, Russian air assets have been severely constrained in operating freely over Ukraine.¹

However, that question and dilemma of attrition is facing many ground assets too because of the constant surveillance, fixing and targeting by an adversary's networked systems, for example, weapons like US' HIMARS against artillery and armour. A truly integrated force rather than just combined-arms seems to be the only way forward, along with attrition-resilience and supply chains to sustain intense combat over long durations.²

Analysts are even wondering if basic manned airpower precepts need to be reworked. Is a framework of mutual air-denial over critical periods leading to relegation of manned airpower's primacy? Is air superiority a done and dusted concept, even if it was never an end in itself but a means to a victorious end? Has leapfrogging technology in anti-aircraft sensors and missiles, autonomous and cheap unmanned platforms, among many others completely changed the variables in the equation? The answer lies in honest analysis of effectiveness and cost-benefit in terms of men, material and money.

Even more, innovative thinking, adaptability and quick-fire solutions at the tactical level have emerged as great disruptors and battle-winners. Decentralisation and dispersal are key words in any domain to survive an otherwise debilitating surprise attack in all domains. Jam-proof and secure networking of all these assets in real-time is crucial, as is built-in redundancy and flexibility of plans. It has again demonstrated the most important aspect in warfare - the cognitive domain.

Air denial does not come cheap. It has to be multi-tiered with multiple weapon options, and dense enough to overlap as an impenetrable matrix. Over larger areas this is an expensive and prohibitive option as seen in the consumption and attrition of large numbers of western supplied ground-based air defence systems. Uninhabited Aerial Vehicles (UAVs) seem to be a cheaper option than exorbitantly expensive manned aircrafts in diluting air-denial. However, as demonstrated in the myth cum failure of the Turkish Bayraktar, the adversary is on a fast-learning curve and adapts in time. In fact, the Russians, using longer-range and far cheaper 'one-way' drones like the Iranian Shahed have completely upset the cost-benefit equation for Ukrainian air defence forces. With depletion in capabilities as a campaign progresses, swarms of expendable UAVs could overwhelm even multi-tiered air defences and cause confusion and attrition. This could then be followed up with combination of manned and unmanned platforms in offensive action through sanitised corridors.

AVIATION EMPLOYMENT DILEMMAS

In the first few days, air strikes were carried out **by Russia** against hundreds of targets including long-range radar installations, air defence systems, and logistics sites along main lines of advance. These were supported by electronic jamming and use of decoys. Ground Based air defence systems such as S-300 and S-11 were jammed or hit by missiles quite effectively.³ Except for the initial week where concerted efforts went in for SEAD/DEAD to gain air superiority, once the first scenario of 'shock and awe' failed, the Russians began conserving efforts and limit it to the actual battle in the east of Ukraine. However, this permitted a regrouping and revitalising of Ukrainian ground-based air defence systems, which in turn allowed the attrition of Russian air assets to increase. It forced ground-attack and support missions to fly low but straight into the man-portable AD missile envelope. These had been supplied on a very large-scale by NATO, and NATO advisors backed by the best intelligence surveillance and reconnaissance (ISR) inputs of the west positioned these very efficiently.

According to western reports, in just a week eight aircraft were shot down by these **West-supplied weapons including** Su-25, Su-30 and Su-34 jets.⁴ The Russian Air Force (VKS) had to resort to firing Kh-29 and Kh-59 missiles to hit fixed targets from standoff ranges using the Su-34 fleet. It tasked its Su-35S and Su-30SM fleets with Kh-31P and Kh-58 anti-radiation missiles to suppress radar-guided SAMs. According to western analysts, a mismatch in electronic spectrum seems to have been an issue in integrating air power into ground operations. For example, the electronic warfare (EW) capabilities used to degrade Ukrainian SAM systems caused disturbances in Russian ground forces communications causing fratricide.⁵

As per western studies of Russian military doctrines, the VKS has traditionally relied on dense and networked surface-to-air defence assets to cover ground-forces on the move, and along with army aviation assets, long-range ground-attack aircraft and helicopters serving as artillery for close-air support.⁶ To allow the first-case scenario to unfold well, it was important not to give away the surprise element by excessive massing and preparation of

aviation assets. In the author's opinion, avoiding collateral civilian damage especially in Russian-speaking areas marked for occupation was also a factor in how airpower was employed. However, **at the time of writing this analysis**, the AD capacities of Ukraine stand diminished due faulty overuse, VKS platforms have stepped up attacks using precision and non-precision weapons.⁷

Drone Warfare. As has been a noticeable trend in the last decade, unmanned cheaper and expendable platforms seem to be the way forward in modern warfare. If anything, the Russo-Ukraine War has only reiterated the complexity and uncertainty of modern conflict. Assumptions such as short-swift conflicts, non-vulnerability of supply lines and optimal stockpiling of armaments, and just-in-time maintenance concepts are being severely questioned.

Transparency on the battlefield is adding to the headaches of attacking forces. With deep-strike precision available, massed forces or strung-out supply lines are easy targets with disproportionate damaging effects on the battle scheme. A good example was in the 2020 Nagorno-Karabakh conflict. The Armenian-backed forces were on higher ground, well dug-in and camouflaged. But multiple tiers of sensors of the Azerbaijani military pinpointed them to be quickly destroyed with precision fires including loitering munitions and drones. However, it must be remembered that it formed only a part of the well-conceived adopting of emerging technologies and well-designed integrated-arms campaign that shocked and awed the Armenians.

An example of coming capabilities is the Russian S-70 Okhotnik drone, which flies at more than 1,000 km per hour with a range of over 6,000 km. It is equipped with an array of sensors for recce and targeting besides its own precision weapon payload of almost three tons. In teaming with the latest Su-57 fighter aircraft, it provides a new realm of manned-unmanned team concept. The Russian military is experimenting extensively with the swarm concept. It is based on multiple unmanned aerial flying platforms integrated as a single networked system self-contained for communication,

reconnaissance and weapons (munitions) to strike enemy ground targets.

Another is the Iran-made Shahed-136, which has quickly become a major dilemma for Ukrainian forces. It costs about \$30,000 USD with an estimated range of 2,000 kilometres. Such one-way attack drones challenge “the assumptions of modern air defense: that conventional militaries will primarily use a small number of extraordinarily capable systems, like advanced cruise missiles, strike aircraft, or UAVs, rather than large numbers of less capable systems.”⁸ One reason for the Saudis pitching for peace is such drone attacks against its oil lifelines. But nations are furiously working on optimised counters to such expendable platforms. For example, drone Hunter F700 (US) has radar backed by autonomous technology, and can precisely fire webs at drones.⁹

Similarly, emerging capabilities of loitering munitions have lapped up the Ukraine War as a proving ground. Suddenly, the tank, a symbol of mobility and lethality in manoeuvre warfare, finds itself in a supporting secondary role. No-contact engagements through loitering missiles are playing a dominant role. However, these are early days and successes, with expected advances and counters from better equipped and discerning air defence systems in the future.

Unmanned combat autonomous vehicles (UCAVs) seem to score over manned options in high-risk missions that suddenly become very plausible and cost-effective. It is not only cheaper in human and monetary terms but a game changing menu of strategic and tactical options. When employed as intelligent swarms they are able to beat most current air defence systems either by overload or hard-kill. Combining manned aircraft, UCAVs and loitering weapons offers posing even greater dilemmas for an adversary.¹⁰ Undoubtedly, in the coming decade, force structures will veer less towards manned options.

Helicopters. The Russian helicopter fleets were extensively employed in all phases of the campaign albeit with changing tactics dictated by the ground-based threats. Ka-52s (Alligator), Mi-28s (Havok) and Mi-35s (Hind)

attack helicopters carried out numerous hunter-killer missions initially, and switched to long-range rockets and stand-off missiles as the threat increased.¹¹ However, quick adaptability with self-protection suites and longer range weaponry has allowed the Ka-52 to operate effectively in thwarting the current Ukrainian counter-offensive.¹²

While UAVs have become the main reconnaissance and fire support platforms instead of helicopters, missions such as medical evacuation, air assault, combat search and rescue, will require helicopters for their speed and low-level stealth, agility, versatility, and payload carrying capability. In the mountains these missions would assume even more criticality. Therefore, the key issue of survivability need immediate addressing. A possible way could be unmanned platforms to carry out these roles in intense conflict zones.

Integrating Manoeuvring Forces. Since 2008, the Russian Armed Forces had changed from large formations to high-readiness combined-arms brigades (BTG). This approach was a lesson from its Afghan War.¹³ However, with a third of army as conscripts, the concept faces challenges of effective integration in a short time.¹⁴ Additionally, the rigidity in tactics, techniques and procedures impede adaptability when plans go awry.¹⁵

The timing and need for surprise and ambiguity at the strategic level affected operational and tactical preparations. "Time was insufficient for elements to conduct reconnaissance, establish flank and rear security, clear routes, pre-position supplies and conduct secure movement under the cover of air defences."¹⁶ An Australian Army report identifies the following as early trend lines and lessons from the fog of the Russo-Ukrainian War:

- Ineffective and non-optimal combined-arms execution mainly due to communication issues of ad-hoc structuring, training and equipment interoperability.
- Rigid plans that did not adapt quickly enough. This was a result of the last-minute decision to invade or to keep the element of surprise.¹⁷ The time to prepare for an integrated battle was too less.

- Russia's doctrinal dependence on artillery as a mainstay of operations got literally stuck in long queues on vulnerable roads. Ratios of artillery, armoured forces and infantry were inadequate for the missions and dense environment available.
- Heavy attrition and breakdowns in an intense campaign underline the dire importance of sustainment, logistics and supply chains.
- Drone usage and attrition in hundreds of thousands is complicating the tactical situation in fundamental ways.

A holistic look at these issues would clearly indicate that ground forces must now move from combined-arms to truly all-Services integrated operations and logistics in general, and MUT in lethal ones. The template in the mountains need detailed deliberations that follow.

MUT IN THE HIGH ALTITUDE CAMPAIGN

Fighting & Surviving. In classic Air-Land Operations, the counter-surface force operation (CSFO) missions such as battlefield interdiction (BAI), battlefield air support (BAS) and armed reconnaissance can be carried out by attack helicopters (AHs) in conjunction with other elements. Under normal circumstances, BAS at high altitude are high-risk missions for high-speed fixed-wing airpower, and they have evolved their own tactics to stay clear of SAM envelopes and deliver precision weapons and even dumb bombs from medium altitude and great distances. However, this mode is more suited for interdiction rather than pin-point targeting against concealed and static targets on hill or mountain tops.

AHs can employ ground hugging and terrain masking techniques, employing their defensive suites and stand-off weapons, and integrating with other land-based fire support for great chances of survivability in the mountains. A helicopter's ability to operate from forward basic helipads and Forward Area Refuelling and Rearming Point (FARRP) and ubiquity allow it to sustain a presence in the battlefield and impose a manoeuvre effect when employed in large numbers. The ability of helicopters to take off and

land vertically and to sustain hovering and low-speed flight brings unique capabilities that make them particularly suitable for employment in a high altitude battle. Of particular relevance in this genre of conflict is the ability of helicopters to approach targets stealthily by flying in the nap of the earth, which offers them significant advantages over fixed-wing aircraft as long as they have adequate self-protection capability.

Terrain Dictates. In the mountains, terrain becomes a primary consideration and factor of warfare. The physical obstacles of terrain coupled with unpredictability of weather in the mountains only increase the degree of difficulty for combat operations. Mountains limit the freedom for rapid movements or manoeuvre, and thereby may hinder concentration of combat forces at a point of choice. Conversely, they may cause unplanned clusters at critical points. Not only does movement become predictable on mountain trails, vulnerability to counter attack on the flanks increase multi-fold. Battles in the mountains will primarily be for holding on to passes, dominating heights and roads, all under multi-tier fire from the enemy. The point here is that terrain will force compartmentalization of action, and therefore, the necessity of independent sub-unit action, including calling in of firepower (artillery or airpower) at a much lower level than the battle in the plains.

In the defensive mode, a planner would be able to effectively cover most likely avenues with a range of firepower. In a sense, the defender is able to effectively template the aggressor's major moves. Therefore, the aggressor would rely on air transport assets to launch operations into the flanks and rear areas. This would call for strengthening air-defence and anti-helicopter actions by the defender. A case in point is the introduction of Stinger missiles in Afghanistan and even the Kargil Ops. An attacker's game plan would include reconnaissance and surveillance of anti-air assets of the defender, and to neutralize them at the earliest with attack helicopters using terrain masking and stand-off weapons if required. UAVs and HUMINT would provide the intelligence inputs, some even real-time, to pairs of hunter-killer helicopters. Thus, pairing of helicopters and UAVs at the tactical level seems to be in order in the mountains.

An attacker's main body is protected in the flanks by security patrols and recon parties, which engage any ambush or flank attacks to destroy them and more importantly, to warn the main body of impending attacks. At such times, attack helicopters on call, coordinated by trained FACs on ground could more than thwart the enemy's moves and neutralise troop and gun placements on adjacent high grounds. Since terrain and few roads during the march do not allow sufficient turning movements to a large attacking force, integral light artillery and attacking air power are the only means to cater to meeting engagement with a counter-attacking enemy. A critical requirement would be availability of FACs on ground in adequate numbers (even at battalion or company level) while on the march.

A very effective way of achieving surprise in the mountains is enveloping detachments from the main body to the enemy's flanks. In case this is closely coordinated with firepower, the probes could detect vulnerabilities and provide windows to exploit. Attack helicopters would provide the means to protect the heliborne forces which would augment the enveloping detachment, as also the necessary fire power when exploiting the enemy's weakness. This calls for a high level of coordination at the lower level. Artillery de-confliction and co-ordination of multi-tiered fire support would have to be delegated to a lower level.

Artillery in mountains is constrained due to a number of reasons such as trajectory angles, difficulty of observation of hits to call out corrections and abrupt changes in weather. The terrain does not allow ideal placements of guns and may even force them to cluster near roads, making them ideal targets by air or counter-battery. These reasons among others will force decentralisation of artillery and would lead to lack of integral firepower at critical times. Such phases would require dedicated fire support in constricted space and time pockets. Attack helicopters/UAV at the Corpsor Div level could be delegated to brigade and battalion levels to cater to such emergent requirements.

An unmanned aircraft could act as a pathfinder for a main helicopter force, watching for anti-aircraft threats as the strike package moves to its objective. The picture seen by the UAV could be relayed back to helicopter

crews, and they could adjust their route accordingly. The main strike force could also take advantage of targets of opportunity as they are discovered by the UAV. The unmanned system could provide targeting data to allow the crews to fire their weapons from stand-off ranges. If the UAV itself is armed, it could be instructed to engage threats directly. The current and future Indian Light Combat Helicopter should be aiming for many of the developments and capabilities listed above.

MULTI-DOMAIN INTEROPERABILITY

Multi-domain operations stretch across a spectrum of conflict from Hybrid Warfare to high-intensity combat situations, and require capabilities that are responsive and adaptive. Warfighting in such an environment is about networking in a secure redundant communication environment with other capabilities in every domain. The visualisation is that helicopter-UAV teaming in all their varieties and capabilities will play major roles from transporting in task-forces into battle to providing all kinds of support such as firepower and situational awareness. A truly integrated battle will mean all roles especially firepower support will be in coordination and synergy with fixed-wing unmanned and manned aircraft.¹⁸ MUTs would be airborne sensors and shooters of the joint force.

Reflecting current trends across, a 2012 US Congressional Research Service report listed 31 percent of US warplanes in service as unmanned. The Israeli Army is clear that swarm operations by unmanned systems executing all battlefield roles would be core of concept in the future.¹⁹ Any involvement of humans would mainly be dictated by high complexity of decision-making along with possible ethical and moral dilemmas.

Even medical and health support has undergone a paradigm shift after the First Gulf War. The concept of forward-basing large surgical units ahead was found unsound in modern-day battles.²⁰ Moving critical or even stabilised cases within the 'golden-hour' to hospital care in rear areas was found to be more efficient and effective. Larger helicopters with trained personnel and on-board ICU-care are now fulfilling this function. Looking

ahead, unmanned helicopters would be resorted to when the risks are too high in a combat zone for manned ones.

Multi-Domain Operations essentially orchestrate and synchronise military with non-military activities across all domains to deliver unexpected converging effects. NATO now talks of Joint All Domain Operations (JADO), growing out of Multi-Domain Operations. It shifts the focus from 'multi-domain', which individual services tend to operate in, back on joint operations. Another concept being tested by the US military is of Mosaic Warfare which takes advantage of secure high-bandwidth networking to obtain an interconnected and interoperable force package, using the best of different platforms.²¹

Transparency on the battlefield is adding to the headaches of attacking forces. With deep-strike precision available, massed forces or strung-out supply lines are easy targets with disproportionate damaging effects on the battle scheme. A good example was in the 2020 Nagorno-Karabakh conflict. The Armenian-backed forces were on higher ground, well dug-in and camouflaged. But multiple tiers of sensors of the Azerbaijani military pinpointed them to be quickly destroyed with precision fires including loitering munitions and drones. However, it must be remembered that it formed only a part of the well-conceived combined-arms campaign that shocked and awed the Armenians.

FAST CHANGING WARFARE

Many analysts believe that "each age has its own wars and its own forms of warfare."²² Some even predict that "significant ongoing changes in the security environment will alter the character of warfare beyond recognition."²³ Most breakthroughs in warfighting have come about due to convergence of numerous and varied fields that have transformed tactics and operational approaches to conflict. Many have even predicted a change in war's nature, heretofore considered a heresy. "The era of disruptive technologies, with the potential to change both the nature and character of war, is swiftly approaching."²⁴

Some view disruptive and emergent technologies shifting the balance back to defence.²⁵ But there is always a danger of techno-romanticism i.e. relying on technology to provide all solutions and breakthrough innovations. The seesaw of defence-offence dominance has been part of military history, and no reason for it not to continue. The man behind the machine, and the limitless power of human innovation, will always be key to victory.

Fighting & Surviving in the Networked Age. An entirely new generation of network enabled weapons, possessing both precision and potency, and aided with real-time intelligence by pervasive sensors and high-speed analytics, is fast changing the nature of warfare. Most of the damage, both material and psychological, will happen before contact by troops. Importantly, all such weapons will have sensors and networking to enable real-time battle damage assessment, a vital issue in combat. The entire gamut of sensing, planning, deciding, and acting will necessarily need coordination across all five domains. However, a sixth domain (people) will need to be indoctrinated in this newer way of networked war fighting to achieve results on ground.

Information dominance will entail a myriad of issues such as the ability to protect own data and networks, high-speed processing, and dissemination capability in an uninterrupted manner, and denying all these to the adversary. Multi-domain synergised operations would demand shared battlespace awareness among men, autonomous machines and commanders of different sub-units. In such a networked high-pace battle, decision-making and allocation of targets and tasks will have to be quick while keeping a battlespace whole-picture framework. Only AI-enabled decision-making can do this for sustained long-term operations.

On the other hand, all the above also point to the vulnerability and susceptibility of networked weapons in particular to cyber or electro-magnetic attacks which could be in the form of jamming or a lethal attack, data corruption from a cyber-attack, or slowing down of network which affects guidance, navigation, and control of weapons in flight. It will also

need a secure network incorporating encryption, redundant paths and nodes, and high reliability. Since accurate and secure navigation data will be the foundation of autonomous platforms and loitering or network-enabled weapons, security in the space domain including satellites and data flow is critical. So are the issues of bandwidth usage that need solutions for data prioritisation and sharing protocols, all being done at high speeds. Everything points to the imperative for a newer model of joint-targeting, and points of decision-making at different levels that caters to optimisation, timing and desired effects.

THE LAC BATTLE SCENARIO

2026 India-China War. This is a hypothetical scenario that brings out some ways to blunt a PLA offensive against Indian military. This is not holistic but serves to put the importance of manned-unmanned teaming in some perspective.

The PLA hoped for the following: mainly target Indian internal faultlines in its information campaign including selective cyber attacks; a quick and localised engagement based mainly on no-contact with shock and awe as primary aims, essentially a short teach-lesson template; and, seek Pakistan to deploy its military and asymmetric proxies to strain India. However, Pakistan was too engrossed and mired in its own economic, political and sectarian crises that were threatening to break it into pieces. India, reading the tea leaves well, aimed to set traps for causing maximum human attrition; planned unexpected incursions/forays, and disruptive controlled escalation; being prepared to accept initial setbacks but not get shocked or awed. All forces planned a quick resilient counter to put pressure on minds of the PLA leaders and personnel. The Kailash Heights episode in 2020 post-Galwan had shown the value of unpredictability in conflicts.

The expected onslaught of missiles by the PLA Rocket Forces (only limited numbers) were catered by a dispersion and disaggregation deployment of all Indian critical nodes. Because of sparsely populated areas along the LAC, a no-holds barred no-contact initial PLA onslaught

was expected. PLAs superiority in unmanned systems, surveillance by space assets, and firepower (artillery deployable close to LAC was to be countered by a jamming and electronic warfare plan, help from the US military in light of newer agreements (e.g. Basic Exchange and Cooperation Agreement (BECA) on geospatial intelligence), and most importantly, the clear edge in airpower capabilities. Indian airpower benefited from numerous and dispersed lower-altitude airfields that allowed jets to be fully loaded. Since they were all close to the Himalayas, quick reaction and turnarounds benefitted the IAF.

Some key innovations had fructified that aimed to blunt the PLA superiority in drones, swarms, massed firepower, and cyber and electronic warfare. Indian forces were closely monitoring and fixing core PLA sensors and communication assets for own missile strikes. The Chinese main aim of defeating Indian networks was planned to be thwarted by a good redundancy plan and ability to move to a 'Plan B' of a low-communication state. This was premised on land and air supported stocking and supply of ammunition and sustenance kits for all weapon systems. MUT packages were kept on quick and adaptable readiness to cause maximum attrition backed by an agile integrated and disaggregated targeting cells across the LAC.

CONCLUSION

The Russo-Ukrainian conflict is instructive of how the character of warfare is changing rapidly, and yet many of its basic tenets and nature have remained constant. While technology has usurped many fundamentals, war has always been and will be about attrition, sustainment and logistics. This paper has attempted to study the tactical issues in integrating manned-unmanned teaming in battles in the mountains. A case for helicopter/UAV teaming has been examined.

It has been brought out that the see-saw between offence and defence is constantly evolving, and a key issue in military campaigns is adaptability and cognition-superiority. Deeper thought is needed in future force-structuring or one may face dire consequences of being out-maneuvred. Open minds are

necessary not only in tactics and employment, but mandatory in deliberating equipment-architecture and capability design.

The question of viability, effectiveness and survival of MUTs in intense battles has been debated. In the mountains such as the Himalayas, manned roles and tasks are still mostly indispensable despite the proliferation of UAVs. Their criticality in mountain warfare as part of the integrated battle and not just combined-arms concept has allowed some recommendations to be made along the way, especially in the scenario depicted.

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