

The integration of multi-domain capabilities in land forces units combined arms operations

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Abstract

Current conflicts, ongoing across the globe, have highlighted the need for a new form of warfare that reduces the number of casualties and the degree of destruction and, at the same time, mitigates the effects of hybrid means, ubiquitous in the doctrine of all actors. This new approach to warfare utilizes multi-domain operations as a means of achieving success. Although multi-domain operations have been conducted in the past, the concept that encompasses the process of these operations is novel, and there are still significant adjustments that need to be made to make it operational for all actors. This article aims to study the integration of multi-domain operations into land operations by identifying the strengths and limitations of their development process, the conditions and principles of their integration at the land forces level, resulting from a comparative analysis of US and Russian Federation approaches, as well as from lessons learned from current conflicts.

Keywords:

combined arms combat; domain; effects; simultaneous and synchronized engagement of arms; multi-domain operations; capabilities.

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The evolution of operational art, over time, can be regarded as an effect of the great military campaigns, fundamental for the level of evolution that war and the different military doctrines that were applied during military operations. In the last century, military doctrine has undergone a massive evolution, often moving from one concept to another, or from one approach to tactics, to another, during the same campaign. Common to all conflicts of the 20th century was that land forces were the main instrument of winning the war and consequently were always supported by other force components. This habit that nations had, has been perpetuated, with few exceptions, to this day. This fact also results from the low level of development of capabilities in other domains achieved, such as air, naval, space, or cyber ([NATO Standard AJP-01 2022](#)), capabilities that are complex, difficult to produce, and expensive.

The doctrine of land forces, applied in World War I, involved the use of trenches to protect troops against direct and indirect infantry and artillery fire. This tactic led to numerous periods of stalemate, in which neither side had any solutions to defeat its opponent, and major maneuvers were often futile and with significant loss of life. It was not until 1916, right after the integration of the tank into the land forces operations, that an efficient combination of infantry maneuver, with artillery fire support and frontal tank strikes, was possible, which led to the Entente forces' success on the Western Front, in breaking the German defenses, and the consolidation of conquered objectives by means of the engineer troops. Most military historians regard World War I as a turning point and as an event of major change, which laid the foundation for contemporary combined arms warfare ([Simoens 2022](#)).

World War 2, on the other hand, practically forced the participating armies to integrate all available weapons, including at battalion level, a moment in which when the combined arms battalion appeared on the battlefield, thus configured, more evident than ever before. In the early years of the war, Germany implemented the „blitzkrieg” doctrine, meaning „lightning war”, which involved the rapid and coordinated engagement of infantry, tanks, and artillery with close air support. This configuration of tactical units constituted a major leap, from the idea of massing tanks or infantry into division-level units, to the creation of mechanized combined arms units, starting from the battalion level. At the same time, the need to counter these German units forced the opposing sides to build their units in the same way, and, moreover, to create small forces with anti-tank capabilities, which significantly hampered armored and mechanized units' penetration through defensive positions.

The emergence and use of the atomic bomb provoked military theorists to consider the possibility that conventional ground warfare might be outdated and that a concentration of ground forces across a small area would be particularly risky. Moreover, the need to wage national liberation campaigns gave rise to guerrilla warfare and unconventional operations, fundamentally changing the doctrine of the first half of the 20th century. Concepts such as guerrilla warfare and

counterinsurgency, especially noticeable in the Vietnam War, led Western states to abandon the development of new-generation conventional mechanized and armored capabilities and to reinvest in light infantry units with enhanced mobility and constant air support ([House 1984](#), 141).

The year 1990 is marked by an event that radically changed the way great military campaigns are planned, prepared, and executed. The Iraqi invasion of Kuwait and the inability of the small state to defend itself against Iraq prompted the US and Saudi Arabia to intervene with military power as well. Operation „Desert Shield” 1990-1991, involved the strategic deployment of US armed forces on the territory of Saudi Arabia, together with the involvement of European or other world allies in this campaign, produced the largest build-up of armed forces in the last 20 years ([Hooton and Cooper 2019](#), 65). The second phase of this major campaign was Operation “Desert Storm”, which meant attacking and defeating invading Iraqi forces in order to liberate Kuwait by employing a major joint air-land-naval operation.

The US lead coalition’s intervention in Iraq, signified the last war of the 20th century, in which large masses of conventional capabilities, tanks, artillery, infantry, engineers, logistics, air assault, and aviation were involved ([Hooton and Cooper 2019](#), 67), again highlighting the importance of configuring large tactical units of ground forces, according to combined arms principles, to enable maneuver over wide spaces and across great distances in order to avoid the enemy’s strengths and occupy advantageous positions.

Currently, conventional warfare has become a component of hybrid warfare, in which military operations are conducted in all 5 domains of the battlespace, and do not use kinetic effects as a primary form of gaining success, but combine lethal and non-lethal effects, advanced technology, behavior-centric approaches on the target audience, and philosophies of leadership or execution, in a harmony designed to orchestrate fighting power as effectively as possible.

The strong evolution of military capabilities and doctrine, accelerated especially after the events of Russia’s invasion of Ukraine and annexation of the Crimean Peninsula in 2014, leading to the development of concepts and terms such as „4th generation warfare” or even 5th generation, multi-domain operations, information warfare, hybrid threat or artificial intelligence, placing a traditional and important concept such as combined arms warfare in a shaded area, where the danger of being forgotten by the scientific community is increasing, despite its proven importance throughout history. It should not be forgotten that, as Murat Caliskan says in his article *Hybrid warfare through the lens of strategic theory*, published in *Defense and Security Analysis*, “concepts shape our military understanding and consequently the armed forces” ([Caliskan 2019](#)), and therefore, the possibility of eliminating coherent and effective approaches exists, when we try to implement, with possible limited success, the more modern concepts, but which do not yet have full validation.

However, combined arms warfare has not yet disappeared from the doctrine of The North Atlantic Treaty Organization (NATO) member states, and this article is meant to reinforce the importance of land forces combined arms units in operations, in the context of the current security environment. The concept of combined arms warfare has been the subject of many scientific articles, but most of them have been oriented towards presenting its peculiarities during various campaigns or wars throughout history. Some of the articles focus on placing the concept in the context of security environments governed by approaches that are currently either not relevant or outdated. What is special about this article is that it analyzes the importance of land forces' combined arms units in the context of multi-domain operations. This analysis is crucial for military theorists, providing support in developing knowledge regarding the place and role of land forces in multi-domain operations and offering a possible tool for use in initiatives aimed at configuring tactical units.

The article addresses 3 main research directions, which materialized as the paper's chapters. In the first chapter, the study addresses the configuration of tactical land units according to the combined arms principle and their place within multi-domain operations. This chapter highlights the critical condition necessary for any tactical unit, namely to have a combined arms configuration in order to have the possibility of integrating capabilities that allow it to act in all the domains of the battlespace and to generate effects in the operational environment. The chapter will also discuss the US' and the Russian Federation's way of configuring tactical combined arms units. In the 2nd chapter, the article presents the possible limitations and challenges arising from the integration of multi-domain capabilities into land forces operations as well as possible methods to mitigate them. Finally, the paper assesses the performance of the Russian Federation's Battalion Tactical Groups (BTGs) in the Ukraine conflict and presents relevant aspects arising from their integration into multi-domain operations conducted in this war.

The role of land forces combined arms units in multi-domain operations

The great armed conflicts of history have been, for the military science community, a good source of information about the actors involved, of observing the tactics used in warfare, an opportunity to evaluate the performance of the utilized units and capabilities, and definitely of lessons learned. Similarly, Russia's invasion of Ukraine, which began in 2014, is an important source of information, from which theorists also built the concept of *multi-domain operations*. The Allied Doctrine AJP-1 defines multi-domain operation as the "*orchestration of military activities, across all domains and environments, synchronized with non-military activities, to enable the Alliance to deliver converging effects at the speed of relevance*" ([NATO Standard AJP-01 2022](#), 3). On the other hand, the US military doctrine, *FM 3-0 Operations*, defines multi-domain operations as "*combined arms employment of all joint and*

Army capabilities to create and exploit relative advantages that achieve objectives, defeat enemy forces, and consolidate gains on behalf of joint force commanders” (Department of the Army 2022, 3-1). The difference between the two main approaches to the concept is clearly visible, but it is also determined by the Alliance’s need to create standards applicable and implementable at the level of all member states, in contrast to the American doctrine, which develops military doctrine to train its own forces.

By analyzing these two forms of defining multi-domain operations, we can agree that they represent those actions that armed forces take by means of capabilities in all domains of the battlespace, which are aimed at achieving success in the most effective way. Although differences in approach do not radically change the nature of multi-domain operations, it should be noted that US doctrine describes actions as a combined arms employment of capabilities across all domains. This approach is an indicator of the importance of a combined arms configuration of units, to enable the employment of capabilities in multiple domains and specially to generate effects in multiple domains.

Military operations that produce multi-domain effects require compliant, resilient, high-tech capabilities and tactical units, characterized by flexibility and versatility, increased combat power, extended operational range, and the ability to enable the execution of joint operations across all domains. These characteristics of land forces tactical units are reflected in the synergistic joining of several arms, services, or components, synchronizing their employment in armed combat, so that countering one of these elements will make the enemy vulnerable to another. With this in mind, we can easily deduce that a combined arms approach to multi-domain operations is not just a good method, but an absolutely necessary one.

The combined arms character of a unit is defined in US doctrine as *“the simultaneous and synchronized application of arms, to achieve an effect greater than that achieved by using each element separately or sequentially” (Department of the Army 2019, 3-9)*, and this is also reflected in the configuration of tactical units, especially brigade, division, and corps level.

Throughout the continuum of competition (NATO Standard AJP-01 2022, 7) – cooperation, rivalry, confrontation and armed conflict – the corps, as a large tactical unit, integrates capabilities from all domains, at the appropriate tactical echelon, and employs divisions in battle in order to conquer the objectives of the joint force land component. The divisions, supported by the army corps, defeat the enemy by combining the maneuver and fire of their brigades and subordinate arms structures, control the conquered terrain, and consolidate the success of the joint operation. This integration of multi-domain capabilities and their engagement in an armed conflict, filled with uncertainty, ever-degraded communication, and fleeting windows of opportunity, is only possible by developing a culture in which tactical unit commanders exercise disciplined initiatives and accept calculated risks, within the mission command leadership philosophy.

Considering these aspects, we can define the role of land forces tactical units in multi-domain operations, as a role of integration and employment of multi-domain capabilities in armed combat, in order to outperform the enemy in all respects and preserve the combat power of the unit.

In US military doctrine, the corps and division provide the joint force with flexible and mission-adaptable combined arms formations and commands, capable of crisis management as well as executing large-scale ground operations, while army-level commands integrate and coordinate multiple capabilities to conduct large-scale operations within the joint operation. Corps or armies may assume multiple roles, of tactical leadership (land component headquarters) or operational leadership (joint force grouping command). These tactical echelons provide combatant commanders with forces that possess the technical and tactical capabilities necessary to conduct operations across the entire spectrum of military operations ([Department of the Army 2021, 1-1](#)).

On the other hand, Russian tactics emphasize the combined arms army and the armored army (tanks) as the main echelon between the operational or strategic leadership of the armed forces and tactical land echelons. These tactical echelons are organized, for the most part, by combined arms brigades, but major changes in the equipment of the armed forces, corroborated with a rushed technological advance caused by the war with Ukraine, portend a reorganization of these armies on divisions and even army corps ([Grau and Bartles 2016, 30](#)). These tactical units have a strong combined arms character; however, they have certain limitations, in terms of multi-domain capabilities, which are retained at operational and strategic echelons, but can conduct multi-domain cyber and air-land operations.

American combined arms units have logical consistency in their organization. The command of a US army corps primarily integrates 3 to 5 combined arms divisions, arms brigades and services, ISR (Intelligence, Surveillance, Reconnaissance), engineer, CBRN defense (Chemical, Biological, Radiological, Nuclear), air defense, artillery and missiles, military police, logistics and other specialized units, with related capabilities. For their part, U.S. divisions have a similar structure to the corps, integrating warfighting brigades, arms, and service battalions, but differing in their capability, in terms of the effects they produce. Analyzing both tactical echelons and their effects, we concluded that corps effects begin where division effects end, in the multi-domain battlespace, with the corps tasked with shaping the battlespace inaccessible to divisions in order to enable divisions to conduct unhindered action in their operating environment. More specifically, the robust combat units of division- or corps-level tactical combined arms structures receive combat or service support constantly, enhancing their maneuver execution and extending their operational range.

In contrast, the Russian combined arms army, organized on divisions, brigades, or regiments in smaller cases, as it showed in the Battle of Kiev of 2022, involved

generating *battalion-level tactical groups (BTGs)*, from the organic structures of the brigades, which were logistically supported by the division and led by the combined arms army (Zabrodskyi et al. 2022, 45). These formations had the combat composition of a reinforced battalion, and their combined arms character was enhanced by the integration of several combat support capabilities, artillery, and missiles in particular, but with reduced infantry combat power. Within these BTGs, the role of infantry consisted of occupying and maintaining defensive positions as well as supporting tank structures.

The differences between the two approaches, American and Russian, are obvious. In the American concept, emphasis is placed on supporting combat units to ensure the success of their maneuver, consolidating conquered objectives and executing tactical actions without interruptions for a long time. The Russian method of engaging tactical combined arms structures relies more on an intense action of combat support structures and their effects, especially those of direct and indirect fire with artillery shells or missiles, followed by the action of combat forces. This method has a visible inclination towards attrition warfare, limited in the maneuvering of combat units and based on the effects of other means, especially hybrid, to defeat the enemy. The American and, by extension, allied approach focuses on integrating multi-domain capabilities into the combined arms operations of tactical structures, to enhance their maneuver and to shape the battlespace so that, through maneuver, the decisive points and centers of gravity of the enemy are exploited, in order to reduce the loss of human lives or capabilities, in both sides.

Many of these limitations of Russia's combined arms concept have led to the return of outdated tactics, by engaging in combat those small teams of „sacrificial” infantrymen, usually recruited from Luhansk or Donetsk provinces, from among prisoners or detainees, or from among mobilized and poorly trained soldiers, who, according to the Ukrainian military, attack under the influence of narcotics or coercion of commanders, usually until they are shot down by defensive fire, or are executed by their own comrades when they retreat. This tactic of attacking in „human waves”, aims to expose opposing defensive positions, depleting resources and creating acceptable conditions for a new attack (Watling and Reynolds 2023, 5).

Challenges arising from the integration of multi-domain capabilities in land force operations and possible methods of mitigating them

The military strategy of the future is conceived and created following the path from cooperation to armed conflict, along the continuum of competition. The North Atlantic Alliance, through the strategic concept adopted at the Madrid Summit on June 29, 2022, orients the main line of effort from crisis prevention and management to its deterrence and defence function (NATO 2022). This reorientation is mainly

caused by the evolution of the main threat to the Alliance, the Russian Federation, and by the new physiognomy of the war as identified in the Russian-Ukrainian conflict.

The new war employs multi-domain capabilities in tactical operations, and combat philosophies such as the Russian one, are relentlessly developing A2/AD (Anti Access/Area Denial) capabilities and means of engaging direct and indirect fire as destructive and performant as possible. Countering Russia's threat, in the Alliance's view, involves deterring armed aggression, and if this strategy fails, defeating the enemy by overcoming it in all domains. As in most cases, the US took the initiative in 2018 to develop a land forces concept for multi-domain operations, in a context in which the other member states of the Alliance did not have the same capacity.

The American concept has as its central idea, the execution of multi-domain operations by land forces, as an element of the joint force in order to achieve success during the competition; when needed, ground forces penetrate and disintegrate enemy A2/AD systems and exploit the resulting freedom of maneuver to conquer strategic objectives and force a return to competition on favorable terms ([TRADOC Pamphlet 525-3-1 2018](#), 7). The U.S. plans to reach full multi-domain operational capability by 2035.

The US has allocated a 773 billion US dollar budget for defense ([US DoD 2022](#), 1-3), ranking number one in the world in 2023. Given the gigantic budget allocated by the US and the estimated time projection at this time, we clearly deduce that the main limitation to having full multi-domain capability is the high cost and long time needed to operationalize it. Among the other NATO member states, Germany and the United Kingdom are next ranked, both with a budget of over \$ 65 billion allocated in 2021, according to a press release of the Alliance ([NATO 2023](#), 7), budgets significantly lower than the American one. This further highlights the inability of NATO member states to achieve an acceptable level of multi-domain capability. Russia does not appear to be close to that capability either, with a defense spending of just over \$351 billion in 2023, according to an article published by Reuters ([Reuters 2023a](#)), but improvements have been seen in various defense segments, especially for the development of long-range ballistic missile systems. Also, China, a confirmed adversary that can challenge the US in military power, had defense spending worth \$ 224 billion in 2023 ([Reuters 2023b](#)), but most of the spending is focused on the acquisition of more modern equipment for land and naval forces, and not necessarily for multi-domain capabilities. For now, from the present data, only the US has a solid concept of achieving a complete multi-domain capability and allocates enough resources in this regard, but acquiring this capability will take at least 10 years.

From a tactical point of view, integrating multi-domain capabilities into ground forces operations generates unique challenges. During experimentation with multi-domain capabilities, analysts have found fluctuations in the availability of multi-domain capabilities. Each domain has concrete limitations such as the speed of

satellites in orbit, closed cybernetic networks that require effective penetration, or the times of refueling, repairing, and rearming aircraft in the air, land or sea environment (Skates 2021, 70). These constraints lead to a temporary availability of all capabilities and can create dilemmas for commanders regarding their allocation.

A principle of multi-domain operations, introduced in American doctrine and mentioned in FM 3-0 Operations, is “convergence”, which according to this field manual, is the result created by the concentrated engagement of capabilities across multiple domains and echelons against a combination of decisive points in any domain, to create effects on a system, formation, decision-maker, or geographic area (Department of the Army 2022, 3-3). As mentioned earlier, multi-domain capabilities are, in the American view, retained at the corps level and employed to shape the division’s combat. From this point of view, we can see that the division, as a fundamental echelon for combined arms operations, has limitations in multi-domain engagement, having significant effects in the ground and air environment and reduced in the other three areas. This involves major efforts to coordinate and synchronize the actions of the division and the corps to achieve convergence. Moreover, high-tech cosmic and cyber capabilities are expensive and often insufficient, being retained by operational and strategic echelons, limiting their availability also at corps level, which can only make it difficult to comply with this tenant.

However, if we imagine the effects of a successful convergence, in a multi-domain operation, the enemy will probably suffer multiple neutralizations of strong points, denying the execution of a coherent operation with chances of success, even from the first phases of the operation. For a successful convergence, its planning and preparation are crucial. We infer from the conditions of successful convergence that the synchronization of actions is the most difficult challenge. According to the military decision-making process (MDMP), the identification of critical points of the enemy depends on the quality of its evaluation outcomes. These outcomes are built through integrative processes related to MDMP, such as the *Intelligence Preparation of the Operational Environment (IPOE)* and *Joint Targeting (JT)*.

IPOE identifies the elements of the enemy, related to its capabilities, its center of gravity, and doctrine applied in combat, integrating lessons learned from combat history as well as probable courses of action of the enemy (NATO Standard AJP 3-9 2016, 2-17). Also, through JT, those High-Value Targets (HVT), High Payoff Targets (HPT), Time-Sensitive Targets (TST), or other enemy targets are identified and prioritized, in order to establish their appropriate engagement in order to obtain effects consistent with the commander’s intention and operation objectives (NATO Standard AJP 3-9 2021, 1-1). The overlapping of products resulting from the 3 processes, MDMP, IPOE, and JT, reveals the enemy’s critical points.

Further, the commander of the large tactical unit will direct the staff on how to engage those critical points. It will aim to synchronize the engagement of capabilities in all domains to deliver simultaneous strikes to the enemy and produce decisive

effects for the entire operation from its inception. As a rule, the General Staff will provide the commander with tools that facilitate the synchronization of actions, through which he will be able to direct the actions of the combined arms unit that he leads.

Challenges of integrating multi-domain capabilities into combined arms units of land forces also arise from the need to configure structures that can integrate and engage these capabilities. Combined arms tactical units, traditionally, are configured to conduct combined arms warfare. The setup of a multi-domain engagement tactical unit seeks to develop multi-domain operations, and currently, there are no tactical units that independently conduct this type of operations. Today's multi-domain engagement requires a joint effort, and capabilities are engaged and coordinated at the operational level.

However, in an article published by the US Land Forces Association, Charles McEnany offers us a variant of configuring a multi-domain structure (Fig. 1), with an operationalization horizon no later than 2035. The configuration of this structure follows 4 functions: effects, fires, protection, and support (McEnany 2022).

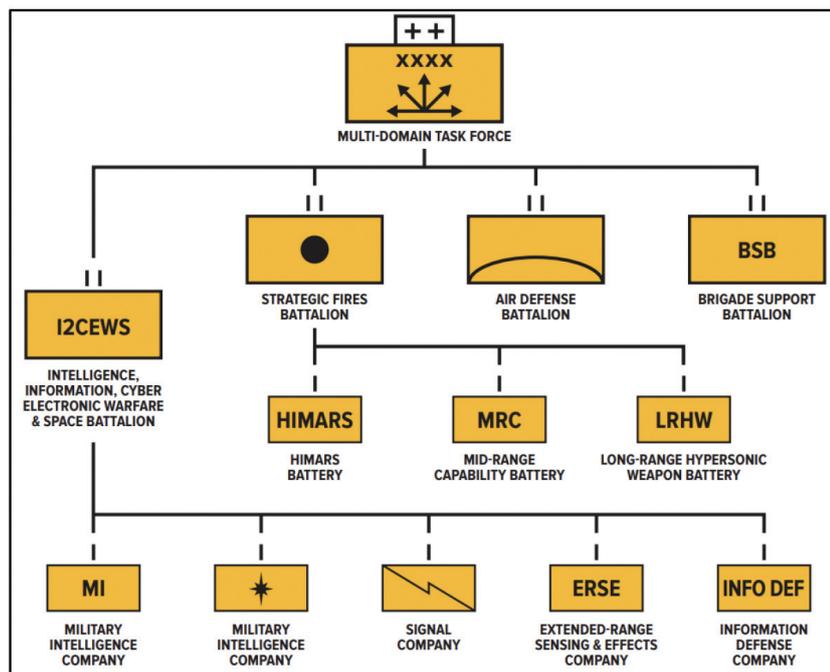


Figure 1 Multi-domain unit composition (McEnany 2022)

This structure has a similar composition to combined arms units, however, the capabilities of its microstructures differ significantly. If combined arms units were configured to effectively neutralize the combat power of the tactical enemy for the success of the operation, the multi-domain structure aims to engage A2/AD capabilities, to ensure freedom of action of the joint force, through synchronized employment of kinetic and non-kinetic effects (Chief of Staff Paper #1 2021). The long operationalization time of this type of structure, even for a nation with a

considerable advance in multi-domain operations, like the US, reveals the difficulty with which the force structure can engage multi-domain effects. Moreover, a possible conflict, assuming the need for such a structure, can accelerate the configuration and operationalization process, and this can have negative effects on its capability.

The Performance of Russian Land Forces in the Multi-domain Operations of the Russian-Ukrainian Conflict

After Russia's invasion of Ukraine and the annexation of Crimea, the Russian armed forces went through a process of reconfiguration, moving to a new look. Before this reform of the Russian ground forces, the Russian combined arms army was organized into combined arms divisions, which in turn were organized into regiments. For the most part, the combined arms character of these structures was not highlighted as it is today, and the combat or service support forces were retained under other commands, having coordinated actions at that level, leaving the divisions and regiments to be nothing more than a massing of tanks, mechanized infantry and motorized infantry, with little arms support.

As Charles Bartles and Lester Grau point out in the book „*The Russian Way of War - Force Structure, Tactics, and Modernization of the Russian Ground Forces*”, the new physiognomy of the Russian ground forces, also applied in the Ukrainian conflict, has as tactical and operational echelon, the combined arms army, organized on brigades. The major change that reform brings involves generating those BTGs, within brigades, to project the combat power of a brigade (Grau and Bartles 2016, 37). Although this change was being implemented, in the initial phase of the war in Ukraine in 2022, the Russians attacked with large tactical units that were configured according to both variants: armies configured by divisions and regiments, but also by brigades. At the same time, the basis for building these large tactical units is the BTG, being Russia's choice in the Battle of Kiev and in the military operations in Donbass, to engage Ukraine's forces at the tactical level.

The BTG used in Ukraine was composed of well-trained personnel and the best readiness capability within a brigade, to create a „reinforced” battalion. The personnel problem faced by the battalion consisted in the fact that the soldiers, from all categories of personnel, did not know each other, did not train together, nor had they ever fought together. Moreover, tactical units in the ground forces faced an acute shortage of staff officers, and NCOs were not properly integrated into the BTG. To mitigate the shortcomings caused by the lack of personnel, the Russians resorted to detaching many of them from brigades or divisions higher up the hierarchical ladder, in order to create operationalized staff at the level of BTGs (Nistorescu 2022, 140). These limitations will, in most cases, create morale, cohesion, and even a significant impact on tactical actions executed by reducing the operational range of large brigade or division-level units. We cannot speak of an efficient war without

well-trained, prolific troops in the tactical field, generated by the development of a professional military institution ([Stanciu 2018, 195](#)).

Although battalions were well equipped with artillery and missile systems, often beyond the battalion commander's ability to manage them, these battle groups lacked surveillance, target acquisition, or electronic warfare systems. This has a major impact on their ability to counter enemy actions in the electromagnetic spectrum, with BTG soldiers resorting even to the use of the mobile phone network of Ukrainian citizens. Of course, this error allowed Ukrainian forces to obtain vital information about Russian plans and intentions. Moreover, this intelligence also revealed the current status of Russian troops, the state of morale, and the remaining combat power. Also, the lack of cyber defense systems has led to the interruption of the operation and systems of ISTAR, leading to the inability of Russian commanders to build a common understanding of the situation, to have a clear ground picture, or to have accurate estimates regarding ongoing operations.

However, although the Russian BTG lacked developed engineer support, it was observed that they had increased mobility in the tactical field, especially for crossing valleys or rivers, due to the constant support with assault bridges or fixed bridges, received from the echelon of the combined arms army ([Watling and Raynolds 2023, 10](#)).

Perhaps the most important aspect that affected the performance of the Russian ground forces was the transformation of the combined arms army command into a joint forces command, which would coordinate capabilities in several fields. Broadly speaking, the Ukrainian theater of operations had Russian land, air, and naval forces, with multiple cosmic and cyber capabilities, coordinated by commanders of ground forces. In this way, we infer that the Russian land forces constitute a category of supported forces, and the other categories have only a supporting role, limiting the benefits brought by the joint operation.

Thus, air operations, being coordinated by the ground command, had the operational range, in terms of time, space, or purpose, reduced to conquering the objectives set by the ground commander. Also, targets engaged through air force actions served the needs of ground forces to occupy critical infrastructure elements ([Zabrodskiy et al. 2022, 45](#)). Also, the air force, as the conflict progressed, was largely used to provide close air support to ground forces. By providing close support for soldiers in defensive or assault positions, it virtually nullified the modeling of enemy depth, to allow freedom of action for ground forces. As a result, with the air force largely focused on the advance directions of the ground forces, the depth, as a basic tenant of an operation, as written in *FM 3-0 Operations/2022*, was not extensive and was severely affected in the other areas as well. The ground component plays an important role in expanding depth, facilitating access to other capabilities in all domains, especially space and cyber, which improve the protection of tactical formations and neutralize enemy air defense systems ([Department of the Army 2022, 3-7](#)).

In general, the Russian ground forces that acted in the war in Ukraine had a poor

performance, which is also proven by the inability to achieve the main objective: the capture of Kiev and the defeat of the Ukrainian armed forces. The poor performance of the Russians results mainly from the lack of maximizing the effects of the joint operation, by limiting the use of multi-domain capabilities to supporting ground forces. Also, this method of waging war has considerably reduced the operational range of large tactical units in the ground forces by concentrating the effort on generating these BTGs with personnel and capabilities from higher tactical echelons, reducing their possibilities to execute major large-scale operations, and relying on the arms and logistical support of the army's echelon.

Perhaps, as the extensive and relevant study by Jack Watling and Nick Reynolds shows, the most important problem affecting Russia's military operations in Ukraine consisted in the lack of troop morale, lack of training and professionalism, and the lack of a philosophy of leadership and execution based on cohesion, trust, and competence.

Conclusions

The year 2024 began with major conflicts unfolding around the globe, characterized, first of all, by a large number of human casualties, mostly among civilians. The Russo-Ukrainian War, Israel's military operations to neutralize Hamas in the Gaza Strip or the Civil War in Yemen are examples of conflicts where the condition of not having a large number of human losses and a massive destruction of infrastructure is set by the ability of the armed forces to plan and execute multi-domain operations. From the images posted by the media or social networks, we realize that multi-domain operations cannot be discussed in these conflicts, the landscape of states where conflicts take place highlighting entire localities turned into rubble, humanitarian crises hard to imagine, and the lack of solutions to end the crises.

From the research carried out, it is deduced that multi-domain operations are oriented towards reducing the duration of conflicts, reducing casualties, reducing infrastructure destruction, and preserving the combat power of the actors involved. This goal of multi-domain operations cannot be achieved without a major investment of money, without considerable resources oriented towards research and development, necessary to build those capabilities that allow the military commander to have, at all times, a real and clear, comprehensive and constantly updated operational environment picture as well as the ability to engage the enemy's centers of gravity and critical points, regardless of their positioning in the battle space.

Thus, we find that the nations of the world are currently far from having operationalized multi-domain forces and capabilities. The US has a fairly large advance in terms of operationalizing a concept of multi-domain operations, but this does not mean that states such as China or Russia will not challenge the

Americans' position in the future, in any domain of the battlespace, by developing their own concepts and programs. However, the fact that the US is moving towards this objective, estimating an operationalization of the concept by 2035, has major benefits for NATO. Alliance member states should assume a participating role in the development of a multi-domain concept of operations, benefiting from the experience and progress of the US in this regard. In any case, Alliance members should at least participate in the development of the American concept in order to strengthen the European side's defence and threat deterrence capability and contribute to its implementation, collectively in Europe.

In another context, we deduce from studying the performance of the Russian Armed Forces in Ukraine that the land forces, engaged in a multi-domain operational environment, must be reconfigured so as to give up the character of supported component and start producing synchronized effects with the other four components, within the joint operation. The role of combined arms ground forces in multi-domain operations must include supporting the other components, which produce effects in other areas, because this extends the operational range of the grouping of joint forces, in scope, space and time, an element that is crucial for the success of large campaigns.

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