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TIME DOMAIN:
A New Dimension of the Battlefield, Revealed by the Experience of the Russo-Ukrainian War

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Abstract

Russia's full-scale invasion of Ukraine in February 2022 created the largest testing ground in modern military science, revealing a dimension of warfare that existing doctrines do not fully capture. One of the clearest manifestations of organisational innovation was the creation of a separate branch of service: the Unmanned Systems Forces.

The history of their creation is particularly interesting because most senior military officers I knew opposed the idea. They generally supported an alternative model, integrating unmanned capabilities into the already existing branches: infantry, aviation, and navy. Their strongest argument was that each existing branch corresponds to a distinct domain, while the Unmanned Systems Forces had no separate domain of their own. Therefore, they argued, there was no need to create the USF as a separate branch, and efforts should instead focus on strengthening existing capabilities.

Nevertheless, the Unmanned Systems Forces were created and today account for roughly 2% of Ukraine's Defence Forces while inflicting more than 30% of enemy losses on the battlefield. It is already clear that this decision was correct, yet the argument about the absence of a distinct domain continued be troubling for a long time. A domain is not simply a part of physical space; it is a way of thinking about the battlefield, and one of the disciplines in which opposing sides compete during war.

A systematic analysis of how Ukraine's most effective units were created, developed, and operated leads to the conclusion that a distinct Time Domain exists. The essence of this dimension is competition with the enemy for time rather than for space. This paper attempts to explain this logic in greater detail and show why time is not merely a resource supporting operations in other domains, but a fully-fledged domain of its own — with its own objectives, rules, constraints, and best practices.

Time Domain is defined as a distinct competitive dimension of armed conflict in which strategic advantage is determined by the relative speed of adaptation cycles between opposing forces. It is conceptually distinct from both existing spatial domains and conventional notions of tempo or speed: it concerns the rate at which a unit transforms battlefield experience into new tactics, systems, and decisions — faster than the adversary can respond. The battlefield should therefore be assessed not only in terms of who occupies which positions and with what capabilities, but also in terms of who possesses technological advantage expressed through time.

This paper proposes the Combat Hub as the organisational architecture that institutionalises this cycle within a combat unit, and presents empirical evidence from Ukraine's Defence Forces demonstrating that this architecture already exists on the battlefield — not as a centrally designed solution, but as a pattern that has independently emerged across different branches of service.

TIME DOMAIN:
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I did not begin this work as a researcher.

I began it as someone who worked with units of Ukraine's Defence Forces, trying to understand why some units survive and prevail while others do not — and why the answer rarely had much to do with what is written in doctrinal documents.

This debate is not merely academic. It carries direct organisational and political significance today.

In late 2023, Ukraine faced a real institutional choice: whether to establish a dedicated Unmanned Systems Forces — or to integrate unmanned capabilities into existing branches of the military. The argument against a separate force was coherent and logically consistent within classical doctrine: each domain has its own branch of service because each domain has its own operational logic. If there is no separate domain, there is no basis for a separate force. Those who advocated for its creation were new teams and units that had entered the traditional military from civilian life. Those who opposed it were conventional generals with classical military education. The existence of the Unmanned Systems Forces depended, in no small part, on finding a compelling counterargument.

Time Domain is that counterargument. If the temporal dimension is real — if the winner is the one whose innovation cycle is shorter than the adversary's adaptation cycle — then there exists a distinct game with a distinct logic. And that game requires a distinct player. Ukraine answered this question in practice by establishing the Unmanned Systems Forces amid active conflict. This article offers the conceptual foundation for that same answer — before the next conflict makes it self-evident.

Russia's full-scale invasion of Ukraine on 24 February 2022 created the largest testing ground in modern military science. No other war in recent decades has generated such a volume of verifiable data on what combat effectiveness looks like in a peer conflict between two armies with significant technological and resource parity.

My understanding of this phenomenon was formed through work with units in the field — not in libraries or headquarters. I worked within *Aerorozvidka*, the militarised community that pioneered the introduction of netcentric warfare principles in Ukraine and effectively created the Delta system; as an adviser to the Commander of Ukraine's Unmanned Systems Forces; as part of the team that built from scratch one of Ukraine's most innovative military units — the 412th Brigade 'Nemesis'; and within teams that conducted combat operations, reflected on them, and changed their own organisation in the process. I saw how technical advantage lasts precisely until the adversary finds a response — and how the speed of that response proved more decisive than the quality of the system itself.

Russia holds superiority across every measurable parameter: personnel, artillery, missiles, armoured vehicles. The struggle for survival under this resource asymmetry made innovation speed not an advantage but a condition of existence. The imperative to change faster than the adversary can adapt generated a cycle of continuous improvement that cannot be replicated — because it is born not from the quantity of resources but from necessity, here and now, at the front. It is this cycle that continues to allow Ukraine's Defence Forces to hold back the army of the aggressor state, which holds quantitative superiority across every classical indicator.

The commanders I observed — the best, the most effective — made decisions intuitively. They sensed that tactics needed to change faster, that units needed to be built differently, that time was the decisive resource. But they had no language to explain

this to headquarters. No instrument to measure it for a supplier or manufacturer. No concept to make it a requirement for doctrine and military planning. The existing apparatus — domains, MDO, firepower — simply has no category for this dimension.

The battlefield has traditionally been defined along two dimensions: who stands where, and how much each side has. But the decisive third dimension — how quickly each side evolves, what the balance between the adaptation cycles of neighbouring units looks like, and what advantage this can create — remains invisible. Commanders on the line of contact see this in real time. Neither headquarters, nor researchers, nor manufacturers possess a shared analytical lens that accounts for this dimension.

Existing doctrine describes war through domains: land, sea, air, cyberspace, space. All of them are spatial categories — they answer the question of 'where'. But the decisive dimension of the war in Ukraine is not exclusively spatial, where time is merely a resource for decision-making. For many innovative teams at the front, time has become an objective in itself — because winning time means gaining, for a period, a technological advantage over the enemy, which creates the opportunity to convert that advantage into gains in space. Increasingly, I see time becoming the foundational variable that shapes the architecture of combat operations and ultimately strengthens positions across all other domains. A unit that updates its technologies and tactics every six weeks structurally outperforms a unit that updates them once a year — even if it is inferior in numbers and resources. The battlefield must therefore be assessed not only by who is positioned where in space and what territory is controlled, but also by who holds what advantage in time through technological superiority. This is the logic of Time Domain — one more dimension of war, the understanding of which has until now been absent.

The logic of Time Domain, however, is not unique to Ukraine's theatre of war. The most predictable objection to this framework is that it reflects the specific conditions of a large-scale, largely fixed frontline conflict. The evidence suggests otherwise.

In Myanmar, Arnold (2026) documents that resistance groups quickly mainstreamed drones into operations while the military remained constrained by habituated doctrine and stagnant centralised procurement. The advantage did not come from technological superiority — it came from a shorter adaptation cycle. Myanmar's civil war is currently the world's second most intense conflict for drone attacks after Ukraine, fought across fluid, non-linear frontlines fundamentally different from eastern Ukraine.

In the Red Sea, Houthi forces backed by Iran demonstrated the same logic in a maritime context and with striking clarity. Beginning with simple aerial drones in 2023, the Houthis evolved within months to swarm attacks, anti-ship ballistic missiles and long-range strikes: by July 2024, a Houthi drone had flown over 2,600 kilometres from Yemen to reach Tel Aviv, penetrating Israeli air defences for the first time (ACLED, 2024). Their advantage was more the speed of tactical iteration than technological sophistication. Each Western response generated a Houthi adaptation; each adaptation exposed a new gap in Western defensive doctrine. The structural cost became visible in the so-called 'shot exchange problem': Western navies were firing million-dollar interceptors to destroy drones worth a few thousand dollars — a ratio that was strategically unsustainable (Sayler and Williams, 2025).

The US response was itself an admission of the adaptation gap. CENTCOM established Task Force Scorpion Strike and deployed the LUCAS drone — a system reverse-engineered from a captured Iranian Shahed-136 — because the United States' own development cycle could not keep pace with the threat it was responding to (CENTCOM,

2025). The adversary's innovation cycle had proved shorter than the defender's procurement cycle and the defender was forced to copy the adversary's weapon to close the gap.

This paper unfolds in two parts. In the first, I attempt to build a theoretical framework: to define Time Domain as a concept distinct from the classical domains; to articulate the architecture of Combat Hub as an organisational response — an integrated combat ecosystem whose primary task is to evolve faster than the enemy; and to describe a new type of capability in the Time Domain, understood not merely as the ability to achieve a specific result on the battlefield at a specific moment, but as the capacity to reliably sustain and develop that ability over time, regardless of adversary countermeasures.

The second part verifies this logic against field evidence drawn from Ukraine's Defence Forces between 2022 and 2026. It examines the Combat Hub continuous improvement framework — a system of nine feedback cycles operating across three temporal horizons — and the Time-Domain Readiness Cycle, a structured approach to training units for adaptive rather than scenario-based warfare. These frameworks are validated through two documented cases: the 412th Unmanned Systems Brigade 'Nemesis', which evolved from a battalion to a brigade in under two years while developing its own R&D, production and training functions organically; and Lasar's Group, a National Guard unit that achieved over $12 billion in confirmed enemy equipment destroyed by systematically shortening the cycle between battlefield observation and operational response. This is not an exception, nor the unique experience of a single brigade — it is a pattern that confirms the necessity of reorienting military planning from the logic of space to the logic of time, and that defines a new doctrine of modern war. This article gives it a name.

PART I. THEORETICAL FRAMEWORK

The Objective: Winning Time, Not Space

The decisive advantage in modern war is achieved not through control of space, but through outpacing the adversary in the speed of adaptation.

Modern military doctrine is organised around the concept of the 'domain' — the environment in which military operations take place. NATO officially recognises five: land, sea, air, cyberspace, and space (NATO ACT, 2021). Each domain answers the question of 'where' — it describes a portion of physical space on which a given force is expected to focus. The traditional logic of a military domain is the logic of contest over territory: armies seize land, navies control waterways, air forces dominate airspace. Multi-Domain Operations rightly develop this logic through the synchronised integration of domains (Gilli, Gilli and Grgić, 2025), but remain within a spatial modality.

The war in Ukraine has revealed three phenomena that invite us to look at this traditional logic from a different angle, and to recognise a dimension that has until now remained largely invisible.

First: unmanned systems are de facto forming a new branch of military service. They do not fit the logic of five domains, as they operate simultaneously across several of them. At the same time, the decisive advantage in their employment is determined not so much by the quality of an individual system as by the speed of its updating and adaptation. The experience of the Unmanned Systems Forces demonstrates that effectiveness grows faster where innovation is directly integrated into combat application through a short feedback cycle. Ukraine is now locked in a relentless race to innovate, with the window between the appearance of new systems and the development of effective countermeasures sometimes reduced to a matter of weeks (Kirichenko, 2025) — a tempo that

NATO's existing doctrinal review cycles are structurally unable to match (Kramer, Dailey and Brodfuehrer, 2024). The existing NATO domain model describes the space of war well but describes its evolution significantly less so.

Second: units of a new type. Successful units in Ukraine — regardless of branch — are increasingly integrating operational functions, analytics, R&D, training and production within a single command (MilitaryLand.net, 2026). Their effectiveness is determined not so much by the number of systems or the positions they hold, as by the speed of institutional learning and the capacity to rapidly update practices. This is a structural characteristic that is only partially reflected in existing doctrine, and for which a fully adequate descriptive framework has yet to be developed.

“Existing military doctrines focus far more on control over space than on advantage in time. This gap is precisely the problem that the concept of Time Domain addresses.”

Third: the update cycle as a decisive variable. Systems such as Delta and other battlefield information platforms enable the collection of vast quantities of field data in real time, allowing decisions that previously relied more heavily on experience and intuition to be prepared and taken differently (Bondar, 2024). In conditions of rapid change on the battlefield, decisions about improving systems, tactics and training must be made daily. In this sense, the advantage lies in the pace of change, not in the spatial dimension.

If victory is increasingly determined by the speed of evolution and adaptation, then that speed becomes substantially more important — and nearly self-sufficient as a variable. Existing military doctrines focus far more on control over space than on advantage in time. This gap is precisely the problem that the concept of Time Domain addresses.

The Battlefield Through the Lens of Technological Advantage (Expressed in Time)

The battlefield must be assessed through the lens of each unit's technological advantage — expressed in time, not in the number of systems.

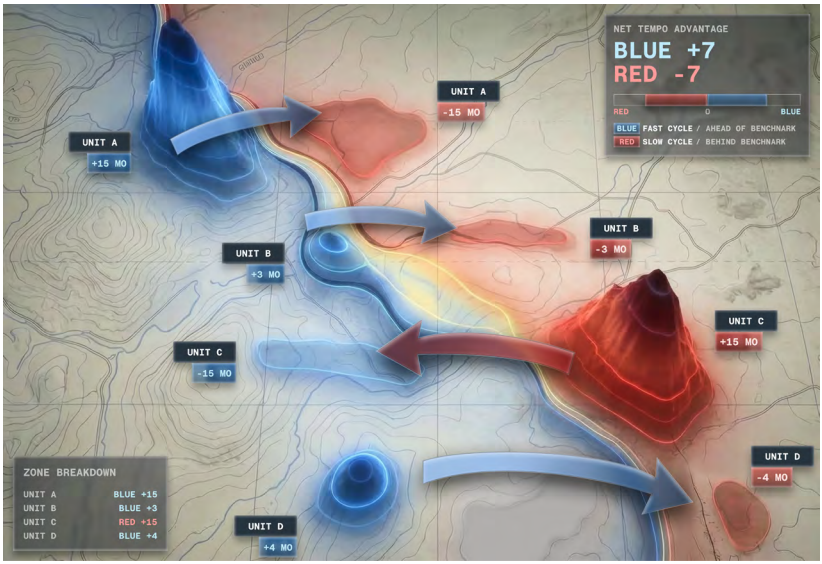
The classical military map shows who is positioned where and what resources each side holds — which allows an assessment of the balance of forces but gives a limited picture of the factor most decisive in modern conflict: the speed of adaptation. Two units with an identical number of drones may have fundamentally different effectiveness if one updates its tactics every six weeks and the other once a year. On the map they appear similar. Their actual capabilities differ fundamentally.

Classical analysis operates primarily with static indicators — firepower, personnel numbers, equipment and position. In conditions of rapid change, this yields only a partial picture (Johnson, 2023). Advantage becomes dynamic: it is gained and lost depending on a unit's capacity to sustain and update its practices. A unit that holds a technological advantage today but cannot develop it will lose that advantage within weeks. A unit that is currently behind but has a short adaptation cycle will catch up and surpass. This represents a fundamentally different logic for assessing combat potential.

In this context, the concept of Time Domain adds another dimension to the traditional map — the pace of technological development of units relative to the adversary. It is an analytical framework that allows one to see not only the disposition of forces, but also the differences in their technological depth and the speed of their evolution. It reveals where on a given section of the front the adversary is falling behind technologically — and where that asymmetry represents the greatest operational opportunity. From this perspective, military units at the front are far more dependent on organisational culture than classical doctrine acknowledges, and

should be assessed against the following additional parameters: the speed at which new technologies are tested and mastered; the speed at which mastered technologies are scaled; and the speed at which new tactical applications are developed and implemented in light of those technologies.

Figure 1. Battlefield Map with Technological Field



A standard tactical map showing units of both sides. Overlaid is the technological field of each unit, expressed as a time advantage relative to the adversary. Where a unit has a shorter adaptation cycle, its technological advantage is greater. The map becomes three-dimensional: the first two dimensions represent space, the third represents time. The map reveals not only where to attack — but where the adversary is most technologically vulnerable.

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The Quality of Decisions Is Measured in Time

Every decision — by a commander, a manufacturer, a strategist — has one key metric: how much time it buys before the adversary finds a response.

Decisions are traditionally evaluated by effect: a target destroyed, a position held, a task completed. This is the logic of the moment — it captures a result at a specific point in time. Time Domain adds a different scale: how much time a given decision buys relative to the adversary finding a response.

Edward Luttwak (1987) characterises the search for a response as an inherent feature of any military interaction: adversaries seek 'to oppose, deflect and reverse each other's actions'. This means that any tactical advantage has a limited lifespan. The question is not whether the adversary will find a response but when. It is precisely this interval that becomes the critical unit of measurement for decision quality in a rapidly changing conflict.

This logic has concrete implications at every level. A commander who thinks through the metric of time makes different decisions. He asks not only 'will this tactic work today', but 'how much time will it buy before the adversary adapts, and what comes after'. This represents a different planning horizon — one that requires continuous analytical support and the constant monitoring of adversary reaction speed.

Procurement changes accordingly. The advantage shifts from maximum capability to the ability to rapidly update and adapt systems. Modular solutions that can be modified within a week hold a temporal advantage over monolithic platforms that require years to change. From this perspective, all elements of combat systems should be classified as platforms, sensors, connectors or effectors,

and be made as multimodal and interoperable as possible. Capability remains important, but without temporal resilience it becomes an advantage with an expiry date.

Doctrine, too, acquires a different logic. Approaches that allow TTPs to be rapidly updated based on combat experience, without lengthy centralised approval processes, hold a temporal advantage. Kreetz *et al.* (2025) note that NATO's doctrinal processes are largely oriented toward peacetime conditions and only partially suited to the pace of modern conflict. As a result, units are either forced to wait for formal approval of changes or adapt informally — and both options carry a cost measured in time.

The strategic conclusion: advantage in the Time Domain is shaped by the quality of decisions across all levels simultaneously — not only on the battlefield, but in procurement, R&D and planning. An army that systematically makes decisions with a shorter 'effective lifespan' risks losing its advantage even when individual decisions are technically correct.

From this perspective, the R&D team and the manufacturer of systems become an essential part of the combat ecosystem and should be assessed in terms of: creative potential — the capacity to improve the characteristics of existing systems or to develop new, more effective ones; the quality of innovation planning — the ability to accurately forecast development timelines and expected outcomes; and the capacity to scale — to move rapidly from prototypes to the production of hundreds and thousands of units.

Defining Time Domain and Capability

Time Domain is a distinct domain in which military teams compete not for dominance in space, but for technological advantage expressed in time. The winner is the one whose system evolves faster.

Capability in the Time Domain is not the ability to perform a discrete action or achieve a result at a specific moment, but the ability to reliably sustain and develop that capacity over time, regardless of adversarial countermeasures. The defining characteristic is its projected stability, rather than the result alone.

Tempo, in military thought, describes the intensity of operational activity. Speed, in the context of Multi-Domain Operations, refers to the ability to conduct coordinated actions 'at a speed that matters' (Gilli, Gilli and Grgić, 2025, p. 80). Both concepts describe execution within an existing tactical framework. Time Domain is distinct in that it describes the speed of change of that framework itself — a meta-level relative to operational tempo.

The innovation cycle encompasses observation on the battlefield, analysis, the generation of solutions, the production or adaptation of systems, operator training, and combat application. If this cycle is shorter than the adversary's adaptation cycle, the unit systematically operates 'inside' the adversary's decision-making loop — in the logic described by John Boyd (1995). A unit may succeed today but if it cannot sustain and develop that advantage, it will quickly disappear. True capability is the ability to preserve and develop advantage through a process of evolution, achieved through the stability and quality of the adaptation cycle.

'Domain' in a military context has traditionally denoted a spatial environment. Time is not space — it cannot be occupied or patrolled. Nevertheless, domains are analytical constructs serving the purposes of planning and command. Time Domain performs an

analogous function, isolating the temporal dimension as a distinct object of strategic planning. If the cyber domain has received its own command structures and resources, the adaptation cycle warrants equivalent institutional attention.

I would argue that the association of a military domain with a portion of space is itself a conceptual limitation — that a domain is better understood as a distinct game, a distinct context that must be understood and won on the battlefield. In my view, the attributes of a distinct domain are the presence of a unique strategic objective and a particular set of constraints on the path to that objective — the rules of the game, in effect. In practice, I observe an entirely distinct and consequential game unfolding on the battlefield: a relentless technology race, developing in real time but entirely without reference to any specific portion of space. This game is decisive for actual battlefield outcomes yet does not fit fully within the coordinate system of any existing military domain. It is on these grounds that I am confident Time Domain has a legitimate claim to existence and that its study will carry serious practical significance.

A New Unit Architecture: The Evolving Ecosystem

*Advantage in the Time Domain requires a specific organisational architecture. I refer to it as the Combat Hub — whose primary task is to evolve faster than the ene*my.

Advantage in the Time Domain does not emerge spontaneously. Barno and Bensahel (2020) demonstrate that tactical adaptation without institutional consolidation dies with rotation — experience is not transferred and the cycle is interrupted. Combat Hub provides the organisational structure that protects and develops this function collectively. Dee *et al.* (2025) diagnose that the informal innovation networks that constitute Ukraine's strength are simultaneously its

“No successful unit today operates without its own R&D and production capacity.”

vulnerability: they depend on specific individuals and do not scale. What is required is an architecture that protects the adaptation cycle from individual losses and renders it institutional.

Combat Hub is that architecture. It is a combat ecosystem — an integrated combat unit that combines four functions under a single command: operational, analytical, research and development, and production. Not as sequential phases, but as parallel and continuous processes. The detailed architecture is described in Part II.

The foundation of Combat Hub is neither technology nor structure in themselves. It is a culture open to experimentation and change — one that is maximally conducive to developing the art of surprising the adversary. Units of a new type in Ukraine that systematically prevail combine these functions regardless of branch of service. This is not the unique experience of a single brigade — it is a pattern. No successful unit today operates without its own R&D and production capacity.

Time Domain and Multi-Domain Operations

Time Domain does not replace Multi-Domain Operations — it adds to it the temporal axis that MDO lacks.

MDO addresses the coordination challenge: how to synchronise actions across different domains. Time Domain addresses the adaptation challenge: how to ensure that each of those actions evolves quickly enough. These are distinct but complementary tasks.

Even well-coordinated MDO loses effectiveness if individual domains adapt slowly. Gilli, Gilli and Grgić (2025) identify cross-domain complementarity as the key advantage of MDO — but if that complementarity is realised through lengthy doctrinal update cycles, it remains a theoretical construct rather than a battlefield advantage. Takabatake (2024) formalises MDO through supermodularity, but his model is static and does not account for the speed of realising that advantage. Time Domain functions as a dynamic extension of this logic.

NATO's official definition of MDO contains a temporal requirement: 'to deliver converging effects at a speed that matters' (NATO ACT, 2021). Yet doctrine and organisational mechanisms provide limited guidance on how to achieve that speed against an adaptive adversary. This challenge is particularly acute for smaller states and coalitions that cannot afford domain-specific dominance and must rely on integration and tempo as force multipliers (Plevnik and Vuk, 2025). Time Domain and Combat Hub offer a response, providing the organisational architecture that makes this requirement operationally achievable. In this logic, MDO answers the questions of 'what' and 'where'. Time Domain answers the question of 'at what speed does this change' — adding a temporal dimension to the battlefield map.

PART II. OPERATIONALISATION

The Force Structure of Time Domain: Combat Hub

Combat Hub is a combat ecosystem that institutionalises the evolutionary cycle within a combat unit. Its primary task is to develop faster than the enemy.

If Time Domain is a real dimension of conflict, it demands an organisational response. The standard logic of unit design determines structure according to tasks and environment — and does not ask how quickly the unit evolves in the execution of those tasks. Combat Hub is the answer to precisely that question: how to organise a unit so that it systematically shortens its own adaptation cycle — in parallel with conducting combat operations, not between them.

Combat Hub combines three functional units in a continuous cycle.

Military Units are the operational core and simultaneously the primary generator of data. Every operation, every interaction with the adversary, constitutes information that feeds the analytical and research functions. Johnson (2023) argues that Orientation — the most important phase of the OODA loop — cannot be automated. Combat analytics represents the institutional provision of this function at the unit level.

R&D generates new solutions — tactical, technological and organisational — on the basis of battlefield data. It is fundamentally important that this function is an organic component of the unit, not an external service. Today, no successful unit in Ukraine operates without its own R&D capacity — this is not the exception of particular brigades, but a systemic characteristic of units that prevail.

Production closes the cycle: it materialises R&D solutions and disseminates new tactics among personnel. Without this unit,

Figure 2. Combat Hub — Structure

Three functional units under a single command — Military Units, R&D, and Production — connected through the central Combat Hub node, forming a continuous adaptation cycle.

Credit: © Oleksiy Honcharuk, 2025. Original diagram created by the author.

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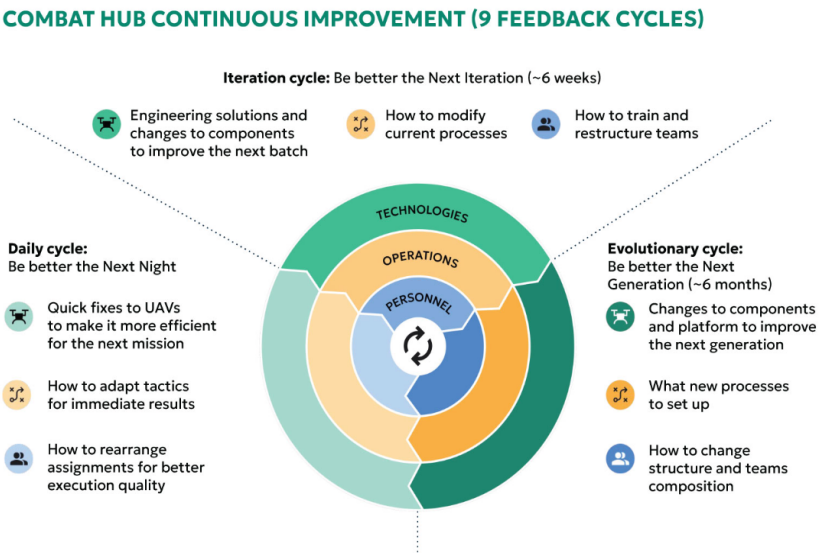
even the best analytical conclusions remain on paper. Dee *et al.* (2025) diagnose that Ukraine's informal innovation networks are simultaneously its vulnerability — they depend on specific individuals and do not scale. The Production Unit formalises and protects this cycle from individual losses through institutional structure.

Figure 3. Combat Hub — Nine Feedback Cycles



The nine feedback cycles of continuous improvement within Combat Hub, structured across three dimensions of adaptation (Personnel, Operations, Technologies) and three temporal horizons (Daily cycle, Iteration cycle, Evolutionary cycle).

Credit: © Oleksiy Honcharuk, 2025. Original diagram created by the author.

The foundation of Combat Hub is neither technology nor structure in themselves. It is a culture open to experimentation and change — one maximally conducive to developing the art of surprising the adversary.

Combat Hub operates simultaneously across three temporal horizons — each of which encompasses three dimensions of adaptation: technologies, operations, and personnel.

Daily cycle (6–24 hours) — 'be better the next night'. Quick fixes

to systems to improve efficiency for the next mission. Adaptation of tactics for immediate results. Reallocation of assignments for better execution quality. The Delta situational awareness system provides a shared operational picture for coordination between units (Bondar, 2024).

Iteration cycle (~6 weeks) — 'be better the next iteration'. Engineering solutions to improve the next batch of systems. Modification of current processes. Training and restructuring of teams. Kramer, Dailey and Brodfuehrer (2024) note that Ukraine updates drone software every two weeks, while NATO reviews doctrine over a period of 15–20 months. It is at this horizon that competitive advantage in the Time Domain is measured.

Evolutionary cycle (~6 months) — 'be better for the next generation'. Changes to components and platforms for the next generation of systems. New processes. Changes to team structure and composition. Barno and Bensahel (2020) demonstrate that without institutional consolidation, tactical experience is lost with rotation. This horizon converts tactical innovations into organisational memory.

Implications for Doctrine, Procurement and Training

Doctrine: a new unit of effectiveness

Adopting the logic of Time Domain requires changes in how armies train, equip themselves and measure results. Time Domain doctrine measures a unit through the speed of its adaptation cycle and through its outcomes.

Classical doctrine measures effectiveness through static indicators: number of systems, personnel, firepower. Time Domain adds a dynamic metric: how long it takes a unit to move from identifying a new adversary tactic to implementing a countermeasure. Kreetz

et al. (2025) argue that doctrine should not prescribe TTPs but should instead provide mechanisms for their rapid generation from the bottom up. Combat Hub is the organisational mechanism that realises this principle. Gilli, Gilli and Grgić (2025) identify interoperability as a key challenge for NATO MDO; Time Domain adds a new dimension to it: not only the compatibility of systems, but the alignment of adaptation cycles between allies.

Procurement: from system to cycle

Procurement in the logic of Time Domain measures the unit's capacity to convert resources into results over time.

Existing procurement logic is fundamentally incompatible with the pace of adaptation in modern conflict. Bondar (2024) notes that Ukraine reduced the time for introducing new systems from two years to 45 days – this became a structural advantage. Instead of 'which system are we procuring', the question becomes: "how do we shorten the cycle from identifying a need to implementing a solution?" A modular system that can be updated within a week holds a temporal premium over a monolithic platform that requires two years to modify.

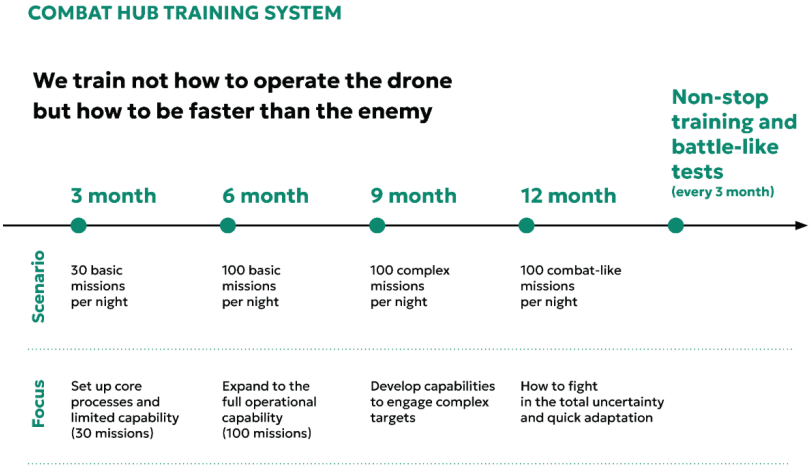
The key proposition is this: a unit's capacity to convert resources into results is a skill that must be developed and measured. A unit that receives resources and regularly demonstrates measurable results holds an advantage over one that receives systems and waits for the next budget cycle. Under these conditions, the very object of procurement changes fundamentally. Rather than spending resources on drones and capabilities with specific characteristics, they would better be spent on building teams — combat ecosystems — that at the required moment will reliably possess the specific capacity to conduct combat operations, sustain that capacity regardless of adversary countermeasures, and develop it faster than the enemy.

Training: anticipating the next battlefield

Training, in the logic of Time Domain, develops the skill of being faster than the enemy and anticipating his adaptation cycle – preparing better for the next war

In the logic of Time Domain, the objective of training is to evolve faster than the enemy, as opposed to the acquisition of a specific skill — how to pilot a drone or strike a particular target. This requires an entirely different culture and logic of training design. I refer to it as the Time-Domain Readiness Cycle (TDRC).

Figure 4. Combat Hub Training System



The Time-Domain Readiness Cycle training timeline.

Credit: © Oleksiy Honcharuk, 2025. Original diagram created by the author.

The best way to prepare for the unpredictable is to regularly encounter the unpredictable (Barno and Bensahel, 2020; Dee *et al.*, 2025). The new training logic is therefore structured around three principal phases.

Phase I — Baseline Capability Generation (BCG): the acquisition of baseline capability under ideal conditions — for example, the ability to conduct 100 combat missions within a 24-hour period.

Phase II — Contested Environment Validation (CEV): the testing of baseline capability under conditions of predictable adversary countermeasures — for example, where the training environment replicates known forms of opposition, but the unit must nonetheless achieve the desired result.

Phase III — Adaptive Stress Testing (AST): stress-testing of baseline capability under conditions of unpredictable adversary countermeasures — where the unit knows it will face opposition but does not know its form and must prepare on the basis of its own capacity to anticipate and forecast it.

A unit should reach its capability threshold through BCG and CEV, and then continuously operate within the AST cycle, to sustain the habit of preparing for the next battle rather than the last one.

Case Study: The Pattern of Successful Ukrainian Units, 2022–2026

The 412th Brigade 'Nemesis' is a documented example of Combat Hub architecture — but not a unique one: it is a pattern that reproduces itself across every successful unit regardless of branch of service.

Analysis of successful units within Ukraine's Defence Forces reveals a consistent pattern: units that systematically prevail invariably integrate operational, analytical, research and production functions under a single command. This is a response to battlefield reality that evolved independently across different branches of service.

The 412th Brigade 'Nemesis' is the most thoroughly documented example: in less than two years, battalion →regiment (December 2024) →brigade (October 2025) (Brovdi, 2025). All Combat Hub functions have been verified through open sources: a powerful analytical component that analyses everything from sortie numbers to munitions effectiveness (Merkotun, 2025); a Technology and Innovation Unit in the brigade's official structure (MilitaryLand.net, 2026); the NEMESIS drone developed by the brigade's own engineers (Defence Tech Community, 2025); and the Nemesis Academy training pilots, operators and engineers directly at the unit's base (412th Nemesis Brigade, 2025).

Combat effectiveness is verified: over $3 billion in enemy equipment destroyed, approximately 20% of all confirmed strikes on Russian air defence systems in occupied territory, top-five in the DELTA ranking since June 2025 (Militarnyi.com, 2025). But what matters for the argument of this paper is not what has been destroyed but why the results are systematic rather than incidental.

Comparable battlefield results have been achieved by other units that applied the logic of Time Domain and invested in reducing temporal costs. One prominent example is Lasar's Group — a unit of the National Guard of Ukraine that provided evidence of confirmed destruction of Russian equipment worth $12 billion and became one of the most productive units across all of Ukraine's Defence Forces. Among the unit's key decisions oriented toward winning time were both technological and organisational.

Direct linkage between production, R&D and supply reduces (to a minimum) the time between a signal from the unit and delivery from the manufacturer. The unit avoids both delays in system refinement and the risk of receiving solutions that are no longer relevant to the battlefield by the time they arrive.

The experience of Lasar's Group illustrates this logic directly. The first production facility was set up in a garage: using '$680,000 in remaining cash, Yelizarov purchased components from China and began assembling drones' (Forbes Ukraine, 2025). The organic connection between the unit and its manufacturer made it possible to receive 'exactly the drones needed for combat missions, rather than having to modify them near the line of contact' (Forbes Ukraine, 2025). While not a logistical solution, it has a temporal advantage: the cycle from identifying a need to receiving an adapted system is shortened from months to weeks.

Clear specialisation reduces retraining time and eliminates operational delays between functions. The unit divided the processes of acquiring combat experience, analysing it, and translating it into production – each receiving its own organisational form. "What in business would be called departments became companies for us, each with a narrow specialisation. Some fly bombers and FPV drones; ground crews support every sortie — swapping batteries and loading munitions. Aerial reconnaissance operates separately, searching for targets with fixed-wing aircraft, while analysts consolidate data in Delta in real time. We are supported by a tech back-office: IT specialists maintaining communications channels, and technicians restoring damaged drones" (DOU, 2025). Not just an organisational convenience or an end it itself, this temporal architecture specialises as an instrument for shortening the cycle.

Intelligence directly generates ammunition distribution tasks, eliminating the command layer that would otherwise need time to process reconnaissance data and make allocation decisions (Forbes Ukraine, 2025). Every eliminated link represents a temporal

premium; decisions are made closer to the source of information and converted into action more rapidly.

This example carries particular significance in a broader context. Following the unit's success, its founder Pavlo Yelizarov was appointed Deputy Commander of the Ukrainian Air Force and tasked with reforming the air defence system. The doctrinal advantages of time management clearly extend beyond the Unmanned Systems Forces — they apply across all spatial domains of war. This represents a de facto recognition at the level of Ukraine's senior military command (Forbes Ukraine, 2025).

Conclusions

The experience of Ukraine 2022–2026 provides a clear answer to the question with which this paper began. Units that systematically prevail do so not through technological superiority at the moment of engagement, but through the capacity to sustain and develop that superiority over time, regardless of adversary countermeasures.

The existing analytical apparatus of military thought describes war primarily in spatial categories. It captures well where forces are positioned and how many there are. It describes far less well how quickly those forces evolve and why that speed is decisive in modern conflict. Coordination between domains does not resolve the problem of adaptation within them. Even the most refined synchronisation loses its value if each of its component streams updates more slowly than the adversary's adaptation cycle. It is precisely this gap that this paper addresses.

The argument that 'no domain means no separate branch of service' continues to be used by conservative military institutions in various countries to block the creation of specialised structures. Time Domain is the answer to that argument: if the temporal dimension is real, there exists a distinct game and a distinct player for whom that

game requires an organisational form. Ukraine's Unmanned Systems Forces represent the first institutional recognition of this reality. They will not be the last.

Time Domain is an attempt to give an analytical name to a dimension of conflict that already determines its outcomes but remains outside the existing doctrinal vocabulary. The battlefield must be assessed not only by positions and strength, but by the technological advantage of each unit expressed in time. Every decision — by a commander, a procurement official, a doctrine writer — has one metric: how long it remains effective before the adversary finds a response. Every advantage has an expiry date. The only question is who manages to renew it first.

Combat Hub is the organisational response to this challenge. Units of a new type in Ukraine that systematically prevail — regardless of branch of service — have converged on a similar architecture: the integration of operational, analytical, research and production functions under a single command within a continuous adaptation cycle. This is not a designed solution, and neither is it the unique experience of a single brigade. It is a response to battlefield reality that evolved independently and reproduces itself as a pattern.

On the battlefield, warfare is inherently multidomain in nature. Time Domain therefore does not replace the multidomain picture; it adds another critical dimension in which competition also takes place: competition for time. This means that the logic of military planning, procurement, training, and other doctrinal elements must also be expanded to account for this new domain.

On doctrine:

NATO and allied militaries should expand their conceptual framework by adding a temporal axis to the logic of adaptation and capability evolution within existing instruments of analysis and planning. Doctrine should not only prescribe TTPs (tactics, techniques, and

procedures) but also create mechanisms for their rapid bottom-up generation. For example, interoperability standards should account not only for system compatibility, but also for the alignment of adaptation cycles between allied units.

On procurement:

In the struggle within the Time Domain, the object of procurement should not be individual systems. Instead, the purpose of resource allocation should be the creation of combat ecosystems — military, engineering, and production teams connected through a shared improvement cycle. In other words, funding should focus on teams capable of consistently generating, sustaining, and evolving capabilities over time regardless of adversary countermeasures. Priority should be given to modular systems that can be rapidly updated. Embedded feedback loops between field operators and manufacturers should become a contractual standard rather than an exception.

On training:

Allied militaries should move from scenario-based preparation toward the systematic development of adaptive capacity. The Time-Domain Readiness Cycle offers a practical framework for this transition: progression from baseline capability, through validation in contested environments, to adaptive stress testing under unpredictable conditions.

On force structure:

Allies should recognise that military units designed to compete in the Time Domain require a different culture and organisational architecture in order to evolve faster than the adversary on the battlefield. Combat Hub is an attempt to propose an organisational standard for such a modern military unit.

The concept of Time Domain is an attempt to provide a conceptual foundation and framework for all these decisions, while also systematising the practical lessons of the war in Ukraine.

The article leaves several questions open. The optimal scale of Combat Hub — from battalion to brigade — requires separate investigation. The conditions for transferring this architecture to armies with different institutional and cultural characteristics remain undefined. The question of accountability and control in structures operating with shortened decision-making cycles — particularly in the context of autonomous systems — is critically important and requires dedicated development.

All organisations tend to prepare for the last war. Time Domain offers a different logic: not to attempt to predict the form of the next conflict, but to build the capacity to adapt to it faster than the adversary. Ukraine's experience is a unique environment in which this logic has been tested against reality in a peer conflict. Its significance lies in the principles that emerge from it, principles that are universal in character.

In my view, the addition of a temporal dimension to military planning, traditionally based on the logic of space, is the central organisational innovation of the war in Ukraine and forms the foundation of a new doctrine of modern warfare. This paper has simply given that innovation a name.

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