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Design, Destroy, Dominate
The Mass Drone Warfare as a Potential Military Revolution

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Abstract

The widespread use of drones observed in Ukraine—both in terms of the scale of the fleets deployed and their omnipresence in the operations of both belligerents—appears to meet the conditions of a genuine military revolution.

Dronization cannot be reduced to a mere technical innovation or a specific category of devices. It stands as a transformative principle, comparable to motorization and mechanization in the past century. It manifests in the evolution of drones into expendable and adaptive tools, the emergence of a "participatory war", and in the conduct of operations, which is shifting toward "multi-fire, multi-domain" combat.

For the European force model, the Ukrainian example should prompt the establishment of the digital, industrial, and human ecosystem needed to support dronization: building a unified information and decision-support system, fostering a "drone culture" within the armed forces, and, in the short term, focusing on the "high-end" segment of dronization—namely, long-range strike capabilities.

Résumé

La dronisation observée en Ukraine, par l'ampleur des flottes engagées et son omniprésence dans les opérations des deux belligérants, semble réunir les conditions d'une véritable révolution militaire.

La dronisation ne peut être réduite à une innovation technique ou à une gamme spécifique d'appareils. Elle s'impose comme un principe de transformation comparable à la motorisation et mécanisation du siècle passé. Elle s'incarne dans l'évolution des appareils en objets consommables et adaptatifs, dans l'avènement d'une « guerre participative », dans la conduite des opérations, qui évolue vers un « combat multi-feux, multi-champs ».

Pour le modèle de force européen, l'exemple ukrainien devrait conduire à établir l'écosystème numérique, industriel et humain capable d'accompagner la dronisation : constituer un système d'information et d'aide à la décision unifié, développer une « culture drone » dans les forces armées et cibler à court terme le « segment haut » de la dronisation, soit les capacités de frappe en profondeur.

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Introduction

Now entering its third year, the Russian invasion of Ukraine has become the theater of a massive drone-driven transformation of military operations. This phenomenon is unprecedented, both in quantitative terms—with several million drones now produced and destroyed each year—and in its influence on the dynamics of operations and the structure of forces. For context, the most drone-intensive conflict prior to 2022 was the war over Nagorno-Karabakh, where drones were responsible for around 45% of all losses in armored vehicles, artillery, and air defense systems. In Ukraine, by 2025, drones are estimated to account for 60 to 70% of all losses across all categories.[1]

For both belligerents, drones have thus become the primary sensors, relays, and kinetic effectors. They constitute a robotic and increasingly automated nervous system[2] that shapes fire support and movement coordination across all domains and operational environments. Genuine AirLand technological chimeras, drones serve simultaneously as binoculars, grenades, and mortars for infantry, who continuously reconfigure them to adapt to the enemy. They have also taken a central role in counter-battery fire, deep reconnaissance, and battlefield interdiction—roles traditionally reserved for Army aviation. At a strategic depth, they are reshaping methods of penetrating air defenses and, through cost-effective mass deployment, they are enabling maneuvering salvos against critical, economic, and political targets central to the adversary's war effort.

More fundamentally, drones have allowed both the Ukrainian and Russian armies to maintain coherence and combat effectiveness under extreme attrition in personnel and heavy equipment. They provide the shock element needed for offensive thrusts and the stopping power required to hold or retake positions. In this sense, drones saturate the front lines like a permanent grapeshot or a reactive shield against enemy breakthroughs.[3]

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1. E. Hecht, "Drones in the Nagorno-Karabakh War: Analyzing the Data", *Military Strategy Magazine*, Vol. 7, No. 4, 2022 ; J. Watling and N. Reynolds, "Tactical Developments During the Third Year of the Russo-Ukrainian War". According to a Russian publication, 40 to 50% of all reconnaissance and combat missions are now carried out by FPV drones. In 2023, Ukrainians estimated that 86% of their ISR missions were conducted using drones of all types. See A. Kalyuzhny et al., "FPV Systems and Their Use in Combat Operations", *Military Engineer*, Vol. 31, No. 1, 2024; S. Sidorov, "The Flow of Innovative Technologies for Determining the Development Directions of Unmanned Aircraft for the Battlefield: The Experience of the Defense Forces of Ukraine (2014–2023)", Kyiv Conference, November 30, 2023.

2. "What Are the Differences Between Automation and Robotics?," Robotiq, December 19, 2024, available at: https://blog.robotiq.com.

3. A. Timokhin, "Know Your Enemy: The Ukrainian 'Army of Drones' Project Against the Russian Armed Forces", Top War, November 1, 2024, available at: https://fr.topwar.ru.

They infiltrate and prowl the rear areas, hunting fire support assets and logistics, posing a constant threat to any troop or equipment rotation. They also conduct long-range raids against infrastructure and troop concentrations.

Contrary to the image of a continuous 1,000-kilometer front from Kharkiv to Kherson, the positional warfare that has taken root in Ukraine since autumn 2022 is, at the tactical and operational levels, highly discontinuous and fluid. To survive on a battlefield saturated with sensors and firepower, forces have de-mechanized and dispersed.[4] According to Russian sources, "in defense, a maximum of 10 men (...) can hold off a superior enemy force, sometimes up to a reinforced company." "Large-scale operations involving battalions and regiments" have become prohibitive due to the need for "comprehensive and integrated" support in intelligence, surveillance, and reconnaissance (ISR), as well as electronic warfare (EW), ground-based air defense (GBAD), and fire support from artillery, aviation, or strike drones. This complexity has given operations a methodical, staccato rhythm reminiscent in spirit of the "conducted battle" of late World War I. Each push requires levels of preparation and coordination that are unsustainable at scale or over time for traditional military organizations. As a result, force deployment increasingly resembles limited raids or incursions. Infantry is often reduced to infiltrating in small groups and, as one Russian officer describes, charging "mounted" on unarmored but fast vehicles.[5]

The echeloning of robotic, dronized, and automated sensors and fires has thus replaced the traditional echeloning of forces, which has become unsustainable for both post-industrial states. Dronization leads to the formation of a highly resilient and adaptive multi-domain operations (MDO) fires mesh that envelops the actions of both belligerents and monopolizes their attention.

Such far-reaching upheavals compel us to confront a fundamental question: does dronization constitute a military revolution? To address this, we will first examine the conceptual criteria of such a revolution (1), before analyzing its characteristics and implications at the levels of individual systems (2), production architectures (3), and the conduct of operations (4).

4. S. Beskrestnov, "Instructions – Countering the Activity of Russian Reconnaissance Drones in the Frontline Zone", Kyiv, 2024.

5. A. Kalistratov, "On the Question of the Positional Stalemate", *Army Digest*, No. 9, 2024; B. A. Friedman, of the U.S. Marine Corps, noted in this regard a return to a form of "mounted infantry", similar to the dragoon units of the 19th century. See B. A. Friedman, "The Future of the Infantry VI", Fire for Effect, January 6, 2025.

Dronization and the question of a "New Army" for the 21st century

Echoing the debates of the early 20th century, the war in Ukraine testifies to a renewal of firepower on the battlefield and the integration of new forces unleashed—then by industrialization, today by digitalization. At the heart of this transformation lies the question of a "new army"[6] for the 21st century. For such a critical juncture to occur, it requires a synergy of inventions and reforms not only within the tactical domain—equipment and procedures—but above all within organizational and, even more importantly, cognitive structures—that is, the very definition of war, the theory of victory, and strategic culture.[7]

Whether triggered by operational urgency from frontline units or initiated by top-down directives, a "revolution in military affairs" compels all belligerents to adapt, though their responses will differ depending on their preferences, their understanding of the stakes, and the available resources. As war is both a reflection and an expression of the societies that wage it, a military revolution presupposes or accompanies a transformation in modes of production, social and economic orders, and the civil-military mechanisms of mobilization.

Dronization clearly meets such conditions. It is not merely a technical evolution, nor are its effects merely incremental or confined to a specific type of weaponry. It represents a broader process of military transformation, akin to the mechanization and motorization of the 20th century. It affects not only the conception of combat but also the organization required to generate, structure, and employ forces.

So far, however, the debate tends to remain fragmented. Under the concept of "Ground-Air Littoral,"[8] U.S. forces are analyzing the effects of the extension and massification of precision strikes in the tactical domain.

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6. Capitaine Jibé, *L'Armée nouvelle. Ce qu'elle pense, ce qu'elle veut*, Paris: Plon, 1905.
7. M. Fortmann, *The Cycles of Mars: Military Revolutions and State-Building from the Renaissance to the Present Day*, Paris: Economica, 2009; M. C. Horowitz and S. Pindyck, "What Is a Military Innovation and Why It Matters", *Journal of Strategic Studies*, Vol. 46 No. 1, 2022; O. Schmitt, *Preparing for War: Strategy, Innovation, and Military Power in the Contemporary Era*, Humensis, 2024.
8. M. K. Bremer and K. A. Grieco, "The Air Littoral: Another Look", *Parameters*, Vol. 51, No. 4, 2021; D. Giffen, "The Air-Ground Littoral And Great Power Conflict", *Æther: A Journal Of Strategic Airpower & Spacepower*, Vol.3, No. 3, 2024.

Their focus lies on the frictions generated by the integration of ground fires, airstrikes, and electronic warfare within their model of air superiority. In the academic sphere, the discussion centers on the new forms of civic and military engagement in the information age. This paradigm is said to be fostering a "crowdfunded war" waged by connected individuals who directly finance and shape the defense effort.[9] In Ukraine, activists and volunteers describe a "technological militarization of societies" that allows them to offset Russia's numerical advantage through the power of innovation.[10] These discussions highlight different dimensions of a common phenomenon, though they have yet to truly engage with one another, despite some studies beginning to bridge the gaps.[11]

The point is not to claim that drones are a miracle weapon, but to offer a synthesis of the profound disruptions they are inducing. In this light, "dronization" appears as a catalyst for digitalization, networkization, and automatization—three long-standing trends that are now permeating and restructuring societies, economies, and, inevitably, the art of war. The "war of engines," typical of centralized mobilization regimes and the "macro-technology[12]" of the industrial age, is thus being replaced by a war of servers and processors—characteristic of globalized economies, yet individualized, propelled by the extraction and application of information.

9. M. Ford, "From Innovation to Participation: Connectivity and the Conduct of Contemporary Warfare", *International Affairs*, Vol. 100, No. 4, July 2024, pp. 1531–1549.
10. Interview with Maria Berlinska, July 2024.
11. M. Plichta et al., "A One-way Attack Drone Revolution? Affordable Mass Precision in Modern Conflict", *Journal of Strategic Studies*, No. 47, 2024; M. Horowitz, "Battles of Precise Mass", *Foreign Affairs*, October 2024; F. W. Kagan, K. Kagan et al., "Ukraine and the Problem of Restoring Maneuver in Contemporary War", Institute for the Study of War, August 2024.
12. D. E. Showalter, "Mass Warfare and the Impact of Technology", in *Great War, Total War*, The German Historical Institute/Cambridge University Press, 2000.

Drones in Ukraine: adaptation through consumption

Dronization reflects an increasing decoupling of firepower from the conduct of operations. It emerged within the Ukrainian, and later Russian, armed forces as a means to compensate for incomplete and sluggish fire support and intelligence capabilities—shortcomings caused both by structural deficiencies and by the scale and intensity of combat operations. The value of dronization lies indeed in its ability to deliver precision strike capacity in a compact and affordable format, leveraging access to civilian technologies. Ukrainians and Russians thus began coupling drones with virtually any conventional effector—from aircraft and artillery to helicopters and tanks—eventually converting drones themselves into remotely piloted munitions. Since 2014, this trend has been driven on both sides—especially in Ukraine—by ecosystems of mutual aid and patriotic associations that fund, develop, and deliver drones and their digital operating systems to frontline units. In this respect, the phenomenon illustrates the mobilizing power of new collective tools such as social media, crowdfunding, open-source intelligence (OSINT), and DevOp practices[13] for software development.

However, from the summer of 2022 onward, the exponential growth in drone demand has been matched by extreme attrition, due to increasingly effective kinetic and electronic counter-drone capabilities. The lifespan of most drones in Ukraine is extremely short, even for those designed for ISR or bombing roles and intended for reuse. The average is about five days for the most common models, such as the Orlan-10 or the commercial-grade Mavics produced by the Chinese firm DJI. This environment has led to an extreme simplification of drone design, which in turn allows for more flexible production and their integration into increasingly diverse fleets. The drone thus becomes a consumable and reconfigurable tool, combining mass deployment with ease of use. The shift is not only conceptual, but also industrial and operational.

13. DevOps is a movement aimed at automating and unifying the stages of software development and monitoring (Dev) with the administration of IT infrastructure—namely, system operation and maintenance (Ops).

Drones, digital societies, and war

Dronization is the product of a cluster of innovations grouped under the label of "Industry 4.0".[14] Computer-aided design and modeling, the adoption of agile development methods for programming, and the democratization of 3D printing now make it possible to produce and test devices simultaneously, continuously optimize them, customize their design, and ultimately industrialize what began as artisanal production. Thanks to advances in miniaturization and electric propulsion, drones have become versatile and adaptable platforms with few bottlenecks—mainly limited by their optronics and degree of automation. A single manufacturer can, in a short time and with minimal added cost, design and produce anything from a rotary-wing FPV drone with limited autonomy to a fixed-wing aircraft capable of flying several hundred kilometers.

After three years of conflict, the production ecosystem has evolved into three complementary layers: incubators, industrial suppliers, and finishing workshops or "tactical customizers."

Incubators focus on innovation and on quickly developing solutions to tactical or technical problems reported directly from the battlefield. They involve varying degrees of cooperation between public authorities and innovation groups, whether civilian or military. In Ukraine, *Brave1* plays this role, as do volunteer organizations like *Come Back Alive* and the *Victory Drones* program by the *Dignitas Foundation*. In Russia, this role was initially taken on by the *Dronista* forum, launched in 2022 by the *Coordination Center for Assistance to Novorossiya* (KCPN)—a pro-Russian separatist association created in 2014 that, like its Ukrainian counterparts, sought to compensate from the bottom up for shortfalls in logistics, equipment, and training among Russian units in Ukraine. Since August 2024, the Russian Ministry of Defense has launched its own incubator, named Rubikon.[15]

Suppliers are driven by state procurement. In Russia, this remains top-down and favors pre-war conglomerates like *Kalashnikov/ZALA Aero*

14. M. Blanchet, "Industry 4.0: A New Industrial Paradigm–A New Economic Model", *Géoéconomie*, Vol. 5, No. 82, 2016.
15. A. Lioubimov, "The Flagship Event of the Unmanned Military Vehicle Industry Is Dronnitsa-2024", *Arsenal of the Fatherland,* No. 5, November 5, 2024; K. Stepanenko, "Russian Effort to Centralise Drone Units May Degrade Russian Drone Operations", Institute for the Study of War, December 13, 2024.

Group (*Kub, Zala, Lancet* drones) or specialized firms such as *STC* for the *Orlan-10/30*, or the special economic zone *Alabuga* for the *Shahed/Geran-2*, and *Supercam* (ISR drones).[16] In Ukraine, production relies on crowdfunding via the *United24* platform and benefits from incentives, such as a 25% profit margin on each drone delivered. Since August 2024, it has been indexed to a credit-based system that rewards the best-performing units,[17] which since May 2025 can purchase new equipment via the *Brave1* procurement platform.[18] Most leading companies emerge from patriotic entrepreneurship. Among the most prominent are *TAF* for *Kolibry* FPV drones (one-third of all FPVs produced in 2024), *Avia Atlon* for *Furia* tactical ISR drones, and *Skyfall* for "mortar drones" like the *Vampire*.[19]

Finally, ***finishing workshops*** are run by volunteer groups and the combatants themselves, who establish production units in the rear areas to apply final modifications to the devices—adjusting communications, warheads, or making heavier adaptations to counter enemy defenses. In a way, they are the modern version of shield-bearers: they fine-tune the drone-enabled layer of fire support for close-combat troops.

These horizontal industrial ecosystems have supercharged production: each month, 200,000 drones are delivered to Ukrainian troops, totaling about 1.5 million such devices produced in 2024.[20] The next phase is the saturation of operational depth (20–150 kilometers) through the dronization of rocket and cruise missile systems. Russia is better positioned in this segment with its *Lancet* and *Shahed* drones, whose monthly output was estimated at 94 and 444 units, respectively, in 2024.[21] However, in the close-combat segment (FPVs and quadcopters), Russia still lags behind. A fully integrated "popular military-industrial complex" like Ukraine's has yet to emerge, though the appointment of Andrei Belousov to Russia's Ministry of Defense is accelerating reforms.[22]

This evolution supports not only the pace of drone consumption but also increases resilience and improves targeting processes, as their

16. D. Albright et al., "Alabuga's Shahed 136 (Geran 2) Warheads", *ISIS*, May 9, 2024.
17. C. J. Chivers, "How Suicide Drones Transformed the front lines in Ukraine", *The New York Times*, December 31, 2024.
18. V. Melkozerova, « Points for Kills: How Ukraine Is Using Video Game Incentives to Slay More Russians », *Politico*, April 29, 2025. The market in question: https://market.brave1.gov.ua/bpla/.
19. K. Post, "10 Ukrainian Drone Makers to Watch", *Kyiv Independent*, February 14, 2025.
20. D. Shumlianskyi, "In 2025, the Ukrainian Defense Forces Started Receiving about 200 Thousand Drones per Month", Militarnyi, February 9, 2025.
21. "How Russians Manufacture 'Shaheds' and 'Lancets' in Shopping Malls: Exposing the Family of the Chief Constructor", Molfar, December 12, 2023. The most accurate estimates indicate 256 Shahed drones per month in 2023, and likely between 310 and 444 units per month in 2024. See D. Albright, D. I. Anokhin and S. Faragasso, "Update: Alabuga's Production Rate of Shahed 136 Drones", *Science and Security*, September 26, 2024; "Supercam Drone Production: War, Spying and Sanctions Helplessness", Molfar, January 17, 2025
22. VPK : military-industrial complex in Russian. See A. Anpilogov, "How Belousov Is Changing the Russian Military Machine", VPK Name, January 6, 2025, available at: https://vpk.name.

functions can be distributed across multiple specialized drones. These devices now enable comprehensive and, most importantly, reconfigurable micro-level air-land operations. Drones provide target detection and designation, serve as remote communication relays, deliver reusable strike and dynamic mining platforms, or transform into single-use munitions. They are also increasingly used for counter-drone purposes (C-UAV), as barrage munitions, or as decoys to exhaust and penetrate air defenses. Finally, drones—both aerial and ground-based—are increasingly used for "last-meter logistics," delivering ammunition and supplies to front-line fighters in the "kill zone," where any movement is potentially lethal.

Such diversification depends on the growing sophistication of information networks and data management systems that ensure overall coherence. The development of situational awareness and battle management systems in the form of mobile apps—cloud-hosted and enhanced by AI techniques—allows for multisensor fusion of operational data. The Ukrainian *Delta* program is the culmination of this trend, automating aggregation, visualization, and targeting, and coordinating with other more specialized apps. The Russians are attempting to replicate this model with *Lis Prometey* (Kalashnikov). From this perspective, dronization resembles a militarized "Internet of Things," made possible by the electrification and digitization of the battlefield. It has led to the saturation of UHF bands (L and S). Never before have there been so many devices, interfaces, access protocols, and transmission modes, from the introduction of multiband software radios to the adoption of the latest mobile phone standards (LTE, 4G, 5G), the democratization of SATCOM links via low-earth-orbit constellations (*Starlink, OneWeb*), and even the continued use of wired connections, especially via fiber optic cables. As an indication, in 2010, a *Global Hawk* drone required 500 Mbps to operate, and a large force needed around 16 Gbps.[23] In Ukraine, a single Starlink terminal averaged "hundreds of terabytes" of monthly data transfers.[24]

23. D. Furstenberg, "Intel: Meeting the Growing Bandwidth Demands of A Modern Military", *Milsat Magazine*, 2012.
24. D. Kirichenko, "Starlink and Europe's Digital Weakness: : How Reliance on Musk's Network Leaves Ukraine Vulnerable", *LBC Opinion*, March 20, 2025.

Dronization, or the dawn of multi-fire, multi-domain combat

Due to its flexibility and availability, dronization is helping transform precision strike capabilities into a mass phenomenon—almost self-sufficient and, above all, customizable according to the specific needs of its users. It functions as a kind of precision and automatization-enhancing kit that augments traditional strike means and existing force structures. Dronization is therefore no longer merely a workaround or an alternative to conventional aerospace power. It marks the maturation of a reconnaissance-strike complex capable of continuously and in a distributed manner generating salvos of diverse and increasingly autonomous vectors, tailored to overcome enemy defenses and exploit their weaknesses.

The dramatic attrition and dislocation effects caused by such firepower are fundamentally reshaping the concept of combined arms maneuver, which itself is evolving toward a broadened counter-battery fight to achieve fire superiority. This must now combine the destruction or suppression of traditional effectors with architectural warfare and even close counter-air combat to neutralize the drone layer of the opposing side's fires "system of systems". Stability and resilience in defense, as well as the ability to seize and maintain initiative, are now conditioned to the establishment and constant renewal of drone echelons in the face of cyber, electronic, and kinetic countermeasures. The conduct of operations thus resembles an organic reconfiguration of strike assets, with innovation—rather than maneuver—becoming the primary means of surprising and overwhelming the adversary.

After three years of unbridled drone proliferation in both Ukrainian and Russian forces, the dronization process now far exceeds the management capacities of traditional command and control (C2) systems. The acceleration and growing sophistication of targeting processes consume resources and personnel, fragmenting formations based on their level of integration into these architectures and reinforcing the positional nature of the war. For this reason, the integration of artificial intelligence techniques is set to intensify—both as support for piloting and targeting and as a countermeasure against electronic interference. More fundamentally, AI addresses the growing complexity of synchronization needs among platforms, data flows, and increasingly varied effects—needs that human operators are struggling to manage.

From this perspective, the creation of a "drone army" as a standalone military branch—by Ukraine in 2024 and soon by Russia in 2025—reflects both a deepening of the dronization effort and an acknowledgment that it requires its own principles of organization. In Russia, current thinking revolves around a drone-based shock force, reminiscent of deep operation doctrines.[25] In Ukraine, through the *Drone Line* program, the focus is on hardening the front lines, akin to NATO's "fire belts" of the Cold War.[26] The growing constraints on both countries' war efforts—combined with the vulnerability of their traditional forces, which are being forced to technically regress in order to withstand attrition—are about to dismantle the last institutional obstacles and hesitations to large-scale integration of drone systems. For both Ukraine and Russia, 2025 is shaping up to be the year of a frantic race toward fully automated warfare.

25. S. I. Makarenko, "Overcoming the Positional Deadlock of Modern Warfare Through Massive Use of Unmanned Aerial Vehicles", *Forces aériennes et spatiales. Théorie et pratique*, No. 32, 2024.
26. V. Kushnikov, "Ukraine Launches 'Drone Line' Doctrine to Strengthen Frontline Defense", Militarnyi, March 3, 2025.

Conclusion

For European force models, such a revolution must not, however, turn into a rush. We enjoy a unique advantage in this technological race—that of being second movers, able to identify the best solutions without bearing the development costs or the risks of disorganization to our force structure. The mistake would once again be to focus on the object, the "drone," rather than fully grasping the digital, industrial, and human ecosystem that unlocks its full adaptive potential.

The main effort should first concentrate on building a unified information and decision-support system, one that ensures effective interaction between drone-based and conventional means. We should first create a shared digital language and interface, capable of integrating new capabilities—akin to the Ukrainian *Delta* system. Certainly, France has made real progress in digital enhancement: with the Army's *SIC-S* under *Scorpion*, then *Titan*, *Connect@aéro* for the Air Force, and *Axon@V* for the Navy. However, these architectures remain parallel functional chains rather than horizontal, joint-service interfaces. They are still insufficiently interoperable and agile for the demands of a "multi-fire, multi-domain," multi-platform, and inter-allied warfare.

Once this digital environment is established, the next question will be whether to generalize or specialize the "drone" skillset within our forces—both in piloting and in production. Rather than being contradictory, these two approaches appear complementary.

Generalization is vital for familiarizing the forces with a drone-saturated battlefield and for developing and refining our technological and industrial pipelines. It is through experimentation in our regiments that incubators of expertise will emerge, which can then feed innovation into the broader defense market.[27] At this stage, the priority should not be mass production or acquiring "perfect" drones and demonstrators, but rather instilling a habit of "tactical customization" and fostering an organic R&D culture within our forces.[28] Within this dynamic, the involvement of reservists is key: they can help stimulate and cross-pollinate civilian solutions with military needs, as seen in Ukraine and previously in Israel. In essence, France should promote a "dronist spirit," similar to the past efforts behind the "popular aviation" movement, which was built on collaboration between flying clubs and public authorities. At a minimum, forums and

27. N. Gain, "The 17th Artillery Group: A Key Player in counter-UAV Ground Capabilities Transformation", Forces Operations Blog, November 27, 2024.
28. *Report of the National Defence and Armed Forces Committee*, No. 31, December 18, 2024.

competitions—modeled after Russia's *Dronnista* or more broadly cyber hackathons—should be organized among pilots, programmers, modelers, and drone manufacturers. From this perspective, generalization does not imply uncontrolled deregulation, but rather the shaping of a cognitive, entrepreneurial, and legal environment needed for the "Drone it yourself" technical initiative our forces require. It is the prerequisite for a gradual, well-managed integration of drones into our societies—placing easily militarizable technologies firmly under the normative and security authority of the state. In this logic of generalization, the DGA's "drone pact," which is extremely promising, should also be opened to participation from certain civilian and sporting associations.

Specialization, meanwhile, should be pursued within the perspective of operational mastery and acceleration, focusing on the "high-end" segments of dronization—those employing the most sophisticated, most automated systems to meet our most urgent needs. At this stage, the priority should be deep strike capabilities aimed at suppression of enemy air defenses and battlefield interdiction. Dronization solves here the dilemma between saturation and penetration of enemy defenses. It optimizes our existing platforms—particularly aircraft—while expanding our strike opportunities against an adversary betting on the depletion of our ammunition stocks. The development of our medium-range remotely operated munitions (ROMs, 50 to 200 km) must be closely tied to the future of *Long-Range Ground Strike* (FLP-T), to the dronization of air combat under the European *MUSHER* program,[29] and more broadly to the operational concepts led by the *Deep Operations Command* (CAPR). Ultimately, the goal would be to create a force or a targeting chain dedicated to managing and delivering deep fires, capable of synchronizing ROMs and conventional effectors within an integrated reconnaissance-strike model. The U.S. Multi-Domain Task Forces offer a preview of this,[30] as do Ukraine's "drone army"—soon to be joined by similar structures in Russia and Poland. Over the long term, these developments should converge toward the European Long Range Strike Approach (ELSA), dedicated to reaching strategic depths (1,000 km).

This brief roadmap does not, of course, cover all the innovations and adaptations that will be required to face a military revolution—dronization—that is bound to deepen and evolve in the years ahead. It does, however, aim to emphasize that these challenges cannot be met by simply acquiring equipment. They demand a broader reform of how we conceive and organize modern warfare—in short, the need for a New Army, forged through victory by transformation.[31]

29. MUSHER: Manned Unmanned System for HelicopteR.
30. P. Gros et al., "Multimilieux-multichamps integration", *Report*, No. 35, FRS, 2022.
31. M. Goya, *S'adapter pour vaincre. Comment les armées évoluent*, Paris: Perrin, 2019.

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