IE University IE International Policy Review (IPR)
Journal **7 Issue 1** (2026)
https://ipr.blogs.ie.edu/

The Role of Emerging Weapons in Sky Security as Counter-hegemonic Tools in Contemporary Warfare

Agnese Lurgo

Interdepartmental University School of Strategic Sciences, University of Turin, Turin, Italy.
Master's Degree in Strategic Sciences.

E-mail: agnese.lurgo@edu.unito.it

Published January 2026

Editor: Weronika von Lonski, IE University

Abstract

The growing availability of unmanned aerial vehicles has lowered traditional barriers to military capability, allowing smaller states and non-state actors to acquire forms of leverage once monopolised by established powers with advanced air forces. This research examines whether these systems can be understood as counter-hegemonic instruments that meaningfully challenge existing hierarchies, or whether the adaptive capacities of major powers constrain the ability of smaller actors to translate temporary advantages into lasting strategic gains. Drawing on Gramscian and Marxist understandings of hegemony and counter-hegemony, as well as Gilpin's conception of technological diffusion as a driver of systemic change, the study considers emerging aerial technologies within broader struggles over authority, legitimacy and strategic adaptation.

Through an analysis of Azerbaijan's victory in the Second Nagorno-Karabakh War and of the operational evolution of the Houthi actions in Yemen, this paper demonstrates how the acquisition of new technologies can generate short-term asymmetrical advantages and disrupt regional balances of power. Yet, these gains are quickly reduced once great powers respond through supply-chain control, regulatory authority, accelerated innovation and discursive securitisation. The findings suggest that although emerging technologies complicate strategic competition, they have not yet produced a structural transformation of global order. As advanced capabilities become normalised within military arsenals, the long-term impact of technological diffusion will depend on whether rising actors can reduce dependencies and consolidate autonomous ecosystems of innovation.

The study proposes policy recommendations focused on inclusive governance, enhanced safeguards against proliferation of advanced warfare technologies to non-state actors, and the protection of civilians and human rights, while emphasising the need for further research into the broader implications of the democratisation of military technology.

Keywords: sky security, counter-hegemony, emerging weapons, new technologies, international order, drones, unmanned aerial systems, Marxist theory, technological diffusion.

1. Introduction

Emerging military technologies are redefining the ways warfare is conducted and the distribution of power in the international system. In particular, unmanned aerial systems (UASs) are increasingly shaping how the actors project influence and engage in conflict. These capabilities were previously the exclusive domain of a limited number of technologically advanced powers. However, they are now spreading more widely across the international arena, becoming accessible to smaller states and non-state actors. The dissemination of these models has prompted a considerable debate about whether technological innovation might alter or merely reproduce existing power hierarchies.

The transformative potential of these technologies has become central to contemporary security agendas. As James Lewis observes, 'innovation and adoption of new technology are the keys to the growth that create national power'.[1] Similarly, the US Department of Defense has emphasised the need to accelerate innovation to maintain a strategic military advantage.[2] Furthermore, NATO's 2022 Strategic Concept acknowledges the pivotal role of emerging and disruptive technologies (EDTs) in enhancing military capabilities and countering threats.[3]

The strategic prioritisation of emerging military technologies is reflected in global market trends. The global military drone market was valued at 14.6 billion USD in 2023 and is projected to grow at a compound annual growth rate of 13.5 per cent from 2024 to 2032.[4] Moreover, the military applications of artificial intelligence (AI) were valued at USD 7.9 billion in 2022, with a projected increase to USD 24.7 billion by 2032.[5] These trends demonstrate the dominance of emerging weapons, which impact not only the capabilities of a state and its potential for deterrence towards other actors, but also the international order.

Recent conflicts have further demonstrated the operational significance of these innovations. States such as Azerbaijan, and non-state actors including the Houthis, have used drones and new technological capabilities to affect regional balances of power and disrupt conventional military asymmetries. These developments raise significant questions regarding the diffusion of technological capacity, its potential to empower weaker actors, and the impact of structural inequalities in production, regulation, and access to knowledge. Concurrently, great powers and international alliances persist in framing technological leadership as a guarantor of stability and global order, integrating technological superiority into their broader narratives of legitimacy and security.

[1] James A. Lewis, "Technology and the Shifting Balance of Power," *Center for Strategic and International Studies* (CSIS), April 19, 2022.

[2] Joseph Clark, "DOD Harnessing Emerging Tech to Maintain Enduring Advantage," U.S. Department of Defense, September 21, 2023.

[3] "Emerging and disruptive technologies," *NATO*, last modified June 25, 2025.

[4] "Dimensioni del mercato dei droni militari," Global Market Insights, accessed November 15, 2025.

[5] Tajammul Pangarkar, "Artificial Intelligence in Military Statistics 2025 By Efficiency, Tech, Simulations," Market.us Scoop, January 14, 2025.

The proliferation of UASs has profoundly transformed the nature of warfare, thereby redefining the parameters of international legitimacy, influence, and deterrence. In light of the aforementioned context, this research investigates the following question: to what extent do emerging aerial weapons function as counter-hegemonic instruments by enabling small state and non-state actors to challenge dominant military capabilities, and potentially reshape the current global order?

2. Background Analysis

Historically, there have been cases of certain new technologies operating as counter-hegemonic tools, unsettling established distributions of power. A well-known example is the sixteenth-century shift often described as the military revolution, shaped above all by the invention of gunpowder. Its adoption increased the number of troops, encouraged the formation of standing armies, and hastened the decline of the dominant feudal cavalry. As a result, the fearsome Swedish infantry was defeated at the Battle of Nördlingen in 1634.[6] Moreover, these shifts enabled Dutch and English naval forces to project Western influence far beyond the Mediterranean.

In contrast, certain twentieth-century instruments of warfare appear to demonstrate an inverse dynamic, in which the introduction of new weapons had a stabilising or even consolidating effect on hegemonic structures. The advent and monopoly of nuclear arsenals are the clearest example of this phenomenon. During the Cold War, the presence of these weapons contributed to the development of a bipolar order, creating structural constraints on great-power competition. In the field of international relations, prominent debates have emerged, most notably the one between Waltz and Sagan, interrogating the question of whether nuclear arsenals contribute to the establishment of a stabilising effect through the principle of deterrence, or whether they result in an escalation of risk.[7] Regardless of theoretical standpoint, the empirical precedent of the Cold War demonstrates how nuclear technology became fundamental to national power, international alliances and global dynamics. This has resulted in a further increase in the power disparity between existing great powers and other global actors.

The two historical paths considered demonstrate how military innovation has both enabled and constrained shifts in the international distribution of power. For this reason, when examining the emergence of contemporary technologies, attention should also be given to how they might operate as counter-hegemonic instruments within the current global order.

2.1 Theoretical framework

According to Alan Hunt and the Gramscian theory, hegemony consists in the dominance of a class that has achieved consensus through culture, institutions, and social norms and that makes the broader society believe

[6] Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500–1800* (Cambridge: Cambridge University Press, 1988).

[7] Scott D. Sagan and Kenneth N. Waltz, "The Spread of Nuclear Weapons: A Debate Renewed," *Foreign Affairs* 74, no. 3 (January 2004).

that its order is natural and inevitable.[8] Consequently, counter-hegemony is the set of strategies and discourses of subordinate classes aimed at opposing the dominant hegemon. It is the construction of an alternative idea that proposes new values and power structures. The emphasis should be on hegemony as strategic and technological supremacy, and on counter-hegemony as a challenge to this dominance.

From a Marxist perspective, counter-hegemony should not be conceived as an isolated act of resistance but as a continuous struggle by subordinate groups to construct an alternative worldview exposing the arbitrary nature of the prevailing system.[9] It is evident in the material dimension through efforts to challenge the monopoly over advanced technologies and the means of coercion. But also discursively, through narratives that interrogate the legitimacy of hegemonic control. In the context of emerging weapons, the emphasis should be on hegemony as strategic and technological supremacy, and on counter-hegemony as a challenge to this dominance. The adoption of new weapons by new actors can give rise to counter-hegemonic dynamics. These practices have the potential to disrupt established hierarchies and redefine conceptions of control, deterrence and security.

Robert Gilpin was a leading scholar in the field of International Relations, particularly renowned for his contribution to the development of the hegemonic stability theory. He emphasised the inherently transitory nature of hegemony, attributing this to the acquisition of similar resources and technology by rising challengers. The author's work explained the rise and fall of the hegemonic states in terms of interaction in the economic, military and technological domains. In his 1975 publication "U.S. Power and the Multinational Corporation", Gilpin posits that the diffusion of technology, promoted by multinational corporations and processes of industrialisation, erodes the exclusivity of dominant powers over time. Consequently, the global spread of technological innovation becomes a structural mechanism through which emerging states can reshape the international order, with potential counter-hegemonic challenges within military and strategic spheres.[10]

From a military perspective, the Italian general Giulio Douhet advanced foundational airpower theory, emphasising air dominance as the future of warfare. Indeed, he argued that airpower would become the determining element in armed conflicts, which would be dominated by air superiority instead of by traditional armies or navies. However, Douhet was also aware of the transient nature of technological superiority in the aerial domain, acknowledging that it is inherently unstable and subject to continual transformation.[11] His recognition of

[8] Alan Hunt, "Rights and Social Movements: Counter-hegemonic Strategies," *Journal of Law and Society* 17, no. 3 (1990): 309–28.
Perry Anderson, *The H-Word: The Peripeteia of Hegemony* (London: Verso, 2017).
[9] Anderson, The H-Word.

[10] Robert Gilpin, *U.S. Power and the Multinational Corporation: The Political Economy of Foreign Direct Investment* (New York: Basic Books, 1975).
[11] Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Washington, DC: Air Force History and Museums Program, 1983).

the volatility of technological advantage aligns with both Marxist and Gilpinian interpretations of power as a mutable construct shaped by innovation and adaptation.

Seen through a multidisciplinary lens, this theoretical framework highlights how emerging technologies in air security go far beyond their material function as instruments of war. They become part of a wider struggle over legitimacy, influence, and the redefinition of global order. As technology spreads, new actors enter the scene and the balance of aerial power constantly shifts, transforming the sky into a space of ideological and strategic competition.

3. Discussion of Findings

3.1 Analysis of the Azerbaijani case

The Nagorno-Karabakh region is an area of historical contention between Armenia and Azerbaijan, but is internationally recognised as part of Azerbaijan.[12] Its history of ethno-political conflict and territorial disputes began in the Soviet era with the establishment of the Nagorno-Karabakh Autonomous Oblast within Azerbaijan, although the majority of the population were ethnic Armenians. The first war (1992–1994) was triggered by the collapse of the Soviet Union and exacerbated by population expulsions, deportations, and attacks in ethnically mixed areas. The 1994 ceasefire left Nagorno-Karabakh as a de facto Armenian-controlled enclave within Azerbaijan. In 2020, a second war broke out when Azerbaijan initiated a military offensive to reclaim the territories. In September 2023, a rapid advance overwhelmed Nagorno-Karabakh's defenders, resulting in the displacement of many Armenians.[13]

Azerbaijan's victory in the 2020 Second Nagorno-Karabakh War reveals how asymmetric warfare, using advanced aerial technology and modernised command integration, can disrupt established military balances. This outcome was made possible by Azerbaijan's deliberate transformation of its armaments through targeted modernisation, technological acquisition, and operational innovation. According to Bivainis, this generated a force capable of deploying long-range fires in conjunction with maneuver elements, effectively integrating the traditional separation between reconnaissance and strike functions. The level of coordination achieved proved to be a decisive advantage when fighting resumed in September 2020.

On one side, Armenia possessed a larger ground force and a more developed air-defence network; yet structural limitations, outdated equipment, and a reactive strategic posture undermined this apparent advantage. In particular, its force structure and doctrine remained static, oriented predominantly around positional defence and attrition warfare.

[12] "Armenia and Azerbaijan: Nagorno-Karabakh Conflict Escalates," *BBC News*, November 10, 2020.
Andrius Bivainis, "Multi-dimensional Assessment of the Second Nagorno-Karabakh War," *Security and Defence Quarterly* 38, no. 2 (2022): 51–61.

[13] *Azerbaijan: Seven Years of Conflict in Nagorno-Karabakh* (Human Rights Watch, 1994).
Nagorno-Karabakh Conflict, Council on Foreign Relations, updated August 12, 2025.

By contrast, Azerbaijan's military modernisation and the employment of drone technology effectively addressed the long-standing positional imbalances. The azerbaijani forces adopted an agile operational art that exploited real-time data, distributed lethality, and networked decision-making. As Bivainis observes, these elements enabled Baku to impose a faster operational tempo, forcing Armenia into a reactive posture and eroding its capacity to coordinate counter-fire or protect logistical routes.[14]

The technological heart of Azerbaijan's advantage lies in its aerial component. Turkish-supplied Bayraktar TB-2 drones and Israeli loitering munitions provided continuous intelligence, surveillance, reconnaissance (ISR) coverage, alongside precision-strike capability. In particular, during the offensive the Azerbaijani military destroyed a large number of Armenian surface-to-air missiles (SAMs) by using UASs, primarily the Turkish Bayraktar TB-2 and the Israeli Harop kamikaze drones. The analysis made by Dr. Can Kasapoglu highlights that this drone-enabled capability degraded Armenian air-defence nodes, command posts, and supply lines during the opening phase, dismantling the layered defensive architecture on which Armenia relied.[15]

Ultimately, Azerbaijan's success reflected an asymmetric redefinition of the battlefield rather than conventional superiority. By integrating unmanned systems into a coherent manoeuvre strategy, it reshaped the interplay between air and land operations, demonstrating that control of aerial technology and data networks can substitute for mass in modern warfare. This conflict thus exemplifies twenty-first-century warfare, where technological adaptation and networked strike capabilities overshadow traditional static defences.

Additional insights from Erickson point to key contributing factors in Azerbaijan's dominance, including the ineffectiveness of Armenian defence systems against small UASs and ballistic missile threats. Moreover, Armenian forces' failure to acknowledge the professionalisation and modernisation advances within the Azerbaijani military cultivated a sense of overconfidence that exacerbated their vulnerabilities.[16]

3.2 Analysis of the Houthi case

The recent advancements demonstrated by the Houthi insurgent group in terms of their drone capabilities represent a new phase in the conflict in Yemen. The group has developed the capacity to utilise drones for reconnaissance activities and to carry out incursions into the territory of Saudi Arabia. Michael Knights, a military expert, stated that the missile and drone technology used by the Houthis has evolved significantly since the

[14] Andrius Bivainis, "Maneuver, Modernization, and the Second Nagorno-Karabakh War," *Air Land Sea Application Center*, April 1, 2022, 2.

[15] Can Kasapoglu, "Hard Fighting In The Caucasus: The Azerbaijani Armed Forces' Combat Performance and Military Strategy In The 2020 Nagorno-Karabakh War," *SAM Papers* no. 18 (February 2021): p. 15, accessed November 15, 2025.

[16] Edward J. Erickson, "The 44-Day War in Nagorno-Karabakh," *Army University Press*, accessed November 15, 2025.

beginning of the conflict.[17] In the period between 2015 and 2016, the Houthi forces demonstrated a marked reliance on a pre-existing supply of rockets derived from the Yemeni army's stockpile. However, due to the expertise of Iranian scientists and engineers, the country has since developed extended-range missiles and unmanned aerial vehicle (UAV) capabilities. Since 2018, a domestic military industry has been developed, allowing for a prolonged campaign of rocket, drone, and missile strikes. In 2019, the Houthis successfully carried out a "large-scale" operation with 10 drones targeting Saudi oil facilities.[18]

The rapid evolution of drone technology has resulted in a tangible short to mid-term tactical advantage for the Houthis. The introduction in 2021 of multi-use drones, which were more cost-effective, had an immediate impact on the battlefield. Indeed, these drones are capable of dropping explosives on designated targets and subsequently returning to base for reuse.[19] The attacks demonstrated several key advantages of asymmetric drone warfare. Firstly, it was revealed that Saudi air defence systems are vulnerable to drone attacks due to the inability of radar to detect devices flying at low altitude, particularly when swarm attacks are employed. Secondly, the lack of accountability resulting from almost anonymous strikes enables plausible deniability for the perpetrators. For these reasons, recent Houthi drone operations have proven to be remarkably effective in achieving symbolic victories through targeted strikes, whether by undermining the stability of the Internationally Recognized Government (IRG) or by exposing the operational vulnerabilities of regional actors.[20]

3.3 Strategic implications and great powers responses

The two case studies presented consider actors with limited conventional capabilities who were able to achieve significant victories through the use of UAVs and new military technologies. However, it is important to assess whether these dynamics are part of a broader trend revealing the counter-hegemonic power of emerging technologies in warfare, or if they are merely achieving tactical results in their regional scenarios.

Great powers rarely respond to technological disruption with simple defensive caution. Instead, they transform potential threats into opportunities to strengthen their spheres of influence. The vulnerabilities become the reason to expand regulatory, material and discursive authority. In their work "Great Powers' Military Robotics", Tobias Vestner and Arthur Lusenti noted that 'overall, the United States' performance in defence innovation, doctrinal evolutions, and fielding of military robotics suggests that it has the ability to remain the dominant player in this field'.[21] This dominance is actively

[17] Michael Knights, "Yemen's 'Southern Hezbollah': Implications of Houthi Missile and Drone Improvements," The Washington Institute, March 2024, accessed November 15, 2025.

[18] Nadim Altaher, Jennifer Hauser, and Ilaria Kottasová, "Yemen's Houthi rebels claim a 'large-scale' drone attack on Saudi oil facilities," *CNN*, September 14, 2019.

[19] ACLED, "Six Houthi Drone Warfare Strategies: How Innovation is Shifting the Regional Balance of Power", December 13, 2023, accessed November 15, 2025.

[20] ACLED, Six Houthi Drone Warfare Strategies.

[21] Tobias Vestner and Arthur Lusenti, "Great Powers' Military Robotics," *Stratos* 1, no. 23 (2023): 81.

reproduced through control of supply chains, rule-making, and the strategic use of securitising narratives.

3.3.1 Supply-chain control

Drones are blurring the boundaries between defence, commercial activities and humanitarian help, transforming global supply chains and security frameworks.[22] Major powers leverage control over semiconductors, autonomous systems, sensors, and cybersecurity infrastructure to position themselves as technological gatekeepers. The critical components of drone systems are still concentrated in the hands of some advanced states, enabling them and the leading firms to condition access to key technologies.[23] Tools such as export controls and drone diplomacy now serve as instruments of influence, with the possibilities of both forging alliances and denying acquisition to adversaries. The US International Traffic in Arms Regulations (ITAR), for instance, prohibit the export of specific military drone technologies.[24]

In order to address the new vulnerabilities arising from the proliferation of drones in warfare, powerful countries are expanding R&D funding to reduce dependencies and secure more long-term autonomy, while also investing heavily in defensive technologies such as counter-UAS (C-UAS). Although many counter-drone systems are already existing, they have to be integrated into coherent architectures and deployed on a wider scale.

In fact, according to the Congressional Research Service 'many smaller UASs cannot be detected by traditional air defense systems due to their size, construction material, and flight altitude'. For this reason the US plan is to invest at least $668 million on C-UAS research and development and at least $78 million on C-UAS procurement. The US Department of Defense is currently developing and procuring a wide spectrum of C-UASs to ensure a resilient and layered defensive posture.[25] Electronic warfare jamming can disrupt the communications link between the device and its operator, while more kinetic options include guns, nets, directed energy, and even conventional air-defence assets. In some cases, trained animals, such as eagles, have also been employed to intercept small drones.[26]

However, the process of adaptation to emerging threats requires time and economical resources, which bigger states are to avoid the redistribution of power thanks to emerging technologies.

3.3.2 Regulatory framework

Hegemonic actors can further consolidate their power by embedding their preferences and interests into regulatory regimes. In this way, they define the legitimate use of military and dual-use technologies, apparently as neutral standards but in practice reflecting their strategic priorities. Export-control systems, certification process and

[22] "The Global Drone Industry," The Geostrata.

[23] Market Report Analytics, *UAVs Component Market Report 2025-2033*, accessed November 15, 2025.

[24] Jonathan Rupprecht, "Ultimate Guide to Drone Export Control Laws (EAR & ITAR)," JRupprechtLaw, January 6, 2025, accessed November 15, 2025.

[25] John R. Hoehn and Kelley M. Sayler, *Department of Defense Counter-Unmanned Aircraft Systems*, Congressional Research Service, June 29, 2020.

[26] Hoehn and Sayler, Department of Defense Counter-Unmanned Aircraft Systems.

operability standards become mechanisms for stabilising leadership and shaping the behaviour of allies and competitors.

Historically, this approach has been adopted in numerous instances to maintain control over critical materials or weapons. An appropriate example would be the attempt to prevent the proliferation of nuclear weapons by developing a regulatory framework that permits states that already possess them to retain them, while prohibiting other countries from acquiring them. Through rule-making, great powers ensure that the field of technological competition is structurally designed to suit them and their interests. In fact, they can shape the regulatory framework and international institutions, in order to limit the erosion of their technological advantage in favor of minor actors.[27]

Great powers possess the ability, particularly through sanctions, to prevent technology transfers between smaller states and to preclude cooperation among them.[28] A recent illustration of sanctions specifically targeting UAVs concerns US Treasury measures in 2025 directed at entities supporting Iran's ballistic missile and UAV production networks.[29] On 12 November 2025, the US Department of the Treasury's Office of Foreign Assets Control (OFAC) sanctioned multiple entities across China, Germany, Hong Kong, India, Iran, Turkey, the UAE, and Ukraine for their involvement in procuring materials and technologies utilised in Iranian UAV and missile programmes.[30] This is part of a broader effort to disrupt supply chains and restrict Iran's capacity to manufacture military drones, which have been deployed in regional conflicts and against US interests.

In addition, from December 2025, the US prohibits the purchase and operation of drones manufactured or assembled by specific foreign companies, including prominent firms such as the Chinese DJI, pending the completion of security assessments. This measure also targets subsidiaries and shell companies to prevent circumvention of the restrictions. Together, these policies demonstrate how the transfer of technology and military cooperation in the domain of UAVs is actively regulated through sanctions, thereby limiting adversarial states' ability to develop these capabilities.

3.3.3 Discursive securitisation

The narrative of technological threats completes this strategy of control by powerful states. By framing innovation, for instance autonomous systems and military robotics, as a domain of existential rivalry, great powers legitimise expanded coercitive capabilities, intrusive surveillance regimes, and more assertive strategic postures. The Copenhagen School explains this concept by asserting that 'if we do not tackle this problem, everything else will

[27] Mark Cartwright, "Embedded Hegemony and the Evolution of the United States' Structural Power," *International Relations*, 2024, 2.

[28] Kai A. Konrad, "Dominance and technology war," *European Journal of Political Economy* 81 (2024): 12.

[29] "US Economic Sanctions: An Introduction," *Chambers Practice Guides*, August 13, 2025, accessed November 15, 2025.

[30] U.S. Department of the Treasury, "Treasury Disrupts Iran's Transnational Missile and UAV Procurement Networks," Office of Foreign Assets Control, November 12, 2025, accessed November 15, 2025.

be irrelevant (because we will not be here or will not be free to deal with it in our own way)'.[31] They refer to the securitisation process, whereby an actor declares an existential threat and convinces the audience to recognise it, thus legitimising the implementation of extreme measures to address the issue. Securitisation also fosters domestic consensus and positions the actor as a vital guardian of the global order. This means that discourse reinforces material advantage and justifies hierarchical structures that disruptive technologies might otherwise destabilise.

3.3.4 Hegemonic resilience

According to Andrew Krepinevich, revolutions in military affairs have to 'fundamentally alte[r] the character and conduct of a conflict'. This is enabled by 'producing a dramatic increase—often an order of magnitude or greater—in the combat potential and military effectiveness of armed forces'.[32] Consequently, revolutions require more than adoption of emerging technologies in warfare. 'To fully exploit the potential of new systems, operational concepts incorporating and integrating the new technologies must be developed into coherent doctrines'.[33] For this reason, over time, drones can become more autonomous and are more broadly connected with other weapons. If this will happen, UAVs may reshape military doctrine and organizations and truly revolutionize warfare.[34] However, at the moment this is not the case.

Technological counter-hegemony efforts frequently generate an adaptive form of hegemony, as the system evolves by assimilating the very challenges it is confronted with. It can be argued that the potential of new warfare technology in the hands of smaller actors is effective only for as long as it remains unpredictable. Once the methods employed become legible, repeatable, and widely adopted, the great powers react by adjusting, integrating the innovation, neutralising its disruptive edge, and ultimately reasserting their dominance.

It is evident that UAVs will remain an integral component of future warfare and governance, continuously reshaping geopolitical relations. However, the maturation and widespread adoption of these technologies will lead to the normalisation of their presence within military arsenals. The ability of emerging powers to convert this moment of disruption into a durable strategic advantage will therefore depend on their capacity to reduce supply-chain dependencies, close regulatory and standards gaps, and develop their own capabilities. However, small states and non-state actors frequently lack the capacity to do so, while great powers possess a robust domestic ecosystem. In order to ensure the maintenance of long-term technological competitiveness, it is recommended that local R&D funding be expanded,

[31] Barry Buzan, Ole Wæver, e Jaap de Wilde, *Security: A New Framework for Analysis* (Boulder, CO: Lynne Rienner Publishers, 1998), 24.

[32] Andrew F. Krepinevich Jr., "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, no. 37 (Fall 1994), accessed November 15, 2025.

[33] James R. FitzSimonds e Jan M. van Tol, *Revolutions in Military Affairs*, Defense Technical Information Center, Spring 1994, 25.

[34] Stacie Pettyjohn, "Drones are Transforming the Battlefield in Ukraine But in an Evolutionary Fashion," *War on the Rocks*, March 13, 2024, accessed November 15, 2025.

that the creation of intellectual property be incentivised, and that financial support be provided to start-ups and to small and medium-sized enterprises (SMEs).

The integration of swarms of UASs with autonomous decision-making capabilities has the potential to transform the near-term dynamics of conflict. Nevertheless, these systems are constrained by persistent limitations in terms of their destructive power and operational versatility when compared to heavy artillery, armour, or crewed air platforms.[35] Drones vulnerabilities, ranging from exposure to electronic warfare to constrained payloads and dependence on secure data links, continue to limit their effectiveness in large-scale operations.[36]

4. Policy recommendations

4.1 Inclusive governance

Great powers should pursue an inclusive framework for the governance of emerging technologies employed in warfare. This would let them preserve their leadership while involving smaller states in the establishment of norms. In fact, the role of global standards on export controls, safety and traceability for emerging aerial technologies is fundamental for international security. This approach would reduce perceptions of technological monopolisation and unilateral imposition of standards. According to Pouliot and Thérien, inclusive governance is desiderable and, most importantly, it is empirically associated with higher compliance, lower illicit procurement, and greater legitimacy of security norms.[37] In particular, this approach would limit incentives for unlawful behaviour or recourse to black-market procurement, while fostering a more transparent and less conflictual diffusion of innovation. Drawing on Keohane's institutionalism, the creation of international institutions facilitates stable cooperation among states by reducing transaction costs, increasing transparency, creating shared behavioral expectations, and ensuring rules are perceived as consensual rather than imposed.[38]

In practice, these objectives could be achieved through a dedicated governance forum under existing multilateral institutions, such as the United Nations (UN), or by extending existing mechanisms. For instance, the Arms Trade Treaty (ATT), adopted by the UN General Assembly, which already establishes obligations for the identification of export risks and the prevention of illicit transfers. It is also important to consider complementary measures such as shared R&D programmes, the implementation of controlled access to critical technologies through agreements, the introduction of capacity-building initiatives to strengthen digital infrastructure and regulatory oversight in smaller states.

[35] Justin Bronk, "NATO Should Not Replace Traditional Firepower with 'Drones'," *RUSI Defence Systems*, July 22, 2025, accessed November 15, 2025.

[36] Marianna Satta, *Rethinking NATO's Defence in the Drone Era*, Atlas Institute, August 14, 2025, accessed November 15, 2025.

[37] Vincent Pouliot and Jean-Philippe Thérien, "The Politics of Inclusion: Changing Patterns in the Governance of International Security," *Review of International Studies* 41, no. 2 (2015): 211–37.

[38] Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton, NJ: Princeton University Press, 1984).

4.2 Enhanced safeguards

Another priority lies in preventing the diffusion of emerging weapons systems to non-state actors through an enforcement-driven non-proliferation regime. This would focus on the different methods of diversion, such as covert supply chains, component smuggling, permissive jurisdictions, and private intermediaries, rather than on normative multilateral cooperation. This recommendation draws directly on precedents such as the Proliferation Security Initiative (PSI), which enhances interdiction capabilities and state coordination to disrupt trade in weapons of mass destruction (WMD), delivery systems, and related materials.[39]

To reduce these vulnerabilities, states should introduce mandatory technical safeguards for systems at risk of misuse. These safeguards include advanced serialisation, to trace each component's origin and movements, remote-identification tools, detecting UASs in real time, and geofencing mechanisms, to prevent military-grade drones from operating beyond authorised areas. In addition, governments should introduce liability frameworks for private companies, with automatic penalties for entities that enable illicit procurement. Finally, a coordinated intelligence effort would be useful to detect and disrupt clandestine transfers at an early stage. The PSI also promotes intelligence and information sharing about suspected shipments of proliferation concern.[40] By integrating data from national security agencies, export-control authorities, and international institutions, states would be able to intervene before advanced technologies reach non-state actors. Such coordination would significantly reduce the capacity of these actors to access advanced technologies.

4.3 Civilian protection

The proliferation of UASs creates blurred boundaries between military and civilian domains. This places civilians at significant risk, as evidenced by the OHCHR's Position Paper on the Use of Armed Drones, which documents repeated cases of civilian casualties from drone strikes.[41] Drawing on this analysis, which highlights the need for independent oversight mechanisms to investigate violations and attribute responsibility in drone strikes affecting civilians, states should establish a dedicated monitoring body for emerging aerial technologies. This would build on existing UN practices and would identify violations and attribute responsibility for the use of emerging aerial technologies against civilians in conflict.

Moreover, states should implement operational guidelines governing the deployment of drones and other emerging technologies in urban or civilian-populated environments. These guidelines should include comprehensive operational assessments, integrating both risk analysis and civilian impact evaluation, in order to strengthen compliance, enhance civilian protection, and

[39] "Proliferation Security Initiative (PSI)," *Nuclear Threat Initiative*, accessed November 15, 2025.

[40] Proliferation Security Initiative (PSI) at a Glance," *Arms Control Association*, accessed November 15, 2025.

[41] Office of the High Commissioner for Human Rights, *Position Paper on the Use of Armed Drones*, February, 2022.

provide clear mechanisms for attributing responsibility when violations occur.

5. Conclusion

Recent conflicts show an erosion of the technological advantage of great powers, but not a fundamental transformation of the international system. Stronger states remain able to implement their arsenals and maintain control over critical resources, supply chains, and technological expertise. For this reason, while emerging weapons are complicating strategic competition and creating temporary asymmetries, they have not yet produced a systemic shift in the global distribution of power. This resilience reflects the capacity of major powers to adapt to new challenges, absorb disruptive innovations, and integrate them into existing military and regulatory frameworks. In this sense, the dynamics of contemporary warfare echo the insight given by Giuseppe Tomasi di Lampedusa's "The Leopard": 'If we want things to stay as they are, things will have to change'.[42] The spread of drones and UASs exemplifies this principle, revealing how temporary disruptions can be neutralised as established actors adjust, preserve their dominance, and maintain the continuity of the international order.

However, the democratisation of new warfare technologies requires further examination. Threats no longer arise solely from great powers confronting each other, but increasingly from small states and non-state actors, as access to know-how, components, and advanced weapons becomes easier. For this reason, inclusive governance frameworks, strengthened safeguards against illicit transfers and the proliferation of emerging military technologies to non-state actors, and enhanced civilian protection mechanisms, represent essential steps recommended for managing these evolving risks. The implications of the wider availability of advanced military technologies to diverse actors, and the resulting impact on the global order, deserve further research. Future studies should investigate, for instance, the long-term capacity of emerging actors to consolidate technological gains and translate them into durable strategic advantages.

[42] Giuseppe Tomasi di Lampedusa, *The Leopard*, trans. Archibald Colquhoun (London: Collins and Harvill, 1960), 31.

Acknowledgements

This paper was made possible by the support of the entire IPR team, whose guidance and suggestions contributed to the development of its arguments.

The initial ideas for this work emerged from the lectures of Professor J. Dufalla at Metropolitan University of Prague. Her teachings on hegemony provided a fertile foundation for the author's reflections, while her insights and assignments encouraged the ambition and confidence necessary to pursue this research.

Additionally, studying the lectures of Professor Beccaro at the University of Turin provided insights into emerging technologies, which inspired the development of certain aspects of the theoretical framework of this paper.

Bibliography

ACLED. “Six Houthi Drone Warfare Strategies: How Innovation is Shifting the Regional Balance of Power.” ACLED. December 13, 2023. Accessed November 15, 2025. https://acleddata.com/report/six-houthi-drone-warfare-strategies-how-innovation-shifting-regional-balance-power.

Altaher, Nadim, Jennifer Hauser, and Ilaria Kottasová. "Yemen’s Houthi rebels claim a ‘large-scale’ drone attack on Saudi oil facilities." *CNN*, September 14, 2019. https://edition.cnn.com/2019/09/14/middleeast/yemen-houthi-rebels-drone-attacks-saudi-aramco-intl/index.html.

Anderson, Perry. *The H-Word: The Peripeteia of Hegemony*. London: Verso, 2017

“Arms Trade Treaty (ATT).” United Nations Office for Disarmament Affairs. Accessed November 29, 2025. https://disarmament.unoda.org/en/our-work/conventional-arms/legal-instruments/arms-trade-treaty.

“Armenia and Azerbaijan: Nagorno-Karabakh Conflict Escalates.” *BBC News*, November 10, 2020. https://www.bbc.com/news/world-europe-54882564

Bivainis, Andrius. “Maneuver, Modernization, and the Second Nagorno-Karabakh War.” *Air Land Sea Application Center*, April 1, 2022. https://www.alssa.mil/Portals/9/Documents/articles/220401_ALSA_Article_Bivainis_Nagorno.pdf.

Bivainis, Andrius. “Multi-dimensional Assessment of the Second Nagorno-Karabakh War.” *Security and Defence Quarterly* 38, no. 2 (2022): 51–61. https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-012da6e9-3c8c-47e2-96f9-07be4c7f04b6.

Bronk, Justin. "NATO Should Not Replace Traditional Firepower with ‘Drones’." RUSI Defence Systems. July 22, 2025. Accessed November 15, 2025. https://www.rusi.org/explore-our-research/publications/rusi-defence-systems/nato-should-not-replace-traditional-firepower-drones.

Buzan, Barry, Ole Wæver, e Jaap de Wilde. Security: A New Framework for Analysis. Boulder, CO: Lynne Rienner Publishers, 1998. https://books.google.de/books/about/Security.html?id=j4BGr-Elsp8C&redir_esc=y.

Cartwright, Mark. "Embedded Hegemony and the Evolution of the United States’ Structural Power." International Relations, 2024. https://doi.org/10.1177/00471178241268418.

Clark, Joseph. “DOD Harnessing Emerging Tech to Maintain Enduring Advantage.” *U.S. Department of Defense*, September 21, 2023. https://www.defense.gov/News/News-Stories/Article/Article/3532946/dod-harnessing-emerging-tech-to-maintain-enduring-advantage.

Council on Foreign Relations. *Nagorno-Karabakh Conflict.* Updated August 12, 2025. https://www.cfr.org/global-conflict-tracker/conflict/nagorno-karabakh-conflict.

Detsch, Jack. “The U.S. Army Goes to School on Nagorno-Karabakh Conflict.” *Foreign Policy*, March 30, 2021. https://foreignpolicy.com/2021/03/30/army-pentagon-nagorno-karabakh-drones.

Douhet, Giulio. *The Command of the Air*. Translated by Dino Ferrari. Washington, DC: Air Force History and Museums Program, 1983.

Erickson, Edward J. “The 44-Day War in Nagorno-Karabakh.” Army University Press. Accessed November 15, 2025. https://www.armyupress.army.mil/Journals/Military-Review/Online-Exclusive/2021-OLE/Erickson.

FitzSimonds, James R., e Jan M. van Tol. Revolutions in Military Affairs. Defense Technical Information

Center, 1994. https://apps.dtic.mil/sti/tr/pdf/ADA360252.pdf.

Gilpin, Robert. *U.S. Power and the Multinational Corporation: The Political Economy of Foreign Direct Investment*. New York: Basic Books, 1975.

Global Market Insights. "Dimensioni del mercato dei droni militari." Accessed November 15, 2025. https://www.gminsights.com/it/industry-analysis/military-drone-market.

Hoehn, John R., and Kelley M. Sayler. *Department of Defense Counter-Unmanned Aircraft Systems*. Congressional Research Service, June 29, 2020. https://fas.org/sgp/crs/weapons/IF11426.pdf.

Hunt, Alan. "Rights and Social Movements: Counter-hegemonic Strategies." *Journal of Law and Society* 17, no. 3 (1990): 309–28

Kasapoglu, Can. *Hard Fighting In The Caucasus: The Azerbaijani Armed Forces' Combat Performance and Military Strategy In The 2020 Nagorno-Karabakh War*. SAM Papers No.18, February 2021. Accessed November 15, 2025. https://www.sam.gov.tr/media/mediafields/Paper/47zvv769dx4y0r015sk4wygwn2/d2441de56ba05f28b54acbee894800be.pdf.

Keohane, Robert O. *After Hegemony: Cooperation and Discord in the World Political Economy.* Princeton, NJ: Princeton University Press, 1984.

Kınık, Hülya, e Sinem Çelik. "The Role of Turkish Drones in Azerbaijan's Increasing Military Effectiveness: An Assessment of the Second Nagorno-Karabakh War." *Insight Turkey* 23, no. 4 (2021): 169–191. https://www.insightturkey.com/articles/the-role-of-turkish-drones-in-azerbaijans-increasing-military-effectiveness-an-assessment-of-the-second-nagorno-karabakh-war.

Knights, Michael. "Yemen's 'Southern Hezbollah': Implications of Houthi Missile and Drone Improvements." The Washington Institute. March 2024. Accessed November 15, 2025. https://www.washingtoninstitute.org/policy-analysis/yemens-southern-hezbollah-implications-houthi-missile-and-drone-improvements.

Konrad, Kai A. "Dominance and technology war." European Journal of Political Economy 81 (2024): 102493. https://doi.org/10.1016/j.ejpoleco.2023.102493.

Krepinevich, Andrew F. "Cavalry to Computer: The Pattern of Military Revolutions." The National Interest, no. 37 (1994). Accessed November 15, 2025. https://nationalinterest.org/legacy/cavalry-to-computer-the-pattern-of-military-revolutions-848.

Lewis, James A. "Technology and the Shifting Balance of Power." Center for Strategic and International Studies (CSIS), April 19, 2022. https://www.csis.org/analysis/technology-and-shifting-balance-power.

Market Report Analytics. UAVs Component Market Report 2025-2033. Accessed November 15, 2025. https://www.marketreportanalytics.com/reports/uavs-component-60476#summary.

NATO. "Emerging and Disruptive Technologies." Last modified June 25, 2025. https://www.nato.int/cps/bu/natohq/topics_184303.htm.

Office of the High Commissioner for Human Rights. *Position Paper on the Use of Armed Drones.* February, 2022. https://www.ohchr.org/sites/default/files/documents/issues/terrorism/sr/activities/20230103-Position-Paper-Use-Armed-Drones.pdf.

Pangarkar, Tajammul. "Artificial Intelligence in Military Statistics 2025 By Efficiency, Tech, Simulations." Market.us Scoop, January 14, 2025. https://scoop.market.us/artificial-intelligence-in-military-statistics.

Parker, Geoffrey. *The Military Revolution: Military Innovation and the Rise of the West, 1500–1800.* Cambridge: Cambridge University Press, 1988.

Pettyjohn, Stacie. "Drones are Transforming the Battlefield in Ukraine But in an Evolutionary Fashion." War on the Rocks. March 13, 2024. Accessed November 15, 2025. https://warontherocks.com/2024/03/drones-are-transforming-the-battlefield-in-ukraine-but-in-an-evolutionary-fashion.

Postma, Joël. "Drones over Nagorno-Karabakh: A Glimpse at the Future of War?" *Atlantisch Perspectief* 45, no. 2 (2021): 15–20. Accessed November 16, 2025. https://www.jstor.org/stable/48638213.

Pouliot, Vincent, and Jean-Philippe Thérien. "The Politics of Inclusion: Changing Patterns in the Governance of International Security." *Review of International Studies* 41, no. 2 (2015): 211–37. DOI: 10.1017/S0260210514000175.

"Proliferation Security Initiative (PSI)." *Nuclear Threat Initiative.* Accessed November 15, 2025. https://www.nti.org/education-center/treaties-and-regimes/proliferation-security-initiative-psi.

"Proliferation Security Initiative (PSI) at a Glance." *Arms Control Association.* Accessed November 15, 2025. https://www.armscontrol.org/factsheets/proliferation-security-initiative-psi-glance.

Rupprecht, Jonathan. "Ultimate Guide to Drone Export Control Laws (EAR & ITAR)." JRupprechtLaw. January 6, 2025. Accessed November 15, 2025. https://jrupprechtlaw.com/drone-export-control-laws-ear-itar.

Satta, Marianna. Rethinking NATO's Defence in the Drone Era. Atlas Institute, August 14, 2025. Accessed November 15, 2025. https://atlasinstitute.org/rethinking-natos-defence-in-the-drone-era.

Sagan, Scott D., e Kenneth N. Waltz, eds. "The Spread of Nuclear Weapons: A Debate Renewed." *Foreign Affairs* 74, no. 3 (January 2004). DOI: 10.2307/20047149. ISBN 0393977471.

"The Global Drone Industry: Technology, Geopolitics, and Emerging Powers." *The Geostrata*. August 8, 2025. https://www.thegeostrata.com/post/the-global-drone-industry-technology-geopolitics-and-emerging-powers.

Tomasi di Lampedusa, Giuseppe. *The Leopard*. Translated by Archibald Colquhoun. London: Collins and Harvill, 1960.

U.S. Department of the Treasury. "Treasury Disrupts Iran's Transnational Missile and UAV Procurement Networks." Office of Foreign Assets Control. November 12, 2025. Accessed November 15, 2025. https://home.treasury.gov/news/press-releases/sb0313.

"US Economic Sanctions: An Introduction." Chambers Practice Guides. August 13, 2025. Accessed November 15, 2025. https://practiceguides.chambers.com/practice-guides/sanctions-2025/usa-washington-dc/trends-and-developments/O21993.

Vestner, Tobias, and Arthur Lusenti. "Great Powers' Military Robotics." *Stratos* 1, no. 23 (2023): 79–86. https://dam.gcsp.ch/files/doc/great-powers-military-robotics.