

# Drone Warfare in Today's World

## 15 Policy Recommendations to Improve the European Union's Defense Capabilities

Gonzalo Arana

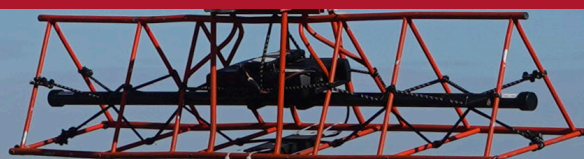
Javier Romero



HARVARD Kennedy School  
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**50** YEARS  
OF RESEARCH, POLICY,  
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STUDENT PAPER  
DECEMBER 2024





**Defense, Emerging Technology, and Strategy Program**

Belfer Center for Science and International Affairs

Harvard Kennedy School

79 JFK Street

Cambridge, MA 02138

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## About the Authors

**Gonzalo Arana** is currently a visiting Research Fellow at Harvard Kennedy School's Growth Lab, focusing on sustainable economic growth. Before taking up this position in June 2024, he completed the Mid-Career Master in Public Administration at Harvard Kennedy School and was a Research Assistant at the Belfer Center, concentrating on research about the conflict in the Middle East. Arana also works as an associate partner at the consulting firm Oliver Wyman, leading the Public Sector department in Spain and Portugal. Over the past decade, he has advised companies and institutions in Germany, Greece, Italy, Portugal, South Africa, Spain, and the United Kingdom, helping them improve performance, enhance digital capabilities, achieve sustainability, and increase their positive impact on clients and the societies in which they operate. In addition, Arana is a visiting fellow and professor in several academic Spanish institutions, where he teaches about economic growth and project management. He is also an Aspen España Fellow, supporting the Aspen Institute's efforts to educate future leaders in values, sustainability, and humanistic leadership.

**Javier Romero** is the former Head of Institutional Policy at Fundación Pensar, one of Argentina's most influential think tanks. He completed the Mid-Career Master in Public Administration at the Harvard Kennedy School, as well as a Master's in International Politics and Economics from Universidad de San Andrés in Argentina. Over the past decade, Romero has held various positions in both national and local government in Argentina, making him an experienced project manager and public servant. He has managed and implemented public policy initiatives across areas such as large infrastructure projects, budget control, and innovation in transportation and other sectors. In the last four years, he has played a significant role in developing public policies and policy documents related to Argentina's defense and international relations, transportation and environmental policy, and government reform and optimization. He has also advised the former President of the Legislature of Buenos Aires on international affairs and foreign policy.

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## Executive Summary

This policy brief provides recommendations for the newly elected President of the European Commission<sup>1</sup> and the newly appointed College of European Commissioners in November 2024<sup>2</sup>. It emphasizes how the European Union might address the complex demands of modern defense in the 21st century. Key recommendations focus on enhancing the EU's preparedness for contemporary warfare by prioritizing development in unmanned aerial systems (UAS), commonly known as drones—an area where the EU currently trails other major global powers in defense technology.

Section 1 of this report examines the technical specifics, associated risks, and opportunities of drone technology. Section 2 discusses the deployment of drones in ongoing conflicts. Section 3 analyzes the European Union's position in drone technology, and finally, Section 4 proposes strategies to strengthen European defense capabilities related to UAS.

UAS, or drones, which include both unmanned aerial vehicles (UAVs) and counter-UAV systems, are transforming military operations. These systems range in size and functionality, from small units for reconnaissance to larger models for direct military interventions, including weapon deployment and use as explosive devices. Automation levels vary from fully manual (Level 0) to fully autonomous (Level 5) – these levels of automation influence the effectiveness and potential risks of drones for different applications. For instance, a Level 5 autonomous drone will continue its mission and adapt to changing circumstances, even if it loses connection with or outlasts its launch base.

The growing use of UAS in conflicts like those in Ukraine, Armenia-Azerbaijan, and the regional war in the Middle East reflects their increasing significance. Their accessibility and autonomy are transforming traditional military strategies, prompting not only huge strategic debates, but also ethical concerns that if not tackled promptly, could have catastrophic consequences for the future of humanity.

Despite a considerable defense budget of EUR 390 billion for 2024, the EU remains underprepared for the challenges posed by UAS. The establishment of a Commissioner of Defense and initiatives toward European reindustrialization and rearmament present crucial opportunities to mitigate UAS threats, create sufficient deterrence to neighboring enemies, and fortify the European project. Additionally,

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<sup>1</sup> European Parliament. (2024, July 10). Parliament re-elects Ursula von der Leyen as Commission President. [Press release]. European Parliament News. <https://www.europarl.europa.eu/news/en/press-room/20240710IPR22812/parliament-re-elects-ursula-von-der-leyen-as-commission-president>

<sup>2</sup> European Commission. (2024). *Commissioners-designate 2024–2029*. European Commission. [https://commission.europa.eu/about-european-commission/towards-new-commission-2024-2029/commissioners-designate-2024-2029\\_en](https://commission.europa.eu/about-european-commission/towards-new-commission-2024-2029/commissioners-designate-2024-2029_en)



the regulatory push, first within the EU but most importantly, using EUs soft power internationally to positively influence the rest of the world, to find global moral standards about the usage of UAS is crucial to ensure that the new technology does not prevent the world from identifying responsibilities of certain war actions.

However, several systemic issues – including the lack of interoperability among EU nations, limited EU-specific defense capabilities, the absence of a unified strategy for armament development, insufficient global ethical standards for the use of such technology, EU's decreasing geopolitical weight internationally, and the inefficiencies inherent in a complex EU bureaucracy – leave the European Union and its member states unprepared to address this emerging threat.

This paper proposes 15 actionable recommendations that promote a proactive approach in policymaking, technological innovation, and international cooperation within EU defense strategies concerning UAS. The recommendations tackle governance, coordination, competence, budget, and industrialization issues. These recommendations aim to advance security and uphold ethical standards in modern warfare. While this document serves as an important first step, further exploration and implementation are needed. Establishing dedicated working groups over the next 12-24 months can help translate these recommendations into effective policies that could reverse Europe's declining defense competitiveness and position the EU as a moral and technological leader in 21st-century defense.

# Introduction: Description of the UAS Technology and Industry Stakeholders

## 1.1 Description of the Technology and its Risks and Benefits

Over the past decade, advancements in core technologies such as artificial intelligence (AI), sensor systems, and connectivity have unlocked significant new possibilities for robotics, autonomous vehicles, and unmanned aerial systems (UAS)<sup>3</sup>, commonly known as drones. Drones—unmanned, autonomous, or semi-autonomous flying robots—were initially developed for military reconnaissance purposes in the 1930s. However, the exponential rise in their use for military operations and surveillance began after the September 11 attacks. Since then, drones have played an increasingly critical role in targeted military operations, expanding their applications from surveillance to offensive strikes<sup>4</sup>.

Recent technological innovations, including longer battery life, lightweight materials, enhanced lifting capacity, and advanced sensors<sup>5</sup>, alongside drastically falling production costs, have significantly broadened the applications of drones beyond their initial military use. Drones are now prevalent across diverse civilian sectors, with applications in agriculture, mining, aerial photography, package delivery, environmental monitoring, and public security. The latest enhanced AI capabilities have also advanced drone autonomy, which ranges from fully manual operation (level 0) to full autonomy (level 5). At level 5, drones can independently plan and execute missions, with AI handling flight planning, obstacle avoidance, and adapting to changing conditions without human intervention, allowing greater operational flexibility and efficiency in both commercial and defense contexts<sup>6</sup>.

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<sup>3</sup>Silicon Valley Innovation Center. (n.d.). *The rise of autonomous systems: Self-driving cars and drones*. Retrieved October 26, 2024, from <https://siliconvalley.center/blog/the-rise-of-autonomous-systems-self-driving-cars-and-drones>

<sup>4</sup>Chamayou, G. (2015). *Drone theory* (J. Lloyd, Trans.). The MIT Press. <https://mitpress.mit.edu/9780262534413/drone/>

<sup>5</sup>Fortune Business Insights. (2023). *Commercial drone market size, share & COVID-19 impact analysis*. <https://www.fortunebusinessinsights.com/commercial-drone-market-102171>

<sup>6</sup>Scharre, P. (2018). *Army of None: Autonomous Weapons and the Future of War*. W.W. Norton & Company.

Figure: the 5 levels of drone autonomy<sup>7</sup>

Autonomy Level	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Human Involvement						
Machine Involvement						
Degree of Automation	<b>No Automation</b>	<b>Low Automation</b>	<b>Partial Automation</b>	<b>Conditional Automation</b>	<b>High Automation</b>	<b>Full Automation</b>
Description	Drone control is 100% manual.	Pilot remains in control. Drone has control of at least one vital function.	Pilot remains responsible for safe operation. Drone can take over heading, altitude under certain conditions.	Pilot acts as fall-back system. Drone can perform all functions 'given certain conditions'.	Pilot is out of the loop. Drone has backup systems so that if one fails, the platform will still be operational.	Drones will be able to use AI tools to plan their flights as autonomous learning systems.

While these developments have enabled more efficient commercial and civilian use, the widespread deployment of military and surveillance drones poses escalating security challenges: Lower production costs and stronger lifting power have enabled terrorist organizations and non-state actors to acquire and deploy these technologies in war zones<sup>8</sup> Furthermore, recent developments in artificial intelligence have enabled drones to perform actions autonomously, amplifying their destructive potential, reducing the level of expertise required to operate them, and complicating efforts to trace accountability.

## 1.2 Types of Unmanned Aerial Systems

The dynamics of the battlefield have been transformed by the strategic deployment of two primary types of unmanned aerial systems (UAS)<sup>9</sup>: larger military drones and smaller, 'hobby-type' drones, each fulfilling distinct roles in military operations. While there are many types of drones with varying characteristics, this analysis simplifies them into two main categories: large and small.

<sup>7</sup> DRONELIFE. (2019, March 11). *Droneii tech talk: Unraveling 5 levels of drone autonomy*. <https://dronelife.com/2019/03/11/droneii-tech-talk-unraveling-5-levels-of-drone-autonomy/>

<sup>8</sup>Watts, A. C., Ambrosia, V. G., & Hinkley, E. A. (2012). *Unmanned aircraft systems in remote sensing and scientific research: Classification and considerations of use*. *Remote Sensing*, 4(6), 1671–1692. [https://www.researchgate.net/publication/236980566\\_Unmanned\\_Aircraft\\_Systems\\_in\\_Remote\\_Sensing\\_and\\_Scientific\\_Research\\_Classification\\_and\\_Considerations\\_of\\_Use](https://www.researchgate.net/publication/236980566_Unmanned_Aircraft_Systems_in_Remote_Sensing_and_Scientific_Research_Classification_and_Considerations_of_Use) and Ouamane, A., Boumehraz, M., Atalla, S., & Mansoor, W. (2023). A comprehensive review of recent research trends on unmanned aerial vehicles (UAVs). *Systems*, 11(8), 400. <https://doi.org/10.3390/systems11080400>

<sup>9</sup> Council on Foreign Relations. (2023). *How the drone war in Ukraine is transforming conflict*. <https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflict>

Large UAVs are military-grade drones serving as high-level strategic platforms, operating from a distance and often synchronized with other military units. With extended endurance capabilities, these drones are essential for prolonged reconnaissance missions, advanced air strikes, and deep penetration into enemy territory<sup>10</sup>. They are equipped to carry additional payloads, such as weapons, reconnaissance systems, and thermal or weather sensors, allowing for sustained autonomous operation.

In contrast, smaller commercial UAS, often not originally intended for military applications, are increasingly used in guerrilla or irregular warfare, frequently by less organized groups or non-state actors. These drones are widely available, require minimal modification, and need little training to operate. Their agility makes them well-suited for operations near the frontline, where their shorter endurance is compensated by their speed and the ability to relay real-time intelligence. These smaller drones are particularly effective for intimidation, targeting, and intelligence gathering<sup>12</sup>.

Both types of drones are increasingly effective assets in modern warfare (see section 2 for further detail), each with distinct uses and challenges. One might consider that restricting their distribution could mitigate these challenges, potentially leading to policy measures focused on limiting adversaries' supply chains and sources. However, this approach faces significant challenges in today's fragmented multipolar order. For instance, following Russia's invasion of Ukraine, efforts to restrict Russia's drone production by limiting its supply chain were only partially effective, as Russia adapted by sourcing drones from Iran<sup>13</sup>—a major drone producer under international sanctions—and accelerating domestic production. This reliance on Iran highlights the difficulty of enforcing sanctions<sup>14</sup>, with Iran's procurement of electronic components from Asian markets demonstrating how easily such restrictions can be bypassed.

The challenge of limiting the proliferation of smaller, 'hobby-type' drones is equally complex. These smaller, cheaper, and more easily transportable drones are widely accessible, complicating regulatory efforts as they can be purchased and deployed with minimal oversight. Their use by terrorist groups is particularly concerning, given the potentially devastating impact if armed with lethal, biological, or even nuclear

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<sup>10</sup>Reuters. (2024, April 29). *Container ship reportedly targeted with missiles near Yemen's Mokha, Ambrey says*. <https://www.reuters.com/world/middle-east/container-ship-reportedly-targeted-with-missiles-near-yemens-mokha-ambrey-says-2024-04-29/>

<sup>11</sup>Ullah, I., & Alsharif, M. H. (2022). Towards the unmanned aerial vehicles (UAVs): A comprehensive review. *Drones*, 6(6), 147. □ HYPERLINK  
"https://doi.org/10.3390/drones6060147"<https://doi.org/10.3390/drones6060147>

<sup>12</sup>Council on Foreign Relations. (2023). *How the drone war in Ukraine is transforming conflict*. <https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflict>

<sup>13</sup>Business Insider. (2024, April). *Iran's drones are the new blueprint for international warfare*. <https://www.businessinsider.com/irans-drones-are-the-new-blueprint-for-international-warfare-2024-4>

<sup>14</sup>Bloomberg. (2024, April 8). *Iran's drone tech innovations are redefining global warfare*. <https://www.bloomberg.com/news/features/2024-04-08/iran-s-drone-tech-innovations-are-redefining-global-warfare?rnd=homepage-americas&sref=yaJhKSOh&embedded-checkout=true>

materials, or if used in targeted strikes on critical infrastructure, as demonstrated by Houthi drone attacks on ships<sup>15</sup> (see section 3). Beyond their accessibility, smaller drones present significant interception difficulties; they are hard to detect, evade advanced missile targeting and electronic warfare, and can overwhelm defenses with swarm tactics or shadow larger UAVs to avoid detection<sup>16 17</sup>.

For these reasons, policy measures must go beyond attempts to curb proliferation, focusing instead on adapting regulatory frameworks and fostering technological innovation to develop effective deterrents against potential drone attacks (see final sections for further detail).

### 1.3 UAS Market Tendencies and EU Interests

As of 2023, the global **commercial drone (UAS) market** reached an estimated value of USD 22.98 billion<sup>18</sup>, with projections suggesting significant growth to USD 57.16 billion by 2030, driven by a compound annual growth rate (CAGR) of 13.9%<sup>19</sup>. This expansion reflects the increasing demand across diverse sectors, including agriculture, logistics, media, and healthcare. Within this market, fully autonomous drones are expected to grow at a faster rate<sup>20</sup> compared to remotely operated drones, as advancements in Beyond Visual Line-of-Sight (BVLOS) and autonomous capabilities enable more complex commercial applications.

The market is dominated by Chinese companies, particularly DJI, which holds an estimated 74% share, followed by French company Parrot and other Chinese firms such as Yuneec, Autel Robotics, and Ehang<sup>21</sup>. This dominance illustrates the global concentration of commercial UAS production in China, a trend that raises potential security concerns, as illustrated by the dual-use nature of many commercially available drones, which could be repurposed for security-sensitive applications.

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<sup>15</sup> Reuters. (2024, April 29). *Container ship reportedly targeted with missiles near Yemen's Mokha, Ambrey says*. <https://www.reuters.com/world/middle-east/container-ship-reportedly-targeted-with-missiles-near-yemens-mokha-ambrey-says-2024-04-29/>

<sup>16</sup>The Bulletin of the Atomic Scientists. (2023, November). *Threat in the sky: How cheap drones are changing warfare*. <https://thebulletin.org/2023/11/threat-in-the-sky-how-cheap-drones-are-changing-warfare/>

<sup>17</sup>Ibid. The Bulletin of the Atomic Scientists

<sup>18</sup> Statista. (n.d.). *Drones - Worldwide market outlook*. Retrieved October 26, 2024, from <https://www.statista.com/outlook/cmo/consumer-electronics/drones/worldwide>

<sup>19</sup> Grand View Research. (2023). *Drone market size, share & growth analysis report, 2030*. Retrieved from <https://www.grandviewresearch.com/industry-analysis/drone-market-report>

<sup>20</sup> Fortune Business Insights. Op.cit

<sup>21</sup> Drone U. (n.d.). *Top drone companies*. Retrieved October 26, 2024, from <https://www.thedroneu.com/blog/top-drone-companies/>

Similarly, **the military UAS market**, valued at USD 13.2 billion in 2022, is expected to grow at a CAGR of 7.7%, potentially doubling to USD 27.7 billion by 2032<sup>22</sup>. Major military UAS producers include the United States<sup>23</sup>, Turkey, Israel, and China, all of which invest heavily in UAS for intelligence, reconnaissance, and strategic strikes. Furthermore, Iran and Russia are increasingly involved in drone production, particularly for military purposes, underscoring the global proliferation of these technologies and their role in modern military operations.

The rapid expansion of both the military and commercial UAS markets highlights the strategic importance of these technologies on a global scale and the need for a policy response. For European stakeholders, this requires not only a focus on maintaining fair market competition but also careful monitoring of dual-use technology developments that may present security risks<sup>24</sup>.

## 1.4 Risks and Opportunities of the Technology

Drones offer distinct advantages<sup>25</sup> in military contexts, notably by reducing risk to military personnel through unmanned operation and by enhancing operational precision, as their proximity to targets enables more accurate strikes<sup>26</sup>. Drones can remain airborne over large, designated areas for extended periods, allowing for sustained operations at lower costs compared to manned aircraft<sup>27</sup>. Additionally, the need for rapid decision-making, responsiveness, and agility on the battlefield has made drones a valuable tool, prompting further automation to maximize tactical and strategic gains.

The push toward automated drone technologies is also motivated by the potential for technological superiority to translate into military advantages. As Eric Schmidt notes<sup>28</sup>, "*Eventually, autonomous weaponized drones—not just unmanned aerial vehicles but also ground-based ones—will replace soldiers and manned artillery altogether... Swarms of drones, networked and coordinated by AI, could overwhelm tank and infantry formations in the field*". This potential for drone swarms controlled by AI represents a transformative shift in modern warfare, as countries seeking to enhance their

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<sup>22</sup> The Brainy Insights. (n.d.). *Military drones market report*. Retrieved October 26, 2024, from <https://www.thebrainyinsights.com/report/military-drones-market-13950>

<sup>23</sup> Markets and Markets. (n.d.). *Military drone market report*. Retrieved October 26, 2024, from <https://www.marketsandmarkets.com/Market-Reports/military-drone-market-221577711.html>

<sup>24</sup> Myers, S. L. (2024, April 25). *U.S. struggles to counter China's dominance in the drone market*. *The New York Times*. <https://www.nytimes.com/2024/04/25/us/politics/us-china-drones-dji.html>

<sup>25</sup> Congressional Research Service. (n.d.). *Unmanned aerial systems: Emerging security concerns* (IF12342). Retrieved October 26, 2024, from <https://crsreports.congress.gov/product/pdf/IF/IF12342>

<sup>26</sup> Gregory, D. (2011). *The everywhere war*. *Geographical Journal*, 177(3), 238-250. <https://doi.org/10.1111/j.1475-4959.2011.00426.x>

<sup>27</sup> Scharre, P. (2018). *Army of None: Autonomous Weapons and the Future of War*. W.W. Norton & Company.

<sup>28</sup> Schmidt, E., & Work, R. (2023). *Innovation and power: How technology will shape geopolitics*. *Foreign Affairs*. <https://www.foreignaffairs.com/united-states/eric-schmidt-innovation-power-technology-geopolitics>

deterrence capabilities may engage in an arms race centered on automated drone development and deployment.

However, increased automation in drone technology brings significant risks<sup>29</sup>, particularly regarding military escalation and global stability. Autonomous drones could make warfare more covert and asymmetric, lowering the threshold for initiating conflict and potentially leading to a more unstable international environment. Unlike traditional warfare, where human operators face direct physical risk, unmanned systems may reduce the psychological barrier to engage in conflict, fostering scenarios of less declared but more frequent covert drone warfare. Moreover, while automation can enhance capabilities, it should require human operators to closely monitor and ensure compliance with intended commands, adding a layer of complexity to military operations and raising ethical concerns about the future of warfare.

## 1.5 Morality of UAS and International Regulation

The ethical implications of deploying fully autonomous drones, particularly those capable of operating without human intervention, have spurred significant global ethical debate<sup>30</sup>. The International Committee of the Red Cross (ICRC) defines autonomous weapons as systems with ‘critical function’ autonomy, allowing them to independently select (i.e., search for, detect, identify, track) and attack (i.e., intercept, neutralize, damage, or destroy) targets<sup>31</sup> (ICRC, 2020). These systems, powered by AI models that may not undergo sufficient vetting by decision-makers, raise profound concerns about accountability, proportionality, and adherence to international humanitarian law. Since 2018, UN Secretary-General António Guterres has maintained that lethal autonomous weapons systems<sup>32</sup> (LAWS) are “politically unacceptable and morally repugnant,” advocating for their prohibition under international law. His stance was reaffirmed in the UN's New Agenda for Peace, which underscores the necessity of robust governance frameworks for emerging military technologies<sup>33</sup>.

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<sup>29</sup> US Congress, Ibid

<sup>30</sup> Just Security. (2023). AI and the future of drone warfare: Risks and recommendations. <https://www.justsecurity.org/89033/ai-and-the-future-of-drone-warfare-risks-and-recommendations>

<sup>31</sup> Verbruggen, M. (2019, December 3). *The role of emerging technologies in future warfare* [Presentation]. European Parliament. [https://www.europarl.europa.eu/cmsdata/194143/SEDE\\_presentation\\_Verbruggen\\_3December2019-original.pdf](https://www.europarl.europa.eu/cmsdata/194143/SEDE_presentation_Verbruggen_3December2019-original.pdf)

<sup>32</sup> Just Security, Ibid

<sup>33</sup> United Nations Institute for Disarmament Research. (n.d.). *In the crosshairs: Addressing military drone use and proliferation* [Event]. Retrieved October 26, 2024, from <https://unidir.org/event/in-the-crosshairs-addressing-military-drone-use-and-proliferation/>

The international community, under the UN's Group of Governmental Experts on Lethal Autonomous Weapons Systems (GGE LAWS)<sup>34 35</sup>, continues to explore these issues. This forum, comprising UN Member States, NGOs, industry representatives, and researchers, aims to build consensus on the principles governing new technologies in weapon systems. In October 2023, the UN General Assembly adopted a resolution expressing concerns about the potential negative impacts of LAWS on global security and emphasizing the urgent need for a collective response to these challenges (UNGA, 2023)<sup>36</sup>

The European Union, committed to promoting peace and human rights, is actively involved in these discussions<sup>37</sup>. Several EU member states were instrumental in advancing the UNGA resolution, and the EU participates actively in GGE LAWS. In addition, the European Commission and European Parliament have established a working group focused on UAS policies, which has published the "Drone Strategy 2.0"<sup>38</sup>, providing guidelines for the responsible use of drones in civilian and military contexts. However, there remains a lack of consensus within the EU, and even less globally, on the regulation of fully autonomous weapons, including on the conditions and types of autonomous systems permissible for deployment, as well as on the responsibilities of their users.

However, so far, beyond expert committees and statements of responsibility and concern, the European Union has been unable to push forward or implement a unified, common, and coordinated international strategy to address the ethical considerations of using unmanned drones, particularly in armed conflicts. Despite growing recognition of the ethical, legal, and security challenges posed by the use of drones in warfare, a cohesive EU framework remains elusive. This inaction highlights a broader challenge in the international community to regulate emerging technologies in conflict zones, where the implications for civilian safety and international law are profound

Balancing long-term security concerns and the strategic advantages of AI-driven drone technologies with ethical considerations and obligations under international humanitarian law remains a complex challenge. Convincing countries currently in

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<sup>34</sup> United Nations Office for Disarmament Affairs. (n.d.). The Convention on Certain Conventional Weapons: Background on LAWS in the CCW. Retrieved October 26, 2024, from <https://disarmament.unoda.org/the-convention-on-certain-conventional-weapons/background-on-laws-in-the-ccw/>

<sup>35</sup> Nuclear Threat Initiative. (n.d.). *United Nations Groups of Governmental Experts*. Retrieved October 26, 2024, from <https://www.nti.org/education-center/treaties-and-regimes/united-nations-groups-governmental-experts/>

<sup>36</sup>United Nations. (2023). *Draft resolution on lethal autonomous weapons* (Document No. N2330266). <https://documents.un.org/doc/undoc/ltd/n23/302/66/pdf/n2330266.pdf?token=sfx0B3c3lhE0U25t8x&f e=true>

<sup>37</sup> European Union. (n.d.). *Aims and values of the European Union*. Retrieved October 26, 2024, from [https://european-union.europa.eu/principles-countries-history/principles-and-values/aims-and-values\\_en](https://european-union.europa.eu/principles-countries-history/principles-and-values/aims-and-values_en)

<sup>38</sup> European Commission. (n.d.). A Drone Strategy 2.0 for Europe to foster sustainable and smart mobility. Retrieved October 26, 2024, from [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13046-A-Drone-strategy-20-for-Europe-to-foster-sustainable-and-smart-mobility\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13046-A-Drone-strategy-20-for-Europe-to-foster-sustainable-and-smart-mobility_en)



conflict, or even non-state actors, to accept new rules of engagement. As autonomous UAS continue to evolve, the EU and its member states, alongside the global community, face the critical task of reconciling these competing priorities in an increasingly AI-driven security landscape<sup>39</sup>.

## **The Impact of UAS in Contemporary Conflicts**

Since 2001, when the CIA launched one of its first reaper drone attacks in Afghanistan<sup>40</sup>, the UAV importance and revolutionary capacities have become more relevant in civil and military arenas. Since then, UAS technology, commonly known as drones, has evolved significantly over the past two decades, with particularly rapid advances in recent years due to breakthroughs in artificial intelligence.

In 2019, two crucial refineries of the Saudi Arabian company Aramco were targeted by kamikaze drones, presumably launched by Iran-backed militia forces, resulting in a substantial reduction in the company's production capacity. The refinery was protected by three air Defense systems: USA Patriot missile, German-made Sky Guard, and France's Shanine mobile anti-aircraft system<sup>41</sup>. They could not prevent the attack from hitting the Saudi Kingdom's most important asset, its production and refining infrastructure.<sup>42</sup>

Drones have been used with varying levels of success in different wars, from Libya's civil war to the Yemeni conflict to the war between Armenia and Azerbaijan, Ukraine, and the Middle East. They have shown the capacity to perform operations deep behind enemy lines and have become a challenge to traditional tactics of air space supremacy.

However, more interestingly, UAVs have been manufactured and supplied mainly by five key players, as referenced in section 1.3.: China, USA, Israel, Turkey, Iran. The first three are not a surprise; the IDF has always been at the forefront of technology usage in warfare, China is one of the principal producers of drones worldwide, and the USA has spearheaded UAV use in military conflicts. However, the drone industry and its impact on the field have allowed middle powers like Turkey or Iran to develop an edge in military technology that has dramatically affected the field. Both Turkey and Iran have developed "drone diplomacy" that will enable them to sell their technology and build their influence in the international arena, heavily impacting existing open conflicts.

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<sup>39</sup> Bachmann, S.-D., & Gunneriusson, H. (2023). Autonomous Weapons and the Future of Warfare: The Need for Meaningful Human Control. *Journal of International Law and Policy*, 12(2), 45-67.

<sup>40</sup> Bergen, P. (2015, May 2). *When the U.S. launched its first drone strike*. *The Atlantic*. <https://www.theatlantic.com/international/archive/2015/05/america-first-drone-strike-afghanistan/394463/>

<sup>41</sup> Macias, A. (2019, September 19). *How Saudi Arabia failed to protect itself from drone and missile attacks*. *CNBC*. <https://www.cnbc.com/2019/09/19/how-saudi-arabia-failed-to-protect-itself-from-drones-missile-attacks.html>

<sup>42</sup>Ibid.

In this section, we examine the impact of drone technology across three active conflict zones. The utilization of drones not only will influence the outcomes of these conflicts, but is also affecting how various stakeholders, including the European Union and NATO, prepare for warfare by shaping their collective defense strategies. The three conflicts under review are:

1. The Russian Invasion of Ukraine
2. The Armenia-Azerbaijan conflict
3. Israel-Gaza and Iran.

We will describe the role of UAVs in each of these cases, the common lessons that can be derived from each case, and what these cases tell us about the future of warfare.

## 2.1. The Russian Invasion of Ukraine

When Russia initiated its invasion of Ukraine, there was a widespread expectation that Russian forces would swiftly secure Kyiv and overthrow the Zelensky government. However, contrary to these expectations, the conflict has extended into its third year. As the situation has evolved, so too has the tactical deployment of UAVs (unmanned aerial vehicles) in the battlefield dynamics, shaping the outcomes of the conflict.

In the early stages of the war, Ukraine quickly became adept at using large drones, notably employing the Turkey-made Bayraktar TB2. This drone was able to evade Russia's initially incomplete air defenses, effectively striking Russian forces and assets. Given its efficacy, Ukraine ramped up the utilization of drones now supplied primarily by the USA and its Western allies. The strategic use of drones was so successful that they were employed as a diversion during the attack on the Moskva, the Russian flagship in the Black Sea Fleet, which was ultimately sunk by a Neptune missile.<sup>43</sup>

As the conflict evolved, smaller drones increasingly took centre stage, surpassing the initial focus on larger drones that were more vulnerable to kinetic countermeasures. These small, cost-effective drones could be launched in large numbers, easily penetrating enemy lines for various strategic purposes. They served as loitering munitions, kamikaze drones, and in swarms for enhanced tactical advantages. Additionally, small first-person view (FPV) drones became pivotal for intelligence gathering and conducting offensive operations, demonstrating their versatility and impact on modern warfare dynamics.

At the onset of the conflict, Russia was not effectively deploying UAV technology; despite possessing UAV assets, it relied more on traditional military capabilities. In contrast, Ukraine has successfully redirected much of its local economic capacity toward drone production. Sanctions have significantly restricted Russia's ability to develop its drone industries, leading it to form alliances with Iran to secure UAV supplies. In the current stage of the war, both sides are heavily relying on drones for their military operations, impacting heavily on the outcome.

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<sup>43</sup> Davis, I. (2023). *Exploring the impact of drone technology on modern warfare*. *Journal of Strategic Studies*, 46(2), 135–158. <https://doi.org/10.1080/14751798.2023.2178599>

Drones have had four main impacts in the Ukrainian-Russian conflict<sup>44,45</sup> that the European Union and its members need to consider when defining its defense strategy:

- a) **Strike Capacity:** They compress the so-called kill chain, shortening the time from when a target is detected to when it is destroyed. Ukraine has been very effective in the use of drones for taking out Russian air defenses, tanks, and Russian personnel.
- b) **Reconnaissance:** Drones with longer endurance profiles can effectively conduct hours of reconnaissance, enabling other, more advanced drones to carry out precision strikes deep inside enemy territory. This makes the battlefield more transparent and makes using the element of surprise more challenging.
- c) **Propaganda:** The use of drone filmed footage or to perform strikes of more significance than strategic importance (refineries Russia or depo close to Moscow) or strikes to infrastructure inside Ukraine. The propaganda impacted civilians so much that campaigns have been launched to gather funds, like the Spitfires fund launched in the United Kingdom in the Second World War, in both nations to pay for commercial drones that can be re-fitted for military purposes.
- d) **Extension of air power:** Drones are beneficial for deep strikes inside any territory and to bomb strategic targets, which means extending air power to places and spaces where the country's conventional access would not allow it. The same could be said of Kiev's maritime usage of drones in the Black Sea.

The war between Ukraine and Russia has reached a point where Ukraine's success cannot be fully understood without acknowledging the extensive use of drones, specially at the beginning of the war. While Ukraine initially gained an advantage over a Russia accustomed to relying on tanks rather than drones, Russia has caught up. The balance of the conflict could shift at any moment, largely influenced by advancements in this technology.

## 2.2. Armenia-Azerbaijan Conflict

The conflict between Armenia and Azerbaijan has been ongoing since the fall of the Soviet Union; this paper does not aim to address its nuances. There have been several clashes after the 1980-90 war, and Russia has generally acted as the more critical broker. In 2020, Azerbaijan launched an invasion of the disputed area, defeating the Armenian army and reclaiming the disputed region<sup>46</sup>.

What is relevant to us in this discussion is not so much the result of the conflict as the appearance in this conflict of two types of drones that have tilted the balance in

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<sup>44</sup> Center for European Policy Analysis. (2023). *An urgent matter of drones*. <https://cepa.org/comprehensive-reports/an-urgent-matter-of-drones/>

<sup>45</sup> Dominika Kunertova (2023) The war in Ukraine shows the game-changing effect of drones depends on the game, *Bulletin of the Atomic Scientists*, 79:2, 95-102, DOI: 10.1080/00963402.2023.2178180

Center for Strategic and International Studies. (2023). *The air and missile war in Nagorno-Karabakh: Lessons for future strike and defense*. <https://www.csis.org/analysis/air-and-missile-war-nagorno-karabakh-lessons-future-strike-and-Defence>

favour of Baku. Azerbaijan was widely acknowledged as a robust and directly combat-oriented drone user, in stark contrast to Armenia's drone capabilities, which primarily consisted of smaller, indigenous systems focused on reconnaissance missions. This disparity in drone capabilities significantly influenced the dynamics of the conflict.<sup>47</sup>

As in the case of Ukraine, the TB2 Turkish medium-large drones that Azerbaijan used were instrumental in the destruction of the Armenian military capabilities. The S-300 air defense systems used by Armenia was not effective in preventing the Azeri army supported by drone air superiority from advancing on the Armenian positions.

In addition to the Turkish bigger drones, Azerbaijan used a combined strategy and launched the smaller Israeli-made drones with loitering munitions as kamikaze drones to disrupt further the Armenian forces. Armenia tried to ramp up the adoption of drones for military use but did it late, suffering the consequences. Although there are reports of Armenia using Russian drones later in the conflict, it did not change the results.

Again, in this case, we see that drones can be used for strikes behind enemy lines disrupting supply lines, in this case deep into Nagorno-Karabakh, disrupting the capabilities of the Armenian army to respond to the attacks, as well as extending air superiority, particularly the large TB2 drones, that were used to disable Armenian air defense system, artillery, and tanks.<sup>48</sup> Drones, and more specifically the rapid adoption of these technologies by one of the parties involved, once again played a decisive role in the outcome of this conflict. The strategic advantage gained through the use of drones significantly influenced military operations, showcasing how quickly evolving technologies can shape modern warfare. This dynamic highlights the increasing importance of drone capabilities in contemporary conflicts, where speed of deployment and adaptation can be pivotal. This conflict highlights the urgent need to address the overreliance on maneuver warfare and to enhance multi-layered air defense systems. While the use of UAVs represents the latest evolution in the modern character of war, it has not completely rewritten the rules of warfare. But, the fact that drone capabilities are outpacing current defense measures calls for a re-evaluation of these air defense strategies and the survivability of ground forces. There is a pressing need to develop more effective drone-blocking capacities to counteract the increasing threat posed by unmanned aerial systems.<sup>49</sup>

The EU must, similarly to landlocked Armenia, recognize its vulnerable position in the world, bordering an aggressive power, all the more as asymmetrically possessed yet rapidly developing drone technology poses a serious threat to traditional air defense systems.

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<sup>47</sup> Ibid.

<sup>48</sup> Russia Matters. (n.d.). A look at military lessons from the Nagorno-Karabakh conflict. Retrieved October 26, 2024, from <https://www.russiamatters.org/analysis/look-military-lessons-nagorno-karabakh-conflict>

<sup>49</sup> Ibid.

## 2.3. Israel-Gaza-Iran

As we have described earlier, Israel was one of the leading producers of drones and one with the highest technology development and has a long experience of using drones in various operations. So, going into the military operation in Gaza, there were expectations of the role of technology in this operation.

One of the most critical roles that drones have played has been as reconnaissance assets to be sent into the Hamas tunnels to be able to inspect and assess the risks that these structures pose for the IDF. Of course, the utilization of drones as surveillance and also as booby trap cleaners implies that drones will be equipped with anti-collision sensors and rotor blades enclosed in protective cages, as well as intelligent software known as SLAM (Simultaneous Location and Mapping), with which the drone builds a 3D map of the area to navigate through when entering a place like a tunnel. This would presumably reduce the number of casualties suffered by IDF troops as they storm these tunnels. In addition to tunnel surveillance, IDF are also using drones to assess buildings, check for explosives, and constantly monitor the Gaza Strip.

Conversely, Hamas, using a less sophisticated and technologically rudimentary approach, also deployed kamikaze drones to disable cameras and sensors that facilitated the October 7<sup>th</sup> <sup>50</sup>. Since then, Hamas has launched kamikaze drones into Israel on numerous occasions.<sup>51</sup>

The escalation of drone warfare reached a new level following an Israeli attack in Syria that resulted in the death of a high-ranking member of Iran's Revolutionary Guard. In retaliation, the Iranian regime launched a missile and drone attack on Israel, involving a swarm of drones that was subsequently intercepted by the United States, its Arab allies, and Israel itself. Although the military impact of this attack was minimal, with no casualties or significant damage reported by Israel, it underscores a critical aspect of modern drone warfare: the need for not only drones that can be used in military actions but effective anti-drone tactics and systems. This incident highlights the growing importance of developing defensive strategies against drone swarms, a component that is becoming increasingly vital in the landscape of aerial combat.

There are two ways so far to counter drone attacks<sup>52</sup>. The first is kinetic interception, which includes using missiles, air defenses, aircraft, and even drone-to-drone combat. The second method involves electronic warfare, such as jamming signals or hijacking control of the drone itself.<sup>53</sup> The problem with kinetic interference under the current technologies is what is called the cost imposition curve, which is a significant factor

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<sup>50</sup> The Economist. (2023, December 4). *How Israel is using drones in Gaza*. The Economist. <https://www.economist.com/the-economist-explains/2023/12/04/how-israel-is-using-drones-in-gaza>

<sup>51</sup> Hambling, D. (2023, October 9). How Hamas leveraged cheap rockets and small drones to ambush Israel. *Forbes*. <https://www.forbes.com/sites/davidhambling/2023/10/09/how-hamas-leveraged-cheap-rockets-and-small-drones-to-ambush-israel/>

<sup>52</sup> European Council on Foreign Relations. (n.d.). *Drones in Ukraine and beyond: Everything you need to know*. Retrieved October 26, 2024, from <https://ecfr.eu/article/drones-in-ukraine-and-beyond-everything-you-need-to-know/>

<sup>53</sup> Center for European Policy Analysis. (2023). *An urgent matter of drones*. <https://cepa.org/comprehensive-reports/an-urgent-matter-of-drones/>

since drones are far cheaper and easier to replace than the technologies that are used to run interference in a kinetic form. For example, according to some reports, the cost of the Iranian attack, drone, and missile to be precise, was around 80 to 100 million, but the cost of the US-Israeli interception was around 1 billion.<sup>54</sup> This is a huge issue for sustainability in a prolonged conflict.

As we have seen in our cases, UAVs have shifted major warfare concepts. They could position middle power or sanctioned countries back into military relevance because of their lower cost and capacity to alter and penetrate established concepts of military warfare. Conventional air Defenses have proved too costly, too slow, or even just ineffective as countermeasures to drones, and there is a clear need for a strategy to deal with the appearance of UAVs in such a manner on the battlefield.

## **UAS in the European Union's Governance and Industry**

### **3.1. Defense Governance in the EU: from EU Treaties to Existing Initiatives**

The Common Security and Defense Policy is outlined in Section 2 of the EU Treaties<sup>55</sup>. While open to interpretation, it explicitly mandates leadership by the European Council (comprising the heads of government of the member states): *“The Common Security and Defense Policy shall include the progressive framing of a common Union Defense policy. This will lead to a common defense, when the European Council, acting unanimously, so decides. It shall in that case recommend to the Member States the adoption of such a decision in accordance with their respective constitutional requirements.”*

Furthermore, the treaty delineates the establishment of the European Defense Agency (EDA), chaired by the European Commission's High Representative and Vice President (HR/VP), yet accountable to the European Council<sup>56</sup>. The mission of the EDA is *“to support the Member States and the Council in their effort to improve European defense capabilities in the field of crisis management and to sustain the European Security and Defense Policy as it stands now and develops in the future”*<sup>57</sup>.

In addition, the EU Military Committee (EUMC),<sup>58</sup> including representatives of the individual Member States, is the highest military body set up within the Council and

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<sup>54</sup> Reuters. (2024, April 18). *In any air war, Israel's defenses would trump Iran's at a high cost.* <https://www.reuters.com/world/middle-east/any-air-war-israels-defences-would-trump-irans-high-cost-2024-04-18>

<sup>55</sup> European Union. (2019). *Consolidated version of the Treaty on European Union*. Official Journal of the European Union. [https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC_1&format=PDF)

<sup>56</sup> Article 45 paragraph 1 *“European Defence Agency referred to in Article 42(3), subject to the authority of the Council”*

<sup>57</sup> European Defence Agency. (n.d.). *Mission and functions*. Retrieved October 26, 2024, from <https://eda.europa.eu/who-we-are/Missionandfunctions>

<sup>58</sup> European External Action Service. (n.d.). *European Union Military Committee (EUMC)*. Retrieved October 26, 2024, from [https://www.eeas.europa.eu/eeas/eumc\\_en](https://www.eeas.europa.eu/eeas/eumc_en)

directs all military activities within the EU framework, in particular the planning and execution of military missions and operations under the Common Security and Defense Policy<sup>59</sup> (CSDP) and the development of military capabilities. The EU Military Staff<sup>60</sup> (EUMS) on the other hand, is the directorate-general of the EU's External Action Service (EEAS) that contributes to the CSDP by providing strategic advice to the HR/VP and commanding operations through its Military Planning and Conduct Capability (MPCC) operational headquarters.

According to EU treaties, the European Commission, as the executive and co-legislative body of the EU, has the authority to propose and implement policies that strengthen the European defense industry, as well as to coordinate external action and defense through the High Representative/Vice President<sup>61</sup> (HR/VP). However, while the European Union can effectively coordinate defense strategies, the treaties assign primary responsibility for defense to individual member states. The EU can only adopt a common European defense policy when the Council (representing the member states) unanimously decides to do so, as described earlier. In practice, this means that the EU lacks the authority to compel member states to follow a unified defense policy. Therefore, the EU has focused in recent years on industrial defense policy, leveraging its executive and legislative powers through the European Commission. This approach emphasizes the economic aspects of defense, an area where the EU has more competencies or at least greater capacity for action. This shift allows the EU to pursue initiatives such as defense industry collaboration, technological innovation, and procurement strategies, despite its limited ability to directly enforce a cohesive defense policy across member states

Since the first conflict in Ukraine in 2015 and accelerated by the Russian invasion in 2022—the first war on European soil in years—the need for a stronger, more coordinated, and technologically advanced European policy has become obvious for the member states. The use of UAS technology in the Ukraine conflict, the ongoing strife in the Middle East, and by other regional powers globally has greatly concerned the EU, which lacks a common stance on the issue. That is why, over the past five years, the European Commission (EC) has actively enhanced the European defense industrial base along various strategic lines. Notably, in response to the war in Ukraine, the EC has initiated several measures to facilitate common procurement and replenish European stockpiles. Key legislative actions include the European Defense Industry Reinforcement through common Procurement Act<sup>62</sup> (EDIRPA), which aims to address capability gaps by providing EU financial incentives to mitigate the

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<sup>59</sup> European External Action Service. (n.d.). *Common Security and Defence Policy (CSDP)*. Retrieved October 26, 2024, from [https://www.eeas.europa.eu/eeas/common-security-and-defence-policy\\_en](https://www.eeas.europa.eu/eeas/common-security-and-defence-policy_en)

<sup>60</sup> European External Action Service Ibid.

<sup>61</sup> Article 42, paragraph 4: “*The High Representative may propose the use of both national resources and Union instruments, together with the Commission where appropriate*”.

<sup>62</sup> European Parliamentary Research Service. (2023). *EU security and defence: Developments and outlook*(EPRS\_BRI(2023)739294). European Parliament. Retrieved from [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2023\)739294](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)739294)

risks associated with joint procurement, and the Act in Support of Ammunition Production<sup>63</sup> (ASAP), which responds to Ukraine’s immediate needs. These two are further explain in the next section of the report.

In conclusion, EU defense governance reflects a dual leadership structure between the European Council, representing the Member States, and the European Commission. While Member States retain national authority over defense, as it directly relates to sovereignty, the Commission primarily holds competencies in economic and defense industrial policy. This division sometimes leads to duplication of programs and strategies, with some initiatives led by the Commission and others by Council-affiliated agencies (e.g., parts of the European Defense Agency overlap with the European External Action Service). Given the current situation and conflicts along Europe’s borders, these inefficiencies have become even more apparent; thus, enhanced defense cooperation among EU member states is now more essential than ever.

The new proposed Commissioner of Defense, former Lithuanian Prime Minister Andrius Kubilius, faces a substantial challenge ahead. For effective implementation and to avoid duplication within European defense capabilities, it is essential that the new Commissioner of Defense clearly defines their competencies in relation to Member States (through the Council), the High Representative/Vice President (HR/VP)—who until now has served as both *kind of* “Commissioner of Foreign Affairs” and “Commissioner of Defense” under the European External Action Service (EEAS)—and existing defense cooperation programs, such as Permanent Structured Cooperation (PESCO). The initial remarks that have been done by the new Commission representatives hints that the new HR/VP will focus more on coordinating external action, while Commissioner Kubilius is likely to concentrate on economic areas such as investment, procurement, and research. This addition of a new Commissioner of Defense role, while in the right direction given increased defense importance, heightens the already complex European balance of power and will test whether the EU can effectively contribute to defense initiatives or risk falling behind.

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<sup>63</sup>European Commission. (n.d.). *ASAP: Boosting defence production*. Retrieved October 26, 2024, from [https://defence-industry-space.ec.europa.eu/eu-defence-industry/asap-boosting-defence-production\\_en](https://defence-industry-space.ec.europa.eu/eu-defence-industry/asap-boosting-defence-production_en)



## 3.2. EU Defense Budget: Less Than the Sum of the Parts

EU Member States' defense spending reached a record €270 billion<sup>64</sup> (\$295 billion) in 2023 and is projected to increase to €350 billion<sup>65</sup> (\$390 billion) in 2024. Although these figures represent a significant rise from historical levels, they comprise the total of national defense budgets, which still exhibit considerable inefficiencies. Issues include duplication of some resources, such as communication systems and ground transportation vehicles, and underinvestment in areas like surveillance and reconnaissance capabilities. Additionally, interoperability and cooperation remain challenging, with many countries prioritizing national interests and protectionism over a shared European strategy. For instance, between 2021 and 2022, only 18 percent of total equipment investment in Europe was made collaboratively<sup>66</sup>.

In her 2023 State of the European Union<sup>67</sup> (SOTEU) address and later again at the Munich Security Conference<sup>68</sup>, European Commission President Von der Leyen emphasized her commitment to promoting a unified strategy to address these inefficiencies and enhance the internal defense industry's capabilities. At the end of the first Von der Leyen Commission's mandate in the first quarter of 2024, two important initiatives were introduced to support this goal:

- The proposal of a common procurement platform, the European Defense Industry Reinforcement through Common Procurement Act<sup>69</sup> (EDIRPA), already approved by the European Council,

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<sup>64</sup> Carnegie Endowment for International Peace. (2024, March 8). *Understanding the EU's new defence industrial strategy*. Retrieved from <https://carnegieendowment.org/2024/03/08/understanding-eu-s-new-Defence-industrial-strategy-pub-91937>

<sup>65</sup> Euronews. (2024, February 20). *Von der Leyen pushes for coordinated EU defence spending*. Retrieved from <https://www.euronews.com/my-europe/2024/02/20/von-der-leyen-pushes-for-coordinated-eu-defence-spending>

<sup>66</sup> European Defence Agency. (2022). *EDA defence data 2022*. Retrieved from <https://eda.europa.eu/publications-and-data/brochures/eda-defence-data-2022>

<sup>67</sup> European Commission. (2023). *Towards the State of the Union 2023*. Retrieved from <https://ec.europa.eu/stories/towards-state-of-the-union-2023/>

<sup>68</sup> Munich Security Conference. (2024). *Europe's finest hour? Building a Defence Union in challenging times*. Retrieved from <https://securityconference.org/en/msc-2024/agenda/event/europes-finest-hour-building-a-Defence-union-in-challenging-times/>

<sup>69</sup> European Parliamentary Research Service. (2023). *EU security and defence: Developments and outlook*(EPRS\_BRI(2023)739294). European Parliament. Retrieved from [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2023\)739294](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)739294)

- The recently proposed (March 2024) European Defense Industry Programme<sup>70</sup> (EDIP) that will succeed the Act in Support of Ammunition Production<sup>71</sup> (ASAP) and aims to help member states to ramp up their investments in Defense sector, and encourage collaboration between manufacturers and joint weapons productions. The EDIP aims to establish a legal framework to promote Defense industry by helping with interoperability and standardization and giving financial incentives (initial budget for this program rounds 2 billion in 2 years – to be refined in each year’s budget).

In conclusion, the European Defense budget has significantly increased (+50% in three years), yet it remains a collection of national budgets that are not necessarily aligned. This results in inefficiencies due to duplications, lack of interoperability, and insufficient investment in critical areas. A dual approach is needed: European coordination bodies to help overcome these inefficiencies, and more substantial allocations of the European budget (through conditional grants or tax credits) to boost the defense industry, and a heavy investment in interoperability of national systems, to ensure real European military capacity.

The new proposed Defense Commissioner, Andrius Kubilius, who will be ratified by the European Parliament in November 2024, has emphasized that while defense funding may increase in the next seven-year budget framework, 'this won't happen until 2028, and the EU cannot afford to wait that long.' Consequently, from the beginning of his term that starts in November 2024, he has been exploring alternative funding options and resource enhancements for the European defense industry, including the possibility of issuing joint bonds or reallocating unspent funds from post-pandemic recovery budgets.

### 3.3. Unmanned Aircraft Systems in the EU: Lots of Research, Lacking Actions

As discussed in section two of this paper, Unmanned Aircraft Systems<sup>7273</sup> (UAS) and their counter-weapon technology (C-UAS) have been utilized in various conflicts over the last decade, gaining significant relevance and often providing a notable competitive advantage. This is why the European Union has incorporated UAS security threats into its Defense strategy discussions in recent years. UASs were

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<sup>70</sup> European Economic and Social Committee. (n.d.). *European Defence Industry Programme*. Retrieved October 26, 2024, from <https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/european-defence-industry-programme>

<sup>71</sup> European Commission. (n.d.). *ASAP: Boosting defence production*. Retrieved October 26, 2024, from [https://defence-industry-space.ec.europa.eu/eu-defence-industry/asap-boosting-defence-production\\_en](https://defence-industry-space.ec.europa.eu/eu-defence-industry/asap-boosting-defence-production_en)

<sup>72</sup> European Commission. (n.d.). *Unmanned aircraft*. Retrieved October 26, 2024, from [https://defence-industry-space.ec.europa.eu/eu-aeronautics-industry/unmanned-aircraft\\_en](https://defence-industry-space.ec.europa.eu/eu-aeronautics-industry/unmanned-aircraft_en)

<sup>73</sup> Focus of this section on the military use of UAS and UAV, since the civil uses and regulations are out of scope of the paper. However, it should be noted that the European Union Aviation Safety Agency (EASA) has imposed an harmonization of regulation across 27 EU countries regarding civil drone flying since January 1, 2021.

included in the 2017 Action Plan to support the protection of public spaces<sup>74</sup>, figured in the 2018 revision of the EU's Capability Development Plan<sup>75</sup>, and were addressed in the 2020 Counter-Terrorism Agenda for the EU<sup>76</sup>. UASs, UAVs and C-UASs were also included in the EDA's 2022 Coordinated Annual Review<sup>77</sup> (CARD). Additionally, at the beginning of 2023, the EDA concluded a two-year project focused on interoperability standards for military drones, providing key recommendations that will help Member States better integrate and align their drone capabilities. Moreover, the 2023 update to the EU Capability Development Priorities — a revision of the Capability Development Plan — places an increased focus on drones and their operational applications. The latest effort from the European Commission to integrate drones into the EU Defense strategy and capabilities is the Counter-UAS package initiative announced in October 2023<sup>78</sup>, which launches new research groups and coordination efforts to address this threat.

In summary, numerous discussions and policy papers have occurred, yet there has been minimal mobilization of funds and industry capabilities. The most significant European Union drone-related manufacturing project to date is the Eurodrone, with a budget of 110 million euros – minimal compared to what other state and non-state actors are spending. This project is expected to deliver 20 medium-altitude, long-endurance, multi-mission drones by the beginning in 2028, already too late for some of the imminent threats that Europe faces these days. In addition to the Eurodrone project, there are another two EU-funded initiatives that are set to produce prototypes of capable small tactical drones for a select few nations —the Low Observable Tactical Unmanned Air System and the Next Generation Small Remotely Piloted Aircraft—. However, both are still small and lack the scale and ambition to be a turning point in European military global position.

Budget analysis and production numbers indicate that cooperative EU projects in both drone and counter-drone sectors are modest in scale, generally in the low millions of euros, and involve only a few nations. For example, only the four largest nations<sup>79</sup>—France, Italy, Germany, and Spain—are participating in the Eurodrone project. Most countries continue to prioritize national initiatives over EU-wide

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<sup>74</sup> European Commission. (2017). *Action plan to improve the protection of public spaces*. Retrieved from [https://home-affairs.ec.europa.eu/system/files/2020-09/20171018\\_action\\_plan\\_to\\_improve\\_the\\_protection\\_of\\_public\\_spaces\\_en.pdf](https://home-affairs.ec.europa.eu/system/files/2020-09/20171018_action_plan_to_improve_the_protection_of_public_spaces_en.pdf)

<sup>75</sup>European Union. (2019). *European security strategy: A global strategy for the European Union's foreign and security policy*. Retrieved from <https://op.europa.eu/en/publication-detail/-/publication/099d0a3f-01e0-11ea-8c1f-01aa75ed71a1>

<sup>76</sup> European Commission. (2020). *Digital Services Act: European Commission proposes new rules for digital platforms*. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_2326](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2326)

<sup>77</sup> European Defence Agency. (2022). *2022 Coordinated Annual Review on Defence (CARD) report*. Retrieved from <https://eda.europa.eu/docs/default-source/eda-publications/2022-card-report.pdf>

<sup>78</sup> Joint Research Centre. (2023, October 19). *Countering the threat of civil drones: The Commission presents new measures*. Retrieved from [https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/countering-threat-civil-drones-commission-presents-new-measures-2023-10-19\\_en](https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/countering-threat-civil-drones-commission-presents-new-measures-2023-10-19_en)

<sup>79</sup> Airbus. (n.d.). *Eurodrone*. Retrieved October 26, 2024, from <https://www.airbus.com/en/defence/eurodrone>

efforts, with member state investments in drone and counter-drone development and production remaining limited. Moreover, a largely uncoordinated approach and a disparate mix of platforms, each with proprietary telemetry and sensors, have impeded interoperability and the establishment of a common doctrinal framework. The promotion by the Commissioner of Defense of intra-European projects to build drones—similar to Eurodrone but larger in ambition—is not only beneficial for the deepening of the EU common Defense strategy, but also necessary given the urgencies of existing conflicts and possible emerging threats related to quick technological advances.

## Policy Recommendations

The European Union faces a significant security challenge with the new Unmanned Aerial Systems (UAS) used in warfare. This new threat requires a comprehensive and action-specific roadmap. In this paper we present **15 recommendations** that the European Commission could enact **to enhance European defense capabilities concerning new autonomous system technologies**. These recommendations address a) role definition and governance, b) strategy and planning, c) budget and resources, and d) technology and innovation. We advise establishing specific working groups to delve into the operability and implementation of these 15 measures, and deep dive in their potential risks, mitigative actions, and roll out schedule. This initial report focuses on describing the recommendations to be implemented and the rationale for their necessity.

### 4.1. Role Definition and Governance: Internal and External Defense Policy Coordination

#### Proposal # 1: Establish a clear mandate and specific competencies for the Commissioner of Defense

**Description:** Establish a clear mandate and specific competencies for the Commissioner of Defense in two main areas: one concerning the coordination of Defense among Member States (currently under the High Representative apart from the European External Action Service) and the other concerning the European Defense industry within the economic and trade sector. The new Commissioner should have the authority to push for the adoption of Unmanned Aircraft Systems (UAS) within the EU countries, as well as the manufacturing of these systems within EU borders, following the strategic autonomy principle.

**Rationale:** In today's context—marked by open war in Ukraine and Gaza, the victory of Trump in the US 2024 elections, and his shift in security policy, the new NATO dynamics, the rise of other global powers like India and China, and a more fractured world in general—it is more crucial than ever to have a strong and unified Europe. This requires an empowered and effective European Commission with a Commissioner of Defense (CoD). As this is the first mandate for the Commissioner of Defense, clearly defining the boundaries and competencies of this role is essential, similar to the developments post-Treaty of Lisbon with the creation of the High Representative's role.

It is crucial to ensure that the new Commissioner of Defense actively participates in all international out-of-the-EU defense-related forums, and remains closely engaged on disarmament / arms regulations efforts (in close cooperation with the High Representative). The longstanding policy-coordination between EU and NATO should be prioritized, given NATO's continued prominence in defense discussions for most EU Member States, even when elaborating a more robust European Security Policy - while acknowledging the fact that not all EUMS hold NATO membership

and the need for the EU to be inclusive. This should be designed and deployed closely with the High Representative.

**Implementation:** The proposal suggests splitting the role of the EU Commissioner of Defense into two aspects: one focusing on improved coordination and a unified defense stance and policy—competencies previously under the last commission's High Representative—and another focusing on the economic development of the European Defense industry, which includes the internal market and regulations concerning external trade.

The distribution of competencies currently held by the High Representative is a political and legal challenge, as the treaties specifically designate the High Representative as the chair of the European Defense Agency with Defense competencies. This might be initially addressed through an Executive Order of the European Commission and some shared competencies between the HR/VP and CoD. However, for the long term, it would be prudent to update the treaties—for instance, by reassigning the chairmanship of the European Defense Agency to the Commissioner of Defense. The assignment of competencies for the internal and external Defense market and industry should face fewer obstacles since these are already within the European Commission's remit, and the distribution of these competencies is at the discretion of the President of the European Commission.

These changes will require not only legal backing but also a robust communication strategy to ensure EU citizens understand what the EU and the EU's Commissioner of Defense are doing in terms of Defense and national security.

### **Proposal #2: Establish working groups and integrate military attachés in embassies under the Defense Commissioner's authority to enhance coordination within the EU and with allied nations**

**Description:** Establish a working group under the authority of the Commissioner of Defense to ensure full coordination among EU actors and the integration of policies and procedures aimed at harmonizing EU and member-state drone legislation. This working group should adopt a holistic approach to drone policy. To ensure coordination, military attachés should be included in embassies to align diplomatic and defense policies and strategies across all actors.

**Rationale:** For the EU to strengthen its defense and deterrence capabilities, all actors must operate in concert, respecting the competencies of various internal stakeholders. Currently, defense-related decisions within the EU are made in disparate forums, depending on the nature of the threat—whether economic, cyber, or military. This fragmentation can result in inefficiencies and misalignments. Establishing a joint defense committee to discuss overarching strategies, with subcommittees focusing on specific issues, would mitigate this problem.

One layer of this structure should include Member State Representatives, building on the existing European Defense Council (or the European Union Military Committee at a more operational level), as defense largely remains a national competency.

Another layer should comprise relevant European institutions involved in defense (e.g., the Commission, Parliament, and the European Central Bank) to ensure a comprehensive approach that includes discussions on market distortions by foreign drone companies with potential dual-use capabilities. In both layers, the Commissioner of Defense or a designated representative should preside over these committees to enhance coherence and streamline decision-making across defense-related activities.

To implement effective defense diplomacy and improve military coordination with allies, military attachés should be integrated into EU delegations abroad for military-to-military engagements. These attachés should be directed jointly by the Military Staff and the External Action Service to proactively represent and communicate the EU's stance and concerns regarding UAS. This proactive approach would align EU defense initiatives with international standards and reinforce collaborative security efforts.

### **Proposal # 3: Leverage EU defense diplomacy to promote global adoption of ethical standards for drone usage in military operations**

**Description:** The European Union is the world's largest donor of development aid, supports the most peace and democracy projects globally, and, despite comprising only 6% of the world's population, accounts for 50% of global social spending, given its focus on the human being and his/her rights. Its foundational values are rooted in the utmost respect for human dignity, freedom, and democracy. As a project originally created to promote peace among nations, the European Union has an obligation to advocate within the international community for the regulation of drone usage, particularly those operating without human intervention, and to establish ethical assumptions and standards for their use.

**Rationale:** First, the EU should leverage all its diplomatic and soft power to advocate for the global adoption of UAS regulations that respect human rights, clearly define accountability in the use of this technology, and restrict its deployment when it is not morally acceptable. The EU should harness the collective influence of its member states within multilateral organizations and through its diplomatic services.

### **Proposal # 4: Strive for interoperability of military capabilities**

**Description:** Launch a plan to enhance interoperability of defense systems, including drone technology, across the EU members. This plan should include investments in conversion processes and bridge technologies that facilitate system communication. Additionally, it should further promote joint military exercises using different UAS technologies to improve the use of common procedures amongst defense forces. This initiative aims to streamline operations and strengthen collective defense capabilities within Europe. Finally, the plan should promote the acquisition of interoperable drone technologies. The Commission should incentivize Member States to acquire European, or NATO technologies.

**Rationale:** Interoperability among defense systems within European Union countries is crucial for ensuring a quick, effective, and coordinated response to any threat. A study by the European Defense Agency<sup>80</sup> in 2023 reports that only 18% of defense purchases by member countries are made in coordination with other nations. This lack of cooperation leads to increased spending (due to the absence of economies of scale), investment inefficiencies (with some equipment being over-invested and others underfunded), and potential interoperability failures when purchasing from different suppliers.

## 4.2. Strategy: Planning Enhanced Defense Capabilities

### Proposal # 5: Develop an integral drone policy for the EU

**Description:** An integral strategy should harness the advantages of each type of UAS, covering intelligence, direct attacks, and even drone-to-drone interception. The strategy will consider the existing stocks of each country and will encompass short, medium, and long-term actions. It will assess costs, propose budgets, and suggest operational measures to be implemented either directly by the European Union or by member states. This includes the procurement and/or manufacturing of both drones and anti-drone systems and their integration with existing European systems such as surveillance networks or joint military actions. In this context, any development of drone policy must be coordinated with the strategy of the EU other military assets; drones alone will not and cannot make a successful military strategy.

**Rationale:** Drones have proven essential in modern warfare, yet their effectiveness extends beyond mere technological acquisition. They must be versatile and fully operable by the nations responsible for carrying out defense military campaigns. Therefore, developing or purchasing technology alone is insufficient; these systems need to be integrated in a more holistic military strategy to optimize their utility/effectiveness.

### Proposal # 6: Prioritize the development of anti-drone technology

**Description:** Prioritize, through existing or new European projects (e.g. using Important Projects of Common European Interest (IPCEI)), the innovation and development of anti-drone strategies and machinery. These counter defense initiatives are aligned with the European Union's values of peacekeeping and deterrence. The anti-drone technology development plan should include these 3 key areas:

- Drone-to-drone technology
- Layered aerial defense system
- Electronic capabilities to take control of or jam drone capabilities.

This will ensure that anti-drone capabilities have the depth and ability to address the future development of UAV technology. Better air defense systems developed for

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<sup>80</sup> European Defence Agency. Ibid



this technology will be needed, as well as the capacity to intercept drones with cheaper technology, drones themselves, and the ability to address the threat electronically.

**Rationale:** The most critical issue the EU must address is strategy and assets for countering drone strikes. Both kinetic and electronic. The existence of Defense systems, as seen in the Aramco attack, the Ukraine and Russia war, on the Hamas attack on Israel, are united and unable to stop these drones. Even when they do, as in the Iranian-Israel attack case, the cost of deploying such assets to counter each attack of significantly cheaper drones is not sustainable. It should be the EU's priority to have the capabilities to deny drones substantial impact on the field; this would re-level the playing field back into more conventional elements of the military where the EU has greater advantages.

### **Proposal # 7: Launch inter-country development projects for small drones, similar to the existing large drone projects like the Eurodrone**

**Description:** Launch inter-country development projects for small drones, akin to the large-scale initiatives like the Eurodrone project. These plans should aim for broad participation from as many countries as possible and set ambitious production targets, leveraging the manufacturing capabilities of the European Union.

**Rationale:** The Eurodrone project engaged four Member States in developing the first medium-sized unmanned aerial system designed for flight in non-segregated airspace. This is a positive step, but more is needed. A comprehensive international drone strategy should include small, medium, and large drones, each with unique capabilities: small drones for urban warfare or reconnaissance, swarms of kamikaze drones to overwhelm enemy air Defenses, and larger drones for precision strikes or deeper penetration of the enemy line.

### **Proposal # 8: Launch an EU common defense procurement program**

**Description:** This build-up should be done in the context of the proposed European Defense Industrial Strategy (EDIS) and its SEAP (Strategy for European Armament Program) in March 2024- The new EU procurement program will allow new assets should allow interoperability with the existing drone stocks. However, SEAP should be used as a joint procurement program that should invite the UK to join, as the country has been an essential component of the European armament industry.

**Rationale:** This will allow the EU to buy the assets it needs as a unit instead of each country buying its stock; this will signal the industry's need to grow its production line to meet demand and will prevent problems of diversity in the products that arise from each member state buying their own. This will allow the EU to harness economies of scale and better purchasing prices, given the increase in volumes to be purchased, as well as the VAT exemptions that all purchases made by the EU enjoy, consequently making them cheaper.

### 4.3. Budget: Fiscal Strategies for Defense Enhancements

To implement this specific plan for UAS in the EU, resources and budget are required. We propose mobilizing and deploying both public and private funds. Public funds will come predominantly from member states; from the European level, we propose to use \$120 million of the EDIP program and explore the possibility of issuing \$500 million of Defense Eurobonds to finance future projects, at least one of them about UAS.

Effective deterrence relies on the existence and deployment of robust military capabilities, backed by industrial capacity and ingenuity. This combination ensures not only that defense needs are met but also that innovation drives forward momentum in cutting-edge technology development.

#### Proposal # 9: Reach \$2bn in UAS Defense-related projects across the EU

**Description:** We propose negotiating a commitment with Member States, adjusted according to the GDP and population of each country, to reach \$2 billion in UAS expenditures in total within the EU. This should be done in a coordinated and interoperable manner as described in the earlier points.

**Rationale:** According to public data from the U.S. Department of Defense, the U.S. spent between \$2.5 and \$7.5 billion on UAS last year<sup>81</sup>, out of a total of approximately \$850 billion. The equivalent in the European Union for 2024 should be between \$1 billion and \$3.5 billion, considering the EU Defense budget will be \$390 billion.

#### Proposal # 10: Launch a 100 million inter-country C-UAS project with EU budget, such as European Anti-Drone Dome

**Description:** Use fraction (~\$100 million) of the European ordinary budget to launch a specific inter-country C-UAS project, such as the European Anti-Drone Dome.

**Rationale:** Given the limitations of European funds, it is proposed to focus budget efforts on specific inter-country projects. For example, the European Anti-Drone Dome involves the manufacturing industry from various countries and those countries that share borders with non-EU nations. Of the European budget of \$1.5

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<sup>81</sup> Several sources used here since there are different ways of categorizing weapons and not all the budget is disclosed:

- Association for Unmanned Vehicle Systems International. (n.d.). *DoD unmanned systems budget report*. Retrieved October 26, 2024, from <https://www.auvsi.org/dod-unmanned-systems-budget-report>
- DRONELIFE. (2023, January 17). *How much will the U.S. Department of Defense spend on drones in 2023? AUVSI's report*. Retrieved from <https://dronelife.com/2023/01/17/how-much-will-the-u-s-department-of-defence-spend-on-drones-in-2023-auvsi-report/>
- DefenceScoop. (2023, March 9). *White House's fiscal 2024 budget aims to accelerate combat drone development and procurement*. Retrieved from <https://defencescoop.com/2023/03/09/white-houses-fiscal-2024-budget-aims-to-accelerate-combat-drone-development-and-procurement/>

billion approved by the last Commission for reindustrialization<sup>82</sup>, about \$100 million would be allocated to boost a European and transnational C-UAS project (similar to the large-scale Eurodrone project<sup>83</sup> and around 8% of the fiscal stimulus program, which is a similar percentage of the US budget dedicated to UAS).

### **Proposal # 11: Issue \$500 million worth Defense Eurobonds to finance, among others, UAS and UAVs-specific project**

**Description:** Exploring the issuance of \$500 million of Defense eurobonds and allocate one specific project of UAS-related technology.

**Rationale:** Finally, given budgetary constraints, exploring the issuance of Defense eurobonds to finance European UAS projects is recommended. This could help with the budget and also publicize the European Defense project (taking cues from past successful campaigns like the Spitfire bond campaign in the UK during World War II and current operations of drone funding in Ukraine and Russia). The joint group Commission-Council-Parliament should evaluate the possibility of issuing another \$500 million on Eurobonds to finance specific Defense projects<sup>84</sup>.

The new Defense Commissioner has already expressed support for this initiative<sup>85</sup>, though it faces challenges, particularly from the 'austerity-minded' countries, primarily led by the Netherlands and Germany, which have traditionally opposed joint debt issuance. This same group resisted such measures after the 2008 financial crisis, only relenting during the COVID-19 crisis, when the need became undeniable. The conflicts on Europe's borders may now act as a catalyst for a unified stance, pushing for alternative financing mechanisms like joint debt issuance to provide the necessary boost for the European defense industry and enable the EU to establish a credible deterrent. Additionally, as noted in the report, European Commission President Ursula von der Leyen has requested support from Mario Draghi, the former Italian Prime Minister and former European Central Bank President, who also advocates for bold investment in European reindustrialization and supports joint debt issuance<sup>86</sup>.

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<sup>82</sup> U.S. News. (2024, March 5). *EU Commission proposes 1.5 billion euro common defence industry package*. Retrieved from <https://www.usnews.com/news/world/articles/2024-03-05/eu-commission-proposes-1-5-billion-euro-common-defence-industry-package>

<sup>83</sup> Defence News. (2024, March 25). *Eurodrone program bags fresh round of EU subsidies*. Retrieved from <https://www.defencenews.com/global/europe/2024/03/25/eurodrone-program-bags-fresh-round-of-eu-subsidies/>

<sup>84</sup> France and Estonia already back up the proposal. Euronews. (2024, March 21). *EU leaders to discuss breaking the defence bond taboo at Brussels summit*. Retrieved from <https://www.euronews.com/my-europe/2024/03/21/eu-leaders-to-discuss-breaking-the-defence-bond-taboo-at-brussels-summit>

<sup>85</sup> Euronews. (2024, September 18). *The EU's new defence commissioner is open to eurobonds*. Retrieved from <https://www.euronews.com/my-europe/2024/09/18/the-eus-new-defence-commissioner-is-open-to-eurobonds>

<sup>86</sup> Draghi, M. (2024). *Report on European competitiveness: Addressing investment needs for economic resilience*. Global Infrastructure Investor Association. Retrieved from <https://gia.net/insights/wake-call-europe-mario-draghi-landmark-report-signals-pivotal-moment-blocs-economic>

## Proposal # 12: Launch a comprehensive incentive program to mobilize private capital along with public expenditure, to maximize impact on UAS-related project investments

**Description:** Launch a comprehensive incentive program that includes tax credits, subsidies, and regulatory simplification that encourages companies to invest in defense-related projects. Explore the possibility of blended-finance instruments to finance defense related projects, not only from a manufacturing perspective, but also in terms of innovation.

**Rationale:** Lastly, mobilizing private capital to co-sponsor these projects and to create a competitive and innovative ecosystem is essential. We propose using the lessons learned from the NextGen Funds<sup>87</sup> to launch an incentive program (tax credits, subsidies, etc.) that encourages companies to invest in Defense in such a way that for every public euro invested, there are four more private euros (20-80% ratio, similar to other existing programs in transition and green technologies).

## 4.4. R&D: Advancing Defense through Research, Technology, and Innovation

### Proposal # 13: Incentivize innovation around UAS technologies support for startups and public-private partnerships

**Description:** Create special programs and funding mechanisms to incentivize innovation in research and development, such as grants, tax incentives, and prizes for breakthrough discoveries and technologies. Leverage on successful case studies where the public sector has invested in and encouraged innovative defense technologies developed by the private sector, similar to the Defense Innovation Unit in the USA. This approach demonstrates effective collaboration between governmental initiatives and private industry to advance defense capabilities.

**Rationale:** The current system of interaction between the public and private sectors is slow, bureaucratic, and overly localized. In a world where technology evolves rapidly and the collaboration between public and private sectors is more essential than ever, it is crucial to establish institutions or programs capable of swiftly investing in and developing technologies that impact national security. This will accelerate the translation of research into practical applications and stimulate the development of a high-tech defense and civil sector.

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<sup>87</sup> European Commission. (n.d.). *A modernised EU long-term budget powered by NextGenerationEU*. Retrieved October 26, 2024, from [https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/whats-new\\_en#a-modernised-eu-long-term-budget-powered-by-nextgenerationeu](https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/whats-new_en#a-modernised-eu-long-term-budget-powered-by-nextgenerationeu)

### **Proposal # 14: Evolve the European Research Council to an international open research ecosystem including public officials, academia, private sector think tanks.**

**Description:** Expand the European Commission's research hub, the European Research Council, to include other key civil society actors: academia, think tanks, and both public and private researchers from allied countries. Introduce specific research lines focused on the development of UAS technology. This approach will foster a more comprehensive and collaborative research environment, integrating diverse perspectives and expertise to advance understanding and innovation in critical areas. This would foster collaborations and encourage joint research projects and cooperative funding initiatives.

**Rationale:** Given the rapid evolution of UAS technology, it is crucial for the EU to maintain a robust research and development team that stays at the cutting edge of technological advancements. This strategic focus will ensure that the EU becomes a competitive leader in the field of unmanned systems and less dependent and more prepared against the threat of Iranian, Chinese and Russian technology.

### **Proposal # 15: Launch a dedicated research initiative on the impact of artificial intelligence on UAS technology.**

**Description:** Launch a dedicated research initiative specifically on the impact of artificial intelligence on UAS technology. This research should consider both current and future AI technologies at the highest level of UAS automation (Level 5). Additionally, the project should not only focus on technological aspects but also include ethical considerations, involving in the research team philosophers, ethicists, and humanists in the technology team to assess and evaluate the compatibility of new technologies with European ethical standards. This multidisciplinary approach will ensure that technological advancements align with broader societal values and principles.

**Rationale:** The impact of artificial intelligence, particularly new large language models (LLMs), on UAS technology could be substantial, heightening threats and raising ethical concerns about their use. The current lack of regulation allows countries with value systems different from those of Europe to exploit these technologies, often using them unethically, even in warfare. As the EU develops new technologies in AI and UAV it cannot lose its place as a leader in AI ethics, that why it need to design policies that are both ethical and applicable. Therefore, it is crucial to establish a working group that focuses not only on the technology but also on the morality of its use.

## Conclusion: Preparing the EU for 21st-century Warfare

While the possibility of elaborating a Common Defense Strategy has always been in the toolbox of the Union, the Russian invasion into Ukraine and a geopolitical climate of heightened tensions and reduced cooperation, have provided the momentum for a mind shift in the EU. In order to guarantee the over “500 million Europeans to live in a free, democratic and prosperous Union<sup>88</sup>”, in order for the EU to be a true geopolitical player, renewed debate on the future of our security architecture and joint action on the development of defense capabilities is of primary importance.

While Member States keep important competencies in terms of defense, the European Union has started to develop more proactively new instruments. In this spirit, EU President von der Leyen announced her intention to add a Commissioner for Defense to the European Commission if she were to be elected for a second term as President, post June 2024, and she has proposed former prime minister of Lithuania, Andrius Kubilius, to hold this position starting in November 2024. The newly elected official has the responsibility to coordinate the Commission's defense strategy, a significant task given the existing geopolitical tensions and ongoing conflicts.

At the same time, the effects of AI and UAV disruption in warfare are just beginning to surface. From 2001 to date, drone use has significantly affected the battlefield and has impacted the planning strategies of most defense ministries across the globe. Although this technology is far from overhauling modern warfare, and cannot change the results of battle on its own, drones have had relevant impacts on intelligence, surveillance, air superiority and strategic targeting. Military planning cannot proceed without including drones as an essential part of their strategy.

In this context, the EU needs to establish a multipronged strategy that will equip the EU institutions with the tools to develop capabilities jointly with the private, public sector and universities. For this, structural issues and policy problems need to be addressed.

The EU's defense policy and capabilities, as highlighted by the French President<sup>89</sup>, must remain independent of outcomes in U.S. elections. This requires the development of a comprehensive defense strategy, including an industrial policy that strengthens the European defense sector. Such a strategy would ensure the EU can meet its military needs while positioning itself as a significant player in technological innovation. This involves advancing capabilities in critical areas like Unmanned

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<sup>88</sup> Von der Leyen, U. (2024, April 17). *Keynote speech at the European Defence and Security Summit*. European Commission. [https://ec.europa.eu/commission/presscorner/detail/en/speech\\_24\\_2101](https://ec.europa.eu/commission/presscorner/detail/en/speech_24_2101)

<sup>89</sup> France 24. (2024, April 25). *Macron to outline vision for independent, stronger Europe in keynote speech*. Retrieved from <https://www.france24.com/en/europe/20240425-macron-to-outline-vision-for-independent-stronger-europe-in-keynote-speech>

Warfare Systems (UWS), among others, to secure autonomy and leadership in defense technology.

Key structural issues include defining the roles and competencies of the new Commissioner of Defense to ensure effective coordination with Member States and other EU stakeholders. This clarity is essential for implementing precise and impactful policies. Additionally, the defense budget needs a transformation to overcome the fragmented approach of individual Member States and align towards a unified, strategic objective. This would involve consolidating resources under a single, clear purpose that should be sensitive to the procurement necessities of the member states military.

Regarding UAV policy, the EU should devise a comprehensive strategy for the development of both drone and anti-drone technologies, thereby strengthening the EU's industrial defense base. This strategy should include substantial investments in research and innovation and establish a joint procurement program. It is vital to integrate these new technologies with the military's existing assets, with a special focus on prioritizing anti-drone technologies to mitigate the effects of UAVs in combat scenarios. These efforts should be collaborative, involving EU institutions, Member States, universities, research institutions, and the private sector.

While it is for the European Union the right time to achieve a more mature level of autonomy with regard to its defense policy and capabilities, proper cooperation and coordination with NATO should remain of key importance, as for most EU Member States, the Alliance remains the central consideration of their defense policy. However, both policy frameworks are reconcilable and complementary.

The establishment of the new Commissioner of Defense role, coupled with the Member States' commitment to deepening reindustrialization and advancing European defense capabilities, presents a critical opportunity to launch initiatives that will prepare the EU for emerging threats. Effective deterrence requires the development of an industrial policy that enables the advancement of industrial, technological, and scientific capabilities. This would empower the EU to develop and the Member States to acquire cutting-edge technologies in Unmanned Warfare Systems (UWS) and anti-drone technology, reinforcing the EU's stance that it possesses the technology, production capacity, and armament needed to confront future challenges.

Simply rearranging responsibilities or securing funds isn't enough. In times of uncertainty, there is a need for courage and make costly or risky political decisions. Clear governance, regulatory changes, and an explicit commitment to the defense industry are essential. Europe has been built through each crisis (the financial crisis led to advances in banking union, the COVID crisis saw joint debt issuance for the first time, etc.). This geopolitical crisis, with wars on Europe's borders, can also be an opportunity to make progress on an issue as vital as the security of European citizens.

Furthermore, the EU's considerable diplomatic and soft power capabilities, combined with a newly strengthened defense industry and increased spending, could establish

the international groundwork for the ethical use of unmanned aerial systems (UAS). The European Union must advocate for UAS regulation that respects human rights and European values. Specifically, it should aim to:

1. Prohibit the use of UAS in situations where their deployment is morally unacceptable.
2. Clearly define responsibility for their use (i.e., determining who is accountable for a strike).
3. Establish international legal standards to penalize those who fail to comply with the regulations.

The European Union has a unique opportunity to lead in creating a more responsible world aligned with its values, while simultaneously ensuring the security of its citizens. By advocating for a framework that regulates UAS usage within ethical boundaries, the EU can set a global example of how to balance technological innovation with the protection of human rights.



# References

## Chapter 1: The UAS Technology

- Silicon Valley Innovation Center. (2024). The rise of autonomous systems: Self-driving cars and drones. Retrieved from <https://siliconvalley.center/blog/the-rise-of-autonomous-systems-self-driving-cars-and-drones>
- McDonald, R., Wu, A., Billaud, E., & Bayer, R. (2020). Evolution of the drone industry. Harvard Business School Case No. 9-620-053. Retrieved from <https://services.hbsp.harvard.edu/lti/links/content-launch>
- Congressional Research Service. (2023). Armed drones: Evolution as a counterterrorism tool. Retrieved from <https://crsreports.congress.gov/product/pdf/IF/IF12342>
- Fortune Business Insights. (n.d.). Commercial drone market. Retrieved from <https://www.fortunebusinessinsights.com/commercial-drone-market-102171>
- Miriam McNabb, (2019), DRONEII: Ted Talk <https://dronelife.com/2019/03/11/droneii-tech-talk-unraveling-5-levels-of-drone-autonomy/>
- Council on Foreign Relations. (2024). How drone warfare in Ukraine is transforming the conflict. Retrieved from <https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflict>
- Reuters. (2024). Container ship reportedly targeted with missiles near Yemen's Mokha, Ambrey says. Retrieved from <https://www.reuters.com/world/middle-east/container-ship-reportedly-targeted-with-missiles-near-yemens-mokha-ambrey-says-2024-04-29/>
- Business Insider. (2024). Iran's drones are the new blueprint for international warfare. Retrieved from <https://www.businessinsider.com/irans-drones-are-the-new-blueprint-for-international-warfare-2024-4>
- Bloomberg. (2024). Iran's drone tech innovations are redefining global warfare. Retrieved from <https://www.bloomberg.com/news/features/2024-04-08/iran-s-drone-tech-innovations-are-redefining-global-warfare?srnd=homepage-americas&sref=yaJhKSOh&embedded-checkout=true>
- Franssen, P. (2023). Threat in the sky: How cheap drones are changing warfare. The Bulletin of the Atomic Scientists. Retrieved from <https://thebulletin.org/2023/11/threat-in-the-sky-how-cheap-drones-are-changing-warfare/>
- Statista. (2024). Drones - Worldwide. Retrieved from <https://www.statista.com/outlook/cmo/consumer-electronics/drones/worldwide>

- Fortune Business Insights. (2024). Unmanned Systems. Retrieved from <https://www.fortunebusinessinsights.com/commercial-drone-market-102171>
- The drone EU, The 25 Top Drone companies in 2024, <https://www.thedroneu.com/blog/top-drone-companies/>
- The Brainy Insights. (2024). Military Drones Market Size, Segmentations & Global Trends. Retrieved from <https://www.thebrainyinsights.com/report/military-drones-market-13950>
- MarketsandMarkets (nd) Military Drone Market. Retrieved from <https://www.marketsandmarkets.com/Market-Reports/military-drone-market-221577711.html>
- Jones, S., Harrington, J., Reid, C., & Strohmeier, M. in CSIS (2022). Combined arms warfare and unmanned aircraft systems. CSIS (2022). Retrieved from [https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221110\\_Jones\\_CombinedArms\\_UASs.pdf?VersionId=2x7tI7AtaEEaNOG0AEKAOdjDsvYwHMn](https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/221110_Jones_CombinedArms_UASs.pdf?VersionId=2x7tI7AtaEEaNOG0AEKAOdjDsvYwHMn)
- DroneWars (2024). Who has armed drones. Retrieved from <https://dronewars.net/who-has-armed-drones/>
- New York Times (2024). A Chinese Firm Is America's Favorite Drone Maker. Except in Washington. Retrieved from <https://www.nytimes.com/2024/04/25/us/politics/us-china-drones-dji.html>
- European Commission (2023). Commission launches investigation on subsidised electric cars from China. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_23\\_4752](https://ec.europa.eu/commission/presscorner/detail/en/ip_23_4752)
- Schmidt, E. (2024). Innovation power: Technology and geopolitics. Foreign Affairs. Retrieved from <https://www.foreignaffairs.com/united-states/eric-schmidt-innovation-power-technology-geopolitics>
- Just Security. (2024). AI and the future of drone warfare: Risks and recommendations. Retrieved from <https://www.justsecurity.org/89033/ai-and-the-future-of-drone-warfare-risks-and-recommendations/>
- Verbruggen, European Parliament. (2019). Presentation on EU policy and legal framework on lethal autonomous weapon systems. Retrieved from [https://www.europarl.europa.eu/cmsdata/194143/SEDE\\_presentation\\_Verbruggen\\_3December2019-original.pdf](https://www.europarl.europa.eu/cmsdata/194143/SEDE_presentation_Verbruggen_3December2019-original.pdf)
- United Nations Office for Disarmament Affairs (UNODA). (2024). Background on laws in the convention on certain conventional weapons (CCW). Retrieved from <https://disarmament.unoda.org/the-convention-on-certain-conventional-weapons/background-on-laws-in-the-ccw/>
- United Nations Institute for Disarmament Research (UNIDIR). (2024). In the crosshairs: Addressing military drone use and proliferation. Retrieved from <https://unidir.org/event/in-the-crosshairs-addressing-military-drone-use-and-proliferation/>

- Nuclear Threat Initiative. (n.d.). United Nations Groups of Governmental Experts. Retrieved from <https://www.nti.org/education-center/treaties-and-regimes/united-nations-groups-governmental-experts/>
- United Nations. (2023). Lethal Autonomous Weapons Systems: Future Challenges and Opportunities. Retrieved from <https://documents.un.org/doc/undoc/ldt/n23/302/66/pdf/n2330266.pdf?token=sfx0B3c3IhE0U25t8x&fe=true>
- Geneva Internet Platform. (2023). UN First Committee adopts draft resolution on lethal autonomous weapons. Retrieved from <https://dig.watch/updates/un-first-committee-adopts-draft-resolution-on-lethal-autonomous-weapons>
- European Union. (n.d.). Aims and Values. Retrieved from [https://european-union.europa.eu/principles-countries-history/principles-and-values/aims-and-values\\_en](https://european-union.europa.eu/principles-countries-history/principles-and-values/aims-and-values_en)
- European Commission. (2024). A Drone Strategy 2.0 for Europe to foster sustainable and smart mobility. Retrieved from [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13046-A-Drone-strategy-20-for-Europe-to-foster-sustainable-and-smart-mobility\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13046-A-Drone-strategy-20-for-Europe-to-foster-sustainable-and-smart-mobility_en)
- Ullah, I., & Alsharif, M. H. (2022). Towards the unmanned aerial vehicles (UAVs): A comprehensive review. *Drones*, 6(6), 147. <https://doi.org/10.3390/drones6060147>

## Chapter 2: The Existing Wars Using UAS

- CNBC. (2019, September 19). How Saudi Arabia Failed to Protect Itself from Drones, Missile Attacks. Retrieved from <https://www.cnbc.com/2019/09/19/how-saudi-arabia-failed-to-protect-itself-from-drones-missile-attacks.html>
- The Atlantic. (2015, May). America First Drone Strike: Afghanistan. Retrieved from <https://www.theatlantic.com/international/archive/2015/05/america-first-drone-strike-afghanistan/394463/>
- Sarah Kreps & Paul Lushenko (2023) Drones in modern war: evolutionary, revolutionary, or both?, *Defense & Security Analysis*, 39:2, 271-274, DOI: 10.1080/14751798.2023.2178599
- CSIS. (2020). Air and Missile War in Nagorno-Karabakh: Lessons for Future Strike and Defense. Retrieved from <https://www.csis.org/analysis/air-and-missile-war-nagorno-karabakh-lessons-future-strike-and-Defense>
- Kofman, Michael, A Look at the Military Lessons of the Nagorno-Karabakh Conflict, December 14, 2020, <https://www.russiamatters.org/analysis/look-military-lessons-nagorno-karabakh-conflict>
- Hambling, D. (2023, October 9). How Hamas leveraged cheap rockets and small drones to ambush Israel.

*Forbes*. <https://www.forbes.com/sites/davidhambling/2023/10/09/how-hamas-leveraged-cheap-rockets-and-small-drones-to-ambush-israel/>

- How Israeli Drones Will Lead the Attack on Gaza Tunnels? The Economist, Retrieved from <http://search.proquest.com.ezp-prod1.hul.harvard.edu/magazines/how-israel-is-using-drones-gaza/docview/2896895484/se-2>
- Reuters. (2024, April 18). Any air war, Israel's defenses would Trump Iran's, high cost. Retrieved from <https://www.reuters.com/world/middle-east/any-air-war-israels-defenses-would-trump-irans-high-cost-2024-04-18/> Retrieved from <https://www.reuters.com/world/middle-east/any-air-war-israels-defenses-would-trump-irans-high-cost-2024-04-18/>.

### Chapter 3: The EU Defense and UAS Situation

- European Union. (2012). Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:12012M/TXT>
- European Defense Agency. (n.d.). Mission and functions. Retrieved from <https://eda.europa.eu/who-we-are/Missionandfunctions>
- European External Action Service. (n.d.). EU Military Committee (EUMC). Retrieved from [https://www.eeas.europa.eu/eeas/eumc\\_en](https://www.eeas.europa.eu/eeas/eumc_en)
- European External Action Service. (n.d.). Common Security and Defense Policy (CSDP). Retrieved from [https://www.eeas.europa.eu/eeas/common-security-and-defense-policy\\_en](https://www.eeas.europa.eu/eeas/common-security-and-defense-policy_en)
- European External Action Service. (n.d.). EU Military Staff (EUMS). Retrieved from [https://www.eeas.europa.eu/eums\\_en](https://www.eeas.europa.eu/eums_en)
- European External Action Service. (n.d.). EU Rapid Deployment Capacity. Retrieved from [https://www.eeas.europa.eu/eeas/eu-rapid-deployment-capacity-0\\_en](https://www.eeas.europa.eu/eeas/eu-rapid-deployment-capacity-0_en)
- European Parliamentary Research Service. (2023). EPRS\_BRI(2023)739294. Retrieved from [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2023\)\\_739294](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)_739294)
- European Commission. (n.d.). ASAP: Boosting defense production. Retrieved from [https://defense-industry-space.ec.europa.eu/eu-defense-industry/asap-boosting-defense-production\\_en](https://defense-industry-space.ec.europa.eu/eu-defense-industry/asap-boosting-defense-production_en)
- European External Action Service. (2023). PESCO: Deepening defense cooperation. Retrieved from

<https://www.eeas.europa.eu/sites/default/files/documents/2023/PESCO-Deepening-defense-cooperarion.pdf>

- Carnegie Endowment for International Peace. (2024). Understanding EU's New Defense Industrial Strategy. Retrieved from <https://carnegieendowment.org/2024/03/08/understanding-eu-s-new-Defense-industrial-strategy-pub-91937>
- Euronews. (2024). Von der Leyen pushes for coordinated EU defense spending. Retrieved from <https://www.euronews.com/my-europe/2024/02/20/von-der-leyen-pushes-for-coordinated-eu-defense-spending>
- European Defense Agency. (2022). Defense data 2022. Retrieved from <https://eda.europa.eu/publications-and-data/brochures/eda-defense-data-2022>
- European Commission. (2023). Towards the State of the Union 2023. Retrieved from <https://ec.europa.eu/stories/towards-state-of-the-union-2023/>
- European Commission. (n.d.). Unmanned Aircraft. Retrieved from [https://defense-industry-space.ec.europa.eu/eu-aeronautics-industry/unmanned-aircraft\\_en](https://defense-industry-space.ec.europa.eu/eu-aeronautics-industry/unmanned-aircraft_en)
- European Commission. (2020). Action plan to improve the protection of public spaces. Retrieved from [https://home-affairs.ec.europa.eu/system/files/2020-09/20171018\\_action\\_plan\\_to\\_improve\\_the\\_protection\\_of\\_public\\_spaces\\_en.pdf](https://home-affairs.ec.europa.eu/system/files/2020-09/20171018_action_plan_to_improve_the_protection_of_public_spaces_en.pdf)
- Publications Office of the European Union. (2019). Publication detail. Retrieved from <https://op.europa.eu/en/publication-detail/-/publication/099d0a3f-01e0-11ea-8c1f-01aa75ed71a1>
- European Commission. (2020). Press corner. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_2326](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2326)
- European Defense Agency. (2022). CARD report. Retrieved from <https://eda.europa.eu/docs/default-source/eda-publications/2022-card-report.pdf>
- European Commission. (2023). Countering the threat of civil drones. Retrieved from [https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/countering-threat-civil-drones-commission-presents-new-measures-2023-10-19\\_en](https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/countering-threat-civil-drones-commission-presents-new-measures-2023-10-19_en)

- Airbus. (n.d.). Eurodrone. Retrieved from <https://www.airbus.com/en/defense/eurodrone>
- European Union. (n.d.). Principles and values. Retrieved from [https://european-union.europa.eu/principles-countries-history/principles-and-values/aims-and-values\\_en](https://european-union.europa.eu/principles-countries-history/principles-and-values/aims-and-values_en)
- Nuclear Threat Initiative. (n.d.). United Nations Groups of Governmental Experts. Retrieved from <https://www.nti.org/education-center/treaties-and-regimes/united-nations-groups-governmental-experts/>
- United Nations Office for Disarmament Affairs. (n.d.). Background on LAWS in the CCW. Retrieved from <https://disarmament.unoda.org/the-convention-on-certain-conventional-weapons/background-on-laws-in-the-ccw/>
- European Commission. (n.d.). A Drone Strategy 2.0 for Europe to foster sustainable and smart mobility. Retrieved from [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13046-A-Drone-strategy-20-for-Europe-to-foster-sustainable-and-smart-mobility\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13046-A-Drone-strategy-20-for-Europe-to-foster-sustainable-and-smart-mobility_en)

## Chapter 4: Policy Recommendations

- European Defense Agency. (2022). CARD report 2022. Retrieved from <https://eda.europa.eu/docs/default-source/eda-publications/2022-card-report.pdf>
- Association for Unmanned Vehicle Systems International. (n.d.). DoD unmanned systems budget report. Retrieved from <https://www.auvsi.org/dod-unmanned-systems-budget-report>
- DroneLife. (2023, January 17). How much will the U.S. Department of Defense spend on drones in 2023? AUVSI's report. Retrieved from <https://dronelife.com/2023/01/17/how-much-will-the-u-s-department-of-defense-spend-on-drones-in-2023-auvsi-report/>
- Defense Scoop. (2023, March 9). White House's fiscal 2024 budget aims to accelerate combat drone development and procurement. Retrieved from <https://Defensescoop.com/2023/03/09/white-houses-fiscal-2024-budget-aims-to-accelerate-combat-drone-development-and-procurement/>
- U.S. News & World Report. (2024, March 5). EU Commission proposes 1.5 billion euro common defense industry package. Retrieved from <https://www.usnews.com/news/world/articles/2024-03-05/eu-commission-proposes-1-5-billion-euro-common-defense-industry-package>
- Defense News. (2024, March 25). Eurodrone program bags fresh round of EU subsidies. Retrieved from <https://www.Defensenews.com/global/europe/2024/03/25/eurodrone-program-bags-fresh-round-of-eu-subsidies/>

- Euronews. (2024, March 21). EU leaders to discuss breaking the defense bond taboo at Brussels summit. Retrieved from <https://www.euronews.com/my-europe/2024/03/21/eu-leaders-to-discuss-breaking-the-defense-bond-taboo-at-brussels-summit>
- European Commission. (n.d.). A modernised EU long-term budget powered by NextGenerationEU. Retrieved from [https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/whats-new\\_en#a-modernised-eu-long-term-budget-powered-by-nextgenerationeu](https://commission.europa.eu/strategy-and-policy/eu-budget/long-term-eu-budget/2021-2027/whats-new_en#a-modernised-eu-long-term-budget-powered-by-nextgenerationeu)

## Chapter 5: Conclusion

- European Commission. (2024). [Speech] 24\_2101. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/speech\\_24\\_2101](https://ec.europa.eu/commission/presscorner/detail/en/speech_24_2101)
- ‘Mortal’ Europe needs to scale up defense, says Macron in keynote speech <https://www.france24.com/en/europe/20240425-macron-to-outline-vision-for-independent-stronger-europe-in-keynote-speech>