

ARTIFICIAL INTELLIGENCE IN THE MILITARY BEYOND LAWS: CONCEPTUAL CLARIFICATIONS AND A FUNCTIONAL APPROACH[♦]

TATEVIK DAVTYAN* 
Yerevan State University

Debates about “lethal autonomous weapon systems” (LAWS) and so-called “killer robots” have dominated legal and ethical discussions of military artificial intelligence over the past decade. Yet contemporary military AI capabilities extend well beyond autonomous weapons, encompassing intelligence, surveillance, and reconnaissance (ISR), command-and-control decision support, cyber operations, logistics, and training. This article maps how “autonomy” and “military AI” have been framed in policy, law, and ethics, and proposes a functional framework aligned with current military practice and emerging AI-enabled operations. It first situates today’s autonomy discourse within a longer trajectory of military automation and delegated control. It then shows how academic and strategic literature has expanded from a LAWS-centered lens toward broader conceptions of algorithmic warfare and AI-enabled defense. Building on this evolution, the article presents a three-axis framework organized by (i) purpose of use, (ii) type of effects, and (iii) role in the decision chain, alongside working definitions of autonomous weapon systems (AWS) and LAWS. It concludes that structuring legal, ethical, and policy analysis around functions, effects, and control modalities—rather than labels alone—better captures the spectrum of military AI and supports coherent governance.

[♦] *This article was funded through a Department of State Public Diplomacy Section grant, and the opinions, findings, and conclusions or recommendations expressed herein are those of the Author and do not necessarily reflect those of the Department of State.*

Սույն հոդվածը պատրաստվել է ԱՄՆ պետդեպարտամենտի Հանրային դիվանագիտության բաժնի կողմից տրամադրված դրամաշնորհի շրջանակում: Հոդվածում արտահայտված կարծիքները, էզրակացությունները և առաջարկությունները պատկանում են հեղինակին և պարտադիր չէ, որ արտացոլեն ԱՄՆ պետդեպարտամենտի դիրքորոշումը:

* **Tatevik Davtyan** – Candidate of Legal Sciences, Associate Professor at YSU Chair of Civil Law, Researcher at the Center for American Studies, Yerevan State University (YSU). Senior Vice President and General Counsel, One Planet Group LLC

Տաթևիկ Դավթյան – իրավաբանական գիտությունների թեկնածու, ԵՊՀ քաղաքացիական իրավունքի ամբիոնի դոցենտ, ԵՊՀ Ամերիկյան հետազոտությունների կենտրոնի հետազոտող, One Planet Group ՍՊԸ-ի ավագ փոխնախագահ և գլխավոր իրավախորհրդատու

Татеви́к Давтя́н – кандидат юридических наук, доцент кафедры гражданского права ЕГУ, научный сотрудник Центра американских исследований ЕГУ, старший вице-президент и главный юрисконсульт One Planet Group LLC

E-mail: t.davtyan@ysu.am ORCID ID: <https://orcid.org/0000-0002-4382-2229>



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Ստացվել է՝ 18.01.2026

Գրախոսվել է՝ 28.04.2026

Հաստատվել է՝ 02.06.2026

© The Author(s) 2026

Key words: *military AI; lethal autonomous weapon systems (LAWS); autonomous weapon systems (AWS); algorithmic warfare; international humanitarian law (IHL); meaningful human control; cyber operations; decision support; autonomy*

1. Introduction

Over the past decade, debates about artificial intelligence in warfare have been dominated by concerns over “lethal autonomous weapon systems” (LAWS) and the specter of so-called “killer robots.”¹ Legal, ethical, and policy discussions—particularly those conducted under the framework of the Convention on Certain Conventional Weapons (CCW)—have often centered on whether, and under what conditions, machines may be permitted to select and engage targets without direct human intervention.² This focus has played an important agenda-setting role, foregrounding issues of human control, accountability, and compliance with international humanitarian law (IHL).³ At the same time, it has tended to narrow the analytical lens through which military uses of AI are understood. Contemporary military AI capabilities extend far beyond fully autonomous weapon systems. Today, algorithmic and machine-learning systems are deployed across the defense lifecycle, including intelligence, surveillance, and reconnaissance (ISR); command-and-control decision support; logistics and sustainment; cyber and information operations; training and simulation; and force protection.⁴ Many of these systems are non-lethal and non-kinetic at the point of use. Yet, they may shape targeting decisions, escalation dynamics, and humanitarian outcomes in ways that are legally and ethically consequential.⁵ As a result, an exclusive or near-exclusive focus on LAWS risks obscuring the broader transformation of military practice driven by AI-enabled systems.

This article argues that debates about “military AI” require a more precise and functionally grounded conceptual vocabulary than that provided by the dominant LAWS framing. Rather than treating autonomy as a monolithic or binary property or treating

¹ See **Peter Asaro**, *On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-Making*, 94 *Int'l Rev. Red Cross* 687 (2012); **Rebecca Crootof**, *The Killer Robots Are Here: Legal and Policy Implications*, 36 *Cardozo L. Rev.* 1837 (2014).

² See Convention on Certain Conventional Weapons (CCW), Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, *Final Report*, U.N. Doc. CCW/GGE.1/2019/3 (Sept. 25, 2019).

³ See **Jack M. Beard**, *Autonomous Weapons and Human Responsibilities*, 45 *Geo. J. Int'l L.* 617 (2014); **Ingvild Bode**, *Practice-Based and Public-Deliberative Normativity: Retaining Human Control over the Use of Force*, 29 *Eur. J. Int'l Rel.* 753 (2023); **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, 34 *Phil. & Tech.* 439 (2021).

⁴ See **Ingvild Bode & Tom F. A. Watts**, *Algorithmic Warfare: Taking Stock of a Research Programme*, 37 *Global Soc'y* 1 (2023); **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence* (Oxford Univ. Press 2024); **Shawn Wasilow & Jason Thorpe**, *Artificial Intelligence, Robotics, Ethics, and the Military: A Canadian Perspective*, 40 *AI Mag.* 47 (2019); **Jeroen G. W. C. Schraagen**, *Responsible Use of AI in Military Systems: Prospects and Challenges*, *Ergonomics* (2023).

⁵ See **Mariarosaria Taddeo & Luciano Floridi**, *Regulate Artificial Intelligence to Avert Cyber Arms Race*, 556 *Nature* 296 (2018); **Forrest E. Morgan et al.**, *Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World* (RAND Corp. 2020); **William N. Caballero & Phillip R. Jenkins**, *On Large Language Models in National Security Applications*, *Stat* (2024).

military AI as synonymous with autonomous weapons, the article advances a functional analytical framework that aligns legal and ethical analysis with how contemporary military organizations actually design, deploy, and govern AI-enabled capabilities.⁶ The article makes three main contributions.

First, it situates current debates within a longer historical trajectory of military automation, showing that delegated control over guidance, targeting, and engagement functions long predates contemporary AI and machine learning. From Cold War–era cruise missiles and remotely piloted aircraft to naval close-in weapon systems, militaries have relied on systems that execute critical functions once activated, under predefined constraints.⁷ Understanding this lineage is essential for avoiding inflated or misleading claims about the novelty of autonomy in warfare. Second, the article traces how the LAWS debate emerged from civil society advocacy and multilateral arms control processes, and how academic and strategic discourse has since expanded toward broader conceptions of “military AI” and “algorithmic warfare.”⁸ It shows that recent doctrinal documents and scholarly work increasingly treat AI as a cross-cutting enabler across kinetic and non-kinetic domains—rather than as a feature of weapons alone—encompassing ISR, decision support, logistics, cyber operations, and information activities.⁹ Third, drawing on this literature, the article presents a functional framework for analyzing military AI. It organizes military AI according to three analytically distinct dimensions: (i) purpose of use, (ii) type of effects, and (iii) role in the decision chain, assessed alongside applicable modalities of human control.¹⁰ Within this framework, the article adopts and operationalizes working definitions of autonomous weapon systems (AWS) and lethal autonomous weapon systems (LAWS) from the literature to clarify their relationship to broader categories of military AI, while remaining sensitive to

⁶ See **Alan L. Schuller**, *At the Crossroads of Control: The Intersection of Artificial Intelligence in Autonomous Weapon Systems with International Humanitarian Law*, 95 *Int'l L. Stud.* 437 (2019); **Marc C. Canellas & Rachel A. Haga**, *Toward Meaningful Human Control of Autonomous Weapons Systems Through Function Allocation*, in **2015 IEEE Int'l Symp. on Tech. & Soc'y (ISTAS)** 1 (2015); **Mariarosaria Taddeo & Alexander Blanchard**, *A Comparative Analysis of the Definitions of Autonomous Weapons Systems*, 28 *Sci. & Eng'g Ethics* 10 (2022).

⁷ See **Kenneth Anderson & Matthew C. Waxman**, *Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can* (2013); **Michael W. Meier**, *Lethal Autonomous Weapons Systems*, in *Complex Battlespaces* (Christopher M. Ford & Winston S. Williams eds., 2018); **Marco Sassòli**, *Autonomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified*, 90 *Int'l L. Stud.* 308 (2014); **Tim McFarland**, *Autonomous Weapon Systems and the Law of Armed Conflict* (Cambridge Univ. Press 2020).

⁸ See **Asaro**, supra note 1; **Noel Sharkey**, *The Evitability of Autonomous Robot Warfare*, 94 *Int'l Rev. Red Cross* 787 (2012); **Crootof**, supra note 1; CCW GGE *Final Report*, supra note 2.

⁹ See **Bode & Watts**, supra note 4; **Ingvild Bode et al.**, *Prospects for the Global Governance of Autonomous Weapons: Comparing Chinese, Russian, and U.S. Practices*, **Ethics & Info. Tech.** (2023); **Taddeo**, *Ethics of Artificial Intelligence in Defence*, supra note 4; NATO, *NATO Artificial Intelligence Strategy* (Oct. 22, 2021); **Brian Haney**, *Applied Artificial Intelligence in Modern Warfare and National Security Policy* (2019).

¹⁰ See **Schuller**, supra note 6; **Taddeo & Blanchard**, supra note 6; **S. Kate Devitt**, *Normative Epistemology for Lethal Autonomous Weapons Systems*, in *Lethal Autonomous Weapons: Re-Examining the Law and Ethics of Robotic Warfare* (Oxford Univ. Press 2020).

variations in human control and the delegation of decision-making authority across different roles in the decision chain and operational contexts.¹¹

Following the Introduction, the article traces, in Section 2, the historical evolution of military automation and the emergence of autonomy as a policy-relevant concept. Section 3 examines the rise of the LAWS debate in civil society advocacy and multilateral governance forums. Section 4 situates LAWS within the broader shift toward military AI and algorithmic warfare. Section 5 introduces the functional framework and elaborates on its three axes. The conclusion argues that legal, ethical, and policy debates will be more coherent and effective if they move beyond contested labels and instead focus on functions, effects, and control modalities across the full spectrum of military AI.

The article does not purport to provide a comprehensive legality assessment of every category of military AI under international humanitarian law or international human rights law. Nor does it argue that any particular class of systems is *per se* lawful or unlawful. Instead, its aim is conceptual and structural: to develop a vocabulary and analytical framework that makes such legality assessments more tractable, comparable, and operationally meaningful. Questions of ultimate legality are therefore treated as context-dependent and system-specific, to be assessed through established mechanisms such as Article 36 weapons reviews, rules of engagement, and responsibility and accountability doctrines, with the framework proposed here serving as an organizing tool rather than a substitute for substantive legal analysis.¹²

Although this article advances a conceptual framework, it is grounded in—and intended to be usable within—existing legal and institutional architectures. Its analysis is anchored in primary sources, including Article 36 of Additional Protocol I, which requires States Parties to determine, in the study, development, acquisition, or adoption of a new weapon, means, or method of warfare, whether its employment would be prohibited under international law;¹³ the U.S. Department of Defense Directive 3000.09, which defines “autonomous” and “semi-autonomous” weapon systems by reference to functions they may perform “once activated” and sets policy conditions for their

¹¹ See **Taddeo & Blanchard**, *supra* note 6 (proposing a value-neutral comparative definition of autonomous weapon systems structured around autonomy, adaptivity, human control, and purpose of use); **Crootof**, *supra* note 1 (advancing a functional definition of autonomous weapon systems grounded in the law of armed conflict).

¹² See generally Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I) art. 36, June 8, 1977, 1125 U.N.T.S. 3 [hereinafter **Additional Protocol I**] (obligating States Parties to review new weapons, means, and methods of warfare); U.S. Dep’t of Def., Dir. 3000.09, *Autonomy in Weapon Systems* (Nov. 21, 2012) (incorporating Change 2, May 8, 2017) (establishing policy and review requirements for autonomous and semi-autonomous weapon systems); Jack M. Beard, *Autonomous Weapons and Human Responsibilities*, 45 **Geo. J. Int’l L.** 617 (2014) (analyzing responsibility and accountability concerns raised by autonomous weapon systems).

¹³ See Additional Protocol I, *supra* note 12, art. 36 (“In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.”).

development and use;¹⁴ the mandate and reports of the CCW Group of Governmental Experts on LAWS, which frame multilateral debate around human responsibility, human–machine interaction, and IHL compliance;¹⁵ the ICRC’s articulation of autonomy in the “critical functions” of weapons, linking technological design directly to the principles of distinction, proportionality, and precautions in attack;¹⁶ and NATO’s Artificial Intelligence Strategy, which treats AI as a cross-cutting enabler across Alliance activities rather than a weapons-only concern.¹⁷ These sources collectively reflect how states and institutions already conceptualize, govern, and review AI-enabled military capabilities, and they provide the normative and institutional baseline against which the framework proposed here is intended to operate.

2. From “unmanned” and “automatic” to “autonomous weapon systems.”

Early technical and doctrinal discussions about technology in warfare typically revolved around ‘unmanned’ (remotely piloted) and ‘automatic’ (rule-governed) systems, long before ‘autonomy’ became associated with contemporary artificial intelligence and machine learning.¹⁸ By the mid-twentieth century and into the early Cold War, militaries deployed systems that were either piloted at a distance or executed significant portions of a mission once activated, with limited continuous human input during terminal phases¹⁹. Historical work on unmanned aircraft and early ‘aerial torpedoes’ traces an operational continuity from radio-controlled targets and pilotless bombs to later generations of unmanned and remotely piloted aircraft, highlighting pre-programmed flight paths and engagement rules with little real-time human control over

¹⁴ See U.S. Dep’t of Def., Dir. 3000.09, *Autonomy in Weapon Systems* 13–14 (Nov. 21, 2012) (incorporating Change 2, May 8, 2017) (defining “autonomous weapon system” as “a weapon system that, once activated, can select and engage targets without further intervention by a human operator,” distinguishing “semi-autonomous weapon systems,” and prescribing approval and design requirements).

¹⁵ See, e.g., Convention on Certain Conventional Weapons, Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, *Report of the 2019 Session*, U.N. Doc. CCW/GGE.1/2019/3 (Sept. 25, 2019) (emphasizing human responsibility, IHL compliance, and human–machine interaction in relation to the critical functions of weapons); Convention on Certain Conventional Weapons, Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, *Report of the 2021 Session*, U.N. Doc. CCW/GGE.1/2021/CRP.2 (Dec. 3, 2021).

¹⁶ See Int’l Comm. of the Red Cross, *Views of the ICRC on Autonomous Weapon Systems* 2–4 (Nov. 2016) (identifying the “critical functions” of selecting and attacking targets as the focal point for legal and ethical analysis); Int’l Comm. of the Red Cross, *Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons* 7–12 (2016) (linking increasing autonomy in critical functions to the IHL principles of distinction, proportionality, and precautions in attack).

¹⁷ See N. Atl. Treaty Org., *NATO’s Artificial Intelligence (AI) Strategy* 2–4 (Oct. 22, 2021) (presenting AI as a cross-cutting, “game-changing” enabler across NATO activities, including situational awareness, decision-making, logistics, and force protection).

¹⁸ See **John F. Keane & Stephen S. Carr**, *A Brief History of Early Unmanned Aircraft*, 32 **Johns Hopkins APL Tech. Dig.** 558, 558–71 (2013); **John A. Blom**, *Unmanned Aerial Systems: A Historical Perspective* (Combat Stud. Inst. Press 2010).

¹⁹ See **Vasile Prisacariu**, *The History and the Evolution of UAVs from the Beginning till the 70s*, 8 **J. Def. Resources Mgmt.** 181, 181–89 (2017).

terminal actions.²⁰ These systems established an enduring operational template: humans assign the mission or authorize activation, while the machine increasingly performs guidance, navigation, tracking, and engagement functions.

Cold War–era cruise missiles exemplified high levels of automated mission execution. Systems such as the U.S. Tomahawk relied on sophisticated onboard guidance and terminal logic: early variants combined inertial navigation with terrain-contour matching (TERCOM), while later versions added Digital Scene-Matching Area Correlation (DSMAC) for terminal guidance²¹. This allowed strike sequences to unfold without continuous “hands-on” control after launch. Likewise, remotely piloted aircraft evolved from radio-controlled targets into operational reconnaissance and strike-support platforms, executing pre-programmed flight paths and control logic while retaining human direction in mission planning and tasking.²²

Naval point-defense systems became particularly salient precedents in later debates over autonomy. The U.S. Navy’s Phalanx Close-In Weapon System (CIWS), when operating in certain modes, can autonomously search for, detect, track, and engage incoming threats within predefined parameters once activated, effectively closing the sensor-to-shooter loop at machine speed²³. Although such systems operate through deterministic engagement logic rather than learning or adaptive algorithms, their operational reality—delegated engagement authority under constrained rules—has been widely treated as a key precedent in later conceptual and legal debates over autonomy in weapon systems.²⁴

A major policy inflection point came with the U.S. Department of Defense’s formal adoption of an “autonomy” taxonomy in DoD Directive 3000.09.²⁵ That directive defines an autonomous weapon system (AWS), in essence, as a weapon system that, once activated, can select and engage targets without further operator intervention, and it distinguishes such systems from semi-autonomous and human-supervised autonomous systems for purposes of design, authorization, and legal review.²⁶ Subsequent conceptual

²⁰ See **John F. Keane & Stephen S. Carr**, *A Brief History of Early Unmanned Aircraft*, 32 **Johns Hopkins APL Tech. Dig.** 558, 558–71 (2013); John A. Blom, *Unmanned Aerial Systems: A Historical Perspective* (Combat Stud. Inst. Press 2010).

²¹ See **Kenneth P. Werrell**, *The Evolution of the Cruise Missile* (Air University Press 1985).

²² See **Thomas P. Ehrhard**, *Air Force UAVs: The Secret History* (Mitchell Inst. 2010); see also **Blom**, *supra* note 20; **Keane & Carr**, *supra* note 20.

²³ See U.S. Navy, *MK 15 – Phalanx Close-In Weapon System (CIWS) Fact File* (last updated Sept. 20, 2021); Ronald O’Rourke, *Navy Shipboard Lasers and the Phalanx Close-In Weapon System (CIWS)*, Cong. Research Serv. R45098 (2020).

²⁴ See, e.g., **Jacquelyn Schneider & Julia Macdonald**, *The Rise of Unmanned Technologies*, in *The Hand Behind Unmanned: Origins of the U.S. Autonomous Military Arsenal* (Oxford Univ. Press 2025).

²⁵ On DoD Directive 3000.09 as a turning point in U.S. autonomy policy, see **Mariarosaria Taddeo and Luciano Floridi**, “Regulate Artificial Intelligence to Avert Cyber Arms Race,” *Nature* (2018). Michael W. Meier, “Lethal Autonomous Weapons Systems,” in *Complex Battlespaces* (2018). Tim McFarland, *Autonomous Weapon Systems and the Law of Armed Conflict* (2020). Ronald C. Arkin, “Lethal Autonomous Systems and the Plight of the Non-combatant” (2013).

²⁶ See **Mariarosaria Taddeo & Luciano Floridi**, *Regulate Artificial Intelligence to Avert Cyber Arms Race*, 556 *Nature* 296 (2018); **Michael W. Meier**, *Lethal Autonomous Weapons Systems*, in *Complex Battlespaces* (Christopher M. Ford & Winston S. Williams eds., 2018); **Tim McFarland**, *Autonomous Weapon Systems and the Law of Armed Conflict* (Cambridge Univ. Press 2020).

work treats the DoD definition as a central reference point in the broader definitional landscape: Crootof and others show how it captures currently fielded systems and shapes treaty debates²⁷, while Taddeo and Blanchard’s comparative analysis of twelve official AWS definitions uses the DoD formulation as one of the primary data points in developing a more value-neutral, four-dimensional definition—autonomy, adaptivity, human control, and purpose of use—intended to support governance and ethical analysis.²⁸ Collectively, these moves frame “autonomy” not as science-fiction agency, but as a specific pattern of delegated targeting functions after activation—a framing that continues to influence U.S. doctrine and many international discussions on AWS and LAWS.²⁹

3. The rise of the “LAWS” debate: from advocacy framing to multilateral governance.

3.1. Advocacy and Multilateral Institutionalization

The contemporary legal and political debate was energized in the early 2010s by civil society advocacy—most prominently Human Rights Watch’s 2012 report, *Losing Humanity: The Case Against Killer Robots*, co-authored with Harvard Law School’s International Human Rights Clinic.³⁰ The report helped popularize the “killer robots” frame, defined “fully autonomous weapons” as systems that could select and engage targets without human intervention, and argued that, in their view, delegating life-and-death decisions to machines would violate core requirements of international humanitarian law (IHL)—especially distinction, proportionality, and precautions in attack—as well as fundamental human rights protections.³¹ It also fed directly into the launch of the Campaign to Stop Killer Robots and informed the 2013 report of the UN Special Rapporteur on extrajudicial, summary or arbitrary executions, which called on states to address emerging autonomous weapons in multilateral fora.³² This advocacy built on and interacted with earlier academic calls for prohibition grounded in IHL and

²⁷ See **Rebecca Crootof**, *The Killer Robots Are Here: Legal and Policy Implications*, 36 **Cardozo L. Rev.** 1837 (2014); **史生 新保 (Shinbo)**, *Lethal Autonomous Weapon Systems (LAWS) Confronting the Robot Law Perspectives*, **IEICE ESS Fundamentals Rev.** (2020).

²⁸ See **Mariarosaria Taddeo & Alexander Blanchard**, *A Comparative Analysis of the Definitions of Autonomous Weapons Systems*, 28 **Sci. & Eng’g Ethics** 10 (2022).

²⁹ See **Kenneth Anderson & Matthew C. Waxman**, *Law and Ethics for Autonomous Weapon Systems: Why a Ban Won’t Work and How the Laws of War Can* (2013); **Taddeo & Floridi**, *supra* note 5; **Taddeo & Blanchard**, *supra* note 6; **Pavel Sharikov**, *International Regulations of Lethal Autonomous Weapons Systems: Transatlantic Security Dialogue*, **World Econ. & Int’l Rel.** (2024); **Ingvild Bode et al.**, *Prospects for the Global Governance of Autonomous Weapons: Comparing Chinese, Russian, and U.S. Practices*, **Ethics & Info. Tech.** (2023).

³⁰ See Human Rights Watch & Harvard Law Sch. Int’l Human Rights Clinic, *Losing Humanity: The Case Against Killer Robots* (2012); *see also* Campaign to Stop Killer Robots, *About Us* (n.d.); **Christof Heyns**, Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, U.N. Doc. A/HRC/23/47 (2013).

³¹ *Id.*

³² *Id.*

human rights law,³³ and with legal analyses emphasizing that certain defensive systems already exhibited functionally autonomous targeting behavior.³⁴

In parallel, the International Committee of the Red Cross (ICRC) pushed debate toward a more legally operational lens by proposing that states focus on autonomy in the “critical functions” of weapons—above all, whether a system can independently select and attack targets without human intervention, rather than on general labels such as “artificial intelligence”³⁵. In its 2016 statement to the CCW Meeting of Experts on LAWS and its 2017 report *Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons*, the ICRC used this “critical functions” notion to link discussions of autonomy directly to IHL targeting obligations concerning distinction, proportionality, and precautions in attack, and to the requirement that decisions to kill or destroy remain a human responsibility.³⁶ At the multilateral level, states first brought the issue formally into the framework of the Convention on Certain Conventional Weapons (CCW) when the CCW High Contracting Parties agreed in 2013 to convene an informal Meeting of Experts on “lethal autonomous weapons systems” (LAWS) which met in Geneva in May 2014. Additional informal expert meetings followed in 2015 and 2016. Building on these, the CCW’s Fifth Review Conference in December 2016 established an open-ended Group of Governmental Experts (GGE) on emerging technologies in the area of LAWS, which held its first session in November 2017.³⁷ The GGE’s mandate explicitly focuses on “emerging technologies in the area of lethal autonomous weapons systems,” rather than revisiting the legality of all existing automated or defensive systems, a framing that has shaped subsequent discussions of scope and state obligations. The CCW meetings of experts and the GGE have not adopted a binding definition of “lethal autonomous weapons systems.”³⁸ Nonetheless, their work has repeatedly centered on three interrelated clusters of issues: (i) the degree and kind of autonomy that might be acceptable in the critical functions of selecting and attacking targets; (ii) how to retain sufficient human judgment, control, and responsibility in decisions to use force; and (iii) whether existing IHL, together with national legal weapons-review procedures under Article 36 of Additional Protocol I, provides an

³³ See **Peter Asaro**, *On Banning Autonomous Weapon Systems*, supra note 1; **Aaron M. Johnson & Seth Axinn**, *The Morality of Autonomous Robots*, **J. Mil. Ethics** (2013); **Robert Sparrow**, *Killer Robots*, in *Political Minefields* (2019).

³⁴ See **Rebecca Crootof**, supra note 1; **Marco Sassòli**, *Autonomous Weapons and International Humanitarian Law*, supra note 7; **Jack M. Beard**, *Autonomous Weapons and Human Responsibilities*, supra note 3.

³⁵ See Int’l Comm. of the Red Cross, *Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons* (2017); Int’l Comm. of the Red Cross, *Autonomous Weapons: Decisions to Kill and Destroy Are a Human Responsibility*, Statement to the CCW Meeting of Experts on LAWS (Apr. 11, 2016).

³⁶ *Id.*

³⁷ See U.N. Off. at Geneva, *CCW Group of Governmental Experts on Lethal Autonomous Weapons Systems to Meet Next Week*, Press Release (Nov. 10, 2017); U.N. Off. for Disarmament Affs., *Timeline of LAWS in the CCW* (n.d.); see also **Shinbo**, supra note 27; **Bode et al.**, supra note 29.

³⁸ See U.N. GGE on Lethal Autonomous Weapons Sys., *Report of the 2017 Session*, U.N. Doc. CCW/GGE.1/2017/CRP.1 (2017); Int’l Comm. of the Red Cross, *Autonomous Weapons: Decisions to Kill and Destroy Are a Human Responsibility*, supra note 36; Council of the Eur. Union, *EU Statement on Lethal Autonomous Weapon Systems*, Statement to the CCW GGE on LAWS (Apr. 9, 2018).

adequate framework for emerging systems or whether new normative instruments are required³⁹. Over time, “LAWS” has become the dominant term of art in these multilateral arms-control and governance debates—used in CCW mandates, GGE documents, and state statements—while its precise boundaries and relationship to broader notions such as “autonomous weapon systems” (AWS) and “military AI” remain contested. The definitional content and legal significance of terms such as AWS and LAWS are analyzed further in Section 6 of this article.

3.2 Definitional convergence and limits in the AWS/LAWS literature

Debates over autonomous weapon systems (AWS) and lethal autonomous weapon systems (LAWS) have long been marked by inconsistent terminology across states, international organizations, and scholars. In response, a substantial body of literature has sought to clarify definitions and assess their legal significance.⁴⁰ Comparative analyses nonetheless reveal increasing convergence around a limited set of governance-relevant variables. Most notably, Taddeo and Blanchard’s review of official definitions⁴¹ adopted by states and international organizations—including the ICRC, NATO, and the U.S. Department of Defense—identifies recurring emphasis on: (i) autonomy in critical functions, particularly target selection and engagement without real-time human intervention; (ii) the degree and form of human control retained; (iii) the system’s intended purpose, especially whether it is designed to employ lethal force; and, in some definitions, (iv) adaptivity or learning, though this is not treated as a necessary condition for autonomy.⁴²

Functional definitions in legal scholarship similarly stress that many existing systems already fall within broad AWS formulations.⁴³ Crotoof’s widely cited definition, for example, highlights that weapon systems capable of independently selecting and engaging targets after activation—such as certain defensive systems—qualify as AWS, challenging narratives that treat autonomy as purely a future concern.⁴⁴ Authority-based approaches further argue that the central legal question is not whether a system is labeled “autonomous,” but which targeting and engagement authorities are delegated to it in

³⁹ *Id.*

⁴⁰ See **Rebecca Crotoof**, supra note 1; **Noel Sharkey**, supra note 8; **Tim McFarland**, supra note 7; **Taddeo & Blanchard**, supra note 6; **Ahmad Khalil et al.**, supra note 68 (surveying persistent definitional fragmentation across states, international organizations, and scholarly literature on AWS and LAWS).

⁴¹ See **Mariarosaria Taddeo & Alexander Blanchard**, *A Comparative Analysis of the Definitions of Autonomous Weapon Systems*, supra note 6 (reviewing twelve official definitions adopted by states and international organizations, including the ICRC, NATO, and the U.S. Department of Defense, and identifying recurring emphasis on autonomy in critical functions, the degree of human control, purpose of use (including lethality), and, in some definitions, adaptivity—while stressing that machine learning is not a necessary condition for autonomy).

⁴² See **Taddeo & Blanchard**, supra note 6.

⁴³ See **Yucel et al.**, *Drones, Bots, and the Law*, supra note 72 (emphasizing that “autonomous weapon systems” denote a category of weapon systems rather than “AI” in general, and that AWS may or may not rely on advanced machine-learning techniques).

⁴⁴ See **Rebecca Crotoof**, *The Killer Robots Are Here*, supra note 1; *id.* (arguing that functional definitions of AWS encompass some existing systems, including certain defensive configurations such as CIWS, thereby undermining claims that autonomous weapons are purely speculative or future technologies).

practice, under what constraints, and in what operational context.⁴⁵ Within this broader category, LAWS are generally understood as a subset of AWS whose autonomous functions can directly produce lethal or physically destructive effects. Recent work has sought to refine this category by distinguishing earlier rule-based systems from contemporary machine-learning-enabled systems, emphasizing properties such as opacity, brittleness under domain shift, and susceptibility to adversarial manipulation.⁴⁶

Taken together, this literature demonstrates both convergence and limitation: while definitions increasingly align around autonomy in critical targeting functions and lethal effects, they remain ill-suited to capture non-weapon AI systems, non-kinetic effects, and the downstream coupling of decision-support tools into lethal decisions. This gap sets the stage for the broader conception of military AI developed in Section 4 and the functional framework introduced in Section 5.

4. From “LAWS” to “military AI” and “algorithmic warfare.”

By the late 2010s, scholars and policymakers increasingly reframed military AI as a broader transformation driven by algorithmic and machine-learning systems across defense organizations. Recent work explicitly traces this move from a weapons-centered focus to broader framings of “algorithmic warfare” and “AI in defense,” emphasizing that contemporary military AI capabilities extend well beyond fully autonomous weapon systems.⁴⁷ In this broader framing, military AI is best understood as an umbrella term for algorithmic or AI-enabled systems deployed across the defense lifecycle, including intelligence, surveillance and reconnaissance (ISR), data fusion and analytics, decision support for command and control (C2), cyber operations, logistics and sustainment, training and simulation, border and maritime security, and targeting pipelines.⁴⁸ The U.S. Department of Defense’s Algorithmic Warfare Cross Functional Team (“Project Maven”), established in 2017 to apply machine learning to ISR imagery and video to

⁴⁵ See **Alan L. Schuller**, *At the Crossroads of Control*, *supra* note 6 (arguing that evaluation of autonomy should focus on the combination of authorities delegated to the computer controlling the weapon system, given its capabilities and operational context); see also **Marc C. Canellas & Rachel A. Haga**, *supra* note 6; **S. Kate Devitt**, *supra* note 10; **Maathuis & Cools**, *supra* note 64 (developing function-allocation and control-mode approaches connecting autonomy to rules of engagement and operational doctrine).

⁴⁶ See **Tim McFarland**, *supra* note 7; **Afonso Seixas Nunes**, *supra* note 55; **Nehal Bhuta et al.**, *Autonomous Weapons and International Law* (2016) (distinguishing rule-based automated systems from more context-sensitive autonomous systems and stressing responsibility-relevant control); see also **Edward Hunter Christie et al.**, *supra* note 67; **史生 新保 (Shinbo)**, *supra* note 27; **Ahmad Khalil et al.**, *supra* note 68; **Simmons-Edler et al.**, *Human-AI Interaction in Military Systems* (2025) (proposing “AI-powered LAWS” to reflect technical properties of contemporary ML systems, including opacity, brittleness, and adversarial vulnerability).

⁴⁷ See **Ingvild Bode et al.**, *Algorithmic Warfare: Taking Stock of a Research Programme*, 38 *Global Soc’y* 1 (2024); **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence* (Oxford Univ. Press 2024); **Forrest E. Morgan et al.**, *Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World* (RAND Corp. 2020).

⁴⁸ See **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence*, *supra* note 4; **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, 34 *Phil. & Tech.* 439 (2021); **Bode et al.**, *supra* note 41; **Mathias Anneken et al.**, *Ethical Considerations for the Military Use of Artificial Intelligence in Visual Reconnaissance*, *arXiv* (2025).

support human analysts and inform targeting and operational prioritization, is frequently cited as a paradigmatic example of this wider shift.⁴⁹

Strategic documents reflect this expansion. NATO's Artificial Intelligence Strategy describes AI as a "strategic enabler" and "cross-cutting" technology across the spectrum of Alliance activities, not merely in weapons development, and commits Allies to integrating AI into capability development, operations, resilience, and support functions.⁵⁰ Scholars further emphasize that contemporary systems often rely on non-deterministic, machine-learning-based algorithms rather than solely on deterministic, rule-based automation, thereby reducing predictability and complicating legal and ethical assessment, particularly with respect to foreseeability, explainability, and accountability under international humanitarian law (IHL).⁵¹

In parallel, Mariarosaria Taddeo's monograph, *The Ethics of Artificial Intelligence in Defense*, conceptualizes "AI in defense" as a family of uses rather than a single technology. She treats AI as spanning sustainment and support (for example, logistics and intelligence analysis), adversarial non-kinetic operations (such as cyber and information operations), and adversarial kinetic uses, including autonomous weapon systems.⁵² This functional, activity-based understanding is echoed and operationalized in Taddeo et al.'s article on ethical principles for AI in national defense, which proposes a principled framework explicitly designed to cover this spectrum of defense use cases.⁵³ Other broad surveys follow the same logic. Morgan et al. analyze "military applications of AI" across the United States, China, and Russia, including targeting, logistics, cyber operations, strategic planning, and decision support, treating "military AI" as a cluster of applications rather than a narrow technical subfield.⁵⁴ Wasilow and Thorpe develop an ethical assessment framework for emerging AI and robotics technologies for the Canadian Armed Forces, effectively delineating the kinds of technologies that defense planners and scientists treat as part of "military AI and robotics."⁵⁵ Joseph Chapa argues that while the causes of AI failures (such as biased data, opacity, or lack of robustness) are often similar across civilian and military domains, the stakes and consequences of those failures are very different in defense settings -again presupposing a broad category of "military AI" that includes both lethal and non-lethal systems.⁵⁶ Policy-oriented work adopts a similar scope. Taddeo and Floridi analyze AI-enabled cyber operations and warn of an AI-driven cyber arms race, explicitly identifying autonomous and AI-assisted

⁴⁹ See **Robert O. Work**, Deputy Sec'y of Def., *Establishment of an Algorithmic Warfare Cross-Functional Team (Project Maven)*, Memorandum (Apr. 26, 2017); **Bode et al.**, supra note 41, at 8–10.

⁵⁰ See N. Atl. Treaty Org., *Summary of the NATO Artificial Intelligence Strategy* (Oct. 22, 2021).

⁵¹ See **Bode et al.**, supra note 41; **Jeroen Kwik & Tom van Engers**, *Algorithmic Fog of War: When Lack of Transparency Violates the Law of Armed Conflict*, 1 **J. Future Robot Life** 53 (2021).

⁵² See **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence*, supra note 4.

⁵³ See **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, supra note 42.

⁵⁴ See **Forrest E. Morgan et al.**, *Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World*, supra note 41.

⁵⁵ See **Shawn Wasilow & Jason Thorpe**, *Artificial Intelligence, Robotics, Ethics, and the Military: A Canadian Perspective*, 40 **AI Mag.** 47 (2019).

⁵⁶ See **Joseph Chapa**, *Military AI Ethics*, 23 **J. Mil. Ethics** 1 (2024).

cyber tools as part of the military AI problem space.⁵⁷ Anneken et al. focus on AI-enabled visual reconnaissance, treating it as a non-lethal, non-kinetic decision support function that nonetheless raises serious questions about traceability, proportionality, governability (human override and control), and reliability in military practice.⁵⁸ Roberts and Venables likewise argue that legal and ethical debate has disproportionately focused on LAWS and human control, while under analyzing AI in ISR and information operations that shape kinetic targeting decisions.⁵⁹

These works converge on a functional, domain-oriented understanding in which “military AI” is defined not by a particular algorithmic technique, but by the role a system plays within military organizations and operations. Building on this literature, this article adopts the following working definition: *military AI refers to AI-based systems, including algorithmic and machine-learning systems, that are developed, adapted, or deployed by state militaries or defense organizations to support or perform functions across the defense lifecycle. These functions include, but are not limited to, intelligence, surveillance, and reconnaissance (ISR); targeting and engagement; command and control and decision support; cyber operations; electronic warfare; logistics and sustainment; training and simulation; and border or force protection.* The definition is intentionally activity-based rather than tied to a specific subfield of AI, reflecting the practice-oriented characterizations found in contemporary literature.⁶⁰

5. A Functional Framework Beyond Weapons Labels

5.1. Framing the Functional Approach

The previous sections have shown how contemporary debates about “military AI” emerged from, and remain strongly shaped by, the arms-control and advocacy framing of lethal autonomous weapon systems (LAWS). That framing has been central to placing human control, accountability, and compliance with international humanitarian law (IHL) at the core of multilateral discussions under the Convention on Certain Conventional Weapons (CCW) and related fora. At the same time, a LAWS-centric lens maps only imperfectly onto the full range of AI-enabled capabilities now used across militaries—including ISR analytics, C2 decision-support, cyber and information operations, and logistics and sustainment systems—many of which are not “weapons” in any conventional sense, yet can still generate or shape legally consequential effects.

This Section addresses that mismatch by proposing a functional framework that allows legal and policy analysis to track what systems do—and how they are embedded in operational processes—rather than turning primarily on contested labels. Debates over

⁵⁷ See **Mariarosaria Taddeo & Luciano Floridi**, *Regulate Artificial Intelligence to Avert Cyber Arms Race*, supra note 5, at 296–98.

⁵⁸ See **Mathias Anneken et al.**, *Ethical Considerations for the Military Use of Artificial Intelligence in Visual Reconnaissance*, arXiv (2025).

⁵⁹ See **Anastasia Roberts & A. Venables**, *The Role of Artificial Intelligence in Kinetic Targeting from the Perspective of International Humanitarian Law*, in *Proc. 13th Int’l Conf. on Cyber Conflict (CyCon): Going Viral* 43 (NATO Coop. Cyber Def. Ctr. of Excellence 2021).

⁶⁰ See **Ingvild Bode et al.**, *Algorithmic Warfare: Taking Stock of a Research Programme*, supra note 41; **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence*, supra note 4; **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, supra note 42; **Forrest E. Morgan et al.**, *Military Applications of Artificial Intelligence*, supra note 41; **Anneken et al.**, supra note 52.

“autonomous weapon systems” (AWS), “LAWS,” “autonomous” systems, or “human-on-the-loop” architectures often compress several governance-relevant questions into a single term: (i) the system’s operational purpose within the force; (ii) the types of effects it directly generates or reliably enables (including non-kinetic and downstream effects); and (iii) where, in the decision chain, authority is exercised and by whom⁶¹. Each of these dimensions can independently shape IHL compliance, escalation risk, and accountability analysis, whether the system is formally classified as a “weapon” or not.⁶² Conflating these dimensions risks two recurring distortions. First, it can under-regulate non-weapon or “upstream” systems—such as ISR classifiers, targeting decision-support tools, or cyber capabilities—that structure or heavily influence targeting decisions, precisely because they are not captured by narrow LAWS definitions.⁶³ Second, it can encourage over-generalization from weapon paradigms to domains where “autonomy” has a different functional meaning (for example, autonomous cyber tools, triage systems for imagery analysis, or large-language-model-based decision-support systems).⁶⁴

The framework developed here is therefore designed as an organizing instrument for legal review and governance rather than a substitute for substantive legal analysis. It does not claim that any class of AI-enabled system is inherently lawful or unlawful. Instead, it provides a stable unit of description that can be used across Article 36-style weapons/legal review processes, operational policy development, and accountability assessments: a concise profile that makes explicit the system’s purpose, its effects (including reasonably foreseeable coupling to other systems and decisions), and its role in decision-making and execution.⁶⁵ Doing so enables clearer comparison across kinetic

⁶¹ See **Mariarosaria Taddeo & Alexander Blanchard**, *supra* note 6; **Rebecca Crootof**, *supra* note 1; **Pavel Sharikov**, *International Regulations of Lethal Autonomous Weapons Systems: Transatlantic Security Dialogue*, *World Econ. & Int’l Rel.* (2024); **Afonso Seixas Nunes**, *The Legality and Accountability of Autonomous Weapon Systems* (2022).

⁶² See **Marco Sassòli**, *Autonomous Weapons and International Humanitarian Law*, *supra* note 7; **Magdalena Pacholska**, *Military Artificial Intelligence and the Principle of Distinction: A State Responsibility Perspective* (2022); **Ahmad Khalil et al.**, *Assessing the Legality of Autonomous Weapon Systems*, *supra* note 2; **S. Kate Devitt**, *Normative Epistemology for Lethal Autonomous Weapons Systems*, *supra* note 10; **Juan Pablo Rivera et al.**, *Escalation Risks from Language Models in Military and Diplomatic Decision Making* (2024); **Caballero & Jenkins**, *supra* note 5; **Anderson & Waxman**, *supra* note 7; **Jack M. Beard**, *supra* note 3; **Robert Sparrow**, *supra* note 34.

⁶³ See **Bode & Watts**, *supra* note 4; **Laura Bruun & Marta Bo**, *Bias in Military Artificial Intelligence and Compliance with International Humanitarian Law* (SIPRI 2025); **Taddeo**, *Ethics of Artificial Intelligence in Defence*, *supra* note 4; **Taddeo & Floridi**, *supra* note 5; **Anneken et al.**, *supra* note 52; **Caballero & Jenkins**, *supra* note 5; **Rivera et al.**, *supra* note 56.

⁶⁴ See **Taddeo & Floridi**, *supra* note 5; **Caballero & Jenkins**, *supra* note 5; **Rivera et al.**, *supra* note 56; **E. Martynova**, *Navigating Regulation of AI-Powered Cyber Operations in the Realm of the Use of Force* (2024).

⁶⁵ See **Sassòli**, *supra* note 7; **Anderson & Waxman**, *supra* note 7; **Alan L. Schuller**, *At the Crossroads of Control*, *supra* note 6; **Devitt**, *supra* note 10; **Seixas Nunes**, *supra* note 55; **Tara Roberson et al.**, *A Method for Ethical AI in Defence (MEIAD)* (2022).

and non-kinetic contexts and helps align legal analysis with how contemporary militaries actually field and manage AI-enabled capabilities.⁶⁶

5.2 The Three-Axis Framework

This article’s three-axis framework is intended to complement—rather than replace—three influential ways of structuring debate on military AI. These approaches can be understood as foregrounding different, but recurring, governance questions raised by AI-enabled military systems: the legal salience of particular functions and effects, the system’s role in operational decision-making, and the allocation of authority and control between humans and machines.

First, the ICRC’s “critical functions” approach centers analysis on whether a weapon system can independently select and attack targets, thereby directly linking autonomy to IHL targeting rules of distinction, proportionality, and precautions (for example, ICRC reports on autonomous weapon systems). This focus captures legally salient functions for weapons but tends to leave non-weapon AI systems analytically underspecified. The present framework incorporates the insight that independent target selection and attack are legally salient “critical functions,” while extending systematic analysis to non-weapon systems by distinguishing purposes and effect types beyond lethal targeting.⁶⁷ Second, “kill chain” and targeting-cycle models, such as the F2T2EA sequence (find, fix, track, target, engage, assess), describe how information moves through operational processes and help diagnose how AI-enabled ISR and data fusion can compress decision time and shape downstream engagements⁶⁸ The present framework is designed to cleanly map onto these operational stages while adding a legally salient distinction between decision-support roles and decision-making or execution roles for AI systems. Third, function-allocation and authority-based accounts of autonomy emphasize that the central governance question is which functions and authorities are delegated to the machine, under what constraints, given its capabilities and the operational context.⁶⁹ Work on meaningful human control and human–machine teaming similarly stresses that ethically acceptable autonomy turns on the division of labor and authority between humans and machines, rather than on an abstract autonomy label⁷⁰

Building on this scholarship, the framework integrates delegated authority into a broader taxonomy of purposes and effects, enabling comparable analysis across kinetic and non-kinetic applications. It organizes military AI along three analytically distinct axes, allowing any AI-enabled military capability to be characterized by answering three questions: (i) **Purpose of use:** What is the system’s primary operational purpose—

⁶⁶ See **Bode & Watts**, supra note 4; **Taddeo**, *Ethics of Artificial Intelligence in Defence*, supra note 4; **Jeroen G. W. C. Schraagen**, supra note 4; **Wolfgang Koch et al.**, supra note 1.

⁶⁷ See **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence*, supra note 4; **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, supra note 42; **Ingvild Bode et al.**, *Algorithmic Warfare*, supra note 41.

⁶⁸ See **Homayounnejad**, *Military AI and Command Responsibility* (2019); **Roberts & Venables**, supra note 53.

⁶⁹ See **Canellas & Haga**, supra note 6; **Schuller**, supra note 6; **Taddeo & Blanchard**, supra note 6.

⁷⁰ See **Beard**, supra note 3; **Noel Sharkey**, supra note 8; **Warren & Hillas**, *Autonomy and Moral Responsibility* (2020); **Maathuis & Cools**, *Human Oversight in Military AI* (2025); **Shekh et al.**, *Operational Ethics of Autonomous Systems* (2025).

sustainment/support, adversarial non-kinetic, or adversarial kinetic?⁷¹ (ii) **Effects generated or enabled:** What effects does it directly generate or reliably enable—lethal or non-lethal; kinetic or non-kinetic—including foreseeable downstream coupling to other systems or decisions.⁷² (iii) **Decision-chain role (with control modality):** Does it operate primarily as decision support, or does it exercise decision-making/execution authority, and what form of human control is exercised in practice (for example, human in, on, or out of the loop).⁷³

The resulting profile provides a stable unit of analysis for legal review, operational governance, and accountability mapping, without presupposing that all legally relevant AI systems qualify as “autonomous weapons systems” under narrower definitions⁷⁴.

5.3 Purpose of Use (Support / Adversarial Non-Kinetic / Adversarial Kinetic)

The first analytical axis concerns the purpose for which an AI-enabled system is designed and deployed within military organizations. “Purpose of use” captures the system’s intended operational role, institutional function, and place within planning and execution, independent of the specific effects it may ultimately generate in a given context.

Drawing on work by Taddeo and co-authors, this article adopts a three-part classification for AI in national defense: (1) sustainment and support, (2) adversarial non-kinetic, and (3) adversarial kinetic.⁷⁵

- *Sustainment and support systems* include logistics, maintenance, infrastructure security, training, modelling and simulation, and many forms of intelligence analysis and decision support.⁷⁶ These uses are generally non-lethal and non-kinetic, even though errors—such as failures in maintenance prediction, mis-prioritization of ISR, or misallocation of defensive assets—may still have significant strategic or humanitarian consequences.⁷⁷

- *Adversarial non-kinetic systems* encompass AI-enabled capabilities for cyber operations, information operations, and many forms of electronic warfare, where the primary intended effects are non-kinetic (disruption, degradation, deception, information manipulation, data exfiltration, or cognitive influence) but may indirectly contribute to physical harm or escalation.⁷⁸ Defense-oriented ethics and policy analyses consistently treat AI-assisted cyber tools and information operations as adversarial uses distinct from

⁷¹ See **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, supra note 42, pt. III.

⁷² See **Sassòli**, supra note 7; **Taddeo & Floridi**, supra note 5; **Zakharchuk**, *AI and Escalation Control* (2025).

⁷³ See **Schuller**, supra note 6; **Taddeo & Blanchard**, supra note 6; **Edward Hunter Christie et al.**, *Regulating Lethal Autonomous Weapon Systems, AI & Ethics* (2023).

⁷⁴ See **Rebecca Crootof**, supra note 1; **Taddeo & Blanchard**, supra note 6; **Ahmad Khalil et al.**, *Assessing the Legality of Autonomous Weapon Systems* (2024).

⁷⁵ See **Mariarosaria Taddeo**, *The Ethics of Artificial Intelligence in Defence*, supra note 4; **Mariarosaria Taddeo et al.**, *Ethical Principles for Artificial Intelligence in National Defence*, supra note 42.

⁷⁶ See **Taddeo & Blanchard**, supra note 6; **Pacholska**, supra note 56; **Devitt**, supra note 10

⁷⁷ See **Mariarosaria Taddeo**, supra note 4; **Forrest E. Morgan et al.**, supra note 41; **Ingvild Bode et al.**, *Algorithmic Warfare*, supra note 41.

⁷⁸ See **Taddeo & Floridi**, supra note 5; **Zakharchuk**, supra note 66; **Yucel et al.**, *Drones, Bots, and the Law* (2023).

logistics or training, while recognizing that they form part of the same broader “algorithmic warfare” ecosystem as weapons and ISR⁷⁹.

- *Adversarial kinetic systems* include AI-enabled targeting, fire control, and autonomous or semi-autonomous weapon systems—cases in which AI directly contributes to lethal or otherwise physically destructive effects⁸⁰. Here, weapons law and targeting law converge most sharply, and debates about LAWS, meaningful human control, and responsibility are most developed.⁸¹

Bode and colleagues’ mapping of “algorithmic warfare” concretizes these purpose distinctions by grouping together systems used for defensive and offensive force-application (such as active protection systems, close-in weapon systems (CIWS), and counter-UAS systems) alongside ISR and decision-support tools, including Project Maven, within a single operational ecosystem.⁸² Roberts and Venables explicitly distinguish AI used in LAWS and kinetic targeting from AI used in ISR and information operations, arguing that these non-weapon, non-kinetic applications are nonetheless crucial for lawful target selection yet remain under-discussed in IHL debates.⁸³ Anneken et al. treat AI-enabled visual reconnaissance as a support-purpose system—intended to assist human situational awareness and targeting decisions—while situating it within just war theory and targeting obligations.⁸⁴ In the cyber domain, Taddeo and Floridi analyze AI-driven, or AI-assisted cyber tools as paradigmatic adversarial non-kinetic applications of military AI, and call for arms-control-style governance tailored to that operational role.⁸⁵ Broader strategic and ethical syntheses similarly treat cyber and information operations as part of the same family of military AI applications as logistics, ISR, and weapon systems, while emphasizing their distinct risk profiles and legal trigger conditions under IHL and jus ad bellum.⁸⁶

5.4 Effects (Lethal/Non-Lethal; Kinetic/Non-Kinetic; Downstream Coupling)

The purpose of use does not fully determine the effects a system will generate. A support-purpose system can contribute to lethal outcomes, and adversarial systems can sometimes be configured to avoid direct physical harm. Accordingly, the second axis concerns the effects a system generates or reliably enables.

For present purposes, it is helpful to distinguish two conceptual “effect axes,” independent of whether a system is physically embodied: (i) *Lethal vs. non-lethal*. Whether AI contributes directly to the application of lethal or physically destructive

⁷⁹ See **Forrest E. Morgan et al.**, *Military Applications of Artificial Intelligence*, supra note 41; **Ingvild Bode et al.**, *Algorithmic Warfare*, supra note 41.

⁸⁰ See **Marco Sassòli**, *Autonomous Weapons and International Humanitarian Law*, supra note 7; **Tim McFarland**, *Autonomous Weapon Systems and the Law of Armed Conflict*, supra note 7; **Mariarosaria Taddeo & Alexander Blanchard**, supra note 6.

⁸¹ See **Peter Asaro**, supra note 1; **Kenneth Anderson & Matthew C. Waxman**, supra note 7; **Heather Roff**, *The Strategic Robot Problem* (2014); **Robert Sparrow**, supra note 34.

⁸² See **Ingvild Bode et al.**, *Algorithmic Warfare*, supra note 41.

⁸³ See **Anastasia Roberts & A. Venables**, supra note 53.

⁸⁴ See **Mathias Anneken et al.**, supra note 52.

⁸⁵ See **Mariarosaria Taddeo & Luciano Floridi**, supra note 5.

⁸⁶ See **Forrest E. Morgan et al.**, supra note 41; **Zakharchuk**, *AI and Escalation Control*, supra note 66; **Yucel et al.**, *Drones, Bots, and the Law*, supra note 72.

force, rather than enabling non-lethal functions such as reconnaissance, logistics, training, or certain forms of cyber defense.⁸⁷ (ii) *Kinetic vs. non-kinetic*. Whether the primary, intended effects are physical—for example, destruction of objects, bodily harm, or physical disablement—or informational/digital, such as data exfiltration, jamming, manipulation of communications, or cognitive influence.⁸⁸

Analyses of autonomous weapons, cyber operations, and information operations already rely—often implicitly—on some version of these distinctions when assessing proportionality, military advantage, and the scope of lawful collateral effects.⁸⁹ Non-kinetic cyber or information operations may be non-lethal in their immediate effects, yet may foreseeably contribute to lethal outcomes through operational coupling, escalation, or interference with critical infrastructure⁹⁰.

A further nuance is downstream or decision-chain coupling. AI systems whose immediate outputs are non-lethal and non-kinetic—such as target-recognition tools or ISR triage algorithms—may nonetheless be systematically coupled to lethal targeting decisions in ways that are both foreseeable and, in practice, difficult for human operators to disentangle under time pressure.⁹¹ The framework, therefore, treats downstream coupling as part of the effect profile: reviewers should ask not only what a system does directly, but also how its outputs feed into subsequent decisions and what effects those decisions reliably produce.

5.5 Decision-Chain Role and Modalities of Human Control

The third axis concerns the role AI plays in the decision chain: does the system merely support human decision makers, or does it itself make or execute decisions that determine the use of force or other operational effects? Closely related is the modality of human control—often described in terms of “human in, on, or out of the loop.”

Recent empirical and normative work explicitly distinguishes between AI decision-support systems and AI decision-making or execution systems. Rivera et al. experimentally compare several large language models used as autonomous agents in simulated international crises—tasked to select actions in a wargame—with the same models conceptually framed as advisors. They find that agentic models can exhibit escalatory and hard-to-predict behavior, including arms-race dynamics and, in rare cases, nuclear first use, and urge caution before deploying such systems in decision-making roles.⁹² Caballero and Jenkins, focusing on large language models in U.S. national-security applications, similarly argue that such models should primarily serve as analytical and planning tools—for instance, for summarization, red-teaming, or wargaming support—rather than as primary strategic decision makers, given risks of hallucination, adversarial manipulation, opacity, and data-security concerns.⁹³

⁸⁷ See **Sassòli**, supra note 7; **McFarland**, supra note 7.

⁸⁸ See **Taddeo & Floridi**, supra note 5; **Zakharchuk**, supra note 66; **Yucel et al.**, supra note 72.

⁸⁹ See **Sassòli**, supra note 7; **McFarland**, supra note 7; **Ahmad Khalil et al.**, *Assessing the Legality of Autonomous Weapon Systems*, supra note 68.

⁹⁰ See **Taddeo & Floridi**, supra note 5; **Zakharchuk**, supra note 66.

⁹¹ See **Ingvild Bode et al.**, *Algorithmic Warfare*, supra note 41; **Jeroen Kwik & Tom van Engers**, supra note 45; **Laura Bruun & Marta Bo**, supra note 57.

⁹² See **Juan Pablo Rivera et al.**, supra note 56.

⁹³ See **William N. Caballero & Phillip R. Jenkins**, supra note 5.

Koch et al. distinguish between “cognitive and volitive assistance systems”—which aid human understanding and volitional choice—and automated weapon systems that can initiate or execute engagements with limited or no real-time human input.⁹⁴ They argue that meaningful human control, explainable AI, and rigorous testing are essential in both categories, but that the ethical and legal stakes are substantially higher when systems can directly trigger lethal or destructive effects.⁹⁵ Roberts and Venables likewise contrast AI used for ISR and information-operations decision support with AI embedded in systems that could erode human control over kinetic decisions, warning against conflating these roles in legal analysis.⁹⁶ Nalin and Tripodi focus specifically on AI-based military decision-making processes, warning that increasing autonomy and reliance on AI tools risks a de facto transfer of decision authority from commanders to AI systems⁹⁷. They call for a detailed classification of AI systems based on their technical, ethical, and cultural properties to determine their suitability for different decision roles—a concern echoed in broader work on the “AI commander problem” and human–machine trust.⁹⁸ Mamak and Kowalczywska, writing on robot design, human–machine trust, and the “human likeness” of military robots, likewise distinguish between systems that support human decision making and those that effectively make or execute decisions, tying this distinction to moral responsibility, trust calibration, and psychological impacts on operators.⁹⁹

In the LAWS literature, this axis is sharpened by definitional choices. Taddeo and Blanchard’s comparative analysis shows that many official definitions of autonomous weapon systems focus on systems that can “identify, select, and attack targets” without human intervention, thereby positioning prototypical LAWS squarely at the decision-making/execution end of the spectrum.¹⁰⁰ Christie et al. adopt the Taddeo–Blanchard definition of LAWS as adaptive systems that can identify, select, and attack targets without human intervention, while stressing that the U.S. DoD and NATO AI principles they analyze are intended to apply to all military AI applications, not only LAWS.¹⁰¹

In line with this literature, this article distinguishes between: (i) *AI decision-support systems*. Systems that process data and generate assessments, predictions, or recommendations, or otherwise shape the informational environment for human operators, but that do not themselves possess authority to initiate or deny the use of force. Examples include ISR analytics, target recognition tools feeding into human-in-the-loop targeting cells, and LLM-based staff work or planning support.¹⁰² The distinction concerns formal authority and control over the initiation of effects, not the causal influence that decision-support systems may exert over downstream lethal or non-lethal

⁹⁴ See **Wolfgang Koch et al.**, supra note 1.

⁹⁵ Id.

⁹⁶ See **Anastasia Roberts & A. Venables**, supra note 53.

⁹⁷ See **Nalin & Tripodi**, *Hybrid Warfare and Emerging Technologies* (2023).

⁹⁸ See **Aaron M. Johnson**, *Moral Responsibility and Autonomous Systems* (2022); **Warren & Hillas**, supra note 64.

⁹⁹ See **Mamak & Kowalczywska**, *Human Oversight and Autonomous Systems* (2023).

¹⁰⁰ See **Mariarosaria Taddeo & Alexander Blanchard**, supra note 6.

¹⁰¹ See **Edward Hunter Christie et al.**, supra note 67.

¹⁰² See **Ingvid Bode et al.**, *Algorithmic Warfare*, supra note 41; **Rivera et al.**, supra note 56; **Caballero & Jenkins**, supra note 5; **Anneken et al.**, supra note 52.

outcomes.¹⁰³ (ii) *AI decision-making/execution systems*. Systems that have been granted a combination of authorities and capabilities such that they can select, prioritize, or engage targets, or otherwise initiate, modulate, or withhold kinetic or non-kinetic effects, without further human intervention at the point of use. This category includes prototypical LAWS, as defined above, and certain highly automated defensive systems operating under pre-delegated rules of engagement.¹⁰⁴

Schuller's influential work argues that, for legal and ethical evaluation, what matters is not an abstract notion of "autonomy" but the set of decision-making authorities delegated to the computer, in light of the system's capabilities and the operational context.¹⁰⁵ This authority-based view aligns with human-factors research and supports proposals to define meaningful human control through clear authority assignments and bounds on autonomous system behavior, rather than through technology labels alone.¹⁰⁶ Although terminology varies, much of the literature rejects a strict binary between "autonomous" and "non-autonomous" systems and instead describes a continuum of control and human involvement.¹⁰⁷

A standard tripartite classification is often framed in terms of human control modalities:

(i) *Human in the loop* – the system can apply force only following a specific human command for each engagement; (ii) *Human on the loop* – the system can initiate or continue engagements on its own, but human operators supervise and can intervene or abort; (iii) *Human out of the loop* – the system operates without real-time human supervision or intervention during engagements.

Practice-based analyses of existing defensive autonomous systems show that, in time-critical contexts, human roles can be reduced and normalized in ways later deemed appropriate, thereby reshaping understandings of "meaningful" control.¹⁰⁸ This literature cautions that "human in/on/out of the loop" labels can be misleading unless tied to operational realities: even when an operator is nominally "on the loop," engagement timelines may make intervention practically infeasible, rendering human control functionally attenuated.¹⁰⁹ For the purposes of this article, "autonomy" is therefore not to be treated as an all-or-nothing property, but as shorthand for particular configurations of delegated authority, adaptivity, and human control. In subsequent sections, each system type will be explicitly located along (i) the decision-chain role spectrum (decision support vs. decision-making/execution), (ii) the human-control spectrum (human in/on/out of the loop), and (iii) the lethal/kinetic axes set out above.

6. Conclusion and Implications

The article has argued that debates about "military AI" require a more precise, function-oriented vocabulary than that provided by a LAWS-centered framing. Using

¹⁰³ See **Kwik & van Engers**, supra note 45; **Bruun & Bo**, supra note 57.

¹⁰⁴ See **Rebecca Crootof**, supra note 1; **Tim McFarland**, supra note 7; **Ingvild Bode et al.**, supra note 41.

¹⁰⁵ See **Alan L. Schuller**, supra note 6.

¹⁰⁶ See **Canellas & Haga**, supra note 6; **S. Kate Devitt**, supra note 10; **Maathuis & Cools**, supra note 64.

¹⁰⁷ See **Jack M. Beard**, supra note 3; **Noel Sharkey**, supra note 8; **Kastan**, *Autonomy and Accountability* (2012); **McFarland**, supra note 7; **Johnson & Axinn**, supra note 34; **Robert Sparrow**, supra note 34.

¹⁰⁸ See **Ingvild Bode**, supra note 3; **Demy**, *Human-Machine Decision Authority* (2020).

¹⁰⁹ See **Ronald C. Arkin**, supra note 24; **Syse & Cook**, *Ethics of Military AI* (2023); **Shekh et al.**, supra note 64.

the three-axis framework developed in Section 5 - purpose of use, effects generated or enabled, and role in the decision chain with associated control modalities—four conclusions follow.

First, autonomy in weapon systems predates contemporary AI and machine learning and has long taken the practical form of delegated control over critical functions. Cold War-era cruise missiles, naval close-in weapon systems (CIWS), and other “automatic” defenses already embodied significant delegation once activated by humans. DoD Directive 3000.09 codifies this lineage by defining an autonomous weapon system as one that, “once activated, can select and engage targets without further intervention by a human operator,” anchoring autonomy in targeting functions rather than speculative notions of machine agency. **Second**, the LAWS and “killer robots” debate played an important agenda-setting role, but it is conceptually narrow relative to today’s spectrum of military AI. AI-enabled capabilities now operate across ISR, command-and-control decision support, cyber and information operations, logistics, training, and force protection—including systems that are non-lethal and non-kinetic at the point of use but can shape legally consequential outcomes downstream. **Third**, AWS and LAWS are best understood as subcategories within this broader universe. Comparative definitional work converges around a limited set of variables—autonomy in critical targeting functions, the form of human control, purpose (including lethal force), and, in some definitions, adaptivity—while remaining insufficient to capture non-weapon systems and non-kinetic effects. The working definitions adopted here therefore function as entry points for analysis, not as substitutes for it. **Fourth**, “autonomy” is most usefully treated as a configuration of delegated authority and human control, not as a binary label. For legal review and accountability, what matters is which judgments are delegated, under what constraints, and whether human supervision or intervention is realistically available in context. These conclusions support a shift away from umbrella labels and toward functional analysis across the full spectrum of military AI. The framework suggests several practical implications for policymakers, military legal advisers, and international institutions:

1. *Adopt functional reporting and review* that describes AI-enabled systems by delegated functions, anticipated effects (including downstream coupling), and decision-chain role—rather than primarily by “autonomous” or “LAWS” labels.
2. *Integrate decision-chain mapping into Article 36-style reviews*, identifying where legally relevant judgments occur, what information they rely on, and what control and override mechanisms are feasible under operational tempo.
3. *Treat non-kinetic and non-lethal systems as governance-relevant* when they systematically shape targeting, escalation, or other legally consequential outcomes.
4. *Operationalize meaningful human control* through bounded parameters, traceability/logging, testing, and intervention mechanisms calibrated to realistic conditions of use.
5. *Reframe multilateral discussions* (including CCW forums) around shared descriptors—critical functions, effects, and control modalities—to reduce definitional stalemates while preserving focus on human responsibility and IHL compliance.

SUՔԵՎԻԿ ԴԱՎԹՅԱՆ – Արհեստական բանականությունը ռազմական ոլորտում՝ մահաբեր ինքնավար զենքային համակարգերի սահմանումից դուրս. հասկացությունների հստակեցում և գործառության շրջանակ – Վերջին տասնամյակում ռազմական ոլորտում արհեստական բանականության կիրառման շուրջ իրավական և էթիկական քննարկումները հիմնականում կենտրոնացել են «մահաբեր ինքնավար զենքային համակարգերի» (LAWS) և, այսպես կոչվող, «սպանող ռոբոտների» խնդրի վրա: Մակայն ժամանակակից ռազմական արհեստական բանականության կիրառությունները էապես ավելի լայն շրջանակ ունեն և ընդգրկում են հետախուզություն, դիտարկում և հետախուզում (ISR), հրամանատարության և վերահսկման համակարգերում (C2) որոշումների աջակցում, կիբեր և տեղեկատվական գործողություններ, ինչպես նաև լոգիստիկա և ուսուցում: Այս հոդվածում վերլուծվում է, թե ինչպես են «ինքնավարություն» և «ռազմական արհեստական բանականություն» հասկացությունները ձևավորվել քաղաքականության, իրավունքի և էթիկայի ոլորտներում՝ առաջարկելով գործառությանին մոտեցում, որը համահունչ է ժամանակակից ռազմական պրակտիկային և արհեստական բանականությամբ պայմանավորված նոր գործառություններին: Յուրյ է տրվում, թե ինչպես է գիտական և ռազմավարական գրականությունը աստիճանաբար ընդլայնել LAWS-ի շուրջ ձևավորված օրակարգը՝ անցում կատարելով դեպի «ալգորիթմային պատերազմի» և «պաշտպանական արհեստական բանականության» ավելի ընդգրկուն տեսություններ: Այս հիմքի վրա առաջարկվում է երեք առանցքով կառուցված վերլուծական շրջանակ՝ կիրառման նպատակ, ազդեցությունների տեսակներ և դերակատարում որոշումների շղթայում, ինչպես նաև ներկայացվում են ինքնավար զենքային համակարգերի (AWS) և մահաբեր ինքնավար զենքային համակարգերի (LAWS) աշխատանքային սահմանումները: Եզրակացվում է, որ ռազմական արհեստական բանականության իրավական, էթիկական և քաղաքական գնահատումը առավել արդյունավետ է, երբ հիմնվում է գործառությունների, ազդեցությունների և վերահսկման ձևերի վրա, այլ ոչ թե միայն տերմինաբանական ձևակերպումների:

Բանալի բառեր – ռազմական արհեստական բանականություն, մահաբեր ինքնավար զենքային համակարգեր (LAWS), ինքնավար զենքային համակարգեր (AWS), ալգորիթմային պատերազմ, միջազգային մարդասիրական իրավունք, մարդկային վերահսկում, որոշումների աջակցում, կիբեր և տեղեկատվական գործողություններ

ТАТЕВИК ДАВТЯН – Искусственный интеллект в военной сфере за пределами летальных автономных систем вооружений: концептуальные уточнения и функциональная рамка. – За последнее десятилетие юридические и этические дискуссии о применении искусственного интеллекта в военной сфере в основном сосредоточились на «смертоносных автономных системах вооружений» (LAWS) и так называемых «роботах-убийцах». Вместе с тем современные военные применения искусственного интеллекта имеют существенно более широкий характер и охватывают разведку, наблюдение и рекогносцировку (ISR), поддержку принятия решений в системах командования и управления (C2), кибер- и информационные операции, а также логистику и обучение. В статье анализируется формирование понятий «автономия» и «военный искусственный интеллект» в рамках политики, права и этики и предлагается функциональный подход, согласующийся с современной военной практикой и новыми функциями, обусловленными развитием ИИ. Показано, каким образом научная и стратегическая литература постепенно расширила повестку, первоначально сосредоточенную на LAWS, перейдя к более комплексным концепциям «алгоритмической войны» и «искусственного интеллекта в

обороне». На этой основе в статье предлагается аналитическая рамка, построенная по трём осям: цель применения, типы создаваемых или обеспечиваемых эффектов и роль системы в цепочке принятия решений. Также формулируются рабочие определения автономных систем вооружений (AWS) и летальных автономных систем вооружений (LAWS). Делается вывод о том, что правовая, этическая и политическая оценка военного искусственного интеллекта является более эффективной, когда она основывается на анализе функций систем, их эффектов и форм контроля, а не только на терминологических формулировках.

Ключевые слова: *военный искусственный интеллект, летальные автономные системы вооружений (LAWS), автономные системы вооружений (AWS), алгоритмическая война, международное гуманитарное право, человеческий контроль, поддержка принятия решений, кибер- и информационные операции.*

References

- Anderson K., Waxman M.C., Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can, 2013.
- Anneken M. et al., Ethical Considerations for the Military Use of Artificial Intelligence in Visual Reconnaissance, arXiv, 2025.
- Arkin R.C., Lethal Autonomous Systems and the Plight of the Noncombatant, 2013.
- Asaro P., On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-Making, International Review of the Red Cross, Vol. 94, 2012, pp. 687–709.
- Beard J.M., Autonomous Weapons and Human Responsibilities, Georgetown Journal of International Law, Vol. 45, 2014, pp. 617–681.
- Bhuta N. et al., Autonomous Weapons and International Law, 2016.
- Blom J.A., Unmanned Aerial Systems: A Historical Perspective, Combat Studies Institute Press, 2010.
- Bode I., Practice-Based and Public-Deliberative Normativity: Retaining Human Control over the Use of Force, European Journal of International Relations, Vol. 29, 2023, pp. 753–776.
- Bode I., Watts T.F.A., Algorithmic Warfare: Taking Stock of a Research Programme, Global Society, Vol. 37, 2023, pp. 1–24.
- Bode I. et al., Algorithmic Warfare: Taking Stock of a Research Programme, Global Society, Vol. 38, 2024.
- Bode I. et al., Prospects for the Global Governance of Autonomous Weapons: Comparing Chinese, Russian, and U.S. Practices, Ethics and Information Technology, 2023.
- Bruun L., Bo M., Bias in Military Artificial Intelligence and Compliance with International Humanitarian Law, SIPRI, 2025.
- Caballero W.N., Jenkins P.R., On Large Language Models in National Security Applications, Stat, 2024.
- Canellas M.C., Haga R.A., Toward Meaningful Human Control of Autonomous Weapons Systems Through Function Allocation, in 2015 IEEE International Symposium on Technology and Society (ISTAS), 2015, pp. 1–7.
- Chapa J., Military AI Ethics, Journal of Military Ethics, Vol. 23, 2024.
- Christie E.H. et al., Regulating Lethal Autonomous Weapon Systems, AI and Ethics, 2023.
- Crootof R., The Killer Robots Are Here: Legal and Policy Implications, Cardozo Law Review, Vol. 36, 2014, pp. 1837–1915.
- Demy T., Human–Machine Decision Authority, 2020.
- Devitt S.K., Normative Epistemology for Lethal Autonomous Weapons Systems, in Lethal Autonomous Weapons: Re-Examining the Law and Ethics of Robotic Warfare, Oxford University Press, 2020.
- Ehrhard T.P., Air Force UAVs: The Secret History, Mitchell Institute, 2010.
- Haney B., Applied Artificial Intelligence in Modern Warfare and National Security Policy, 2019.
- Homayounnejad M., Military AI and Command Responsibility, 2019.
- Johnson A.M., Moral Responsibility and Autonomous Systems, 2022.
- Johnson A.M., Axinn S., The Morality of Autonomous Robots, Journal of Military Ethics, 2013.

- Kastan B., *Autonomy and Accountability*, 2012.
- Keane J.F., Carr S.S., *A Brief History of Early Unmanned Aircraft*, Johns Hopkins APL Technical Digest, Vol. 32, 2013, pp. 558–571.
- Khalil A. et al., *Assessing the Legality of Autonomous Weapon Systems*, 2024.
- Koch W. et al., [հոդվածի հիման մեջ վերնագիրն ամբողջությամբ նշված չէ], 2023.
- Kwik J., van Engers T., *Algorithmic Fog of War: When Lack of Transparency Violates the Law of Armed Conflict*, Journal of Future Robot Life, Vol. 1, 2021, pp. 53–75.
- Maathuis C., Cools A., *Human Oversight in Military AI*, 2025.
- Mamak K., Kowalczywska K., *Human Oversight and Autonomous Systems*, 2023.
- Martynova E., *Navigating Regulation of AI-Powered Cyber Operations in the Realm of the Use of Force*, 2024.
- McFarland T., *Autonomous Weapon Systems and the Law of Armed Conflict*, Cambridge University Press, 2020.
- Meier M.W., *Lethal Autonomous Weapons Systems, in Complex Battlespaces*, Christopher M. Ford & Winston S. Williams eds., 2018.
- Morgan F.E. et al., *Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World*, RAND Corporation, 2020.
- Nalin G., Tripodi P., *Hybrid Warfare and Emerging Technologies*, 2023.
- Nunes A.S., *The Legality and Accountability of Autonomous Weapon Systems*, 2022.
- O'Rourke R., *Navy Shipboard Lasers and the Phalanx Close-In Weapon System (CIWS)*, Congressional Research Service, R45098, 2020.
- Pacholska M., *Military Artificial Intelligence and the Principle of Distinction: A State Responsibility Perspective*, 2022.
- Prisacariu V., *The History and the Evolution of UAVs from the Beginning till the 70s*, Journal of Defense Resources Management, Vol. 8, 2017, pp. 181–189.
- Rivera J.P. et al., *Escalation Risks from Language Models in Military and Diplomatic Decision Making*, 2024.
- Roberson T. et al., *A Method for Ethical AI in Defence (MEIAD)*, 2022.
- Roberts A., Venables A., *The Role of Artificial Intelligence in Kinetic Targeting from the Perspective of International Humanitarian Law*, in Proceedings of the 13th International Conference on Cyber Conflict (CyCon): Going Viral, NATO Cooperative Cyber Defence Centre of Excellence, 2021, pp. 43–57.
- Roff H., *The Strategic Robot Problem*, 2014.
- Sassòli M., *Autonomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified*, International Law Studies, Vol. 90, 2014, pp. 308–340.
- Schneider J., Macdonald J., *The Rise of Unmanned Technologies, in The Hand Behind Unmanned: Origins of the U.S. Autonomous Military Arsenal*, Oxford University Press, 2025.
- Schraagen J.G.W.C., *Responsible Use of AI in Military Systems: Prospects and Challenges*, Ergonomics, 2023.
- Schuller A.L., *At the Crossroads of Control: The Intersection of Artificial Intelligence in Autonomous Weapon Systems with International Humanitarian Law*, International Law Studies, Vol. 95, 2019, pp. 437–471.
- Sharikov P., *International Regulations of Lethal Autonomous Weapons Systems: Transatlantic Security Dialogue*, World Economy and International Relations, 2024.
- Sharkey N., *The Evitability of Autonomous Robot Warfare*, International Review of the Red Cross, Vol. 94, 2012, pp. 787–799.
- Shekh et al., *Operational Ethics of Autonomous Systems*, 2025.
- Shinbo, *Lethal Autonomous Weapon Systems (LAWS) Confronting the Robot Law Perspectives*, IEICE ESS Fundamentals Review, 2020.
- Simmons-Edler et al., *Human–AI Interaction in Military Systems*, 2025.
- Sparrow R., *Killer Robots*, in Political Minefields, 2019.
- Syse H., Cook M., *Ethics of Military AI*, 2023.
- Taddeo M., *The Ethics of Artificial Intelligence in Defence*, Oxford University Press, 2024.

- Taddeo M., Blanchard A., A Comparative Analysis of the Definitions of Autonomous Weapons Systems, Science and Engineering Ethics, Vol. 28, 2022, Article 10.
- Taddeo M., Floridi L., Regulate Artificial Intelligence to Avert Cyber Arms Race, Nature, Vol. 556, 2018, pp. 296–298.
- Taddeo M. et al., Ethical Principles for Artificial Intelligence in National Defence, Philosophy & Technology, Vol. 34, 2021, pp. 439–465.
- Warren A., Hillas A., Autonomy and Moral Responsibility, 2020.
- Wasilow S., Thorpe J., Artificial Intelligence, Robotics, Ethics, and the Military: A Canadian Perspective, AI Magazine, Vol. 40, 2019, pp. 47–56.
- Werrell K.P., The Evolution of the Cruise Missile, Air University Press, 1985.
- Work R.O., Establishment of an Algorithmic Warfare Cross-Functional Team (Project Maven), Memorandum, Apr. 26, 2017.
- Yucel et al., Drones, Bots, and the Law, 2023.
- Zakharchuk, AI and Escalation Control, 2025.
- International and institutional documents
- Convention on Certain Conventional Weapons (CCW), Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, Final Report, U.N. Doc. CCW/GGE.1/2019/3, Sept. 25, 2019.
- Convention on Certain Conventional Weapons, Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, Report of the 2019 Session, U.N. Doc. CCW/GGE.1/2019/3, Sept. 25, 2019.
- Convention on Certain Conventional Weapons, Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, Report of the 2021 Session, U.N. Doc. CCW/GGE.1/2021/CRP.2, Dec. 3, 2021.
- Council of the European Union, EU Statement on Lethal Autonomous Weapon Systems, Statement to the CCW GGE on LAWS, Apr. 9, 2018.
- Heyns C., Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, U.N. Doc. A/HRC/23/47, 2013.
- Human Rights Watch & Harvard Law School International Human Rights Clinic, Losing Humanity: The Case Against Killer Robots, 2012.
- International Committee of the Red Cross, Autonomous Weapons: Decisions to Kill and Destroy Are a Human Responsibility, Statement to the CCW Meeting of Experts on LAWS, Apr. 11, 2016.
- International Committee of the Red Cross, Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons, 2016.
- International Committee of the Red Cross, Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons, 2017.
- International Committee of the Red Cross, Views of the ICRC on Autonomous Weapon Systems, Nov. 2016.
- NATO, NATO Artificial Intelligence Strategy, Oct. 22, 2021.
- NATO, Summary of the NATO Artificial Intelligence Strategy, Oct. 22, 2021.
- Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), June 8, 1977, 1125 U.N.T.S. 3.
- U.N. GGE on Lethal Autonomous Weapons Systems, Report of the 2017 Session, U.N. Doc. CCW/GGE.1/2017/CRP.1, 2017.
- U.S. Department of Defense, Directive 3000.09, Autonomy in Weapon Systems, Nov. 21, 2012, incorporating Change 2, May 8, 2017.
- U.S. Navy, MK 15 – Phalanx Close-In Weapon System (CIWS) Fact File, last updated Sept. 20, 2021.
- Internet resource**
- Campaign to Stop Killer Robots, About Us.
- U.N. Office at Geneva, CCW Group of Governmental Experts on Lethal Autonomous Weapons Systems to Meet Next Week, Press Release, Nov. 10, 2017.
- U.N. Office for Disarmament Affairs, Timeline of LAWS in the CCW.