Technologies That Kill and the Companies That Design Them: Why Legal Scholars Must Look Upstream

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Introduction

With ongoing wars in Ukraine and Gaza, weaponized artificial intelligence (AI) is no longer a distant future but a reality for both military and civilian populations. In the war in Ukraine, AI-enabled drones contribute to the widespread infliction of terror and the destruction of Ukrainian cities and civilian infrastructure.[1] In Gaza, reports by journalists reveal how the Israeli Defense Forces (IDF) use an AI-enabled decision-making system called Lavender to locate and select targets based on data patterns predicting the likelihood that a person is a member of Hamas.[2] While the IDF claims that AI enables them to strike with more effectiveness and precision, evidence from Gaza shows how AI is accelerating the speed of targeting and the potential scale of civilian harm in unprecedented ways.[3] As formulated by a former IDF intelligence officer who was quoted on the use of such systems, AI has essentially facilitated a "mass assassination factory".[4]

In recent years, the role of AI in warfare has informed a growing research agenda in public international law. However, much of the emerging legal research has focused on how specific

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[1] Dominika Kunertova, 'The war in Ukraine shows the game-changing effect of drones depends on the game', *Bulletin of the Atomic Scientists* 79, nr. 2 (4 maart 2023): 95-102.
[2] Yuval Abraham, '"Lavender": The AI Machine Directing Israel's Bombing Spree in Gaza', +972 Magazine, 3 april 2024, 972mag.com/lavender-ai-israeli-army-gaza/.
[3] Yuval Abraham, '"A Mass Assassination Factory": Inside Israel's Calculated Bombing of Gaza', +972 Magazine, 30 november 2023, 972mag.com/mass-assassination-factory-israel-calculated-bombing-gaza/.
[4] Abraham.

principles of International Humanitarian Law (IHL) – especially proportionality and precaution – apply to AI systems at the point of use. While this work remains important, it tends to examine legal effects during deployment, overlooking the design choices that shape how these systems operate in the first place.

We argue here that legal scholars must turn their attention upstream: toward the design processes and organizational cultures that precede deployment and shape whether technologies support or undermine core IHL principles. As militaries increasingly rely on private tech companies, especially those embedded in Silicon Valley's venture capital and ideology ecosystems, it becomes urgent to understand how these upstream factors shape life-and-death decisions. Legal research must engage not only with how AI applications for the military are used, but how they are built.

Towards the Legal Study of AI Decision-Support Systems

Initial concerns about weaponized AI, both in international policy and legal scholarship, focused heavily on so-called autonomous weapon systems, defined as weapon systems capable of selecting and engaging targets without human intervention. Such systems pose serious risks to IHL compliance, especially regarding distinction, proportionality, and accountability. As a result, early debates have centered on the need for a preventive ban on autonomous weapons systems and ensuring human oversight and control.[5]

However, many AI systems in warfare are not fully autonomous, but still demand legal attention. For instance, the aforementioned Lavender system 'merely' supports military decision-making: while it suggests targets, the decision to kill the target remains with an IDF officer. However, this has not made Lavender any less deadly: IDF intelligence officers have explained how systems enabled them to go "from 50 targets per year" to "100 targets in one

[5] See e.g., Peter Asaro, "On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-Making," *International Review of the Red Cross* 94, no. 886 (June, 2012): 687–709; Boutin, Berenice, en Taylor Woodcock. 'Aspects of Realizing (Meaningful) Human Control: A Legal Perspective'. SSRN Scholarly Paper. Rochester, NY: Social Science Research Network (May, 2022).

day”[6], and that, at its peak, Lavender managed to “generate 37,000 people as potential human targets”.[7] While the decision-making power officially remained with the human operators, in practice, they were delegating their agency to the algorithm: “I would invest 20 seconds for each target at this stage … I had zero added value as a human.”[8]

This underscores the need for legal scholars to scrutinize not only autonomous weapons systems but shift attention to AI-enabled decision-support systems.[9] Although the use of AI systems in lethal decision-making processes is not new,[10] the algorithms underpinning them have become highly complex and opaque.[11] This fundamentally changes existing levels of predictability in warfare and challenges human operators’ ability to exercise control or judgment.

A small but growing body of scholarship has begun to explore these challenges and their impact on IHL, reflecting, for instance, on how an overreliance on the outputs generated by intelligent machines (automation bias) or time constraints imposed by the system may erode meaningful application of IHL principles, such as distinction, proportionality and precaution in the targeting process.[12]

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[6] Abraham, ‘“A Mass Assassination Factory”’.
[7] Abraham, ‘“Lavender”’.
[8] Abraham.
[9] Anna Nadibaidze, Ingvild Bode, en Qiaochu Zhang, ‘AI in Military Decision Support Systems: A Review of Developments and Debates’, Report, *AI in Military Decision Support Systems* (Odense: Center for War Studies, 4 november 2024).; Taylor Woodcock (2024), ‘Human/Machine(-Learning) Interactions, Human Agency and the International Humanitarian Law Proportionality Standard’ *Global Society* 38(1), 100-121.
[10] The use of such systems is not new and can be traced back to earlier examples, such as during the so-called war on terror, when US intelligence officers relied on predictive analytics to target unidentified persons based on identified patterns in cellphone metadata, see Martin Robbins, ‘Has a Rampaging AI Algorithm Really Killed Thousands in Pakistan?’, *The Guardian*, 18 februari 2016, sec. Science, https://www.theguardian.com/science/the-lay-scientist/2016/feb/18/has-a-rampaging-ai-algorithm-really-killed-thousands-in-pakistan.
[11] Michel Holland, ‘The Black Box, Unlocked: Predictability and Understandability in military AI’ (Geneva, Switzerland: United Nations Institute for Disarmament Research, 2020).
[12] Nadibaidze, Bode, en Zhang, ‘AI in Military Decision Support Systems’; Elke Schwarz, ‘Devalued Humanity: The Status of Human Life in Times of Nihilistic War’, *OpinioJuris*, 13 maart 2024. Woodcock, Taylor Kate. ‘Human/Machine(-Learning) Interactions, Human Agency and the International Humanitarian Law Proportionality Standard’. *Global Society* 38, nr. 1 (2 januari 2024): 100-121.

The Need for Legal Research Studying 'Upstream' Design Choices

While it is essential to understand how AI decision-support systems shape legal reasoning during deployment, legal scholars must also examine the upstream environments in which these systems are developed. The legal consequences of an AI system are often preconditioned by decisions made long before a target is selected. Such systems do not appear ready-made. Instead, they are designed by engineers who determine how the technology works and where its limitations lie.

The technology, in turn, shapes military decision-making in its own ways, as algorithms filter what decision-makers see and know and present as viable courses of action.[13] Whether legal protections such as those contained in IHL are meaningful depends not just on whether they are enforced after the fact, but on how those rules are (or are not) translated into the technology supporting lethal decision-making. This translation happens through various design decisions related to data cleaning and categorization, the design of the interface, and the system´s interaction with its user. Legal scholars must consider these choices, as they influence whether legal principles are rendered actionable or irrelevant within these systems.[14]

Silicon Valley Goes to War

Understanding upstream design decisions also requires situating AI decision-support systems within the broader political economy of military technology development. While methodologically challenging, legal scholars must work across disciplines to understand the specific organizational, economic, and ideological contexts in which AI systems are developed and how they impact whether IHL protections can be meaningfully implemented *downstream* of these design environments.

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[13] Suchman, Lucy. 'Algorithmic warfare and the reinvention of accuracy'. *Critical Studies on Security* 8, nr. 2 (3 mei 2020): 175-87.
[14] Hildebrandt, Mireille. 'The Future of Computational Law in the Context of the Rule of Law'. *Journal of Cross-Disciplinary Research in Computational Law* 2, nr. 2 (20 mei 2024).

These contexts matter because military technology production is undergoing a fundamental transformation. As anthropologist Roberto González has argued, we are witnessing a shift away from traditional military-industrial actors clustered in the “Capital Beltway” (such as Lockheed Martin and Boeing) toward new players concentrated in Silicon Valley.[15] A growing number of military startups and Big Tech companies, including Google and Amazon, are becoming central to the development of AI-enabled targeting systems. Yet, their roles in the AI-enabled kill chain and legal responsibilities remain poorly understood.

It is crucial to pay attention to the values, incentives, and development logics shaping how these private companies design AI systems, especially given their monopolistic business model.[16] When just a handful of tech companies come to control key infrastructures of lethal decision-making, we must understand how their design choices shape the way legal norms are interpreted, operationalized, and potentially distorted through technology. How do venture capital incentives shape what legal norms are (or are not) embedded in AI decision-support systems?[17] What does the organizational culture known by the adagium “move fast and break things” mean for the design – and, crucially, the testing – of technologies that affect life-and-death decisions?[18] And how does Silicon Valley’s techno-optimism influence how developers assess and communicate the limitations of the systems they build?[19]

Conclusions

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[15] Roberto Gonzalez, ‘How Big Tech and Silicon Valley are Transforming the Military-Industrial Complex’, 17 april 2024, https://watson.brown.edu/costsofwar/papers/2024/SiliconValley.
[16] Marijn Hoijtink en Jasper Van der Kist, ‘Platforms on the Frontline: The Rise of the Platform Model in Defense Tech’, *Opinio Juris* (blog), 11 februari 2025, https://opiniojuris.org/2025/02/11/platforms-on-the-frontline-the-rise-of-the-platform-model-in-defense-tech/.
[17] ‘From blitzkrieg to blitzscaling: Assessing the impact of venture capital dynamics on military norms | Finance and Society | Cambridge Core’. Geraadpleegd 17 april 2025.
[18] Hoijtink, Marijn. ‘“Prototype Warfare”: Innovation, Optimisation, and the Experimental Way of Warfare’. *European Journal of International Security* 7, nr. 3 (augustus 2022): 322-36.
[19] Gebru, Timnit, en Émile P. Torres. ‘The TESCREAL Bundle: Eugenics and the Promise of Utopia through Artificial General Intelligence’. *First Monday*, 14 april 2024.

As AI decision-support systems become increasingly central to military operations, accelerating targeting and increasing the scale of civilian harm, legal scholars must broaden their analytical scope. Understanding how these systems are built by whom, and for what purpose, is not just the prerogative of social scientists, but of lawyers too. Without attention to the upstream development of these systems, downstream governance efforts, such as the recent (UNGA) Resolution 79/239 and the Responsible AI in the Military Domain (REAIM) initiative[20], risk becoming merely exercises in damage control.

[20] See: https://reaim2024.kr/reaimeng/index.do