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THE LAW OF ARMED CONFLICT AND AUTONOMOUS WEAPONS: THE RELEVANCE OF INTERNATIONAL HUMANITARIAN LAW IN THE AGE OF ARTIFICIAL INTELLIGENCE

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Abstract
This paper examines the shortcomings of existing International Humanitarian Law (IHL) in governing autonomous weapons systems (AWS), emphasizing significant issues with the concepts of accountability, proportionality, and distinction. The study finds important gaps in IHL by examining case studies, state submissions, and academic opinion. These gaps include the difficulties in assigning blame for illegal acts and the absence of efficient oversight procedures for AWS implementation. The report suggests a thorough strategy to remedy these shortcomings, which includes developing a unique legal framework for AWS, guaranteeing significant human oversight, modernizing weapons review procedures, and promoting global agreement through continuous multilateral dialogues. These suggestions seek to protect humanitarian ideals and guarantee that AWS is applied in future conflicts in accordance with accepted legal norms.

INTRODUCTION

The ability of machines, especially computer systems, to carry out operations that normally require human intelligence, like decision-making, problem-solving, learning, perception, and language understanding, is known as artificial intelligence (AI). The algorithms used by AI systems allow them to examine data, spot trends, and use that information to forecast or decide (Russell & Norvig, 2021). Artificial Intelligence (AI) can be divided into a number of different forms according to its features and capabilities. The fundamental building blocks of artificial intelligence are Reactive Machines, which are programs that react to particular inputs with preset outputs but are unable to retain past experiences for use in making judgments in the future. The chess-playing computer Deep Blue from IBM is a well-known example. Limited Memory refers to more sophisticated systems that can use past information to make better decisions; self-driving cars that examine recent traffic patterns are a good illustration of this. Theory of Mind, a more hypothetical level of AI, describes robots that are now being developed to comprehend emotions, beliefs, and social cues. The most sophisticated—yet still speculative—kind is Self-Aware AI, which would be significantly more advanced than present technology and have consciousness and self-understanding. Furthermore, artificial intelligence

(AI) is sometimes separated into two primary categories: artificial general intelligence (AGI), which would equal human cognitive capacities in all domains, and artificial narrow intelligence (ANI), which is intended for specialized tasks like language translation or facial recognition. Artificial Super Intelligence (ASI), a third category, is still a speculative concept that imagines machines to be smarter than humans in almost every domain (Singh et al., 2021).

Artificial Intelligence (AI) has transformed a number of fields by improving innovation, operational effectiveness, and decision-making. Applications of AI in the healthcare industry, such as image recognition and predictive analytics, have significantly increased early disease identification and diagnostic accuracy, particularly in radiology and oncology (Jha & Topol, 2016).

AI in finance uses natural language processing and pattern recognition technologies to help with algorithmic trading, fraud detection, and customer support (Batrinca et al., 2023). Manufacturing sectors use AI to analyze real-time sensor data for quality control and predictive maintenance, which drastically lowers operating costs and downtime (Bahrin et al., 2016). Significant progress has also been made in education thanks to AI-powered adaptive learning systems that improve learning outcomes by customizing course material to each student's needs (Chen et al., 2020).

Decades of multidisciplinary innovation, fueled by developments in computer science, neuroscience, and mathematics, have resulted in the emergence of artificial intelligence (AI). When Alan Turing asked, "Can machines think?" and presented the Turing Test to assess a machine's capacity for intelligent behavior in 1950, he established the theoretical underpinnings of artificial intelligence (AI) (Turing, 1950). Following this theoretical foundation, John McCarthy and associates formally introduced artificial intelligence (AI) as a field of study at the 1956 Dartmouth Conference, where they suggested that "every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it" (McCarthy et al., 2006).

Early AI research was characterized by optimism due to the quick advancements in problem-solving and symbolic reasoning. However, during the so-called "AI winters" of the 1970s and late 1980s, funding and enthusiasm declined due to a lack of processing capacity and unrealistic expectations (Hendler, 2008). The discrepancy between theoretical promise and real-world implementation was highlighted during these times.

Several variables came together to spark the rebirth of AI in the twenty-first century. The first was the ability to process large datasets in real time due to exponential gains in computing power. Second, more robust training of machine learning models was made possible by the availability of large-scale data from digital platforms (Jordan & Mitchell, 2015). Lastly, algorithmic advancements, especially deep learning, opened up new possibilities in language modeling, pattern recognition, and perception that far outperformed earlier standards (LeCun, Bengio, & Hinton, 2015). AI was once a specialized area of study, but these technical advancements have transformed it into a key element of contemporary innovation.

The development of AI has raised concerns about bias, transparency, and ethical governance despite its scientific achievement. To guarantee that AI advances in accordance with societal values, academics are calling for more thorough regulatory frameworks and interdisciplinary research (Floridi et al., 2018). As a result, the development of AI is a reflection of both technological advancements and changing perspectives on how AI will affect human society.

The emergence of artificial intelligence (AI) in military applications has revolutionized a number of crucial operational domains. Intelligence analysis, where AI systems analyze vast volumes of data to find trends and forecast outcomes, is one important application of AI in the military. For example, artificial intelligence (AI) tools such as deepCOM, which were created for military use, have been shown to help with intelligence analysis by increasing the speed and precision of data processing when compared to conventional techniques. This makes them extremely useful in cases where time is of the essence (Nitzl et al., 2024).

AI is essential for decision support and target recognition in addition to intelligence collection. Military analysts can now more easily and swiftly

make better conclusions by using machine learning algorithms, such those utilized in Project Maven, to improve object recognition in surveillance film (Allen, 2019). In contemporary combat, where quick decisions are crucial, these systems' ability to automatically recognize and categorize targets is crucial.

The creation of autonomous systems is a key use of AI in the military. AI-powered autonomous drones and unmanned vehicles can carry out a range of activities with little assistance from humans, such as logistical operations, surveillance, and reconnaissance. These technologies are particularly useful in distant or hazardous areas where it would not be possible for humans to be present. AI-driven systems offer dependability and adaptability, making it possible to safely execute more complicated tasks (Scharre, 2018).

AI is also essential to military networks' cybersecurity. Unusual patterns in network traffic can be detected by AI technologies with machine learning algorithms, which may be a sign of a cyberattack. These algorithms offer a layer of protection that is crucial for protecting sensitive military data and systems because they can react to such threats swiftly and in real-time (Brundage et al., 2018).

Lastly, AI has revolutionized military simulation and training. Artificial intelligence (AI)-powered training programs generate dynamic, adaptive scenarios that react to learners' activities, enhancing their decision-making skills and equipping them for a range of real-world circumstances. According to Johnson, Valente, and Taylor (2017), these simulations are crucial for ensuring that military personnel are highly prepared for a variety of issues they may face.

Advanced military technology known as Autonomous Weapons Systems (AWS) are capable of choosing and engaging targets on their own without direct human assistance. These devices collect sensor data, make judgments based on preset standards, and execute missions with little to no human intervention by utilizing artificial intelligence (AI) and machine learning algorithms. The main feature of AWS is its autonomy, which allows it to carry out activities like target recognition, decision-making, and engagement without constant human supervision (Crootof, 2015).

The autonomy with which AWS make operational decisions sets them apart from conventional weapons systems. While traditional weapon systems usually need human input to choose targets and engage them, AWS can do this by using learned behaviors from massive data sets or pre-programmed rules. For instance, an AI-enabled autonomous drone would be able to evaluate surveillance data and choose targets according to particular standards like position, movement, or shape. Without the need for immediate human directions, the AWS can carry out the engagement on its own once a target has been chosen, including firing a missile or engaging in direct fire (Sharkey, 2019).

AWS raises serious ethical, legal, and strategic issues even while they have the ability to improve operational effectiveness and lower hazards to human soldiers. Because these systems are autonomous, there is a chance that they could make decisions that are against international humanitarian law or misread data, which could cause unintended injury. Furthermore, by enabling quicker, more accurate, and maybe more deadly operations, the deployment of AWS could change the character of combat (Lin, 2018). In order to guarantee that autonomous weapons are employed in compliance with accepted laws of war, including the Geneva Conventions, there are continuous discussions about how to regulate and govern them (Gibbons, 2021).

Autonomous Weapons Systems (AWS) development is fueled by both strategic needs and technological breakthroughs. Robots, sensor systems, and artificial intelligence have advanced quickly, allowing robots to carry out more complex jobs with less assistance from humans. In comparison to human operators, modern artificial intelligence (AI) systems, particularly those that use machine learning and computer vision, can process real-time battlefield data and make snap judgments, enabling faster reaction times (Scharre, 2018). Opportunities for autonomous weapons systems in high-speed, high-risk situations where human reaction would be too sluggish have been made possible by these technologies.

Strategically, the goal of force multiplication and improved operational efficiency is one of the main drivers behind AWS development. Missions can be completed by autonomous systems without

endangering the lives of soldiers, especially in hazardous or inaccessible areas. As a result, militaries can exert force using fewer men and materials. AWS, for example, can work continuously without becoming tired, which is essential for duties including warfare, defense, and surveillance throughout extended operations (Cummings, 2017). Furthermore, AWS is thought to be crucial in thwarting rivals who are also making investments in cutting-edge technologies, which fuels an arms race driven by AI (Boulanin & Verbruggen, 2017). The possibility for accuracy and less collateral damage is another strategic motivator. Supporters contend that AWS can handle vast amounts of sensor data more precisely than humans, which could lead to more precise target identification and a decrease in unintentional harm (Lin et al., 2012). Additionally, in contested or denied situations where remote-controlled equipment might malfunction, like places impacted by electronic warfare or communication jamming, autonomy provides tactical advantages. However, questions concerning accountability, escalation, and adherence to international humanitarian law are raised by AWS's speed and independence. The intricate balance between technological prowess and moral obligation, which continues to be at the center of the global discussion regarding AWS deployment and regulation, is reflected in these worries (Heyns, 2013).

Literature Review

Autonomous weapons systems (AWS) are the result of the incorporation of artificial intelligence (AI) with military technologies. These systems are capable of choosing and attacking targets without direct human supervision. International humanitarian law's (IHL) fundamental standards are being called into question by this technological advancement, especially the concepts of accountability, proportionality, and distinction. Different academics and organizations have looked at how these systems work inside the current legal system and if the laws in place are adequate to handle the special features of AWS (Davison (2016). AWS raises important ethical and legal issues and represents a revolutionary change in combat. Their adherence to the principle of distinction, which mandates that parties to a war distinguish between fighters and civilians, is a crucial concern. AWS may find it challenging to draw these lines, particularly in populous and dynamic situations, which could raise the possibility of unjustified civilian harm (Schmitt and Thurnher, 2013).

The proportionality concept is another area of issue. AWS might not have the judgment and contextual awareness necessary to assess the proportionality of attacks, which could lead to the deployment of excessive or illegal force. Compared to human operators, AWS's ability to evaluate real-time combat scenarios is constrained because they rely on machine learning or pre-programmed algorithms (Amoroso, 2020). Accountability is still one of the most contentious legal issues. It might be difficult to determine who should be held accountable when an AWS causes illegal harm—the state, the developer, or the commander. This problem is known as the "responsibility gap," highlighting the possibility that the autonomous character of these weapons may not be sufficiently addressed by the accountability systems in place (Goussac and Pacholska, 2025). New weapons, tools, or methods of warfare must be evaluated for their compliance with international humanitarian law (IHL) through the legal review procedure specified in Article 36 of Additional Protocol I of the Geneva Conventions. Given AWS's ability to alter behavior based on data inputs and machine learning procedures after deployment, traditional review mechanisms might not be adequate (Boulanin and Verbruggen, 2017).

Beyond legality, ethical issues also influence the conversation about AWS. Giving machines the ability to make life-or-death judgments runs the risk of eroding moral accountability in combat. He argues that in order to guarantee that moral and legal norms are respected during military operations, "meaningful human control" is essential (Sharkey, 2019).

International attempts to control AWS have been sluggish and dispersed. States, specialists, and civil society organizations have convened for discussions under the Convention on Certain Conventional Weapons (CCW), but agreement on legally enforceable norms is still elusive. In order to guarantee that the use of AWS stays within the parameters of international law, the United Nations Institute for Disarmament Research (UNIDIR, 2025)

emphasizes the significance of developing precise standards and definitions. Overall, the literature suggests a growing concern that existing IHL frameworks may be inadequate to fully address the challenges posed by AWS. Scholars generally concur that further legal, ethical, and policy work is required to control AWS and guarantee that its use does not jeopardize fundamental humanitarian safeguards during armed conflict (United Nations, 2025).

Recommendations

1. **Develop a Specific Legal Framework for AWS**

There is an urgent need for a specific international legal instrument because the current IHL is inadequate in addressing the special features of AWS. Clear definitions of autonomy, the boundaries of permissible AWS use, and the application of concepts like proportionality and distinction to machine-based decision-making should all be included in this framework. In-depth instructions on compliance requirements during AWS's design, development, and deployment should also be included.

2. Ensure Meaningful Human Control

To mitigate the risks posed by fully autonomous systems, states must embed the principle of "meaningful human control" into legal and operational standards. This involves requiring human oversight at critical stages of AWS operations—particularly target selection and engagement—to maintain accountability and ethical responsibility. Such a requirement can help prevent unlawful or indiscriminate attacks and reinforces human judgment in life-and-death decisions.

3. Close Accountability Gaps

A robust doctrine of accountability is essential to ensure that violations of IHL by AWS can be addressed. Legal reforms should clarify the lines of responsibility among programmers, military commanders, and states. Establishing legal mechanisms that hold individuals and institutions accountable for AWS malfunctions or misuse—regardless of the level of autonomy—will uphold justice and deter negligence or abuse.

4. Enhance Article 36 Review Mechanisms

Article 36 of Additional Protocol I obliges states to review new weapons for legality. However, traditional review processes must be adapted to accommodate the complexities of AWS, particularly regarding unpredictable behavior, adaptive learning, and algorithmic decision-making. This may require creating international guidelines or expert panels to assist states in conducting meaningful, standardized reviews.

5. Promote Multilateral Dialogue and Ethical Consensus

Sustained multilateral engagement through forums such as the Convention on Certain Conventional Weapons (CCW) is critical to build a shared understanding and consensus on the acceptable use of AWS. Such dialogues should prioritize humanitarian concerns and reflect the ethical values embedded in the Martens Clause. Participation should include diverse stakeholders—states, civil society, legal experts, and technologists.

6. Support Interdisciplinary Research and Transparency

Governments and international institutions should invest in interdisciplinary research to better understand the technical, legal, and ethical implications of AWS. Transparency in the development and use of these systems, including data sharing and reporting mechanisms, can help build trust, support evidence-based policymaking, and ensure compliance with international norms.

Research Question

How effectively can current international humanitarian law principles govern the application of AI-powered autonomous weapons systems in armed conflict?

Methodology

This study employs a qualitative legal research methodology, integrating a case study approach, qualitative content analysis, and doctrinal legal analysis to evaluate how well International Humanitarian Law (IHL) governs the use of artificial intelligence (AI)-powered autonomous weapons systems (AWS). The interpretation and

implementation of fundamental IHL concepts, such as distinction, proportionality, and precaution, in the context of AI-enabled autonomous warfare are the main objectives of the doctrinal component. This study will be based on primary legal sources, such as the Geneva Conventions, their Additional Protocols, the International Committee of the Red Cross's (ICRC) codified customary international humanitarian law, and the Martens Clause.

The study uses qualitative content analysis of important documents, including state submissions to the UN Convention on Certain Conventional Weapons (CCW), reports from non-governmental organizations and international organizations (like Human Rights Watch and the Stop Killer Robots campaign), and pertinent scholarly literature, to supplement the doctrinal framework. To find new interpretations and legal stances regarding AWS, these writings will be analyzed for recurrent themes, including meaningful human control, accountability, legality, and ethical concerns.

The legal analysis will also be contextualized through the use of a case study approach. The alleged use of Israel's Harpy loitering munition, Russia's Uran-9 unmanned ground vehicle tested in Syria, the United States' Project Maven, which incorporates artificial intelligence (AI) into target recognition processes, and the alleged deployment of Turkey's KARGU-2 drone in Libya (2020), which may be the first known autonomous drone attack without human input, are some examples. To assess the degree to which actual AWS use is applying or challenging established legal standards, these case studies will be examined via legal and ethical frameworks.

Lastly, a comparative study of state practice and normative perspectives will be incorporated to evaluate differences in legal reasoning and policy stances, especially between emerging countries and big military powers. There will also be a critical analysis of the normative foundations of IHL, particularly human dignity and the Martens Clause, as well as its ethical aspects. The validity of results will be strengthened through the triangulation of data from case studies, documentary content, and doctrinal sources. The report notes many restrictions that could affect the availability and dependability of data, such as limited access to classified information and the quickly developing nature of AI technologies.

Findings and Analysis

The degree to which autonomous weapon systems (AWS) can be regulated under current IHL principles

The current framework of International Humanitarian Law (IHL) is seriously challenged by autonomous weapons systems (AWS), especially with regard to the fundamental concepts of prudence, proportionality, and distinction. Although these principles are still applicable and legally binding, there are significant gaps in their interpretation, accountability, and technological viability when applied to AWS.

1 Distinction Principle

According to the principle of distinction, which is enshrined in Additional Protocol I (AP I) Article 48, parties to a conflict must always make a distinction between civilians and combatants as well as between civilian objects and military goals (Geneva Conventions Additional Protocol I, 1977). IHL is based on this duty.

Autonomous weapons cast doubt on the ability of machines to make such complicated, dynamic decisions. When it comes to identifying combatants who might not be wearing uniforms or who are congregated with civilians, AWS lacks the moral judgment and contextual awareness that human operators possess (ICRC, Customary IHL Study, Rule 1). Even highly sophisticated algorithms have trouble processing unclear or insufficient input, particularly when attackers purposefully obfuscate the distinctions.

Although the ICRC stresses that "the use of AWS must not lead to indiscriminate attacks" (ICRC Commentary on the Additional Protocols, 1987), it is still uncertain if technology can achieve this need. As a result, although the notion of differentiation is still relevant, its actual application through AWS is hotly debated.

2 The Proportionality Principle

Attacks that are predicted to result in incidental civilian casualties that are disproportionate to the expected military advantage are prohibited under

proportionality (AP I, Article 51(5)(b); Customary IHL, Rule 14). This notion necessitates weighing the human cost versus military requirement using a value-based approach.

The evaluation of proportionality is intrinsically subjective and situational, frequently necessitating quick moral and legal decisions under duress. Even with pre-programmed parameters or machine learning skills, AWS might not be able to assess proportionality in real time, particularly in urban warfare where civilian presence is unpredictable and fluctuating.

According to the ICRC, "the legal responsibility for assessing the proportionality of an attack cannot be transferred to a machine" (ICRC, Views on Autonomous Weapon Systems, 2016), assigning proportionality judgments to machines runs the risk of weakening legal protections. Therefore, entrusting AWS with proportionality evaluations runs the danger of breaking this important IHL norm, even though they might help with targeting decisions.

3 The Precautionary Principle

Belligerents are required by the precautionary principle to take all reasonable measures to prevent or lessen incidental harm to civilians (AP I, Articles 57(1)-(2); Customary IHL, Rule 15). This entails confirming targets and selecting attack strategies that provide the least threat to civilians.

Theoretically, by decreasing reaction times and increasing accuracy, AWS could improve adherence to precaution. The system must, however, have dependable, real-time situational awareness and be able to adjust to changing battlefield conditions, which is a requirement that is not yet satisfied by existing technology.

Additionally, precaution entails using human judgment in real-time, such as stopping an attack because of fresh intelligence, which AWS does not consistently offer. "In cases not covered by existing rules, civilians remain under the protection of principles of humanity and the dictates of public conscience," according to the Martens Clause, which is incorporated in the preamble to AP I and earlier in the 1899 Hague Convention II. This emphasizes the ethical aspect of caution, which AWS is not prepared to manage.

Case study Analysis

1. KARGU-2 Drone in Libya (2020)

According to reports, Turkey's STM created the loitering munition known as the KARGU-2, which was used in Libya during the 2020 war. Without explicit human guidance, the drone might have engaged human targets on its own, according to a UN Panel of Experts assessment (UN Security Council, 2021). The deployment of an AWS in deadly activities without direct human supervision may be unusual in this case. Since it is yet unknown how or whether the KARGU-2 distinguished between fighters and civilians, this incident calls into question the IHL need of distinction. It is doubtful whether the drone can adhere to AP I, Article 48 (Geneva Conventions Additional Protocol I, 1977) – differentiating legitimate targets — given its dependence on machine learning-based object recognition. Furthermore, command accountability is masked when there is no human involved, which raises issues with usual IHL Rule 152, which holds commanders accountable for their failure to prevent or punish war crimes (ICRC, 2005).

2. Israel's Harpy Loitering Munition

An automated radar signal detection and destruction system, the Harpy system was created by Israel Aerospace Industries. Even though it can only make decisions based on radar signatures, which streamlines the targeting logic, it functions somewhat independently after launch with little to no human supervision.

Utilizing this method only against radar installations—which are typically military targets—may better adhere to the principle of distinction. Contextual use determines legality, though. Problems with proportionality and prudence arise when operations are conducted against movable targets or in crowded urban areas. According to the ICRC (2016), especially in intricate operational situations, "autonomous systems must be used in ways that ensure meaningful human control."

3. Russia's Uran-9 in Syria

Syria saw the deployment of Russia's Uran-9 Unmanned Ground Vehicle to aid in urban combat operations. Russian military assessments, however, state that the system has serious reliability problems,

such as poor targeting performance, slow response times, and a loss of human controller connection (Muraviev, 2018).

This instance serves as an example of how IHL compliance might be jeopardized by technological constraints. The vehicle violates AP I Articles 51(4)–(5) (Geneva Conventions Additional Protocol I, 1977) by increasing the risk of indiscriminate or disproportionate assaults due to its incapacity to sustain operational awareness and dependable communication. The case also raises moral questions about entrusting force decisions to untested technology, which could go against the Martens Clause as it doesn't adhere to the "dictates of public conscience."

4. U.S. Project Maven

The U.S. Department of Defense launched Project Maven, an AI program, to enhance images processing for targeting and surveillance, especially in drone operations. Even if it isn't an AWS, it is a prime example of how AI is increasingly being used into deadly decision-making processes.

The delegation of targeting assessments presents ethical and legal issues according to Project Maven. Reliance on algorithmic outputs might skew or automate judgments in a way that compromises proportionality and prudence, even with human monitoring (Crootof, 2019). Commanders are required by AP I Article 57 to confirm targets and take all reasonable measures; IHL compliance may be jeopardized if an excessive dependence on AI lowers these responsibilities to approving algorithmic results.

Fragmentation in Global Approaches to AWS Regulation

Significant fragmentation in global approaches to regulating autonomous weapons systems (AWS), particularly with regard to their compatibility with International Humanitarian Law (IHL), is revealed by a qualitative content analysis of important international documents, including state submissions to the UN Group of Governmental Experts (GGE) on Lethal Autonomous Weapons Systems (LAWS), NGO advocacy materials, and scholarly research. Although the majority of nations agree that AWS is covered by IHL, there isn't a consensus on how to operationalize established principles like distinction, proportionality, and precaution in systems that do not have direct human oversight. The demand for "meaningful human control" over AWS is a recurring topic, with nations such as Japan, the Netherlands, and Germany stressing the need to preserve human judgment in life-or-death decisions in order to maintain accountability and legal compliance (UN GGE, 2020). Further, non-governmental organizations like Human Rights Watch (2021) and the Campaign to Stop Killer Robots have pushed for a legally binding agreement that forbids fully autonomous weapons on the grounds that machines are incapable of replicating human morality or judgment, particularly in dynamic combat situations where it is context-dependent to distinguish between combatants and civilians (ICRC, 2019). On the other hand, technologically sophisticated military nations like the US, Russia, and Israel oppose calls for new prohibitions, arguing that existing IHL, including Article 36 weapons reviews under Additional Protocol I, offers an adequate legal framework to regulate the creation and application of AWS (UN GGE, 2020).

According to scholarly evaluations, AWS poses accountability issues, especially when machine learning and algorithmic opacity make it difficult to determine who is legally liable for infractions (Crootof, 2016; Boulanin & Verbruggen, 2017). The regulatory environment is fractured as a result of these variations in legal interpretation, ethical viewpoint, and technical optimism. As a result, there is increasing pressure on the international community to balance these viewpoints and create more precise legal standards that guarantee AWS complies with the fundamental principles of IHL and the Martens Clause, which highlights the importance of human values and public conscience in filling in legal gaps (ICRC, 2005).

Comparative Legal and Normative Evaluation of Autonomous Weapon Systems

The debate over the ethics and legality of autonomous weapon systems (AWS) demonstrates the intricate relationship between new technologies and the current International Humanitarian Law (IHL) frameworks. AWS proponents contend that these systems can improve adherence to IHL principles like distinction and proportionality if they

are appropriately thought out and put through stringent weapons reviews, like those required by Article 36 of Additional Protocol I. The elimination of emotional bias and operational tiredness may allow autonomous systems to perform better than human operators, thereby leading to more accurate targeting judgments. According to the Stockholm International Peace Research Institute (2021), this stance is backed by the fact that AWS could be used legally provided that strong protections, like significant human oversight and technological review processes, are integrated into its development and operation (Schmitt, 2013). The Martens Clause, which invokes the "principles of humanity and the dictates of public conscience," casts doubt on this viewpoint, nevertheless, and raises serious ethical and legal issues. Depriving the use of lethal force of meaningful human control), compromises the moral basis of international humanitarian law and jeopardizes human dignity (International Committee of the Red Cross, 2019). This worry is shared by the International Committee of the Red Cross (2019), which claims that completely autonomous systems are incapable of understanding context-specific moral nuances or making value-based decisions—two critical skills for adhering to humanitarian principles and international humanitarian law. By giving non-sentient machines the ability to make life-or-death choices, AWS may nonetheless be in violation of international law, according to these normative arguments, even if it complies technically (International Committee of the Red Cross, 2019).

Furthermore, these conflicts are reflected in governmental policies and foreign stances. Other states, like Austria and Brazil, advocate for stricter normative boundaries or outright bans, citing the unpredictable humanitarian consequences and accountability gaps associated with AWS, while nations like the United States and Israel support a cautious integration of AWS within existing legal frameworks (ICRC, 2019; SIPRI, 2021). The absence of a cohesive global reaction serves as an example of the more general difficulty in interpreting and implementing IHL rules in a battlefield that is changing rapidly. All things considered, the comparative legal and normative analysis reveals a widening gap between those who prioritize ethical restraints based on public conscience and human dignity and those who emphasize technical growth within the confines of current laws.

Gaps in International Humanitarian Law Concerning Autonomous Weapon Systems

International Humanitarian Law (IHL) faces significant challenges in effectively regulating Autonomous Weapon Systems (AWS), primarily due to the unique characteristics of these technologies.

1. Accountability Deficits

A central concern is the "accountability gap" that arises when AWS operate without direct human intervention. Traditional IHL frameworks rely on human agency to assign responsibility for unlawful acts. However, when AWS make independent targeting decisions, it becomes challenging to attribute liability, especially in cases where harm results from system errors or unpredictable behaviors. This ambiguity complicates the enforcement of legal norms and the provision of remedies for victims.

2. Challenges to the Martens Clause

The Martens Clause, which emphasizes the principles of humanity and the dictates of public conscience, serves as a moral compass in IHL. The deployment of AWS, particularly those capable of making life-and-death decisions autonomously, raises questions about compliance with this clause. The absence of human judgment in critical decisions may contravene the ethical standards envisioned by the Martens Clause, leading to calls for reevaluating the legality of such systems.

3. Procedural and State Responsibility Issues

AWS introduce complexities in attributing state responsibility for violations of IHL. Errors in AWS operations, especially those stemming from software glitches or unforeseen interactions with dynamic environments, challenge the traditional notions of state accountability. Determining liability becomes problematic when malfunctions cannot be directly linked to human negligence or intent, necessitating a reevaluation of existing legal doctrines to address these nuances.

4. Limitations in Existing Legal Frameworks
The current IHL provisions, including the Geneva Conventions and their Additional Protocols, were established before the advent of AWS and may not adequately address the specific challenges posed by these technologies. For instance, the requirement for weapons reviews under Article 36 of Additional Protocol I may not sufficiently capture the complexities of AWS, leading to potential gaps in ensuring compliance with IHL.

Conclusion

In a nutshell current international humanitarian law offers a fundamental framework for controlling armed conflict, but it is ill-prepared to handle the intricate problems presented by autonomous weapon systems. International attention is desperately needed to close the gaps in ethical monitoring, legal clarity, and accountability. To guarantee that emergent military technologies are managed in a manner that respects humanitarian values, legal accountability, and human dignity, it is imperative to strengthen the legal system through new frameworks, enforce real human control, and promote international consensus.

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