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The Legality and Implications of Autonomous Weapons System (AWS) under International Humanitarian Law

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Abstract

The emergence of autonomous weapons systems (AWS), which can select and engage targets without human intervention, presents significant challenges to international humanitarian law (IHL). Autonomous Weapons systems raises significant concern under international humanitarian law, as their ability to select and engage targets without human intervention may lead to unintended harm to civilians and non-combatants, potentially violating principles of distinction and proportionality. The legality of autonomous weapons systems is uncertain and their development and use may require new international regulations to ensure compliance with humanitarian law and prevent potential war crimes, emphasizing the need for ongoing debate and clarification on their permissible use in armed conflicts. The objective of this paper is to assess the risks and challenges posed by AWS to civilians, noncombatants and international peace and security. The research methodology employed in this paper was content analysis .Relevant documents, including national laws, international agreements and policy statements are analyzed to identify trends and patterns of the regulations of AWS. The paper findings reveals that the development and use of AWS raises fundamental ethical concerns, as they delegate life and death decisions to machines. The paper hereby recommend that there should be an establishment of clear guidelines and standards for the development, deployment and use of AWS, including requirements for predictability, reliability and transparency

Keywords: Legality, implications, autonomous, weapons, International

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1. Introduction

Autonomous weapons systems (AWS), which have the capability to operate independently without direct human input, have emerged as a focal point of debate within international humanitarian law

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(IHL).¹ These weapons, often referred to as “killer robots”, operate based on artificial intelligence and are capable of selecting and engaging targets without real-time human intervention.² The growing use of artificial intelligence in military technologies raises pressing legal and ethical concerns about the application of IHL to AWS.

IHL, also known as the law of armed conflict, regulates the conduct of hostilities with the aim of protecting civilians and ensuring that warfare is conducted within legal boundaries.³ The International Committee of the Red Cross, identified the key principles underpinning IHL to include distinction, proportionality, and necessity, each of which plays a crucial role in determining the legality of Autonomous Weapons systems. The principle of distinction requires that parties to a conflict distinguish between combatants and civilians, while proportionality limits attacks that may cause excessive harm to civilians relative to the anticipated military advantage. The principle of necessity, on the other hand, mandates that only military objectives are targeted to achieve legitimate military aims.⁴

This paper explores the legal and ethical implications of deploying AWS under IHL. It considers whether existing legal frameworks, particularly the Geneva Conventions and their Additional Protocols, are equipped to regulate AWS, or whether new, specialized rules are required. Furthermore, it delves into the question of accountability, examining who bears responsibility when autonomous systems commit violations of IHL.

2. Historical Background of Autonomous Weapon Systems

The concept of using autonomous systems in warfare is not entirely new. Since the advent of modern military technology, there has been a continuous effort to develop machines that could enhance the capabilities of human soldiers, reduce risks to military personnel, and increase efficiency on the battlefield. Autonomous Weapon Systems (AWS), which operate with little to no human intervention in selecting and engaging targets, represent the latest stage in this technological evolution. To fully understand the current legal and ethical debates surrounding AWS, it is essential to examine their historical development.

2.1 Early automated military systems

The roots of AWS can be traced back to the early 20th century, particularly during World War II, when automated defense systems were first introduced. Anti-aircraft systems, such as the German “Wasserfall” missile system, included basic forms of automation, although they required significant human oversight for targeting and launching.⁵ The Cold War further accelerated the development of unmanned systems, especially with the introduction of remotely piloted drones by the United States and the Soviet Union for surveillance and reconnaissance purposes. These early drones, however, were not autonomous; human operators controlled them remotely, guiding their missions and targeting decisions.

¹ Neil Davison, ‘Autonomous Weapons Systems under International Humanitarian Law’ (2017) 94 Int’l Rev Red Cross 1069

² Peter Asaro, ‘On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-making’ (2012) 94 Int’l Rev Red Cross 687.

³ Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law* (Cambridge University Press 2005).

⁴ Marco Sassoli, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar Publishing, 2019)

⁵ Matthew Bolton, *Modernizing Arms Control: Autonomous Weapons Systems and the Changing Laws of War* (Oxford University Press 2021) 33.

In the 1980s, advances in microelectronics and artificial intelligence (AI) began to revolutionize military technologies.⁶ The creation of semi-autonomous systems, such as the U.S. military's "Patriot" missile defense system, introduced machines that could track and engage incoming missiles without direct human involvement.⁷ While these systems still operated under significant human supervision, they marked a critical transition towards the development of AWS.

2.2 The Rise of artificial intelligence in military systems

The rapid development of AI in the late 20th and early 21st centuries paved the way for more sophisticated autonomous systems. AI's ability to process vast amounts of data and make decisions in real-time became an attractive feature for military systems. The use of AI in warfare has significantly expanded beyond missile defense to include offensive capabilities, surveillance, reconnaissance, and cyber operations.⁸

The first notable fully autonomous military systems were deployed for mine detection and neutralization. For example, the U.S. Navy's Mk 60 CAPTOR mines, developed during the 1970s and 1980s, could autonomously detect and engage enemy submarines.⁹ These systems, while limited in their operational scope, demonstrated the potential for machines to autonomously carry out specific military tasks.

2.3 AWS in the 21st century: drones, loitering munitions, and beyond

The 21st century has seen a marked increase in the development and use of AWS. Unmanned aerial vehicles (UAVs), commonly known as drones, are the most prominent example of semi-autonomous systems in modern warfare. Although many drones, such as the U.S. MQ-9 Reaper, still require human operators for target selection and engagement, advancements in AI and machine learning are driving efforts towards full autonomy.¹⁰ The increasing use of "loitering munitions", such as the Israeli-made Harpy drone, represents a further step towards autonomy. These drones are capable of autonomously patrolling an area, identifying targets based on pre-programmed criteria, and attacking without human intervention.¹¹

Furthermore, several states have invested heavily in research and development of AWS with the aim of creating systems that can independently identify and engage targets in complex combat environments.¹² For instance, the U.S. military's "Loyal Wingman" program seeks to develop drones that can operate in concert with manned aircraft, executing missions autonomously based

⁶ Peter Asaro, 'Robots and Responsibility from a Legal Perspective' in Patrick Lin, Keith Abney and George A. Bekey (eds), *Robot Ethics: The Ethical and Social Implications of Robotics* (MIT Press 2011) 163.

⁷ Michael Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton University Press 2010) 122.

⁸ John Arquilla and David Ronfeldt, In *Athena's Camp: Preparing for Conflict in the Information Age* (Rand Corporation 1997) 47.

⁹ Rebecca Crotoft, 'The Killer Robots Are Here: Legal and Policy Implications' (2015) 36 *Cardozo L Rev* 1837, 1845.

¹⁰ Noel Sharkey, 'Saying "No!" to Lethal Autonomous Targeting' (2010) 9 *Journal of Military Ethics* 369.

¹¹ Peter Bergen and Daniel Rothenberg (eds), *Drone Wars: Transforming Conflict, Law, and Policy* (Cambridge University Press 2015) 78.

¹² Vincent Boulanin and Maaïke Verbruggen, *Mapping the Development of Autonomy in Weapon Systems* (Stockholm International Peace Research Institute 2017) 22.

on high-level directives from human pilots.¹³ Similarly, Russia's "Uran-9" combat robot and China's AI-driven systems signal that the race to develop AWS is a global phenomenon.¹⁴

2.4 The implications of autonomous weapons: the future of warfare

The rapid technological advancements that have fueled the development of AWS have raised significant questions about their implications for the future of warfare. Some proponents argue that AWS can enhance precision, reduce civilian casualties, and limit the risks faced by soldiers.¹⁵ However, critics caution that AWS may lower the threshold for engaging in conflict, leading to more frequent and indiscriminate warfare.¹⁶ Furthermore, there are concerns about the potential for unintended consequences, such as malfunctions or the inability of machines to make complex ethical decisions, which could result in violations of international humanitarian law (IHL).¹⁷

The emergence of AWS thus represents a pivotal moment in the history of military technology. As states continue to develop and deploy these systems, the international community must grapple with the legal, ethical, and strategic implications of warfare increasingly dominated by autonomous machines.

3. International Humanitarian Law (IHL) and Its Key Principles

International Humanitarian Law (IHL), also referred to as the law of armed conflict or the law of war, is a set of rules that seek to limit the effects of armed conflict on people and property.¹⁸ Its primary aim is to protect those who are not, or are no longer, participating in hostilities, such as civilians, medical personnel, and prisoners of war. IHL also regulates the means and methods of warfare, ensuring that the conduct of hostilities is governed by legal norms.¹⁹

IHL is derived from both treaty law, such as the Geneva Conventions of 1949 and their Additional Protocols of 1977, and customary international law.²⁰ Together, these laws aim to balance military necessity with humanitarian considerations, ensuring that the suffering caused by armed conflicts is minimized.²¹ The four Geneva Conventions of 1949 are the cornerstone of modern IHL, providing protections for the wounded, sick, shipwrecked, prisoners of war, and civilians. The Additional Protocols of 1977 further expanded these protections by addressing the conduct of hostilities, especially in conflicts involving non-state actors.²² Moreover, customary IHL continues

¹³ Michael C. Horowitz, Paul Scharre, and Ben FitzGerald, 'The Coming Swarm: The Militarization of Artificial Intelligence' (Center for a New American Security, 2015) <https://www.cnas.org/publications/reports/the-coming-swarm> accessed 23 October 2024.

¹⁴ Samuel Bendett, 'Russian and Chinese Progress in Military Robotics' (2018) 40 War on the Rocks <https://warontherocks.com> accessed 23 October 2024.

¹⁵ P.W. Singer, 'The Ethics of Killer Applications: Why Is It So Hard to Talk About Morality When It Comes to New Military Technology?' (2010) 9 Journal of Military Ethics 299.

¹⁶ Noel E. Sharkey, 'Autonomous Weapons Systems, Killer Robots and Human Dignity' (2018) 33 Ethics & Information Technology 145.

¹⁷ Bonnie Docherty, 'Mind the Gap: The Lack of Accountability for Killer Robots' (Human Rights Watch, 2015) <https://www.hrw.org/report/2015/04/09/mind-gap/lack-accountability-killer-robots> accessed 23 October 2024.

¹⁸ Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law* (Cambridge University Press 2005) 3.

¹⁹ ICRC, *What Is International Humanitarian Law?* (ICRC Advisory Service on IHL, July 2004) https://www.icrc.org/en/doc/assets/files/other/what_is_ihl.pdf accessed 23 October 2024.

²⁰ Geneva Convention Relative to the Protection of Civilian Persons in Time of War (Fourth Geneva Convention) (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 287 (GC IV).

²¹ Andrew Clapham, *The Oxford Handbook of International Law in Armed Conflict* (OUP 2014) 45.

²² Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I) (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 3 (AP I).

to evolve as states develop practices that become legally binding even in the absence of treaty provisions.²³

At the heart of IHL are three fundamental principles: distinction, proportionality, and necessity. These principles guide the conduct of hostilities and aim to ensure that armed conflicts are waged in a manner that limits harm to civilians and non-combatants.²⁴

3.1 Principle of distinction

The principle of distinction is one of the cornerstones of IHL. It requires that parties to a conflict must always distinguish between combatants and civilians, as well as between military objectives and civilian objects.²⁵ This principle ensures that attacks are directed only against combatants and military objectives and not against civilians or civilian property.

Article 48 of Additional Protocol I (1977) to the Geneva Conventions codifies this principle by stating that “the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives”.²⁶ A breach of this principle, such as the intentional targeting of civilians or civilian infrastructure, constitutes a war crime under both treaty law and customary international law.²⁷

In the context of Autonomous Weapon Systems (AWS), the principle of distinction poses significant legal and ethical challenges. There are concerns about whether AWS can reliably differentiate between combatants and civilians, particularly in complex urban environments where civilians and combatants may be closely intermingled.²⁸ The inability to ensure proper distinction raises questions about the legality of deploying AWS in armed conflicts.²⁹

3.2 Principle of proportionality

The principle of proportionality requires that the harm caused to civilians or civilian objects must not be excessive in relation to the concrete and direct military advantage anticipated from an attack.³⁰ This principle is enshrined in Article 51(5)(b) of Additional Protocol I, which prohibits “an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated”.³¹

The principle of proportionality does not prohibit civilian harm entirely, but it seeks to limit the extent of that harm, balancing military objectives with humanitarian concerns. Violations of this principle, such as launching disproportionate attacks that result in excessive civilian casualties, are

²³ Jean-Marie Henckaerts and Louise Doswald-Beck (n 23) 37.

²⁴ Marco Sassòli, *International Humanitarian Law: Rules, Controversies, and Solutions to Problems Arising in Warfare* (Edward Elgar 2019) 98.

²⁵ API, Art 48

²⁶ Ibid, Art 48

²⁷ Rome Statute of the International Criminal Court (adopted 17 July 1998, entered into force 1 July 2002) 2187 UNTS 3 (Rome Statute), art 8(2)(b)(i).

²⁸ Matthew Bolton, *Modernizing Arms Control: Autonomous Weapons Systems and the Changing Laws of War* (Oxford University Press 2021) 50.

²⁹ Noel Sharkey, ‘Saying “No!” to Lethal Autonomous Targeting’ (2010) 9 *Journal of Military Ethics* 369.

³⁰ Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict* (3rd edn, Cambridge University Press 2016) 119.

³¹ API, Art 51(5)(b)

considered war crimes under both treaty and customary law.³² AWS pose unique challenges to the principle of proportionality. While these systems may be capable of processing vast amounts of data and making real-time calculations, there are concerns about whether they can accurately assess proportionality in complex and rapidly changing battlefield conditions.³³ Furthermore, determining what constitutes ‘excessive’ harm is a subjective judgment that may be difficult for autonomous systems to make without human oversight.³⁴

3.3 Principle of military necessity

The principle of military necessity permits only those measures that are required to achieve a legitimate military objective and that are not otherwise prohibited by IHL.³⁵ This principle allows for the use of force, but only when it is necessary to weaken the enemy's military capacity. The 1868 St. Petersburg Declaration provides one of the earliest articulations of the principle of necessity, stating that “the only legitimate object which States should endeavour to accomplish during war is to weaken the military forces of the enemy”.³⁶ This principle is closely related to both distinction and proportionality, as the use of force must be directed only against legitimate military objectives and must not result in unnecessary suffering or destruction.

AWS raise questions about how the principle of necessity is applied in autonomous weapons system warfare. Ron Arkin,³⁷ Peter Asaro³⁸ and Elke Schwarz³⁹ argue that AWS could enhance the precision of attacks, thereby minimizing unnecessary suffering. However, others caution that the use of AWS may lead to the over-militarization of conflicts, lowering the threshold for the use of force and increasing the likelihood of unnecessary attacks.⁴⁰

3.4 Principle of precaution in attack

Article 57 of Additional Protocol I introduces the principle of precaution, which requires parties to take all feasible precautions to minimize civilian harm when planning and executing attacks.⁴¹ This includes verifying that the targets are military objectives, choosing means and methods of warfare that avoid or minimize civilian harm, and giving advance warnings to civilians where possible.

In the context of AWS, the principle of precaution underscores the need for human oversight and control. Critics of AWS argue that fully autonomous systems may not be capable of taking all feasible precautions, especially in complex environments where human judgment is crucial.⁴² Therefore, ensuring that AWS comply with this principle may require maintaining meaningful human control over key decisions in the targeting process.

³² Rome Statute (n-32) art 8(2)(b)(iv)

³³ Michael N. Schmitt, ‘Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics’ (2013) 4 *Harvard National Security Journal* 1, 27.

³⁴ Ibid

³⁵ Robert Kolb and Richard Hyde, *An Introduction to the International Law of Armed Conflicts* (Hart Publishing 2008) 53.

³⁶ Declaration Renouncing the Use, in Time of War, of Explosives Projectiles under 400 Grammes Weight (St Petersburg Declaration) (adopted 11 December 1868)

³⁷ Ron Arkin, *The case for ethical autonomy in unmanned systems*(2010)

³⁸ See (n-2)

³⁹ Elke Schwarz, *autonomous weapons systems and meaningful human control*(2021)

⁴⁰ Noel E. Sharkey, *Autonomous Weapons Systems, Killer Robots and Human Dignity*’(2018) 33 *Ethics & Information Technology* 145

⁴¹ API, Art 57.

⁴² Bonnie Docherty, ‘Mind the Gap: The Lack of Accountability for Killer Robots’ (Human Rights Watch, 2015) <https://www.hrw.org/report/2015/04/09/mind-gap/lack-accountability-killer-robots> accessed 23 October 2024.

4. The Legal Status of Autonomous Weapon Systems under Existing International Law

The legal status of Autonomous Weapon Systems (AWS) under existing international law remains a highly contested issue. Although there is no specific international treaty that explicitly addresses the use of AWS, their legality can be assessed through the application of existing International Humanitarian Law (IHL), International Human Rights Law (IHRL), and customary international law.⁴³ The development of AWS, which can select and engage targets without human intervention, according to Heather M. Roff raises significant legal and ethical concerns about their compliance with fundamental principles of IHL, such as distinction, proportionality, military necessity, and accountability.⁴⁴

4.1 AWS and international humanitarian law (IHL)

In his views, Michael N. Schmitt, under IHL, all weapons and methods of warfare must comply with the principles of distinction, proportionality, and military necessity.⁴⁵ These principles are codified in the Geneva Conventions of 1949 and their Additional Protocols of 1977, as well as customary international law.⁴⁶ The application of these principles to AWS poses unique challenges due to the autonomous nature of these systems.

- a) The principle of distinction requires that combatants distinguish between civilians and combatants and between civilian objects and military objectives.⁴⁷ AWS, which may operate with minimal or no human oversight, must be able to reliably differentiate between these categories in complex and rapidly changing environments. Critics argue that current technological capabilities are insufficient to guarantee that AWS can consistently comply with this requirement, raising the risk of unlawful targeting of civilians and civilian objects.⁴⁸
- b) The principle of proportionality prohibits attacks in which the incidental harm to civilians or civilian objects would be excessive in relation to the anticipated military advantage.⁴⁹ AWS must be capable of assessing proportionality in real time, which requires the ability to process large amounts of data and make context-sensitive decisions. However, it remains unclear whether AWS can make such complex assessments without human judgment, particularly in situations where the distinction between combatants and civilians is ambiguous.
- c) The principle of military necessity permits only those actions that are necessary to achieve a legitimate military objective.⁵⁰ AWS must be able to justify their actions based on military necessity, and any use of force must comply with the limits set by IHL. The lack

⁴³ Christof Heyns, 'Autonomous Weapons Systems: Living a Dignified Life and Dying a Dignified Death' in Nehal Bhuta and others (eds), *Autonomous Weapons Systems: Law, Ethics, Policy* (Cambridge University Press 2016) 3.

⁴⁴ Heather M. Roff, 'Autonomous Weapons and the Future of War' (2013) 13(3) *Global Governance* 383.

⁴⁵ Michael N. Schmitt, *The Manual on the Law of Non-International Armed Conflict* (International Institute of Humanitarian Law 2006) 42.

⁴⁶ Geneva Convention Relative to the Protection of Civilian Persons in Time of War (Fourth Geneva Convention) (adopted 12 August 1949, entered into force 21 October 1950) 75 UNTS 287.

⁴⁷ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I) (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 3, art 48.

⁴⁸ See (n-37, 38, 39) above.

⁴⁹ AP I, art 51(5)(b).

⁵⁰ Robert Kolb and Richard Hyde, *An Introduction to the International Law of Armed Conflicts* (Hart Publishing 2008) 53.

of human oversight over AWS may lead to situations where autonomous systems make decisions that violate the principle of necessity, particularly in unforeseen circumstances.

AWS are not prohibited under IHL per se, but their use must comply with these fundamental principles. If AWS cannot meet the requirements of distinction, proportionality, and necessity, their deployment in armed conflict may be considered unlawful.

4.2 AWS and international human rights law (IHRL)

International Human Rights Law (IHRL) continues to apply during armed conflict, particularly in situations where states exercise jurisdiction and control over individuals.⁵¹ The use of AWS must therefore comply with fundamental human rights protections, including the right to life, as enshrined in Article 6 of the International Covenant on Civil and Political Rights (ICCPR).⁵²

Under IHRL, the arbitrary deprivation of life is prohibited, even during armed conflict.⁵³ To comply with this standard, the use of AWS must be both necessary and proportionate.⁵⁴ However, the autonomous nature of AWS complicates the assessment of whether these systems can ensure compliance with the right to life, particularly in scenarios where human judgment is essential for determining the legality of a lethal operation. There are also concerns about the lack of accountability for unlawful killings carried out by AWS. If an AWS makes a decision that results in the unlawful death of civilians, it may be difficult to determine who is legally responsible: the programmer, the commander, or the state that deployed the system.⁵⁵ This lack of clarity has led to calls for a prohibition on fully autonomous weapons until sufficient safeguards can be implemented to ensure compliance with IHRL.⁵⁶

4.3 International treaties and customary law

No international treaty currently addresses AWS explicitly, but their use is governed by general rules applicable to all means and methods of warfare under the 1980 Convention on Certain Conventional Weapons (CCW).⁵⁷ The CCW's framework allows states to negotiate additional protocols to regulate or ban specific types of weapons. In recent years, the international community has been engaged in ongoing discussions under the auspices of the CCW regarding the potential regulation or prohibition of AWS.

In 2019, the Group of Governmental Experts (GGE) on Lethal Autonomous weapon Systems (LAWS) convened to discuss the implications of AWS for international law. While there has been broad agreement on the need to ensure meaningful human control over autonomous systems,⁵⁸

⁵¹ Philip Alston, 'Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions' (UN Doc A/HRC/14/24/Add.6, 2010).

⁵² International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 (ICCPR), art 6.

⁵³ ICCPR, art 6(1).

⁵⁴ Melzer Nils, *Human Rights Implications of the Usage of Drones and Unmanned Robots in Warfare* (European Parliament Directorate-General for External Policies 2013) 20.

⁵⁵ Peter Asaro, 'Robots and Responsibility from a Legal Perspective' in Patrick Lin, Keith Abney and George A Bekey (eds), *Robot Ethics: The Ethical and Social Implications of Robotics* (MIT Press 2011) 169.

⁵⁶ ICRC, *Views of the International Committee of the Red Cross on Autonomous Weapon Systems* (ICRC, 11 April 2016) <https://www.icrc.org/en/document/views-icrc-autonomous-weapon-system> accessed 23 October 2024.

⁵⁷ Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (adopted 10 October 1980, entered into force 2 December 1983) 1342 UNTS 137 (CCW).

⁵⁸ United Nations Institute for Disarmament Research, 'The Weaponization of Increasingly Autonomous Technologies: The Implications for International Law' (2015) 6.

states remain divided on whether a new legally binding instrument is necessary.⁵⁹ Some states, such as the United States and Russia, argue that existing international law is sufficient to regulate AWS, while others, including Austria and Brazil, advocate for a preemptive ban on fully autonomous weapons.⁶⁰

In the absence of a specific treaty, customary international law continues to play a crucial role in determining the legality of AWS. Customary IHL, which is based on state practice and *opinio juris*, applies to all means of warfare, including AWS.⁶¹ As AWS become more prevalent, state practice regarding their use and regulation will shape the development of customary law in this area.

4.4 Accountability and AWS

One of the most pressing legal issues surrounding AWS is the question of accountability. If an AWS commits a violation of IHL or IHRL, such as the unlawful killing of civilians, it is unclear who would bear legal responsibility.⁶² Existing legal frameworks, such as the Rome Statute of the International Criminal Court (ICC), assign criminal responsibility to individuals, not machines.⁶³

The deployment of AWS raises complex questions about how to assign accountability for violations of international law. Would responsibility lie with the human operators who deployed the system, the programmers who designed the algorithm, or the state that authorized its use? These unresolved issues have led to calls for clearer legal frameworks to address accountability for the actions of AWS.

5. Key Legal and Ethical Issues of Autonomous Weapon Systems

The emergence of Autonomous Weapon Systems (AWS) presents several legal and ethical challenges that necessitate rigorous examination. As these systems become increasingly integrated into military operations, concerns arise about compliance with international law, accountability, the potential for misuse, and ethical considerations surrounding their deployment in combat situations. This discussion explores the primary legal and ethical issues associated with AWS.

5.1 Compliance with international humanitarian law (IHL)

One of the foremost legal concerns regarding AWS is their compliance with the principles of International Humanitarian Law (IHL), which governs the conduct of armed conflict.⁶⁴ The key principles of IHL relevant to AWS include:

- a) The principle of distinction mandates that combatants distinguish between civilians and combatants, as well as between military objectives and civilian objects.⁶⁵ AWS must possess the capability to make these distinctions accurately. The lack of reliable technology

⁵⁹ ICRC (n 64).

⁶⁰ Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law* (Cambridge University Press 2005) 75.

⁶¹ Heather Harrison Dinniss, *Autonomous Weapon Systems and the Law of Armed Conflict: Compatibility with International Humanitarian Law* (Oxford University Press 2012) 110.

⁶² Rome Statute of the International Criminal Court (adopted 17 July 1998, entered into force 1 July 2002) 2187 UNTS 3, art 25.

⁶³ Robert Sparrow, 'Killer Robots' (2007) 24 *Journal of Applied Philosophy* 62.

⁶⁴ International Committee of the Red Cross (ICRC), 'What Is International Humanitarian Law?' (2004) https://www.icrc.org/en/doc/assets/files/other/what_is_ihl.pdf accessed 23 October 2024.

⁶⁵ Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I) (adopted 8 June 1977, entered into force 7 December 1978) 1125 UNTS 3, art 48.

raises concerns about the risk of unlawful attacks on civilians, potentially leading to violations of IHL.⁶⁶

- b) The principle of proportionality prohibits attacks that result in excessive collateral damage relative to the anticipated military advantage.⁶⁷ AWS must evaluate the proportionality of their actions in real-time, posing significant challenges given the complexities of armed conflict environments.⁶⁸ An inability to effectively assess proportionality could result in unlawful strikes and civilian casualties.
- c) Determining accountability for violations of IHL poses a significant challenge with AWS. The traditional frameworks of responsibility assign liability to individuals, but the autonomous nature of these systems complicates this paradigm. Questions arise regarding whether responsibility lies with the programmers, military commanders, or the states that deploy the systems.⁶⁹

5.2 Ethical considerations

The deployment of AWS raises profound ethical issues, particularly concerning the moral implications of delegating life-and-death decisions to machines. Key ethical concerns include:

- a) The principle of meaningful human control is central to ethical debates surrounding AWS.⁷⁰ Many experts argue that human oversight is essential in lethal decision-making to ensure adherence to ethical norms and moral accountability. The absence of human judgment in autonomous operations could lead to decisions that violate ethical standards and humanitarian principles.
- b) The use of AWS may contribute to the dehumanization of warfare, where human soldiers are replaced by machines.⁷¹ This shift can alter perceptions of combat and reduce the psychological burden of killing, potentially desensitizing military personnel and society to the realities of war. The ethical implications of this transformation warrant serious consideration.
- c) The potential for AWS to proliferate into the hands of non-state actors and rogue states raises significant ethical concerns.⁷² If AWS are easily accessible or replicable, they may be deployed in ways that contravene international law and ethical norms, leading to increased violence and instability.

⁶⁶ Noel Sharkey, 'Saying "No!" to Lethal Autonomous Targeting' (2010) 9 *Journal of Military Ethics* 369.

⁶⁷ Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict* (3rd edn, Cambridge University Press 2016) 128.

⁶⁸ Michael N. Schmitt, 'Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics' (2013) 4 *Harvard National Security Journal* 1, 30.

⁶⁹ Duncan Lennox, 'Legal and Ethical Implications of Autonomous Weapon Systems' (2014) 11(2) *Journal of International Humanitarian Legal Studies* 259, 264.

⁷⁰ Christof Heyns, 'Autonomous Weapons Systems: Living a Dignified Life and Dying a Dignified Death' in Nehal Bhuta and others (eds), *Autonomous Weapons Systems: Law, Ethics, Policy* (Cambridge University Press 2016) 5.

⁷¹ Martin Schor, 'The Ethics of Autonomous Weapons Systems' in David Danks and Alex Hutchinson (eds), *Artificial Intelligence and Ethics* (Springer 2020) 25.

⁷² Bonnie Docherty, 'Mind the Gap: The Lack of Accountability for Killer Robots' (Human Rights Watch, 2015) <https://www.hrw.org/report/2015/04/09/mind-gap/lack-accountability-killer-robots> accessed 23 October 2024.

5.3 Implications for accountability and justice

The question of accountability for the actions of AWS is critical, particularly in the context of international law and justice.⁷³ The challenges of attributing responsibility for unlawful acts committed by AWS complicate the enforcement of legal norms. In cases of civilian casualties or war crimes involving AWS, the lack of clarity surrounding accountability may hinder efforts to seek justice and remedy for victims.

Additionally, the potential for AWS to operate independently raises concerns about the adequacy of existing legal frameworks to address emerging technologies in warfare.⁷⁴ As technology continues to advance, there may be a growing need for specific regulations governing AWS to ensure compliance with legal and ethical standards.⁷⁵

6. The Current International Debate on Regulating Autonomous Weapon Systems

The regulation of Autonomous Weapon Systems (AWS) has become a focal point of international debate, raising profound legal, ethical, and security concerns. This discourse revolves around the tension between the technological advancements in warfare and the existing legal frameworks, alongside the growing recognition that AWS may require new international regulations. The central issues in this debate include the need for legal clarity, ensuring meaningful human control, and addressing the ethical implications of delegating lethal decisions to machines.

6.1 Calls for a ban or moratorium on AWS

A significant aspect of the debate involves calls for either a ban or moratorium on AWS development and deployment. Human rights organizations, such as Human Rights Watch, and a coalition of non-governmental organizations (NGOs) like: Amnesty International, International Committee for Robots (ICRAC) AND Security and Human Rights in Latin American and the Caribbean (SEHLAC) under the *Campaign to Stop Killer Robots*, have been vocal advocates for a preemptive ban on AWS. They argue that AWS pose risks of indiscriminate killings, lack accountability, and may lead to a dehumanization of warfare. The key argument is that AWS are inherently incompatible with International Humanitarian Law (IHL), particularly the principles of distinction, proportionality, and accountability.⁷⁶

On the other hand, some states and defense experts argue against a complete ban, contending that AWS could be more precise and reduce human error in conflict situations.⁷⁷ They highlight the potential benefits of AWS, such as minimizing risk to military personnel and achieving military objectives more efficiently.⁷⁸ However, they also acknowledge the necessity of establishing robust legal and ethical frameworks to regulate their use.

⁷³ Heather Harrison Dinniss, *Autonomous Weapon Systems and the Law of Armed Conflict: Compatibility with International Humanitarian Law* (Oxford University Press 2012) 110.

⁷⁴ Christof Heyns, 'Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions' (UN Doc A/HRC/32/39, 2016) 17.

⁷⁵ International Committee of the Red Cross (ICRC), *Autonomous Weapon Systems and International Humanitarian Law: An Overview of the Issues* (ICRC, 2019) <https://www.icrc.org/en/publication/autonomous-weapon-systems-and-international-humanitarian-law-overview-issues> accessed 23 October 2024.

⁷⁶ Noel Sharkey, 'Saying "No!" to Lethal Autonomous Targeting' (2010) 9 *Journal of Military Ethics* 369.

⁷⁷ Michael N. Schmitt, 'Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics' (2013) 4 *Harvard National Security Journal* 1, 30.

⁷⁸ Peter W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (Penguin 2009) 125.

6.2 Discussions within the UN and CCW framework

The United Nations (UN), through the Convention on Certain Conventional Weapons (CCW), has been at the center of the formal international debate on AWS. Since 2014, a Group of Governmental Experts (GGE) has been convened under the CCW to discuss the legal and ethical implications of AWS and explore the possibility of regulating or banning such systems.⁷⁹

The concept of meaningful human control has gained significant traction and is seen as a crucial safeguard to prevent violations of IHL and International Human Rights Law (IHRL).⁸⁰ However, there is no consensus among states regarding the specifics of such control. While some states advocate for strict requirements for human involvement, others argue that technological advancements may allow for some level of autonomy without violating IHL. This divide reflects the broader debate on how much autonomy is acceptable in weapon systems, and whether it is feasible to regulate AWS through existing frameworks or if new treaties are necessary.

6.3 Diverging state positions

The international debate is marked by divergent state positions. Several states, including Austria, Brazil, and Chile, have called for a legally binding instrument to regulate AWS or an outright prohibition.⁸¹ These states argue that existing international law is insufficient to address the unique challenges posed by AWS, particularly regarding accountability for violations of IHL and IHRL.

Conversely, states such as the United States, the United Kingdom, and Russia have expressed reservations about new legally binding regulations.⁸² These states argue that existing IHL is sufficient to regulate the use of AWS and that any new regulations could stifle technological innovation. Moreover, they stress that AWS, if properly used, could adhere to the principles of distinction and proportionality better than human soldiers in some scenarios.⁸³

This division underscores the complexity of the AWS debate, with varying levels of commitment to regulation depending on national security interests, technological capabilities, and ethical perspectives.

6.4 Ethical concerns and the role of AI

A significant portion of the international debate focuses on the ethical implications of AWS, particularly the integration of Artificial Intelligence (AI) in warfare.⁸⁴ It is my view that AI-controlled systems may lack the capacity for moral reasoning and empathy, which are essential for making decisions in complex and morally ambiguous combat situations. The concern is that AWS may engage in actions that violate human dignity or result in unlawful harm to civilians, without the possibility of moral accountability.

⁷⁹ United Nations, *Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS)* (United Nations, 2019) <https://www.un.org/disarmament/the-convention-on-certain-conventional-weapons/> accessed 23 October 2024.

⁸⁰ Christof Heyns, 'Autonomous Weapons Systems: Living a Dignified Life and Dying a Dignified Death' in Nehal Bhuta and others (eds), *Autonomous Weapons Systems: Law, Ethics, Policy* (Cambridge University Press 2016) 5.

⁸¹ United Nations Institute for Disarmament Research (UNIDIR), 'Views on the Regulation of Autonomous Weapons' (2020) <https://www.unidir.org/publications/views-regulation-autonomous-weapons> accessed 23 October 2024.

⁸² Bonnie Docherty, 'Losing Humanity: The Case against Killer Robots' (Human Rights Watch, 2012) <https://www.hrw.org/report/2012/11/19/losing-humanity/case-against-killer-robots> accessed 23 October 2024.

⁸³ Michael Horowitz, 'The Ethics and Morality of Robotic Warfare: Assessing the Debate over Autonomous Weapons' (2016) 10 *Journal of Ethics and International Affairs* 143, 147.

⁸⁴ Heather M. Roff, *Autonomous Weapons and the Future of War* (Oxford University Press 2016) 110.

Moreover, the potential for AI systems to malfunction or be hacked raises additional concerns about the reliability and security of AWS.⁸⁵ If an autonomous system were to be compromised or make an incorrect targeting decision, it could result in catastrophic consequences, including mass civilian casualties or unintended escalation of conflict. These ethical and security concerns are central to the debate on whether AWS should be banned or subjected to strict regulation.

6.5 Proposals for regulation

Several proposals have been advanced within the international community regarding the regulation of AWS. One approach is the adoption of a new protocol under the CCW that would explicitly regulate AWS, setting clear standards for meaningful human control, accountability, and compliance with IHL.⁸⁶ This approach would build on existing legal frameworks while addressing the specific challenges posed by autonomous technologies. Another proposal is the creation of a soft law framework, which would provide non-binding guidelines for the development and use of AWS. This could include best practices for states to ensure compliance with international law and mitigate the ethical risks associated with autonomous weapons.⁸⁷ While this approach may lack the enforceability of a legally binding treaty, it could serve as a pragmatic step toward greater international cooperation and norm-building in the regulation of AWS.

7. Case Studies on Autonomous Weapon Systems in Armed Conflict

The deployment of Autonomous Weapon Systems (AWS) in armed conflicts, while not yet widespread, has already demonstrated both their potential capabilities and the legal and ethical challenges they present. Several case studies highlight the increasing use of autonomy in modern warfare, particularly by technologically advanced militaries. These examples offer insight into the practical application of AWS in conflict situations and the complex issues that arise in terms of compliance with International Humanitarian Law (IHL) and ethical concerns.

7.1 The Israeli harpy and harop loitering munitions

Israel has been at the forefront of developing and deploying AWS, particularly loitering munitions, such as the Harpy and Harop systems. These systems are designed to autonomously detect, target, and destroy radar systems without direct human control during the targeting phase.⁸⁸

- a) Developed by Israel Aerospace Industries (IAI), the Harpy is an anti-radar “ire-and-forget” drone that can autonomously loiter in a given area and detect enemy radar signals. Once it locates a target, the Harpy automatically dives to destroy it, with no human intervention required after launch. While the Harpy operates autonomously during its mission, its initial deployment decision remains under human control. This raises questions regarding compliance with IHL, particularly the principles of distinction and proportionality, as the system lacks the capacity to discriminate between military and civilian radar systems during its autonomous targeting phase.⁸⁹

⁸⁵ Vincent Boulanin and Maaïke Verbruggen, *Mapping the Development of Autonomy in Weapon Systems* (SIPRI 2017) 47.

⁸⁶ United Nations, *Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS)* (n 6).

⁸⁷ Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law* (Cambridge University Press 2005) 75.

⁸⁸ Israel Aerospace Industries, ‘HARPY NG – Autonomous Anti-Radiation Weapon’ (IAI, 2020) <https://www.iai.co.il/p/harpy-ng> accessed 23 October 2024.

⁸⁹ Noel Sharkey, ‘Saying “No!” to Lethal Autonomous Targeting’ (2010) 9 *Journal of Military Ethics* 369.

- b) A more advanced version of the Harpy, the Harop also functions as a loitering munition but includes the capability to be human-supervised or fully autonomous.⁹⁰ It has been used in conflicts such as the 2020 Nagorno-Karabakh war, where reports indicated its involvement in targeting enemy assets.⁹¹ While the Harop's autonomous capabilities raise similar legal and ethical concerns as the Harpy, its human-in-the-loop option provides an additional layer of oversight. However, debates persist about the adequacy of this human supervision in complex combat environments

These systems exemplify the growing use of semi-autonomous and autonomous weapons in contemporary conflicts, raising concerns about accountability for potential violations of IHL.

7.2 The U.S. MQ-9 Reaper drone

The United States has heavily relied on unmanned aerial vehicles (UAVs) such as the MQ-9 Reaper for both surveillance and targeted strikes. While the MQ-9 is not fully autonomous, it incorporates increasing levels of automation, particularly in surveillance and navigation.⁹² The Reaper's use in counterterrorism operations, such as the U.S. drone strikes in Afghanistan, Pakistan, and Yemen, has sparked significant debate over the ethical and legal implications of autonomous technologies in warfare.⁹³

The MQ-9 operates with a human in-the-loop for the decision to strike, but its autonomous capabilities in identifying and tracking targets without human intervention are growing. This raises concerns about the adequacy of human oversight in fast-paced combat environments, where decisions must be made rapidly.⁹⁴ Critics argue that increasing reliance on automation in targeting decisions risks reducing the level of concerning distinction and proportionality.⁹⁵

Moreover, the use of UAVs in targeted killings has raised questions regarding the legality of extrajudicial killings under International Human Rights Law (IHRL), particularly in non-international armed conflicts.⁹⁶ While these systems are not fully autonomous, their expanding capabilities suggest a trajectory toward greater autonomy in future weapon systems, raising further legal and ethical challenges

7.3 The Turkish Kargu-2 loitering munition in Libya

In 2020, the United Nations published a report indicating that the Kargu-2, a Turkish loitering munition, had been used in an autonomous mode during the Libyan civil war.⁹⁷ The Kargu-2 is a drone capable of autonomously seeking out and attacking targets without human intervention once

⁹⁰ Israel Aerospace Industries, 'HAROP – Loitering Munitions System' (IAI, 2020) <https://www.iai.co.il/p/harop> accessed 23 October 2024.

⁹¹ Emil Avdaliani, 'Israel's Harop in the Armenia-Azerbaijan Conflict' (Modern War Institute, 2020) <https://mwi.usma.edu/israels-harop-in-the-armenia-azerbaijan-conflict/> accessed 23 October 2024.

⁹² Department of Defense (DoD), *MQ-9 Reaper Factsheet* (2020) <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104470/mq-9-reaper/> accessed 23 October 2024.

⁹³ Peter Bergen and Katherine Tiedemann, 'Washington's Phantom War: The Effects of the U.S. Drone Program in Pakistan' (2011) 90(4) *Foreign Affairs* 12.

⁹⁴ Michael N. Schmitt and Jeffrey S. Thurnher, "'Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict' (2013) 4 *Harvard National Security Journal* 231

⁹⁵ Nils Melzer, *Targeted Killing in International Law* (Oxford University Press 2008) 112.

⁹⁶ United Nations Security Council, 'Final Report of the Panel of Experts on Libya Established Pursuant to Security Council Resolution 1973 (2011)' (8 March 2021) UN Doc S/2021/229.

⁹⁷ United Nations Security Council, 'Final Report of the Panel of Experts on Libya Established Pursuant to Security Council Resolution 1973 (2011)' (8 March 2021) UN Doc S/2021/229.

it is launched. The report stated that the Kargu-2 engaged in combat operations autonomously against forces loyal to Libyan National Army leader Khalifa Haftar.⁹⁸

The use of the Kargu-2 in Libya is significant because it may represent the first instance of a fully autonomous weapon system being deployed in combat without direct human oversight during its mission. This raises serious legal and ethical concerns about accountability, as it remains unclear who would be held responsible if the system were to target civilians or violate IHL.⁹⁹ The autonomous nature of the Kargu-2, which can operate without human intervention, challenges existing legal frameworks that rely on human accountability for compliance with IHL.

This case highlights the potential for AWS to be deployed in volatile conflict zones where oversight and accountability mechanisms are weak, exacerbating concerns about indiscriminate harm and civilian casualties.

7.4 Russia's Uran-9 unmanned ground vehicle

Russia's development of the Uran-9, an unmanned ground vehicle (UGV), provides another example of an AWS deployed in conflict, though with limited success. The Uran-9 is equipped with anti-tank missiles, a machine gun, and an automatic cannon, and it has been tested in the Syrian conflict.¹⁰⁰ The Uran-9 is designed to operate semi-autonomously, with human operators controlling its movement and weapon systems remotely, while some autonomous functions, such as target acquisition, are built into its design.

During its deployment in Syria, the Uran-9 reportedly faced significant operational challenges, including communication breakdowns between the system and its human operators, leading to concerns about its reliability in combat.¹⁰¹ These issues highlight the technical limitations of AWS and underscore the risks associated with deploying autonomous or semi-autonomous systems in complex and unpredictable conflict environments.¹⁰²

The Uran-9's deployment raised questions about the feasibility of autonomous weapon systems in urban warfare and complex terrain, where human oversight remains crucial for compliance with IHL.¹⁰³ Moreover, the system's failures indicate that technological limitations could lead to unintended violations of the laws of war, particularly in ensuring distinction and proportionality.

7.5 South Korea's SGR-A1 autonomous sentry guns

The SGR-A1, developed by Samsung Techwin, is an autonomous sentry gun deployed by South Korea along the Demilitarized Zone (DMZ) with North Korea.¹⁰⁴ The system is capable of autonomously identifying and engaging targets using machine vision, although it currently requires human authorization before firing.

⁹⁸ Ibid.

⁹⁹ United Nations Institute for Disarmament Research (UNIDIR), *The Weaponization of Increasingly Autonomous Technologies: Artificial Intelligence* (UNIDIR, 2017).

¹⁰⁰ Charles Digges, 'Russia's Uran-9 Robot Tank Gets Bad Marks in Syria Field Test' (Bellona Foundation, 2018) <https://bellona.org/news/nuclear-issues/2018-07-russias-uran-9-robot-tank-gets-bad-marks-in-syria-field-test> accessed 23 October 2024.

¹⁰¹ Ibid.

¹⁰² Ibid.

¹⁰³ Michael K. McClintock, 'Autonomous Military Robotics: Risk, Ethics, and Design' (2008) *California Polytechnic State University Research Report* 45.

¹⁰⁴ Samuel Osborne, 'South Korea Unveils Machine-Gun Equipped Robot to Patrol Border with North Korea' (The Independent, 2016) <https://www.independent.co.uk/news/world/asia/south-korea-unveils-machine-gun-equipped-robot-to-patrol-border-with-north-korea-a7213086.html> accessed 23 October 2024.

The deployment of the SGR-A1 raises important questions about the role of AWS in border security and defensive operations, as well as the potential for future systems to operate without human intervention. If future iterations of the system were to operate in fully autonomous mode, concerns would arise regarding the ability to comply with IHL, particularly in distinguishing between combatants and civilians who may inadvertently cross the border.¹⁰⁵

Moreover, the potential for accidental or unintended engagements, due to the system's reliance on machine vision, raises additional concerns about accountability and compliance with the principle of proportionality.¹⁰⁶ The SGR-A1 represents a case where AWS are already deployed in sensitive, high-stakes environments, underscoring the need for robust oversight and regulation.

8. Conclusion

IHL provides a robust legal framework for regulating the conduct of hostilities, with the principles of distinction, proportionality, necessity, and precaution serving as its cornerstones. However, the development and deployment of AWS challenge the application of these principles in contemporary warfare. As technology continues to evolve, there is a growing need for the international community to assess whether existing legal frameworks are adequate to govern the use of autonomous systems in armed conflict, or whether new laws are required to address the unique challenges posed by AWS. The legal status of Autonomous Weapon Systems under existing international law remains ambiguous. While AWS are not explicitly prohibited, their use must comply with the fundamental principles of IHL, IHRL, and customary international law. The autonomous nature of AWS presents unique challenges to the application of these principles, particularly with regard to distinction, proportionality, military necessity, and accountability. As states continue to develop and deploy AWS, the international community must engage in ongoing dialogue to ensure that these systems are regulated in a manner that is consistent with existing legal norms and that provides sufficient safeguards to protect civilians and uphold human rights. The key legal and ethical issues surrounding Autonomous Weapon Systems highlight the urgent need for comprehensive regulation and oversight. As AWS become an integral part of modern warfare, their compliance with IHL and IHRL must be rigorously assessed to prevent unlawful harm to civilians and uphold humanitarian principles. Ethical considerations surrounding human control, the dehumanization of warfare, and the potential for misuse must also be addressed to ensure that the deployment of AWS aligns with the values of justice, accountability, and respect for human rights.

As discussions regarding the regulation of AWS continue, it is imperative that legal frameworks evolve to meet the challenges posed by these systems while safeguarding ethical norms and humanitarian values in armed conflict. The international debate on the regulation of Autonomous Weapon Systems reflects the profound challenges posed by the integration of AI and autonomy in warfare. While there is broad recognition of the need for regulation, the specific nature and scope of such regulation remain contested. The key issues at the heart of the debate include ensuring meaningful human control, addressing accountability for violations of IHL, and responding to the ethical implications of delegating lethal decisions to machines. As discussions within the UN and the CCW continue, it is essential that the international community balances the potential benefits of AWS with the imperative to uphold humanitarian principles and safeguard human rights in armed conflict. Whether through new legally binding treaties, soft law mechanisms, or adaptations of existing frameworks, the regulation of AWS will be a defining issue for international law in the coming decades.

¹⁰⁵ Ibid.

¹⁰⁶ Ibid.

Finally, these case studies illustrate the growing use of Autonomous Weapon Systems in modern warfare, highlighting both their operational potential and the significant legal and ethical challenges they present. The increasing autonomy of weapon systems raises critical questions about accountability for violations of International Humanitarian Law, particularly regarding the principles of distinction, proportionality, and accountability. As AWS continue to evolve, these challenges will become more pressing, necessitating the development of clearer regulatory frameworks to ensure compliance with international legal norms and ethical standards.