



T.C.

ANKARA YILDIRIM BEYAZIT UNIVERSITY

INSTITUTE FOR INTERNATIONAL RELATIONS AND STRATEGIC
RESEARCH

**BAN OR REGULATE: AN ASSESSMENT OF LETHAL AUTONOMOUS
WEAPON SYSTEMS (LAWS)**

MASTER'S THESIS

Ramazan ERCAN

DEPARTMENT OF SECURITY STUDIES

ANKARA, 2024

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Supervisor

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ANKARA, 2024

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DECLARATION

I declare that this thesis is my own work, that I have not had any unethical behaviour infringing patent rights and copyright at any stages from the planning to writing of the thesis, that I have obtained all the information in this thesis within academic and ethical rules, and that I have cited all the information and comments used in this thesis.

14/08/2024

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ABSTRACT

The third revolution in warfare after the use of gunpowder and nuclear weapons would likely be the development of Lethal Autonomous Weapon Systems. As a result of technological advancements in the area of Artificial Intelligence, there is an increased demand for those weapon systems for use in armed conflict. As Trumbull said "In future wars, victory may depend on "the quality of each side's algorithm" rather than on the skill or bravery of a State's armed forces". Some states invest heavily to improve those weapons. However, the development and deployment of Autonomous Weapon Systems have sparked intense debates regarding their ethical, legal, and societal issues along with arguments for and against using weapons and have even been called for to be banned. Limitations on the use of Lethal Autonomous Weapon Systems as weapons means, and combat methods are covered by International Humanitarian Law both specifically and generally. Further regulations are negotiated at the related forums to pave the way to use those intelligent weapons complying with the existing and potential future regulations. While some advocate for a blanket ban on autonomous weapons, this thesis argues that regulating these weapons is more pragmatic approach that balances security concerns with ethical considerations. This paper also contributes to ongoing discussions and policy deliberations surrounding autonomous weapons and their impact on global security and stability.

Keywords: Artificial Intelligence, International Humanitarian Law, Lethal Autonomous Weapon Systems.

ÖZET

Barut ve nükleer silahların kullanılmasından sonra savaştaki üçüncü devrim muhtemelen Öldürücü Otonom Silah Sistemlerinin geliştirilmesi olacaktır. Yapay Zekâ alanındaki teknolojik gelişmelerin bir sonucu olarak, silahlı çatışmalarda kullanılmak üzere bu silah sistemlerine olan talep artmaktadır. Trumbull, geleceğin savaşlarında zaferin, tarafların silahlı kuvvetlerinin gücü ve kabiliyetinden ziyade algoritma kalitesine bağlı olduğunu ifade etmektedir. Bazı ülkeler bu silahlara büyük yatırımlar yapmaktadırlar. Bununla birlikte, bu silah sistemlerinin geliştirilmesi ve kullanımı etik, hukuki ve sosyal etki bağlamında lehte ve aleyhte tartışmalara yol açmakta bunun da ötesinde yasaklanması çağrısında bulunmaktadır. Aslında, Öldürücü Otonom Silah Sistemleri'nin kullanımı ve savaş yöntemleri üzerindeki sınırlamalar hem özel hem de genel çerçevede Uluslararası İnsancıl Hukuk kapsamındadır. Bu tez, Otonom Silahların yasaklanmasını isteyenler olsa da, sözkonusu silahların düzenlenmesinin güvenlik ve etik kaygılar arasında denge sağlayan daha pragmatik bir yaklaşım olacağını savunmaktadır. Tez ayrıca çeşitli forumlarda devam etmekte olan çalışmalara, siyasi müzakerelere ve ayrıca otonom silahların küresel güvenlik ve istikrara etkileri konusundaki görüşmelere katkıda bulunmayı hedeflemektedir.

Anahtar Kelimeler: Öldürücü Otonom Silah Sistemleri, Uluslararası İnsancıl Hukuk, Yapay Zekâ.

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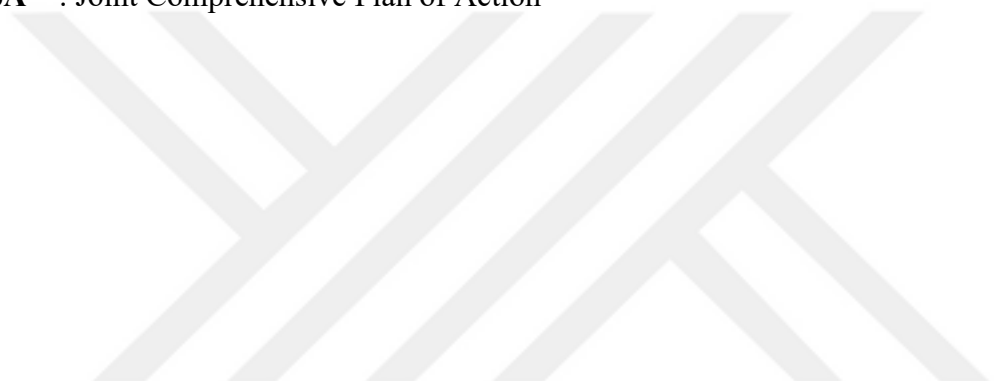
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ABBREVIATION INDEX

AI	: Artificial Intelligence
APMBC	: Anti-personnel Mine Ban Convention
AWS	: Autonomous Weapon Systems
CCW	: The Convention on Certain Conventional Weapons
CCM	: The Convention on Cluster Munitions
CIL	: Customary International Law
CTBT	: Comprehensive Test Ban Treaty
CWC	: Chemical Weapons Convention
EU	: European Union
GA	: General Assembly
GGE	: Group of Governmental Experts
GPS	: Global Positioning Systems
HRC	: Human Rights Watch
HRL	: Human Rights Law
HRW	: Human Rights Watch
ICL	: International Criminal Law
ICRC	: International Committee of the Red Cross
ILC	: International Law Commission
IHL	: International Humanitarian Law
ISO	: International Organization for Standardization
LAWS	: Lethal Autonomous Weapons Systems
LOAC	: Law of Armed Conflict
MHC	: Meaningful Human Control
NATO	: North Atlantic Treaty Organization
NGO	: Non-governmental Organizations
NPT	: Treaty on Non-proliferation of Nuclear Weapons
PESCO	: Permanent Structured Cooperation
R&D	: Research and Development
ROE	: Rules of Engagement

SIPRI : Stockholm International Peace Research Institute
TPNW : Treaty on Prohibition of Nuclear Weapons
UAV : Unmanned Air Vehicle
UN : United Nations
UNIDIR : United Nations Institute for Disarmament Research
UNODA : United Nations Office for Disarmament Affairs
US : United States
UK : United Kingdom
JCPoA : Joint Comprehensive Plan of Action



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1. INTRODUCTION

Autonomous weapons have roots dating back to the mid-20th century, with early developments in guided missiles and drones. In recent years, advances in Artificial Intelligence (AI) have accelerated their development, sparking ethical and legal debates about their use in warfare.

The military sector has seen tremendous transformation thanks to AI, particularly in designing and using weapon systems. With the addition of AI to weapon systems, efficiency, speed, and accuracy have all enhanced while human error has decreased. A crucial component of AI-enabled weaponry is the deployment of autonomous weapon systems, which allow the military to carry out extremely complicated and precise operations. AI-based weapon systems are built on cutting-edge sensor technology and machine learning algorithms. These systems may gather and analyze environmental data via sensors, and they can utilize machine learning algorithms to make decisions based on that data. AI-based weapon systems must continue to be developed and integrated in order to remain useful and efficient (Magbagbeola, 2021, p. 5).

LAWS are considered to be the "third revolution in warfare," with their development being regarded as having an impact comparable to that of gunpowder and nuclear weapons. To ban or regulate the deployment of these killer robots, numerous states, international non-governmental organizations (NGO), civil society, and AI professionals have separately and collaboratively engaged at various levels. The US Phalanx Close In Weapon System (CIWS), the Israeli HARPY loitering munition (LM) and Iron Dome, the Russian Arena, and the German AMAP Active Defense System (ADS) are just a few examples of the countries and weapon systems with varied degrees of autonomy (Noor, 2023).

It is argued that new technology will change the characteristics of warfare in the upcoming decades. The wars in Ukraine, the Middle East, Armenia and Azerbaijan are unlike any other because of the technologies on exhibit in those regions. However, drones and military robotics are merely precursors to more significant developments that are on the horizon.

Since the development and deployment of autonomous weapon systems are unavoidable, any attempt at a universal ban will be unsuccessful in preventing their use. The current legal standards are strong enough to allow us to handle the challenges brought on by those weapons.

International discourse aimed at fostering common standards and disseminating best practices would be the best method to adjust current norms to deal with these new technologies.

LAWS provide States with military advantages such as mobility, homing, target acquisition, navigation and target image recognition.

The figure below shows the global cumulative number of deployed weapon systems using AI technologies.

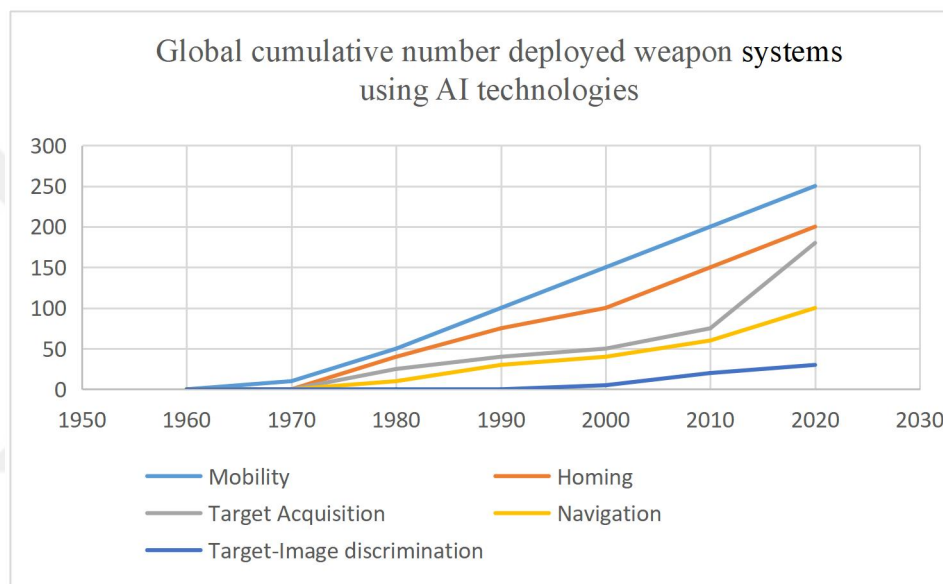


Figure 1.1. Global, cumulative number of deployed weapon systems using AI technologies

Source: *The presentation on Lethal Autonomous Weapons, Artificial Intelligence and Meaningful Human Control* by Heather M. Roff (2017)

<https://futureoflife.org/wp-content/uploads/2017/01/Heather-Roff.pdf>

With AI, LAWS can decide for themselves without the need for human interaction. This leaves a big vacuum in our understanding of how LAWS might go wrong as well as the particular difficulties in regulating LAWS from a risk viewpoint.

To guarantee that AI-based weapon systems are utilized responsibly and safely, compliance with international laws and regulations, transparency, and accountability are crucial. The debate concerning the regulation and control of AI-based weaponry has arisen as a result of worries about accountability, safety, and unexpected consequences. It is uncertain whether

control over these weapon systems can be maintained given their growing autonomy and ability to function without human involvement. Policymakers and military commanders must take into account ethical, legal, and operational challenges in order to develop and use AI-based weapon systems responsibly.

These systems have the potential to transform warfare since they would be more resilient, accurate, and swift than current weaponry, and they would also reduce the number of casualties in combat. However, in addition to arguments for and against the deployment of weapons, these systems impose a number of ethical, legal, and societal difficulties. As such, the weaponry provoked a contentious discussion and even led to calls for an outright prohibition.

The development, use, and governance of AWS are not unlimited, International Humanitarian Law (IHL) and Customary International Law (CIL) already place limits on the development and use of AWS. Human responsibility for decisions on using LAWS cannot be delegated to machines totally and should be considered through the life cycle of those weapon systems. High-level human-machine interaction is required at every stage (human in the loop/human on the loop) of the development, use, and governance of LAWS. If the rules of IHL and CIL are met, no need to ban those weapons. Regulating AW can involve setting clear guidelines and standards for their development and use. This can include establishing international agreements, protocols and laws to ensure accountability, transparency and adherence to ethical principles. Regulation can address concerns such as human control, distinction, proportionality and compliance with IHL. By regulating rather than outright banning AW, it allows for continued innovation while minimizing risks and promoting responsible use. Thus, this thesis aims to assess the LAWS regarding outright banning or regulating them and to show that regulating Automated Weapon Systems (AWS) would be more effective than banning them. Furthermore it aims to expose legal and ethic dimensions and challenges of LAWS. It will also make significant contributions to the policy of the international community, nations, academia, and the military.

In this regard, this thesis supports the hypothesis that regulating LAWS would be more effective than banning them addressing the following research questions;

- Why does the regulation of LAWS outweigh banning them?
- How and to what extent do existing regulations/considerations affect the development, use, and governance of LAWS?

- What level and manner of human-machine association is necessary to meet LAWS requirements under IHL?

- What conditions are required for securing respect for IHL?
- Who bears responsibility for governing LAWS?
- How would ethical considerations be determined for LAWS?
- Why is an outright ban on LAWS, not a solution?
- What is the public perception of LAWS?
- Why does regulation of LAWS might be more effective than banning them?

This research stems from news sites, books, journals, articles, conventions and treaties. In the past two decades, scholarly interest in and writing on LAWS has increased significantly. The writing has primarily addressed the legal, moral, ethical, and policy concerns related to LAWS. The limitation of this research is that quantitative data is very limited to support the hypothesis of this thesis.

This thesis includes the headings Introduction, Literature on LAWS and Method, Ethics and AWS, The LAWS in International Humanitarian Law, Challenges and Regulating of LAWS, Discussions, Findings and Conclusion and Recommendations.

Literature review part establishes the definition, level of autonomy, benefits and risks of the LAWS and arguments in this regard. It aims the understanding what is AWS, how it works and why it is argued to place them in the battle ground or not.

Ethics and AWS part covers ethical frameworks of LAWS, moral gambit, ethical concerns, revulsion and respect.

The LAWS in IHL covers the existing regulation which is applied to LAWS which limits to develop and use them, legal review, compliance and human control. The purpose of this part is to put on the table the legal aspect of this research.

2. LITERATURE REVIEW AND METHOD

2.1. History of Autonomous Weapons

AWS have a complex history that spans several decades. The concept of autonomous weapons or systems capable of independently identifying and engaging targets without direct human intervention, has evolved alongside advancements in technology and warfare.

In the mid-20th century, the development guided missiles and Unmanned Aerial Vehicles (UAVs) commonly known as drones, laid the groundwork of autonomous weapon systems. These early technologies allowed for remote-controlled operation but still required human oversight and decision-making. When the US and its allies first deployed autonomous weapons like the Phalanx air defense system to intercept attacking cruise missiles and anti-ship missiles in the 1980s, autonomous weapons started to show up in the arsenals of major powers.

As computing power increased and AI technologies matured, the possibility of fully autonomous weapons became more feasible. In the 21st century, nations began investing in research and development programs focused on integrating AI into military systems, including weapon platforms. One notable example is the use armed drones with AI algorithms installed to locate and interact with targets on their own according to preset standards. These systems can operate independently for extended periods, making rapid decisions in dynamic combat environments. In 2004, the United States deployed tracked robots in Afghanistan and Iraq. However, these needed a man-in-the-loop, a person who made vital choices.

However, the development of autonomous weapons has raised significant ethical, legal and strategic concerns. Critics argue that relinquishing human control over lethal decision-making could lead to unintended consequences, including civilian casualties and escalation of conflicts. International efforts to regulate the use of autonomous weapons have led to discussions within forums such as the United Nations (UN) The Convention on Certain Conventional Weapons (CCW).

Despite these challenges, the development and deployment of autonomous weapons continue to progress, driven by military interests in enhancing operational efficiency and maintaining strategic advantage. As technology advances and ethical considerations evolve, the future of autonomous weapons remains a topic of debate and scrutiny on the global stage.

2.2. Definition

The definitions focus on different characteristics of AWS, leading to different approaches to the moral and legal issues these weapon systems raise. To define AWS, one must consider their autonomy, adaptability, human control, and intended use, all of which are critical to examining ethical and legal implications. IHL is critical to this discussion, as there is widespread agreement that AWS can only be used if it meets IHL norms of distinction, proportionality and precaution. Both supporters and detractors of AWS will look for a definition that benefits their objectives and interests. In order to achieve a definition that is value-neutral, two objectives must be met: (i) identifying the main characteristics that allow AWS to be recognized; and (ii) defining these characteristics to make clear their interrelationships (such as automation vs. control) and differences (such as automatic vs. autonomous behavior). In light of this, autonomy, adaptability, and control are seen as traits that may all be plotted along a continuum. To a greater or lesser extent, AWS may display each of these traits. Each of these traits may be present in AWS to varying degrees. To further illustrate how broad the range may be, the potential uses are also provided. Finding the combination of levels and goals that satisfies ethical and legal standards is the responsibility of ethical analysis, policy, and legislation. With this approach in mind, we define AWS as follows:

"An artificial agent which, at the very minimum, can change its internal states to achieve a given goal, or set of goals, within its dynamic operating environment and without the direct intervention of another agent and may also be endowed with some abilities for changing its own transition rules without the intervention of another agent, and which is deployed to exert kinetic force against a physical entity (whether an object or a human being) and to this end can identify, select or attack the target without the intervention of another agent is an AWS. Once deployed, AWS can be operated with or without some form of human control (in, on, or out of the loop) ". A lethal AWS is a specific subset of an AWS that exerts a kinetic force on humans (Taddeo; Blanchard, 2022, p. 36, 37).

The Netherlands defines LAWS as "a weapon that, without human intervention, selects and engages targets that meet certain predefined criteria after a human has decided to use the weapon, assuming that once an attack has begun, it cannot be stopped by human intervention". France, for example, states, "LAWS is to be understood as having no human supervision

whatsoever, i.e., there is no connection (communication or control) with the military chain of command”. Similarly, the United Kingdom defines LAWS as a system “capable of understanding, interpreting, and applying higher-level intentions and instructions based on a precise understanding and assessment of what a commander intends to do and, perhaps more importantly, why”.

2.3. Level of Autonomy

Level of Autonomy includes semi-autonomous, human-supervised, autonomous, and fully autonomous weapon systems.

As Trumbull pointed out (Trumbull, 2020, p.539-542)

Semi-Autonomous

Weapons that are semi-autonomous can identify and engage their targets on their own, but they can only engage single targets or narrow audiences chosen by a human operator. A human being is frequently said to be "in the loop" when referring to semi-autonomous weapons. Unknown targets cannot be engaged by semi-autonomous weapons, but they can be employed to identify known targets. As an illustration, the South Korean SGR A-1 Sentry is a border defense system that employs sensors to track and identify potential targets along the demilitarized zone with North Korea while avoiding engaging them.

Human Supervised

While human-supervised AW systems are capable of identifying, selecting and engaging targets, they are made with the ability for humans to step in and terminate the engagement in the event of a malfunction or unanticipated events. Incoming precision-guided missiles and artillery are two examples of human-supervised weapons that are primarily deployed defensively and intended to hit objects rather than people. Examples of such systems include Israel's Iron Dome, the land-based missile, artillery, and mortar defense system, and the ship-based Aegis system of the United States.

Autonomous Weapons

Humans are "out of the loop" with AW since once launched, the weapon properly selects and engages targets without human interaction. The Israeli Harpy is an often-referenced illustration of an existing autonomous weapon. It does not have to be used against a specified target at a precise location, unlike semi-autonomous weapons.

Following table depicts level of Autonomy.

Table 2.3. Level of Autonomy

Semi- Autonomous (Human in-the-loop)	Supervised Autonomous (Human on-the-loop)	Fully Autonomous (Human out-of-the-loop)
Weapon systems that, once activated, are intended to engage the target specified by an operator	Human launches weapon and can intervene at any time including in the event of any malfunction or undesirable situations	Weapon systems that, once activated, can identify and engage targets without human intervention

Note: Information on this table adapted from *How can we design AI Autonomous Weapon Systems? AI and Ethics* by Sancar İ.V (2024)

2.4. Benefits and risks of AWS

Certain military specialists maintain that AW systems not only bring about major strategic and tactical benefits on the battlefield but also are preferable morally when compared to deploying human combatants. In contrast, opponents contend that these weapons should be limited, if not prohibited, for various moral and legal causes. (A. Etzioni, O. Etzioni, 2017, p. 71).

2.4.1.Benefits

Proponents of increased development and utilization of AWS often cite multiple military advantages. Primarily, they are seen as a method of force multiplier, as fewer war fighters are required to achieve a given task, increasing the success rate of each war fighter. Further, proponents credit autonomous weapon systems with expanding the battlefield and making it

possible to penetrate areas that were formerly inaccessible. Finally, AWS can mitigate casualties by drawing human combatants away from hazardous missions. A number of roboticists and military specialists have made the case that AWS should not only be seen as morally justifiable, but also as being morally superior to human warriors. AWS' judgment won't be influenced by feelings like fear or hysteria, and they'll be able to assimilate a lot more sensory data than people can without dismissing it or twisting it to match their own predetermined ideas (A. Etzioni, O. Etzioni, 2017, p.72- 74).

The following benefits also categorized by Payne (2017);

Leveraging Civilian Technology

Research and development (R&D) investments in these fields in a positive feedback loop, lethal autonomy can accelerate the growth of commercial inventions and industrial capacities. Thus, there is a beneficial synergistic interaction between military and civilian autonomous capability advancements.

Improvements In Ethical Warfare

LAWS are immune to the shock and rage that human soldiers may experience and use as justification for mistreating them. It may also lessen the willingness and capacity of these troops to participate in improper or illegal behavior if LAWS are present in mixed teams with human soldiers, especially if LAWS have their own independent capacity to determine ethical behavior. By removing some of the inaccuracies brought on by incomplete surveillance and the temporal distance between trigger and target, autonomous decision-making at the point of deadly engagement may increase the precision of weapon systems.

2.4.2. Risks

Opponents of AWS frequently express concern about non-human entities making judgments that could potentially result in death. This is especially problematic for systems that have the ability to choose their targets on their own. Famous computer scientist Noel Sharkey, for example, has demanded that "lethal autonomous targeting" be prohibited since it goes against the concept of distinction, which is one of the most important principles in armed conflict. It is difficult, even for humans, to distinguish between a combatant and a civilian. Giving AI targeting power will most likely lead to unacceptable collateral damage and the deaths of civilians (A. Etzioni, O. Etzioni, 2017, p. 75).

The following arguments opposed to AWS categorized by Payne (2017);

Uncontrolled Arms Race

LAWS may also spark a more serious weapons race. There are two versions of this claim. First, rivals of peers and neighbors will be compelled to create more complex autonomous capabilities for their own weapons systems due to the significant tactical advantage associated with the development of LAWS. Second, once this technology is extensively used in conflict, asymmetric adversaries, such as transnational terrorist organizations, who would otherwise lack the organic research and development to construct such systems, will have access to it. Additionally to the inherent instability linked to the dynamics of the weapons race, competitors may have fewer possibilities or incentives to influence the behavior of LAWS in either scenario. Numerous reasons in opposition to this concern have been presented. Some claim that an arms race is already in progress with rivals working on AWS on a peer and near-peer level. Second, given that some claim that it will be very simple to weaponize some civilian technologies, asymmetric competitors may be able to benefit from technological advancements in the civilian sector.

Asymmetric Warfare

Given the history of nuclear strategy and terrorist assaults, both of which have placed a significant emphasis on civilian targets, replacing soldiers with LAWS also runs the risk of increasing the number of attacks on civilian targets. Both asymmetric adversaries and near-peers are willing to put civilians in peril if it furthers their strategic objectives.

Hacking/ Subversions

Dependence on autonomous systems makes the military more susceptible to hacking or hardware and software infiltration. The broad use of AWS, the copying of software, and the complexity and interdependence that go along with it all have the potential to greatly increase the risk in the event that an opponent finds a security flaw or an exploitable system breakdown. Mass attacks, or unintentional escalation are all possible outcomes. Onboard autonomous capabilities, however, can actually counter-subvert or thwart hacking of present and future remotely controlled systems, which is one response to this issue. In fact, computer hardware and software are frequently used in military systems even without autonomous capabilities. Automation doesn't appear to be much more immune to hacking and subversion, and the

autonomy feature might make a system more robust than a similarly computerized, if less strictly regulated, non-autonomous weapon system.

Loss of Command and Control

The system's interconnection, complexity, and adaptability, which allow it to carry out difficult tasks, may result in unexpected and unintended lethality. Furthermore, the risk of uncontrolled escalation is significantly higher precisely because LAWS' ability to strike quickly—one of its key military advantages—could pose a security problem.

Judgment Errors/Accuracy

Reliability and predictability are the final and most commonly listed danger. Almost everyone interested in the analysis of LAWS understands the challenges inherent in guaranteeing trustworthy decision-making for a variety of reasons. Those who favor a prohibition typically argue that because an autonomous weapon system's decision-making is inherently or irreducibly unpredictable, there is no need to do further dependability studies.

Legal Issues

Regarding autonomous weapon systems, there are two legal gray zones. The ability of the weapon system to adhere to IHL responsibilities and rules of engagement (ROE) is the first area. Will the weapon systems' functioning satisfy the pertinent requirements? This is fundamentally an operational question. The second worry is less about how LAWS would work and more about whether it will be harder to hold parties responsible for misconduct in armed conflict if they utilize LAWS.

Taxonomy of debate is summarized at Table 2.4.

Table. 2.4. Taxonomy of the debate

Category of Concern		Specific Issue	Critical of LAWS	Supportive of LAWS
Benefits and risks	Benefits	Military capabilities	The possibility of errors and hostile actions could be more detrimental than the benefits	Offers a major, or perhaps determinable, military benefit
		Leverage civilian technology	An arms race arises due to the competitors' inability to understand the technical aspects of militarizing civilian technology	Enhances the sustainability of advantage by utilizing areas of technological leadership
		Ethical improvements	Lacks the capacity to make moral judgments	may enhance the use of precision weapons safeguarding civilians
	Risks	Likelihood of war/Jus ad bellum	Leaders will be more likely to wage illegitimate war if there are fewer casualties	Generic objection that applies to the development of any substantial military advantage
		Arms race	Expands the arms race	LAWS will be the outcome of peer development and civilian technology
		Asymmetric warfare	Increases likelihood of strikes on civilians	Overly broad criticism; appears to hold victims accountable for unlawful assaults
		Hacking/subversion	Allows for hacking/subversion	Allows continued operations without communications
		Loss of command and control	Uncontrolled escalation is a potential threat to security	LAWS likely restrictive rules of engagement
		Judgment errors	Decision-making of the system is unpredictable	LAWS acknowledges the difficulties associated with ensuring reliable decision-making
Legal Issues	Weapons Law	Per se	Because inherently indiscriminate, per se illegal	High-intensity conflicts make even unreliable LAWS conditionally legal
		Distinction	Unable to distinguish civilians	No negative emotions, human-level decisions
		Proportionality	Cannot balance military advantage and collateral damage	Commander who initiates action exercises judgment, as is customary
	Accountability		No one has been held accountable for committing war crimes	Much attention on criminal; same as other weapon malfunctions

Table. 2.4. Taxonomy of the debate (continued)

Moral / Ethical Issues	Demeaning to humanity for LAWS to determine death	LAWS do not make decisions; it is the commander who sets them in motion
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Source: Payne, T. B. (2017). Lethal Autonomy: What It Tells Us about Modern Warfare. *Air & Space Power Journal*, 31(4).

2.5. Adapting the Law of Armed Conflict to Autonomous Weapon Systems

As technology develops and capacities are gradually automated, new AWS are being gradually incorporated into conflict. These are often designed for use on the battlefield, such as in naval disputes where there is little risk to civilians, and are typically restricted to machine-to-machine defense where human operators can activate, monitor, and override the system's operation. Examples include Israel's Iron Dome missile defense system and the American Patriot and Phalanx missile defense systems. Many additional systems could be introduced in the not-too-distant future for a range of military operations and battlefields. Automation enables military systems of all types—not just weapons—to act faster than people can estimate, compute, and react, and in some cases to respond to a military danger more precisely and accurately. In many non-military fields, automation and robotic technologies are seen as more efficient, secure, and trustworthy than human judgment, and their application in the military domain is almost certain. Future generations, who might often rely on the automated judgments of self-driving cars, are likely to demand—on moral grounds—that similar technology be applied to lessen the harm caused by war. The main concern is whether or not these systems function properly (Anderson & Reisner & Waxman, 2014, p. 389).

When compared to human soldiers' faults, which are frequently made worse by fear, retaliation, or other emotions, and the limitations of human senses and reason, AWS can lessen hazards to civilians by improving targeting and firing judgments. Weapon systems with an ever-increasing level of automation could, at least in some combat scenarios, reduce the misjudgment of military targets, more accurately identify or assess potential collateral damage, or allow the deployment of less force than human judgments would allow (Anderson & Reisner & Waxman, 2014, p. 393).

2.6. Arguments for Banning or not Banning

Regulating or outright outlawing LAWS is still a topic of discussion. This raises a crucial query: "What are the reasons, from a variety of societal, ethical, and legal perspectives, to support the prohibition (or not) of AWS?"

To ban

The deployment of AWS could contribute to a new arms race, threatening global peace and stability, according to the social argument against it (Tamburrini, 2016; Scharre, 2018). There are potential security concerns with AWS technology. The tech industry cannot guarantee invulnerability to hacking or spoofing, making them fallible according to the UN Institute for Disarmament Research (UNIDIR) in 2017. An (L)AWS could turn into a Trojan horse if it is compromised while it is at its military site.

Notwithstanding that "any computer system is, in principle, susceptible to hacking, greater complexity can make it harder to identify any vulnerabilities" (Scharre, 2016, p. 14). A further recognized concern is spoofing, which is defined as a system that is "intentionally deceived into thinking that it sees objects- or military targets- that do not exist" (Reim, 2020, p. 2) and may also refer to the fabrication of actual visual data (UNIDIR, 2021). For instance, by going without a uniform (and being mistaken for a civilian) or by dressing like the enemy on the battlefield (falsifying data; see spoofing). There is a possibility that the LAWS may sense and respond to a situation based on its programming, but the interpretation may be incorrect in reality. Additionally, malfunctions and miscommunications can occur due to changes in light, reflection, shadows, colors, and animals, which can pose a risk. Moreover, there is an essential ethical dilemma regarding the delegation of life and death decisions to AWS. If a machine were given the authority to use force, it raises the question of whether the machine can be held responsible for its actions. Can it be deemed morally accountable for what it does? The significance of this accountability issue for AWS's legality cannot be overstated. From a legal perspective, it is possible to draw a comparison to human criminal liability: if a person does something that is out of his or her control, they cannot be held legally responsible for their actions (Heyns, 2016; Sartor and Omicini, 2016). According to this, machines wouldn't be held accountable for their actions, and even if they were, "there is no point in putting a robot in jail" (Heyns, 2016, 12; Stercke, 2022, p. 2,3).

The decision about the use of force (lethal or otherwise) has always been taken in human-to-human interactions, according to some scholars (Asaro, 2013; Boulanin, 2016; Heyns, 2016), hence it has never been essential to make this requirement explicit in international law. This latent argument emphasizes the importance of ensuring that the concept of "human control" aligns with IHLs. There is already a global agreement regarding accountability within the larger AWS framework, which involves maintaining a responsible chain of human command and control over AWS. Different stakeholders have different opinions on what constitutes Meaningful Human Control (MHC). Some believe it should involve a human soldier who is fully aware and responsible for launching an attack, while others believe it is enough for a human to simply write the AI program that controls the machines (Heyns, 2016; UNIDIR, 2014; HRW, 2020; Davison, 2018; Stercke 2022, p. 2,3).

One of the most hotly debated claims regarding AWS is that due to their superior performance, they may be able to respect IHL or HRL better than humans do (Sharkey, 2016; Heyns, 2013; Tamburrini, 2016; UNIDIR, 2014, p. 6). For instance, it is not apparent if robots can adhere to the distinction and proportionality principles, both essential components of IHL (Tamburrini, 2016). If AWS is unable to distinguish them from soldiers in combat, then their adherence to IHL is in question. Therefore, the performance and ability of the systems to differentiate are critical prerequisites for IHL compliance. This point is closely linked to the cutting-edge technologies included, such as AI. However, this issue could be addressed through compulsory modeling and testing before the production of weapon systems.

Not to ban

From a societal perspective, AWS has the potential to improve public safety and make warfare more ethical (UNIDIR, 2014; Heyns, 2016; 2013; Scharre, 2018; Etzioni and Etzioni, 2017). Due to higher weapon precision than human operators, remote operation of AWS decreases collateral damage and reduces hazards to military people (Etzioni and Etzioni, 2017; Heyns, 2016). Additionally, they wouldn't worry, drift off, "get bored," and "need food, water, or sleep" (Williams 2011, p. 5). They are able to work "day and night" and access locations where people are unable (Williams, 2011, p. 5). AWS looks more financially, economically, and effectively attractive than employing human soldiers when comparing the resources required to the return on investment (Heyns, 2013; UNIDIR 2014). Despite its limitations, AWS should not be banned. The social argument against AWS, which is related to a global

arms race, can also be countered. If an international prohibition on AWS is enacted, it won't work to prevent its use by the states whose acquisition of such weapons would pose the greatest threat (Anderson and Waxman 2013, 15). The development of AWS is of utmost importance for maintaining international security dynamics as it serves as a means of deterrence (Horowitz 2021; Anderson and Waxman, 2013; Stercke, 2022, p. 2,3).

Before creating or using AWS, it is necessary to meet certain safety measures and technical standards to minimize risks. To achieve this, it is advisable to collaborate with professionals in the fields of science, technology, and business, as recommended by UNIDIR in 2017. This approach is practical and effective. Clear regulations and standards are necessary for the industry to operate effectively. To ensure compliance with IHL, AWS must function accurately and discriminate effectively. Banning the systems, including their development, before meeting operational requirements may hinder progress (Anderson and Waxman, 2013). Therefore, it would be "unjustified" to forbid their development. The functional superiority in processing could indicate that AWS will "be able to respect IHL or HRL better than humans do" at the nexus of technology and law (UNIDIR 2014, p. 6). Through ongoing research and development of AWS, there is potential to decrease the likelihood of misidentifying military targets and improve the detection and calculation of possible collateral damage. It may also enable the use of smaller amounts of force compared to human decision-making, and these benefits are likely to increase over time (Anderson and Waxman, 2013, p.15). This leads us to the question of responsibility. Under current CIL, AWS could be held responsible under the principle of command responsibility (Sehrawat, 2021). This could indicate that "individual(s) can be held criminally responsible for their role as operators, commanding officers, programmers, engineers, technicians, or other relevant functions" (Sehrawat, 2021; Stürchler and Siegrist, 2017, p.23). Additionally, the argument for individual criminal culpability may be overused in the discussion because it is merely one method of enforcing IHL (Anderson and Waxman, 2013; Sehrawat 2021). IHL compliance is typically enforced through "mechanisms of state (or armed party) responsibility" as well (Anderson and Waxman, 2013). Note that neither side of this argument questions the application of IHL to AWS: AWS is subject to IHL (HRW, 2020; UN, 2019). The interpretation regarding AWS under IHL on the contrary, is that it is not "specifically regulated" (Davison, 2018, p. 7). Some countries, like Russia, believe that creating another set of regulations for AW is unnecessary because IHL already covers them. In

summary, AWS have advantages in warfare, including protecting both civilians and military personnel (Stercke,, 2022, p. 5).

In summary, there are valid arguments supporting both sides of the AWS debate. It is currently unclear whether or not AWS should be banned, but it is important to proceed with caution, have human oversight, and establish some form of global regulation, regardless of whether or not a ban is implemented (Stercke, 2022, p. 6).

2.7. Method

This study aims to show that regulating AWS would be more effective than banning them exposing legal, ethic dimensions and challenges of LAWS which are theoretical in nature. Since, qualitative research was preferred to quantitative research because the information and data available for the preparation of this thesis were considered from a theoretical point of view and there was limited connection or interaction with numerical data.

The study conducted an extensive review of academic literature, policy documents, and technical reports related to AWS development, ethical considerations, legal frameworks and societal impacts.

Conceptual research has also been applied to bring awareness to and provide additional information on the regulation of LAWS and to reinterpret existing information on the regulation of LAWS in a comprehensible way.

Using content analysis techniques, this thesis was able to compile the literature that regulating outweighs the ban on LAWS and the content of the documents was analyzed to form a rational conclusion that those weapons can be used lawfully if well regulated.

3. ETHICS AND AUTONOMOUS WEAPON SYSTEMS

3.1. Ethical Frameworks for Artificial Intelligence

The introduction of LAWS will be technically feasible, and certain types of LAWS will unavoidably evolve and be used due to military need and economic efficiency. IHL and national rules of engagement will limit the deployment and use of LAWS in the absence of new normative frameworks. There is currently no significant debate about holding an AI system or LAWS legally responsible for anything because all existing legislation is based on human responsibility. However, since LAWS are free to decide their course of action within certain parameters, they might engage in complicated and unanticipated behaviors in the pursuit of military goals that could jeopardize adherence to IHL principles like proportionality. Certain weapon systems are prohibited in some specific documents. This includes biological and chemical weapons since they cannot be used proportionately and distinctly, among other considerations concerning humanity. Similar to this, "dumb" weapons like cluster ammo used in nightly airstrikes came under investigation, which aided in the development of "smarter" substitutes like Global Positioning System (GPS) or laser precision-guided munitions. These smarter weapons' compliance with IHL is a result of their ability to enable pinpoint accuracy in targeting. These weapons' accuracy, combined with features like changeable fuse settings, let users accomplish their military objectives with little force, minimizing the likelihood that military action will be seen in the target's surroundings. However, numerous well-publicized incidents where purportedly "smart" bombs produced collateral damage—damage to unanticipated, frequently illegitimate targets—have been the consequence of operator error or technical failure. Increased compliance with IHL, particularly the rules of distinction and proportionality, is something that LAWS can achieve. This would entail higher accuracy and less collateral harm. LAWS might use precision weapons autonomously and process information more quickly than any human operator, but they also carry different forms of risk due to their opacity and unpredictable behavior in unforeseen circumstances. The effects of LAWS on the IHL principles of distinction and proportionality are a common topic of discussion among authors. Human commanders are required to explain and justify their actions by IHL by providing evidence of the logic behind their attack choices. It calls for human-machine integration that provides human control through in-the-loop or on-the-loop

supervision. The degree of integration between the human operator and the operation of the weapon system is described by these notions. While in-the-loop requires the operator to confirm each prospective attack, on-the-loop permits the system to attack on its own while the human operator serves as a fail-safe. The term "out-of-the-loop" refers to a system that operates entirely on its own without any human intervention. When humans are not involved or connected to the loop, the issue of responsibility is much more crucial. MHC refers to the human operator's function as a fail-safe to assure continued adherence to IHL, to maintain ongoing accountability for potential violations of IHL, and to ensure the human moral agency stays involved with any acts performed by LAWS. AI will make it possible for systems to follow IHL guidelines ever more closely while still benefiting from quicker decision-making and objective decision-making procedures. Even if this is still a distant possibility, one could envision machines being better at complying with IHL than humans, assuming additional advancements in AI. From a utilitarian standpoint, an allegedly high-performance LAWS with a record that is superior to humans in upholding the IHL principles of distinction and proportionality could be considered to be more in compliance with the principle of humanity, such as by causing less collateral damage, firing more quickly and effectively against legitimate enemy targets, and exercising self-control for proportionality's sake. Future LAWS should adhere to the following sets of goals: proportionality, precaution, distinction, military necessity, and humanity. Throughout the LAWS processes, from the architecture of the system to the governance, human judgment will be necessary to guarantee that LAWS are used in a manner compliant with IHL and the principles (Christie & Ertan & Adomaitis & Klaus, 2023).

3.2. Moral Gambit-Ethical Concerns

LAWS are not morally responsible for their actions; only humans are. This is because only human beings are capable of having meaningful intents, plans, rights, obligations, praise, or punishment. Human responsibility is a fundamental principle for the (possible) use of LAWS according to the UN GGE on emerging technologies in the area of LAWS of the CCW: "Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. This should be considered across the entire life-cycle of the weapon system" (UN GGE CCW, 2019, p. 13). Meaningful moral responsibility is constrained when it comes to LAWS due to the unpredictability of these

systems. For human beings to be held morally accountable for (all possible) unexpected actions that AWS may take would be both unfair and illogical. This is because these actions were not intended by the human agent and the agent lacked the information necessary to anticipate all potential actions that an AWS could take once it was deployed, allowing them to identify and stop any that they did not want to take place (Taddeo & Blanchard, 2022, p. 3).

The effectiveness of LAWS depends on the assessment of the potential for unintended fatal effects and the high level of confidence that, given design requirements and deployment circumstances, the risk of this outcome has been minimized to the greatest extent possible. For this, the suggestions are arranged in a logical sequence.

- Invest in AWS whose underlying AI technologies can be understood, not just explained. AI systems' lack of transparency also contributes to their unpredictability;
- Analyze predictability (Providers and defense institutions should determine which technological and operational aspects of AWS compromise their ability to detect, select, and engage targets to engage them predictably) and work to improve these aspects to reduce unpredictable outcomes;
- High level of technical knowledge of the systems and the theater of operations for the decision-makers (Those choosing to use non-lethal AWS should have this knowledge in order to identify the systems' strategic and tactical potential, the best way to deploy them, as well as their potential vulnerabilities for failure);
- The traceability of procedures;
- Justification of uses (Use of non-lethal AWS should always be justified by the necessity principle and be based on a risk/benefit analysis);
- Assuring non-fatal effects (Measures must be made to lessen the risks of lethal outcomes from the use of non-lethal AWS;
- Redressing and remedy (A process should be used to identify mistakes and unintended effects, assess the costs and effects of such mistakes, and specify corrective action options);
- Monitoring (To enhance the processes for making decisions and taking recourse, ethics-based reviews of LAWS for their acquisition and implementation ought to be established (Mökander & Floridi, 2021). This will help to delineate responsibilities, spot possible weak points, and promptly resolve them) (Taddeo & Blanchard, 2022,19);

To that aim, technological companies and defense organizations will benefit from the eight suggestions listed above.

In conclusion, one contends that for the use of these technologies to be morally acceptable, human actors should be given real moral responsibility. This type of moral responsibility is assigned under strict conditions that are justified by the nature of the harm that AWS may inflict (whether fatal or not). The moral gambit can be used to accept meaningful moral responsibility for the actions of non-lethal AWS, provided that defense institutions set up the necessary procedures to aid human agents prepared to take the moral gambit in comprehending how AWS work, the advantages, and drawbacks of using them, as well as the repercussions of doing so (Taddeo & Blanchard, 2022, p. 20).

Advocates for the use of LAWS have developed a strong case for its use when it outperforms human operators at distinguishing between legitimate military targets and civilians. They do this by highlighting the positive outcome of saving lives, which makes the use of LAWS not only ethically questionable but possibly even required (Arkin, 2010). This pro-LAWS argument can also be presented on the grounds that applying LAWS maintains the dignity of the individuals whose lives are spared, directly refuting the argument that doing so would be disrespectful to individuals' intrinsic dignity (Jenkins and Purvis, 2016; Dean, 2022, p. 2).

Not only does moral theory employ the tactic of grounding moral claims in fundamental respect for individuals or human dignity, but it is also evident in major public pronouncements like the UN Universal Declaration of Human Rights, which calls for universal and equal "respect" for these rights and bases its specific human rights on "recognition of the inherent dignity" of all humans (UN, 1948; Dean, 2022, p. 5).

3.3. Meaningful Human Control (MHC)

As Cummings pointed out, it's critical to distinguish autonomy from automation while discussing technology. Automated systems follow precise, repeatable rules that are built on precise data from detected objects. Autonomous systems gather information about their environment, which is unstructured, process it to provide information and options, and then decide what to do in the face of ambiguity. This collection of skills is frequently referred to as

self-governing. It's common for systems to swing between being fully automated and fully autonomous.

Any autonomous system that currently uses computer-reliant systems to reason about dynamic surroundings is likely to be very unreliable, especially in scenarios the system has never experienced before, according to a pure engineering assessment approach. Unfortunately, war is by its very nature violent. As a result, It is crucial to maintain human control in present military operations because the technological flaws are so severe. However, it would be far too early to claim that this would always be the case, even though technology cannot currently handle unpredictability on the battlefield. Due to major flaws in computer vision algorithms and substantial uncertainty, human control is required for dynamic targeting in offensive missions because an autonomous system cannot function consistently and dependably. However, because of their dynamic nature, such processes are also vulnerable to human mistakes. There are already autonomous offensive weapons capable of accurately hitting fixed, predetermined, and well-mapped targets. Additionally, they are fire-and-forget weapons that, at least in real-time, are superior to MHC. They have replaced human fallibility, and errors occur only when a human enters targeting information incorrectly or chooses the wrong target. Therefore, any restriction on such technology rejects both the way we currently use them and the idea that future developments could lead to autonomous offensive weapons that are less error-prone than people. The term MHC is vague and could even be a distraction. Real-time decision-making on the battlefield is exceedingly challenging with a significant chance of error due to the fog of war, time constraints, and the growing amount of inaccurate information available to war fighters. The most effective method of human control in the use of offensive weapons is choosing in advance which targets will be prosecuted and under what circumstances (Cummings, 2019, p. 20-26). It is important to verify that an autonomous weapon can accurately identify and engage a target with greater accuracy than a human, once a genuine target has been certified by a human decision-maker. This requirement is satisfied by targets that are static, accurately mapped, and compliant with the engagement guidelines. Unfortunately, not many targets fit this description. If autonomous weapon systems such as these are to be used for prosecution against dynamic and evolving targets, they should have to show that they are significantly better than humans operating in comparable circumstances. While AW technology for dynamic environments is still a ways off, we still have a

responsibility to keep working toward a balanced role allocation in weapons systems that, at the very least, are less prone to error than people for the sake of both the pilots who are likely to make mistakes in such conditions and the innocent bystanders who could be killed by human error.

MHC's ethical and legal arguments suggest three key roles for humans in managing weapon systems to ensure they are ethical. Firstly, human control must act as a safeguard, preventing direct attacks on civilians or excessive collateral damage caused by malfunctioning weapons, in compliance with IHL. Secondly, human control must ensure accountability by assigning responsibility if a weapon violates international law, to prevent any gaps in accountability. In armed conflict, immoral artificial agents mustn't harm the life, physical integrity, or property of people, including combatants. Lastly, based on the principle of respecting human dignity, human control must act as a moral enforcer. This means ensuring that decisions related to the life, physical well-being, and property of individuals involved in armed conflicts (including combatants) are not made by non-moral artificial agents (Amaroso & Tamburrini, 2019, p. 189).

4. THE LAWS IN INTERNATIONAL HUMANITARIAN LAW

4.1. The LAWS and International Humanitarian Law

A collection of guidelines and precepts known as IHL, sometimes referred to as the law of armed conflict or the law of war, aims to lessen the effects of armed conflict and safeguard civilians, injured parties, and prisoners of war. It governs the conduct of warfare and seeks to ensure humane treatment and respect for human dignity during times of armed conflict. Subject to several restrictions, such as the requirement that the provisions of the more specialized legal rules of IHL be consulted when determining the application of Human Rights Law (HRL) during armed conflict, HRL supplements IHL's regulations on the use of force.

IHL primarily comprised of two branches: the Hague Law, which focuses on regulating the means and methods of warfare and the Geneva Convention, which emphasizes the protection of individuals who are no longer taking part in hostilities. Overall, IHL seeks to balance military necessity with humanitarian considerations, promoting respect for human life and dignity even in the midst of conflict.

The particular and general regulations on weapons, means, and methods of warfare under IHL already establish restrictions on the development and application of AWS. An analysis of the pertinent IHL regulations reveals that there are three requirements that must be met in order for AWS to be developed and used in accordance with IHL:

- The capacity to predict with precision whether an AWS's effects might, in some or all situations, breach particular and/or general prohibitions and limits on weapons, means, and methods of conflicts. It would probably be illegal to use an AWS whose use, behavior, and effects cannot be reasonably predicted.
- The capacity to manage an AWS's operation in a way that complies with hostilities' rules of engagement. Use of an AWS that cannot be restricted in conformity with the rules of IHL, specifically the rules of distinction, proportionality, and precaution would be illegal.
- The capacity to trace the use, behavior, and impacts of AWS. The assessment and application of governmental responsibility and/or individual criminal liability for infractions would be precluded by the use of AWS that cannot be effectively ascribed, detected, or confirmed.

The question of how to ensure these three conditions are met through human-machine interaction is an important question that states need to clarify their views on. IHL does not give a clear answer on the specific type and extent of human-machine interaction needed for compliance. Different states and experts may have different approaches to this question, depending on whether they view IHL as solely focused on the effects of military action or if they allow the use of any combination of humans and machines as long as the effects are not unlawful.

A system that requires human evaluations and judgments in military operations also raises questions about how to interpret and comply with IHL. These questions revolve around four aspects: personal, material, temporal, and geographical (Boulanin & Brunn & Goussac, 2021).

The first aspect concerns who is responsible for respecting IHL provisions. It is unclear whether the decision to use an AWS and its consequences lies with one person or multiple individuals. How do various contributions to the functioning and decision-making of an AWS interact in a multi-agent paradigm, if the latter is the case? The second aspect pertains to the specific types and levels of interaction between humans and machines that are required, allowed, or prohibited by the rules of IHL. For instance, to what extent does IHL dictate, permit, or forbid the delegation of value judgments to machine processes? The third and fourth aspects have to do with when and where IHL requirements must be followed. For instance, How far into the past and into space may IHL-mandated assessments be carried out? How the unpredictability generated by the use of autonomy should be addressed and managed under IHL is another crucial concern. How, for instance, should the assessment of unpredictable events be carried out beforehand (as part of the legal review and advice), managed during deployment, and assessed afterward to establish individual and state accountability for possible IHL violations. It is essential to take into account these different aspects in order to decide what would make AWS illegal essentially as well as how IHL regulations should be adhered to in the development and use of AWS: who is responsible for what, when, where, and how (Boulanin & Brunn & Goussac, 2021).

The recommendations would be as follows:

First, States should engage in more in-depth discussions on the meaning of respecting and ensuring respect for IHL in relation to Autonomous Weapons Systems (AWS). Although the adoption of 11 guiding principles (see Annex 1) by the GGE of The CCW (The 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 as amended on 21 December 2001) has helped clarify some legal issues, there are still many unanswered questions about what AWS development and use are permitted, required, and prohibited under IHL. Second, States should exchange views and share experiences regarding practical measures that can improve compliance with IHL in the development and use of AWS. States could provide further details on the expected standards of knowledge and behavior that would enable users to determine the legality of the system's operation, performance, and effects. Additionally, precautions should be made to guarantee that users have operational control over the weapon, may restrict its effects in compliance with IHL, and that the results of utilizing an AWS can be linked to a person or a state. Third, States need to be more specific about how human-machine interaction complies with IHL and the moral and legal principles that support those interactions. States must justify their ethical presumptions for why some types of human-machine interaction may be acceptable in terms of IHL compliance. This involves deciding whether to prioritize human agency and responsibility in upholding IHL duties or to base the choice of human-machine interaction simply on reducing the danger of unlawful outcomes. In order to determine whether some level of human-machine interaction is always required, independent of the features of the weapon system and the situation in which it is employed, it is imperative to find an answer to this question (Boulain & Brunn & Goussac, 2021).

4.2. The limits on autonomous weapon systems under International Humanitarian Law

4.2.1. Rules on weapons, means, and methods, of warfare

As stated in Article 35 of Additional Protocol I to the 1949 Geneva Conventions, in any armed conflict, the right of the parties to the conflict to choose their methods or means of warfare is not unlimited.

The rules of IHL that limit the development and use of AWS can be classified into three categories:

- "Rules prohibiting or restricting specific weapons, means, and methods of warfare ";
- "General prohibitions and restrictions on weapons means, and methods of warfare ";
- "General prohibitions and restrictions on the conduct of hostilities".

The first and second categories pertain to determining if a weapon or method of warfare is inherently illegal, while the third category of IHL rules governs the lawful use of weapons and methods (also known as targeting law). However, it is important to consider the Martens Clause which has been a part of the laws of armed conflict since it originally appeared in the preamble to the 1899 Hague Convention (II) regulating the laws and customs of war on land. The States Parties believe it is appropriate to declare that, until a more comprehensive code of the laws of war is published, populations and belligerents continue to be protected by the principles of international law, which derive from the customs developed between civilized nations, from the laws of humanity, and from the demands of public conscience, in situations not covered by the regulations they have adopted. This clause ensures that both combatants and civilians are not left without any protection in situations not covered by IHL conventions.

Specific and general rules prohibiting or restricting specific weapons, means, and methods of warfare:

Any new means of conducting war, including AWS, would be deemed fundamentally illegal under IHL if it possessed one or more of the following features:

- The weapon which is already forbidden by a specific convention, such as one that forbids the use of poison, biological or chemical weapons, or lasers that cause blindness;
- The weapon's nature makes it likely to inflict superfluous injury or needless suffering;
- The weapon is by nature indiscriminate, meaning that it cannot be aimed at a specific military goal or have its effects limited as required by IHL. As a result, it has the potential to strike both military targets and people or civilian objects without distinction;
- The weapon is designed to create broad, severe, and long-lasting environmental harm, or it may be expected to do so (Boulain & Brunn & Goussac, 2021, p. 5,6).

The use of weapons in armed conflict is governed by IHL, as is the kind of weapons that are employed. In the first place, IHL explicitly forbids the use of any weapons that could result in "superfluous injury" or "unnecessary suffering." A weapon whose principal purpose is to "injure by fragments that cannot be detected in the human body by X-rays" is an example of one that is prohibited by this rule. Undetected fragments worsen the wounds of soldiers who are already unable to perform their duties, resulting in pain that does not serve for military objectives. Second, IHL forbids the employment of weapons that are by nature indiscriminate. Balloon bombs and some unguided missile systems are examples of weapons that are

inherently indiscriminate since they cannot be directed at a specific military target. Due to the uncontrollable nature of their consequences, biological weapons are also seen as indiscriminate. In addition to those outlawed by IHL, other weapons may also be prohibited by treaties. For instance, using, developing, producing, purchasing, stockpiling, and transferring antipersonnel mines are all prohibited by the Ottawa Convention. By its terms, the Oslo Convention forbids States Parties from using cluster munitions. These conventions' impact is limited by the fact that several powerful military nations, including the United States, are not signatories. The use of AW is not specifically prohibited by a treaty or a rule of international law. Additionally, no special rules of IHL law apply to the employment of AW. The fundamental principles of IHL are intended for use by humans, not machines because it was not conceivable to foresee AI and complete autonomy in weaponry during the Geneva Conventions' negotiation stages. Prior to deployment, all States must thoroughly evaluate any new autonomous weapon's legality to ascertain whether it violates any laws because it may result in unnecessary suffering or be indiscriminate. While some autonomous weapons may fail the legal test, it is not true to argue that all AW are prohibited under IHL (Trumbull, 2020, p. 554).

General prohibitions and restrictions on the conduct of hostilities

There are general rules and restrictions on how hostilities can be conducted. Even if weapons, means, and methods of warfare are not inherently illegal, their use is still limited by these rules. These rules are established in various IHL treaties, such as the Hague Conventions of 1899 and 1907, the Geneva Conventions of 1949, and their Additional Protocols of 1977. These rules are considered to be customary IHL. According to these rules, the use of a weapon, including AWS, would be considered illegal in certain situations.

- A bombardment attack using any technique or tool that treats as a single military objective a number of independent and distinct military targets situated within a city, town, village, or other location with a comparable concentration of civilians or civilian-related items;
- An attack that targets both military targets and civilians or civilian objects without distinction;
- An attack that would be disproportionate given the expected concrete and direct military gain and could be expected to cause incidental civilian casualties, civilian injuries, damage to

civilian property, or any combination of these. IHL accords also describe basic principles that attempt to protect civilian populations from the consequences of war;

The aforementioned regulations require parties involved in armed conflict to adhere to the principles of distinction, proportionality, and precautions during attacks.

The principle of distinction (Article 48 of AP I) a rule of CIL codified in Additional Protocol I, mandates that parties must differentiate between civilians and combatants, active combatants and those who are not able to fight, and civilian objects and military targets. This principle is put into action by the rule that parties can only target active combatants and military objectives, not civilians and civilian objects (unless civilians directly participate in hostilities). All sides of the debate agree that the difficulty of this task is a major concern in the context of irregular warfare. The presence of soldiers among regular people makes decisions in these conflicts very complicated. For instance, think about complicated scenarios that consist of non-civilian noncombatants who are legally authorized to receive protection, like surrendered, wounded, or disabled fighters (Boulain & Brunn & Goussac, 2021, p. 6,7).

The principle of proportionality codified in Article 51(5) (b) of Additional Protocol I, puts additional limits on attacks against military objectives. This principle acknowledges that civilians and civilian objects may be incidentally affected by an attack aimed at a legitimate military objective. This rule states that it is forbidden to launch an attack that is predicted to have a greater adverse effect on human life, civilian injury, civilian property damage, or a combination of these effects than the projected military advantage. On one hand, many argue that an autonomous system is fundamentally incapable of making the inherently complex and flexible proportionality judgment required by this rule. To maintain proportionality when making a decision about allowable collateral impact, the decision maker must integrate the surrounding battlefield circumstances and overall military action goals (Boulain & Brunn & Goussac, 2021, p. 7).

The precautions principle (Article 48 of AP I) is made up of two related components, one dealing with military operations and the other with attacks. First, IHL requires parties to use vigilant caution when conducting military operations in order to protect the civilian population, civilians, and civilian property. Second, when carrying out particular attacks, IHL requires that parties take a number of safety measures. The responsibility to take measures in attacks specifically includes the requirement to: a) make every effort to ensure that the planned

targets are not civilians, civilian objects, or subject to special protection, but rather military objectives; (b) take all reasonable precautions when choosing the means and methods of attack to prevent, or at the very least minimize, accidental loss of civilian life, harm to civilians, and destruction to civilian objects; (c) abstain from launching an attack if it is likely to go against the proportionality principle; and (d) cancel or halt an attack when it becomes clear that a target is not a military objective, when a target is under special protection, or when an attack is anticipated to go against the proportionality principle. IHL also imposes restrictions on the use of AWS in contexts other than hostilities. These restrictions include rules that limit the use of AWS for crowd control, keeping the people safe in the area under occupation, and for guarding relocating prisoners. The Martens Clause, as stated in Additional Protocol I to the 1949 Geneva Conventions, states that civilians and combatants are protected by principles of international law that are drawn from long-standing custom, humanity, and public conscience in cases not covered by the Protocol or other international agreements. The interpretation of the Martens Clause varies greatly, with disagreement among states and experts regarding its status as customary law, an independent source of law, or moral guidelines. However, it has been argued that the clause implies positive obligations when military action would have unacceptable humanitarian consequences, even if not explicitly prohibited (Boulanin & Brunn & Goussac, 2021, p. 7).

Key issues concerning the rules on weapons means, and methods of warfare

Personal Aspect

Who is responsible for following the rules of IHL regarding an AWS, and what can the individuals protected by those rules expect from those responsible. The obligation to comply with IHL rules, such as those concerning distinction, proportionality, and precautions, lies solely with human agents. According to Guiding Principle (d) of the 2019 GGE (see Annex 1) (In 2016, the Fifth Review Conference of the High Contracting Parties to the CCW established an open-ended GGE on emerging technologies in the area of LAWS) human responsibility for decisions regarding the use of weapons systems must be maintained as accountability cannot be delegated to machines. This principle focuses on human responsibility rather than human agency. If everyone is partially responsible, no one is fully responsible. Determining the level and type of human involvement that can be expected from AWS users in accordance with the

principle outlined in the Martens Clause could be challenging (Boulanin & Brunn & Goussac, 2021, p. 14).

Material Aspect

The fundamental principles guiding the conduct of hostilities, such as distinction, proportionality, and precautions, demand the use of evaluative judgments and value judgments, just like many other IHL norms. The evaluation and judgment required by these rules involve various aspects. For example, the principles of distinction and proportionality would require the establishment of target profiles and decision-making methods that can differentiate between military objectives and non-targetable individuals or objects. Additionally, these principles would involve assessing the conditions under which force can be applied, considering factors such as threat level or context-based requirements for taking precautions. The principle of precautions suggests that systems could be designed with fail-safe mechanisms, warning capabilities, and self-deactivation or self-neutralization mechanisms. It is crucial to remember that the principles of distinction, proportionality, and precautions ultimately require human judgments and evaluative decisions. Regarding the principle of proportionality, it underlines that figuring out what counts as a military advantage is related to the situation at the time of the attack and not just dependent on quantitative measurements. The supporters argue that once an AWS is deployed, it should not be allowed to make assessments of proportionality. Instead, it is the responsibility of the user to assess proportionality before launching an attack. They also point out that the principle of precautions places obligations on those who plan or decide on an attack, so the evaluation required by this principle cannot be delegated to an AWS or replaced with preprogrammed precautionary mechanisms. When using AWS, it is necessary to establish technical indicators in advance that will enable the system to detect, identify, select, and prioritize targets once it is activated. The legal question of how these indicators should be programmed remains a subject of debate. The debate on targeted strikes has also discussed whether combatants and military objects can be targeted based on information proxies such as location, biometric features, or behavior. IHL sometimes lacks exact definitions for terms like civilians, non-combatants, combatants, and military objectives. These ideas are frequently predicated on elements like involvement in or contributing to hostilities, as well as military membership.

Different interpretations and practices exist regarding the identification and encoding of a person or object as a legitimate target. Some states define military objectives in terms of geographical areas, considering anyone or anything located in areas of heavy fighting as a legitimate target, often referred to as "kill boxes". Other states believe that biometric and behavioral markers, such as assigned gender, height, age, and posture, can be used to determine whether an individual is a combatant or civilian for targeting purposes. However, this perspective has faced criticism from other states and civil society organizations, questioning the feasibility and legality of using geographical location or physiological and social indicators to distinguish combatants from non-combatants. Using these indicators alone might not be enough to meet legal requirements under the principles of distinction, proportionality, and precautions, even though IHL does not expressly forbid their use. How specific must a "military objective" be, and what does it mean? Based on their nature, location, and intended use, military items are already classified into three categories under IHL. It is commonly accepted that several military goals cannot be merged into one overarching goal, as expressed in Article 51(5)(a) of the 1996 CCW Amended Protocol II on mines, booby-traps, and other devices, and Additional Protocol I to the 1949 Geneva Conventions. Therefore, in more complex battle environments with diverse targets, relying less on technical indicators would be considered lawful (Boulain & Brunn & Goussac, 2021, p. 18).

The Temporal Aspect

When should the provisions of IHL be followed? According to the definition, AWS is considered a weapon with a time delay, meaning there can be a significant gap between the decision to use force and its impact. When do limitations on attacks start and stop? The principles of distinction, proportionality, and precautions, along with other IHL regulations governing the conduct of hostilities, are designed as constraints on attacks (Boulain & Brunn & Goussac, 2021, p. 22).

The Geographical Aspect

Which locations are subject to IHL provisions? This pertains to where an attack begins, extends, and concludes, as well as how AWS users should engage with the surrounding environment. It is widely acknowledged among states that a case-by-case assessment is necessary, taking into account various factors. Firstly, the nature of the environment must be considered. Secondly, whether the intended environment contains elements protected by IHL,

such as civilians, civilian structures, and the natural environment. Lastly, the interaction between the characteristics of the AWS system itself and the environment, including its perception capabilities, ability to adapt to weather changes and the environmental impact of an attack. How should AWS users interact with the system? According to the precautionary principle, a user should be able to halt or suspend an attack if it turns out that the target is not a military target, has special protection, or would be disproportionately affected by it (Boulainin & Brunn & Goussac, 2021, p. 25).

In summary, the report "Limits on Autonomy in Weapon Systems: Identifying Practical Elements of Human Control" by SIPRI and the ICRC in 2020 found that human control measures can take various forms. These measures can be used to improve the way a weapon is made, how it is used, and how a user interacts with it. The study came to the additional conclusion that the context, the features of the systems, and the environment will determine the precise combination of measurements required. According to the 2020 chair's assessment of the GGE deliberations, which includes some of the findings in its recommendation for further developing the guiding principles, states have favorably reacted to these discoveries. How nations might choose the best combination of actions to uphold and guarantee observance of IHL remains a difficult problem. In terms of personal, material, temporal, and geographic characteristics, it creates basic issues with interpretation and application. Although every aspect merits separate consideration, the most pressing concerns regarding the level and type of human-machine interaction necessary for IHL compliance can be found in the combination of two or more of these aspects. Which combination would be prohibited by IHL? When is it no longer possible to accurately predict, manage, and adequately trace the operation, performance, and effects of an AWS due to the multiple humans sharing responsibility, reliance on automated processes, and distance in time and space? Some states have already outlined the rationale and guidelines for using specific autonomous weapon types, such as close-range weapon systems, in compliance with IHL in each of these four areas. The conduct of hostilities would benefit from states being able to more clearly define the combinations that would show respect for or disregard for IHL. States may find it helpful to use particular instances to examine the boundaries of what is permissible under IHL. States could combine different factors in various contexts to look at what would be permitted, necessary, or forbidden. What personal, material, temporal, and geographic factors, for instance, would determine whether it

is appropriate or inappropriate to use a swarm of anti-personnel AWS in a populated area? Could human supervision be required despite of technology capabilities due to the target's nature? What details about the system and the use environment would the user want in order to allow a launch and choose the required degree of human-machine interaction afterward? And what role does the timing of the procedure play? These are just a few of the issues that states must take into account while debating how to conduct wars and engage with machines (Boulanin & Brunn & Goussac, 2021, p. 27).

4.2.2. Rules Requiring Legal Reviews and Advice

The frequency with which a weapon system will operate in the same way under a specific set of conditions is referred to as reliability. For instance, the examiner must understand how consistently a weapon fulfills its intended use in order to determine if it is indiscriminate. A similar element in legal considerations is the weapon system's predictability, or whether it will perform as intended under different conditions. In order to decide whether a weapon system can be deployed in accordance with IHL, the assessor must be able to predict how the weapon will operate in the various operational contexts in which it is likely to be employed. This is true even if a weapon system performs consistently in a controlled environment. A single standard contains too little and too much reliability and predictability, depending on the weapon's intended use and operational context. It is likewise unlikely that a mandated standard would resolve an issue already in existence. Weapons that are unpredictable and unreliable would be of little use to governments (Trumbull, 2020, p. 568).

States Parties to the IHL are expected to conduct legal analyses of new military equipment and tactics. They are also supposed to offer legal advisor to military commanders so they can advise them on how IHL should be applied and what directives should be given to the armed forces. These duties can also be regarded as conventional IHL. Article 36 of Additional Protocol I to the 1949 Geneva Conventions specifies the requirement to conduct legal reviews of new weapons, tools, and techniques of combat. It is up to the States Parties to decide whether the Protocol or any other international law standard would forbid the employment of a new weapon, means, or method of warfare. This obligation is founded on the ideas that treaty obligations must be upheld in good faith and that governments do not always have the absolute freedom to determine the means and techniques of war. Although it is still debatable whether

this responsibility applies to governments that are not party to Additional Protocol I, conducting legal reviews to guarantee compliance with international responsibilities is generally seen as good practice (Boulain & Brunn & Goussac, 2020, p. 9). Article 36 does not offer specific guidance on the process of conducting legal reviews. There has been extensive discussion on what should be included in a review and what methods should be employed. However, it is generally agreed upon that Article 36 has a broad scope and can encompass all types of weapons, regardless of their lethality. It also applies to new weapons, whether they are being developed for research or obtained from other countries. Regarding methodology, it is acknowledged that there cannot be a one-size-fits-all approach to legal reviews due to the varying needs and resources of different states. Nonetheless, there are several components of best practice that include reviewing weapons as soon as possible, applying a multidisciplinary approach, depending on empirical data, and, if practical, carrying out independent testing to assess a weapon's performance and related issues.

The legal test must take into account, in particular, treaty and customary law prohibitions and restrictions on specific weapons, as well as the general rules of IHL that apply to all weapons, means, and methods of warfare. These include the laws intended to shield combatants and civilians from the indiscriminate impacts of weaponry as well as undue harm and suffering for civilians. Conducting such an assessment requires a deep grasp of the weapon's capabilities as well as the ability to predict its effects, particularly through testing and verification. Legal verification must require an extraordinarily high degree of confidence that the autonomous weapon system, once activated, would operate predictably and reliably as intended. This is due to the fact that, in contrast to when target selection and engagement were directly under human control, the commander or operator must assess the legitimacy of an attack using an AWS early. This presents a particular challenge in ensuring that predictability which is the ability "to say or estimate that (a certain thing) will happen or be a consequence of something in the future." Applied to an autonomous weapons system, predictability means knowing how it will perform and what its effects will be under given operational conditions. Reliability is "the quality of being trustworthy or consistently performing well". Knowing the machine's reliability in this sense means understanding how consistently it will function as planned, for example, without failures or unforeseen consequences (Davison, 2016, p. 9).

According to Article 82 of Additional Protocol I to the 1949 Geneva Conventions, there is a requirement to provide legal advice. This means that the High Contracting Parties and the Parties involved in armed conflict must ensure that legal advisers are accessible to military commanders when needed. These advisers are responsible for guiding commanders on the application of the Conventions and the Protocol, as well as providing appropriate instructions to the armed forces. The availability of legal advisers is a practical measure that helps states fulfill their obligation to respect and ensure respect for IHL. One could consider this obligation to be derived from the general rule of carrying out legal obligations in a sincere manner (Boulanin & Brunn & Goussac, 2021, p. 10).

Key Issues Concerning Legal Reviews and Legal Advice

Legal reviews and legal advice play a crucial role in ensuring that AWS is used in compliance with IHL. This is crucial because while utilizing AWS, it can be difficult to tell the difference between the two mechanisms. While operational legal advice may call for a deeper awareness of the operational environment, legal evaluations of AWS may demand a deeper understanding of the nature of the weapon system. By accelerating legal advisor responsibility throughout the whole process of designing, purchasing, implementing, and using AWS, this overlap can promote better adherence to IHL. This lessens the chance of missing any problems. The prospect of transferring responsibility arises from this blurring of duties, nevertheless, as neither the legal adviser nor the reviewer sees themselves as responsible for recognizing and addressing violation risks. States may want to adopt regulations that spell out the precise duties of legal reviewers and legal advisers, as well as how they communicate with one another, to prevent this. There are still various legal and practical issues that states may want to address in order to have a better understanding and ensure proper legal review when using AWS. This will help promote compliance with IHL before, during, and after the deployment of such systems (Boulanin & Brunn & Goussac, 2021, p. 28).

4.2.3. Responsibility

Two key tenets of international law are state responsibility and personal criminal responsibility. They come about as a result of the fact that both governments and persons are subject to IHL responsibilities and that each has a legal personality under the convention. An

IHL violation may be the result of a variety of factors, including the type and character of the breach, one or more states, one or more people, or a combination of state(s) and individual(s). As a result, responsibility can be assigned, determined, and examined simultaneously through a number of frameworks, and the same behavior can result in one or more infractions, none at all, or several violations. The legal foundations for state and individual responsibility aid in structuring adherence to IHL regulations, preventing impunity for IHL violations, and maintaining faith in the effectiveness of the IHL regime (Boulanin & Brunn & Goussac, 2021, p. 40).

State Responsibility

All states are obligated to uphold and ensure the respect of IHL, even by their own armed forces and individuals or groups acting under their authority or control. Additionally, every state is accountable for any internationally wrongful acts that can be attributed to them. The notion of state accountability is essential for upholding and respecting international law, including IHL, as well as the legal principles outlined in Additional Protocol I, Article 82. The International Committee of the Red Cross (ICRC) recognizes the importance of legal advisers for armed forces in ensuring compliance with IHL. The principles of state responsibility and individual criminal responsibility have long been established in international law (Boulanin & Brunn & Goussac, 2021, p. 41). For state responsibility, see e.g. Geneva Convention (IV) Relative to the Protection of Civilian Persons in Time of War, opened for signature on 12 Aug. 1949, entered into force 21 Oct. 1950, Article 1; and ICRC, Customary IHL Database. The IHL Databases of the ICRC are three databases that can be searched and provide information about IHL. Users can conduct searches across all three databases, individually, or collectively, to locate and access documents pertaining to IHL standards in both treaty and customary law, as well as their application, implementation, and interpretation. An overview of the limits on LAWS under IHL underpinning the framework for state responsibility can be traced to the beginning of modern international law. IHL defines the scope and content of 'primary' rules. In relation to violations of those core IHL principles, the legal institution of state responsibility defines and organizes the "secondary" standards. The International Law Commission's (ILC) well-known articles on "Responsibility of States for Internationally Wrongful Acts" have consolidated and defined the laws governing state responsibility. There are four requirements for state responsibility to occur. Firstly, the actions must be attributed to the state. States act

through human agents and are abstract entities. Members of the state's armed forces, people or organizations with the state's permission to exercise certain governmental powers, people or organizations acting under the state's command or under its influence, and private individuals or groups whose actions are recognized and supported by the state are all examples of human agents that can be attributed to the state. Secondly, there must be a violation of one or more of the state's international obligations, whether they are general or specific, through either an act or a failure to act. The rules on state responsibility do not define the specific obligations, as that is determined by IHL. States have a general obligation to uphold and ensure compliance with IHL instruments, as stated in Common Article 1 of the 1949 Geneva Conventions. Thirdly, in order for an act to be considered internationally wrongful, it must not be justified or excused by any recognized circumstances. In accordance with the draft articles of the ILC, a state may violate a major rule of international law under the following six justifications: consent, self-defense, force majeure, distress, necessity, and countermeasures. Nonetheless, none of these situations permit deviating from a general international law norm that is preemptive. One could argue that the fundamental principles of IHL- distinction, proportionality, and precautions - can be considered as absolute norms. Lastly, there are specific legal consequences that arise from committing an internationally wrongful act. These consequences primarily involve the obligation to stop the act if it is ongoing, provide necessary assurances and guarantees to prevent future occurrences, and fully compensate for the harm caused (Boulain & Brunn & Goussac, 2021, p. 11).

Individual Crime Responsibility

Individuals can be held accountable for war crimes and other international crimes they commit. These crimes include war crimes, crimes against humanity, genocide, and aggression. The specific criteria for determining what constitutes a war crime can be found in the interaction between IHL and International Criminal Law (ICL). The Rome Statute, which outlines the ICL framework, is also taken into account. The importance of this framework, both in relation to armed conflict and in general, has been recognized by various actors. It is necessary to consider the rules on individual responsibility, at least as outlined in the Rome Statute, in order to fully understand the concept. Four elements are essential in establishing individual criminal responsibility, and all four must be present for a war crime to occur. Firstly,

the behavior must be attributable to one or more individuals who are involved in actions related to an armed conflict. Non-human entities, like machines, cannot be held personally accountable for crimes under the Rome Statute of the International Criminal Court. Secondly, the behavior, circumstances, or outcomes must constitute a serious violation of IHL that amounts to a severe breach or war crime, such as intentionally killing a protected person. This condition pertains to the factual (or objective) aspect of the offense. The definition and specifics of the factual elements of war crimes (including severe breaches) are derived from IHL. Thirdly, the necessary mental aspect (also referred to as *mens rea*) must be proven. Depending on the relevant legislation, this issue, which pertains to the personal element of the war crime, may involve determining whether the accused acted intentionally (according to IHL) or whether the accused had or lacked enough understanding and intention regarding the actions, circumstances, or outcomes (according to the Rome Statute). Lastly, criminal responsibility and liability for punishment only apply if the prohibited behavior was committed through one of the recognized forms of individual criminal responsibility. In accordance with the Rome Statute, various forms of accountability are outlined. These include personally carrying out a war crime, giving orders or encouraging others to commit a war crime, and providing assistance or support in the commission of a war crime. Additionally, the Rome Statute holds commanders or superiors responsible in specific situations for war crimes committed by their forces or subordinates under their command or control. This responsibility arises when they fail to adequately exercise control over these forces or subordinates (Boulain & Brunn & Goussac, 2021, p. 12).

Key Issues Concerning Frameworks for State Responsibility and Individual Criminal Responsibility

For two reasons, state responsibility may be more significant than the regulations governing individual criminal responsibility: (a) state responsibility is applicable to all violations of IHL, not just the most serious ones; and (b) states may be held accountable for their failure to uphold their international obligations even in situations where they lacked the knowledge or intent necessary for individual criminal responsibility. Another issue that needs clarification is the question of who, and how many individuals, are responsible for ensuring that a state complies with its IHL obligations in the use of AWS. GGE Guiding Principle (d) states that

there should be a "responsible chain of human command and control" for the development, deployment, and use of AWS within the framework of the CCW, but it does not specify what constitutes such a chain. Legally, the state would probably be held accountable if one or more state agents could have reasonably predicted repercussions or effects, but those consequences or effects were either not expected or anticipated but ignored. A crucial legal issue in this context is determining how far back in time states are obligated to take feasible precautions. Some experts argue that this obligation extends to the procurement and design stage, while others believe it only applies during the operational stage. Additionally, states need to address how they can ensure that their state agents have the ability to predict, manage, and trace conduct involving AWS in order to comply with IHL. By answering these questions, states can better identify existing limitations and potential areas for further regulatory development (Boulain & Brunn & Goussac, 2021, p. 40, 43).

Although the GGE has focused more on individual criminal responsibility than state responsibility, there are still several unanswered questions. Individual criminal responsibility is determined by four elements: (a) a serious violation of IHL, (b) a material element, (c) a mental element, and (d) the conduct being carried out through one of the established modes of responsibility. All four elements must be present for individual criminal responsibility to be imposed. Additionally, these elements must be attributable to a specific individual. If the conduct cannot be traced back to an individual criminal responsibility cannot be imposed. The main topic of discussion regarding AWS and individual criminal responsibility is the extent to which autonomy affects the ability to establish the four elements of criminal responsibility and connect them to specific individuals. As mentioned earlier, autonomy plays a role in how individuals engage in unlawful behavior in various aspects such as personal, material, temporal, and geographical dimensions. Regarding the temporal aspect, the question arises as to when the violation occurred. In the case of AWS, decisions regarding attacks and the use of force can be made well in advance, even during the weapon's development phase. This temporal dimension raises various issues. The geographical dimension has to do with the location of the violation. The ability to establish both the physical and psychological components of individual criminal culpability in respect to AWS is examined in this dimension along with how the environment's characteristics and the type and degree of interactions between users and their use environment. Weapon autonomy has the potential to profoundly alter

presumptions about how people comply to or violate IHL, particularly in terms of measures of accountability or the psychological effects of war crimes (Boulain & Brunn & Goussac, 2021, p. 45).

To sum up, regarding IHL and the use of AWS, maintaining human responsibility is crucial. The development and use of AWS are governed by the basic IHL principles, but supplementary frameworks of responsibility make sure that people and nations follow these standards and that there are systems in place to hold those who break them accountable. Some incidents may qualify as war crimes without implicating state responsibility, while others may involve state responsibility without constituting war crime liability. Additionally, some situations could result in either, neither, or both. The main concern is whether the current frameworks of state responsibility and individual criminal responsibility provide clear and applicable institutions and norms to attribute, identify, and examine conduct related to AWS, including the imposition of responsibility on individuals and/or states when a violation of IHL occurs.

These inquiries relate to fundamental presumptions on the legitimacy of states and people during armed conflict. Depending on how they are applied and interpreted, current frameworks for distributing accountability in respect to AWS may or may not be enough. This is significant either because they show disrespect for IHL or because they make it more difficult to hold states or people accountable when IHL is violated. Expanding on the 11 guiding principles established in the GGE (see Annex 1), countries could offer more clarity on whether a single human agent should bear the responsibility for military operations involving AWS, and if so, what qualifications and resources that person should possess to ensure compliance with IHL provisions. To aid in these discussions, it might be useful to list the prerequisites, taking into account various combinations of the four dimensions (personal, material, temporal and geographical) : (a) one or more human agents can accurately predict the effects and performance of an AWS in the anticipated situations and throughout its operation (b) the AWS can be successfully managed during operation; and (c) the actions and outcomes of the AWS can be attributed to one or more accountable human agents. Discussing these aspects can contribute to enhancing discussions in the GGE regarding current legal principles, rules, and standards concerning predictability, control, and accountability in relation to military operations involving AWS. In this context, the importance of being able to track actions should

be emphasized. Although it has not been a major focus in the GGE discussions, it is arguably a crucial requirement for ensuring compliance with IHL. The inability to trace actions and the absence of tracing hinder the assessment of IHL adherence, which in turn limits the ability to assign responsibility and hold individuals and states accountable for violations (Boulanin & Brunn & Goussac, 2021, p. 50).

4.3. Compliance with International Humanitarian Law

Autonomous weapon systems, as defined, are not explicitly addressed in IHL treaties. However, it is undeniable that AWS must be able to be deployed. The responsibility to ensure this rests primarily with any state that develops, deploys, and uses weapons. While the parties to an armed conflict are the primary addressees of IHL, the rules governing the conduct of hostilities—particularly the rules of distinction, proportionality, and precautionary measures for attacks—are directed at those who plan, decide, and carry out an attack. Among the most important legal obligations of a commander or operator in the use of weapons systems are distinction, proportionality, and precaution. When utilizing weapons to perform attacks, human fighters are subject to responsibilities under IHL, and they have the responsibility of adhering to these rules and being held accountable for any infractions. Like other legal duties under international law, these legal duties and liability for them cannot be delegated to a device, computer program, or armaments system. Therefore, those responsible for planning, deciding, and carrying out an attack with an autonomous weapon system must make sure that both the weapon system and the method in which it is deployed preserve their capacity to make these crucial legal judgments and, consequently, assure compliance with IHL. As a result, if an AWS hinders commanders or operators from making these legal decisions by its design, performance, and/or mode of use, it may be in violation of IHL. When a mobile AWS searches for targets over a large area and for an extended period of time without human oversight or communication, for example, neither the commander who authorized the use of the weapon nor the operator who activated it can be certain of the exact location and timing of an assault. This begs the question of their ability to differentiate, determine proportionality, or take preventative measures in the event that circumstances alter (Davison, 2016, p. 7).

4.4. The “Principles of Humanity” and The “Dictates of The Public Conscience”

The Martens Clause creates a connection between moral principles and IHL, making it especially pertinent to the assessment of autonomous weaponry. It states that civilians and combatants will continue to be protected by traditional IHL, principles of humanity, and dictates of public conscience in cases not covered by existing treaties. As weapons systems become more autonomous, human decision-making is being replaced by computerized processes, and decisions about life and death in armed conflict are being handed over to machines. Beyond concerns with adherence to IHL in the conduct of combat operations, this raises fundamental ethical considerations regarding the place of humanity in the use of force and the taking of human life. There is deep public unease about the notion of weapons systems that remove the use of force from human control (Davison, 2016, p. 8).

5. CHALLENGES AND REGULATING AWS

5.1. Challenges in Regulating Lethal Autonomous Weapons under IHL

5.1.1. Definitional Problems

Internationally, there is no clear definition of autonomous weapon systems, which makes it difficult to regulate them. Without a common understanding of the technology involved, meaningful regulation is not possible. The current definitions fall into three categories. The first one defines machine autonomy as the role of human operators. For instance, the United States defines “autonomous weapon systems” as weapon systems that, “once activated, can select and engage targets without further intervention by a human operator”. The 2022 US defense policy on LAWS defines it as “a special class of weapon systems that use sensor suites and computer algorithms to independently identify a target and employ an onboard weapon system to engage and destroy the target without manual human control of the system” (Noor, 2023). The Netherlands defines LAWS as “a weapon that, without human intervention, selects and engages targets that meet certain predefined criteria after a human has decided to use the weapon, assuming that once an attack has begun, it cannot be stopped by human intervention”. France, for example, states, “LAWS is to be understood as having no human supervision whatsoever, i.e., there is no connection (communication or control) with the military chain of command”. For Human Rights Watch (HRW), the term “fully autonomous weapon” refers “to both out-of-the-loop weapons and those that allow a human on the loop, but that are effectively out-of-the-loop weapons because the supervision is so limited.” Alternatively, some states base their definition of autonomous weapon systems on the systems’ capabilities. For example, the United Kingdom (UK) defines an “autonomous system” as one that “is capable of understanding higher-level intent and direction.” The U.K. definition further explains that “from this understanding and its perception of its environment, such a system can take appropriate action to bring about a desired state”. The third category of definition focuses on the tasks that can be performed autonomously by a weapon system and the legal consequences that result from its use. The ICRC defines an autonomous weapon system as one that possesses autonomy in its "critical functions". These critical functions refer to a weapon's ability to search for, detect, identify, track, intercept, use force against, neutralize, damage, or destroy targets without any human intervention. The ICRC considers "critical functions" to be the most

significant functions that impact "targeting decision-making" and, therefore, compliance with IHL. At present, Switzerland's definition of AWS refers to weapons capable of performing tasks governed by IHL in place of humans during the use of force, specifically in the targeting process. Switzerland acknowledges that this definition is subject to change and may require more clarity and specificity in the future (Reeves & Alcala & McCarthy, 2020, p. 105).

5.1.2. Legal Challenges

The US and the UK think that the existing laws of armed conflict are sufficient to control the development and application of LAWS. They contend that as long as states appropriately interpret and apply treaties and customary laws pertaining to armed conflict, they are sufficient to regulate LAWS. Some contend, however, that autonomous decision-making cannot accurately determine whether the use of force will abide by the standards of distinction and proportionality set forth by international law. Critics assert that using human discretion and holding decision-makers accountable for their actions is necessary to uphold the principles of the law of armed conflict. Furthermore, it is uncertain how conventional rules of the law of war would apply because of the speculative nature of LAWS technology. Some nations have proposed non-binding treaties to declare the value of employing lethal force sparingly and to direct states using this technology in accordance with the laws of armed conflict. It is challenging for states to come to an agreement to even begin negotiations for a legal agreement, let alone agree on the actual terms of any such arrangement. To address concerns about LAWS, regulatory limits could be imposed without banning them outright. One option is to establish an international agreement that confirms the applicability of the existing rules of armed conflict to LAWS and requires state legal reviews before their deployment. Another aspect of this regulation would be to require MHC over such weapons. However, the technological uncertainties and debates over terminology may pose challenges and disagreements. An additional regulatory measure might be to outline the knowledge that military commanders must possess before using an automated weapon system, the requirement for both the ability for human override and sensory input necessary to adhere to the law of armed conflict's guiding principles, such as the principle of distinction. The document might also address how states are held legally accountable for using AW, including their liabilities and obligations for using force against their citizens without authorization. To ensure the agreement is widely

accepted by state parties, the provisions mentioned above would likely be based on existing laws relating to armed conflict and be specifically applicable to LAWS. It's worth noting that legally binding agreements respecting LAWS are currently opposed by major military powers like the US and Russia.. The US has yet to ratify many essential treaties governing conduct during hostilities, including the Additional Protocols to the Geneva Conventions, CCM, and APMBC. The United States' reluctance to support these treaties is partly due to its opposition to certain limitations set out in these agreements (Reeves & Alcala & A. McCarthy, 2020, p. 107).

APMBC and CCM have been negotiated in other forums rather than UN as shown at the table below.

Table 5.1.2. Multilateral treaties and conventions negotiated in and outside of the UN

Name of Treaties	UN Forum	Other Forums
NPT (1968)	X	
BWC (!972)	X	
CCW (1980)	X	
CWC (1993)		X
CTBT (1996)	X	
APMBC (1997)		X
CCM (2008)		X
TPNW (2013)		X

Note: Information on this table adapted from UNODA web page

<https://yearbook.unoda.org/2019/chapter7.html>

If the negotiation for LAWS at CCW fails, there is always possibility to convey the discussions to the forum outside of the UN by supporters of regulation of LAWS.

5.1.3. The Nature of LAWS

Sean Watts, in his article published in International Law Studies, highlights various factors that can predict the success of weapons regulations. He explains that the principles of unnecessary suffering, distinction, and honor are the primary factors determining regulatory

success. Additionally, Watts contends that historically, states' approval or rejection of particular rules has been influenced by the inherent characteristics of the weapons. Effectiveness, novelty, deployment, medical compatibility, disruptiveness, and notoriety are a few examples of elements that have an impact on a state's readiness to abide by international restrictions. For instance, the likelihood that rogue nations or non-state armed groups may acquire LAWS technology may increase the likelihood that the international community will agree to regulate the sale and transfer of these weapons (Reeves, Alcala & McCarthy, 2020, p. 110).

5.1.4. Humanitarian and Ethical Concerns

Autonomy presents serious humanitarian issues as it does with many military advancements. These worries are made worse by the reality that civilians suffer disproportionately throughout contemporary conflicts. Civilian casualties vastly outweigh fighter casualties since wars are increasingly fought in cities rather than in trenches. A major problem with AW is that they could fail in ways that cause great harm to civilians. While AW generally enhance distinction, catastrophic outcomes could result from a malfunctioning system. Failures are also unavoidable. AW that cannot be deactivated or recalled in the event of a problem are of special concern since they can continue to fire until their ammunition or energy runs out. The last remaining traces of compassion or honor in combat may be destroyed, autonomous weapon opponents warn. Even though killing an enemy is legal, combatants may decide against doing so if they feel that doing so goes against a moral principle. To murder an opponent while they are absolutely vulnerable, such as when they are sleeping or taking a bath, for instance, may offend a soldier. Most likely, machines can't judge morality in this way. A former U.N. Special Rapporteur, Christof Heyns, argues that machines "lack morality and mortality, and should as a result not have life and death powers over humans." Removing or even eliminating humans from these lethal choices can have far-reaching social consequences. Giving machines the authority to decide matters of life and death violates the human dignity of combatants, according to a related ethical argument. Last but not least, there is a worry that autonomous weapons "could create a gap or void in accountability" (Trumbull, 2020, p. 551).

5.2. The Case for Regulating Fully Autonomous Weapons

Landmines and cluster bombs serve as two examples that highlight this idea. In 1997, the APBMC (is also called Ottawa Treaty) formally outlawed anti-personnel landmines. Several nations, including the US, China, Russia, and India declined to sign the treaty, citing the need for military strength. The more constrained rules of the Amended Protocol have largely been followed by countries who have declined to sign the Ottawa Treaty. In a similar vein, several states have refrained from ratifying the Oslo Convention of 2008, which outlawed cluster munitions, citing arguments of military necessity. These countries have made it clear that they are open to discussing rules under the CCW. These incidents indicate that countries are unlikely to consent to a complete prohibition on weapons that they routinely employ. A more modest attempt to control these weapons among those states that are prone to utilize AWS may increase both initial buy-in and overall compliance with the distinction and proportionality principles (Lewis, 2015).

A LAWS agreement akin to the Amended Landmine Protocol should be negotiated by the international community or created by individual governments. The ability of LAWS to distinguish between civilians and combatants may change significantly as they mature. This would suggest that, for the time being, the use of LAWS in densely populated regions should be prohibited per se, at least until LAWS technology advances further. The constant supervision of an operator, who can change targeting choices in real time, may greatly support the legality of a weapon. Even explicit oversight might be necessary, depending on the other characteristics of the weapon and how they affect its capacity to differentiate. The issue of responsibility would also need to be covered by a global agreement outlining guidelines for LAWS use. To both promote the correct use of the weapons and allow authorities to determine when a commander has used them unlawfully, the rules created to control LAWS should seek to give commanders more detailed instructions regarding legal use (Lewis, 2015).

In this sense, regulation is an effort to both reduce the harm caused by war and to support the rule of law. The commander is responsible for his illegal deployment, just like a commander who carelessly orders the artillery to be launched in a densely populated area. It is acknowledged that these weapons can be deployed by international law and that, in any case, a prohibition is unlikely to be effective, thus a regulatory policy that concentrates on limiting the

most problematic applications of LAWS is preferred. Therefore, it would be inappropriate to forbid their development.

5.3. LAWS and Regulation through Non-Proliferation

Lewis remarked the issue of proliferation as follows;

Currently, nations that are leading the development of LAWS are against any calls for their prohibition. The U.S. Department of Defense believes that these AI-powered weapons must be created to ensure that there is enough human judgment in the use of force, even though the US thinks that the current international humanitarian standards are enough to govern the use of these weapons. China's position on the matter is still unclear emphasizing the need for "full consideration of the applicability of general legal norms" without providing a specific definition of LAWS. Meanwhile, Russia is using diplomatic tactics to delay and shorten discussions at the UN regarding the matter and is not even considering it.

Most nations have requested the prohibition or regulation of the development and use of LAWS. In 2019, Antonio Guterres, the UN secretary-general, expressed that LAWS are "politically unacceptable, morally repugnant, and should be prohibited by international law". There is widespread concern among nations, international NGOs, academics, and AI specialists regarding the use of LAWS. It is widely acknowledged that their introduction could have significant negative impacts, although the specific effects on society are not fully understood. In the past, alternative approaches to prohibition treaties have been somewhat successful, such as with the 1997 Ottawa Convention for land mines, the 2008 Oslo Accords for cluster munitions, and the the 2017 Convention on the Prohibition of Nuclear Weapons which was the first to offer a framework for governments that currently possess nuclear weapons to renounce them and to outright forbid nuclear weapons under IHL. But while a few of states signed these accords, most of the major powers refrained from doing so.

Non-proliferation has not received much attention in regards to LAWS, but it has been addressed in the past with missile technology control regimes, biological weapons, chemical weapons, and nuclear weapons. The Treaty on Non-proliferation of Nuclear Weapons (NPT), which has been in effect since 1970, accomplished the demands of major and minor powers. The treaty did not require countries with nuclear weapons to immediately relinquish them, allowing other states to use nuclear power for civilian purposes. Implementing a non-

proliferation policy for LAWS would simplify the regulation of their development, transmission, and use for those countries not willing to relinquish them. This policy, akin to nuclear non-proliferation, would reduce the likelihood of terrorist attacks and totalitarian control globally. It is undeniable that this task will be difficult. The reason why the nuclear non-proliferation regime has been effective thus far is that it has been a fundamental aspect of the overarching strategies of major nations. In the past, during the Cold War, superpowers were able to agree to control proliferation within their respective areas of influence. This provided security guarantees to nations that may have otherwise been hesitant to give up their nuclear weapons. Countries like Iran, when they signed the Joint Comprehensive Plan of Action (JCPOA), were coerced into accepting more stringent limitations on their nuclear programs through the use of threats and promises.

To address the issue of proliferation, non-proliferation regimes utilize targeted export restriction agreements for dual-use technologies. The Australia Group, which consists of 43 member nations, is a good example of this. They coordinate export controls on technologies that can assist in the development of biological or chemical weapons, and while it may not have completely stopped proliferation, it has likely slowed it down. However, controlling the spread of copy-able software poses an even greater challenge. This is because multiple players could easily create weapons by combining readily available hardware with software that supports autonomy. To address the issue of software copying, an international legal non-proliferation regime could enforce safety provisions to prevent copying, identify software that should not be accessible to the public, limit the transfer of advanced hardware, and criminalize actions that promote proliferation, such as financing crucial materials (Lewis, 2015).

5.4. The Regulation of LAWS

Aspects of technology, international relations, ethics, and security are discussed in the inter-governmental discussion of robotics. While the regulation of civilian robots is mostly considered at the national level and to some extent at the European level, the focus is on military uses. So far, the Human Rights Council and the CCW have been used by the UN to discuss the military application of autonomous systems. Since 2014, there has been debate about the regulation of LAWS, primarily in the context of CCW. IHL is a major topic of discussion in relation to the CCW's mandate. Although participants in the meetings have talked

about other topics including ethics and global stability, LAWS legislation may not pay much attention to these topics. Three main topics for discussion in the CCW debate are the general need for international regulation, the precise definition of LAWS as a foundation for regulation, and additional standards for potential regulation. With regard to the first debate thread, it may be claimed that the advantages of regulation are already debatable. For instance, it might be possible to prohibit the development of LAWS, but doing so might impede the development of autonomous systems that can be utilized for civilian purposes. Therefore, even though LAWS may then be employed in specific instances, it appears more logical to restrict their use. National moratorium on the development of LAWS or a common political declaration on key parts of regulation would be a "weaker" alternative until comprehensive (international) regulation is established (Dahlmann & Dickow, 2019, p. 16).

During the CCW sessions, the idea of MHC predominated as a potential standard for regulation. In order to accurately analyze and, if required, customize the behaviors of the machine and outcomes of weapon use during the selection and engagement phase, the operator must be appropriately informed about the operating context. Additionally, this would guarantee that the humanitarian considerations demanded by international law are carried out by people rather than being assigned to technology or even neglected. The CCW process concentrates on IHL, or the legal aspect of LAWS, but the ethical aspect also matters in the discussion. The preamble of CCW makes reference to the Martens Clause, which stipulates that when no other rule is applicable, customary law, public conscience, and principles of humanity may serve as sources of IHL. On the one hand, written law and customary law are frequently the consequence of ethical ideals. When it comes to the perspectives of people involved in the CCW process, not all outcomes are equally likely to occur. The most comprehensive remedy would be a new treaty to the Arms Convention with a legally binding prohibition on the development and use of LAWS, but given the state of discussions, this is doubtful. As of 2019, 28 states have stated that they support such a prohibition, but many more are dubious or outright oppose any kind of restriction of CCW. The point of contention might be identified as the question of whether a state has the resources and expressed intention to create and implement LAWS. Israel, South Korea, the United States, and Russia are against a ban, while a large number of developing and growing nations are in support (Dahlmann & Dickow, 2019, p. 17,18).

Despite various meetings and initiatives, progress has been slow. It wasn't until the Fifth Review Conference of the CCW in 2016 that a GGE was established to formalize the regulation process. The Campaign to Stop Killer Robots reports on these developments. In the following years, the GGE persisted in its mission to explore options, even though several countries - including Austria, Brazil, Chile, and Benin on behalf of the African Group - demanded a legally binding instrument (HRW 2020). The 2019 CCW meeting decided to expand the GGE mandate based on their guidelines. Over the years, technology has advanced rapidly, particularly in the realm of AWS development. However, there is currently no regulation in place to govern this technology. Recently, guidelines have been established to provide a clear path for regulating AWS. While the guidelines suggest the drafting of an additional protocol for the CCW, some argue that a new treaty may be a more effective starting point for future regulatory work. Unfortunately, reaching a consensus among all parties to amend the CCW is a challenge, which impedes progress towards regulation. Some countries are not explicitly for or against regulation, which further complicates the process. However, the lack of progress in regulating AWS has significant consequences since precursor weapons are not covered under current laws.

A group of willing industries could take action in this area, forming a baseline for further legal work. This "coalition of the willing" could establish minimum rules and enforce a legal threshold among its members. By doing so, it could also set the standard for the international community and deter non-members from disregarding these standards. Additionally, the International Organization for Standardization (ISO) could provide useful options for setting industrial quality and minimum standards. ISO norms already exist for UAVs and military certifications and could serve as a stepping stone toward consensus. High performance, a certain degree of security and state regulations like "human in or on the loop" functionalities would all be enforced by these industrial safeguards. Although this does not take the place of a legislative framework, it might help the world evolve in a constructive way (Stercke, 2022).

6. DISCUSSIONS

Several countries, including the United States, United Kingdom, Russia, China, France, Germany, and Norway are investing heavily in AI technology to gain an advantage over their opponents.

Ensuring safety and security is a critical concern when it comes to developing and deploying lethal autonomous weapons. While these weapons may comply with risk regulations and operate lawfully most of the time, any system failure or loss of control could lead to disastrous consequences such as civilian casualties. Unfortunately, such failures are rare but inevitable. It's challenging to imagine these weapons being capable of discerning between combatants and non-combatants during attacks. To ensure that lethal autonomous weapons comply with the laws of war principle for risk regulation, they must rely on data and information to make qualitative judgments, which can be difficult to quantify. The proportionality principle is based on qualitative interpretation and calls for a determination of whether the negative effects of an attack on people, property, and the environment are acceptable given the potential military benefit. However, it is unclear how LAWS can account for a shift in the dynamics of the circumstances during the attack.

States and the international community have raised concerns regarding the review process for weapons. Some have questioned whether all States possess the necessary technical expertise to effectively conduct weapons reviews. Additionally, other States have expressed concern about the lack of standardization in national standards of weapons review and whether this can ensure that LAWS is consistent with IHL. The United 59 States Delegation responded by suggesting that a document establishing a thorough process of weapon review be developed by the CCW. Any State attempting to develop, acquire, or implement LAWS would use this document as a benchmark for a consistent strategy and understanding (Magbagbeola, 2021, p.58).

A responsible military should not deploy a weapon that is known to have a high risk of failure or unknown consequences. However, the development and deployment of LAWS contradict this norm and accept the possibility of system failures from a high-risk technology. Therefore, how should States and the international community approach the development and use of LAWS? What strategies should they employ? A fully autonomous lethal weapon system cannot comply with risk regulation principles that ensure societal safety and security without

human intervention. Due to this, the international community and civil society have been pressuring various governments to ban killer robots. Despite efforts to ban LAWS, practical challenges remain. One major obstacle is reaching a consensus on what qualifies as a LAWS. Defining the term can be complex and lead to ambiguity in determining what should be banned. Another challenge is that private companies are heavily involved in the research and development of LAWS, making it difficult for governments to impose a ban. To address the risks and uncertainties associated with LAWS, the precautionary principle may be a viable option. It is important to find solutions to these challenges to ensure the safe and ethical development and deployment of autonomous weapon. To prevent accidents and other potential risks, precautions can be taken by identifying LAWS. If the risks associated with developing and deploying these LAWS are deemed too great, they can be prohibited altogether. This would eliminate any risks or uncertainties. The UNIDIR provides resources on this topic. "...this might be a legally binding prohibition, or be achieved using an international moratorium until the international community agrees on clear standards for determining how accidents would be prevented, and how agreed standards would be verified" (Borrie, 2016, p.16; Magbagbeola, 2021, p.59).

One effective way to verify and evaluate LAWS is by creating a framework that includes technical standards and procedures that interested states must comply with for the development and deployment of LAWS. This approach can be highly beneficial. It is recommended that protocols be established to provide necessary information and training to end users, guide risk assessments, and suggest additional safety measures for LAWS. However, the feasibility of developing a framework for reviewing weapons with LAWS is uncertain. While it is crucial to consider and address the potential for fail-safes, creating them for LAWS may be a daunting task due to the challenges. However, given the variety of dangers posed by LAWS, it is necessary to adopt a strategy that effectively recognizes, manages, and prevents the risk of unlawful action in addition to producing information that can be utilized to do so (Bhuta et al, 2016 p. 299; Magbagbeola, 2021, p. 59).

Limiting LAWS to semi-autonomous weapons systems is one idea. In order to engage LAWS and operate as a fail-safe in the event of potential errors or mishaps, these systems would need human intervention. The human controller, sometimes known as the "human in the loop," can halt or alter the system's activities to stop further harm in the case that LAWS

actions are in violation of IHL. Furthermore, having a person involved in the process enables LAWS to adhere to risk standards that demand human intervention and judgment. Fully autonomous weapon systems, however, might inflict more harm than expected before a person can step in. Although LAWS have advantages in terms of accuracy, speed, and dependability, it's crucial to keep in mind that they lack human flexibility in adapting to new circumstances (Magbagbeola, 2021, p. 60,61).

6.1. Forums on LAWS- Official Positions of National Governments

Since 2013, states have been grappling with the ethical, legal, and peace and security implications resulting from the growing autonomy of weapons systems. This discussion first began at the HRC and has since continued at the CCW since 2014.

As shown at table 6.1. there are also other forums called "Working Group on Controllability in Intelligence Systems" at North Atlantic Treaty Organizations (NATO), "Permanent Structured Cooperation" at the European Union (EU), and the Disarmament and International Security Forum First Committee at the General Assembly of the UN.

NATO released its AI Strategy in the fall of 2021, and its six guiding criteria for responsible use—lawfulness, responsibility and accountability, explainability and traceability, dependability, governability, and bias mitigation—apply to AWS as well. However, it speaks nothing about the specific issue of interaction between humans and machines. In order to allow groups of willing member states to coordinate initiatives and long-range planning in sectors connected to the Common Foreign and Security Policy (CFSP), the EU introduced Permanent Structured Cooperation (PESCO) in 2017. In collaborative defense programs, the twenty-five PESCO member states are already developing autonomous functions for weapon systems. The other UN forum where AWS could be debated is the General Assembly (Hoffberger & Vanessa & Pippan & Vohs and Köhler, 2022).

Table 6.1. International forums on regulation of autonomous weapons systems

Organisations	Forums	Sub-Forums
United Nations	General Assembly (GA)	First Committee of GA
United Nations	Convention on CCW	GGE
NATO	WG on Controllability of Intelligent Systems	
EU	European Parliament	
EU	Common Foreign and Security Policy	Permanent Structured Cooperation

Note: This table is prepared with the information from *Autonomous weapons systems: UN expert talks facing failure time to consider alternative formats* (No. 43/2022) by Hoffberger-Pippan, E., Vohs, V., & Köhler, P.

The UN has emphasized time and time again that these systems must be regulated in order to guarantee that people continue to have control over the use of force. This is crucial to manage the consequences of these weapons, which could otherwise do unexpected or inexplicable things, in addition to ensuring accountability and responsibility. “Machines with the power and discretion to take lives without human involvement are politically unacceptable, morally repugnant and should be prohibited by international law” declared Secretary-General António Guterres. He was primarily talking about weaponry that could be used to target and launch an assault without the need for human intervention, control, or supervision. In his 2023 New Agenda for Peace, the Secretary-General reaffirmed this demand, advising States to establish a legally binding document by 2026 that would govern all other forms of AWS and prohibit LAWS that are not subject to human inspection or control and that cannot be employed in compliance with IHL. He emphasized that, in the lack of specific multilateral regulations, design, development, and use of these technologies raise ethical, legal, security, and humanitarian issues in addition to directly endangering fundamental freedoms and human rights. The GGE on LAWS (GGE LAWS), which functions under the context of the CCW, is

subject to negotiation in the relevant international forum. An international forum called the CCW has guidelines to regulate specific types of conventional weapons. Currently, 126 countries, including the five permanent members of the Security Council (USA, Russia, China, UK, France), major military powers such as India, Pakistan, Israel, and Saudi Arabia, all members of the G20 except Indonesia, all NATO members, and all Latin American countries have ratified the CCW. The majority of non-signatory nations are located in Africa, the Caribbean, the Middle East, and Southeast Asia, with Iran and North Korea being the most significant nations not part of the treaty from a security standpoint. With the participation of the majority of state parties, the GGE LAWS went into effect in 2014. At the group's November 2019 meeting, the state parties unanimously endorsed the 11 guiding principles that had been presented in the conclusions of a 2018 study by the GGE LAWS. Of the 11 principles, the first two are the most fundamental (Christie & Ertan & Adomaitis & Klaus, 2023).

The first phrase affirms that IHL is applicable to all types of weapons, including any future developments and applications of LAWS. The second affirms that accountability must remain a human obligation because it cannot be delegated to machines. The first two principles serve as the foundation for the remaining principles, which encompass the development and use of LAWS. These principles emphasize the importance of risk assessment, risk mitigation, and security measures, including cyber security, to ensure safety. The third principle addresses human control within the context of "human-machine interaction," stressing compliance with IHL but not outlining specific limitations regarding the necessity of in-the-loop versus on-the-loop human supervision for certain functions. In general, the 11 principles do not impose new legal obligations. Instead, they represent a shared understanding among state parties about what they pledge to uphold in their own countries. Additionally, the principles do not create the possibility for an international system to monitor or verify LAWS. Since agreements among state parties must be reached by consensus, the most restrictive limitations on LAWS that are agreed upon will be the minimum common denominator between national positions. As of 2019, it seemed that the direction for an international agreement was to simply confirm IHL and make flexible political commitments to human control. It seems unlikely that the five permanent members of the UN Security Council will agree to a consensus on prohibiting the use or development of certain types of LAWS. This is due to two factors: major military powers distrust each other and want to maintain the flexibility to explore military advantages.

LAWS, with their greater accuracy and speed, have the potential to be superior to non-autonomous weapons in their effects on opposing forces and in posing lesser danger to one's forces. In contrast, chemical or biological weapons lack these characteristics and are prohibited. The US, the UK, Korea, Japan, and Australia formed one group, while Argentina, Costa Rica, Guatemala, Kazakhstan, Nigeria, Panama, Philippines, Sierra Leone, the State of Palestine, and Uruguay formed another group. Both groups submitted a joint paper to GGE LAWS, proposing to prohibit four potential types of LAWS. These are (1) LAWS “of a nature to cause superfluous injury or unnecessary suffering [or] if it is inherently indiscriminate, or if it is otherwise incapable of being used by IHL”. (2) LAWS “designed to be used to conduct attacks against the civilian population, including attacks to terrorize the civilian population”. (3) LAWS “designed to cause incidental loss of civilian life, injury to civilians, and damage to civilian objects that would invariably be excessive about the concrete and direct military advantage expected to be gained”. (4) LAWS in which the autonomous functions are designed “to be used to conduct attacks that would not be the responsibility of the human command under which the weapon system would be used”. One could argue that the four categories described above logically follow from relevant IHL and the second guiding principle proposed in 2019—namely, that accountability cannot be outsourced to a machine. On the other side, the US and some of its allies have put forth a rule by IHL to engage military targets on its own initiative and without human intervention. The joint papers by the USA and its allies have the greatest potential for agreed limitations on the use of specific types of LAWS, even though other national contributions to GGE LAWS in 2022 also contain essential parts (Christie & Ertan & Adomaitis and Klaus, 2023).

Alongside the potential development of a new protocol under the CCW through an intergovernmental agreement, states have also been developing non-legally binding "soft law" such as national guidelines and principles. These are being implemented on both a national level and at NATO level for member states. Soft law approaches are valuable as they provide more detailed guidelines for national activities than what states may agree to in a legally binding convention or treaty.

The 2023 GGE on emerging technologies in the field of LAWS concluded its work by approving a report that highlights, among other topics, the imperative for states to ensure adherence to their international legal obligations throughout the life cycle of weapon systems

that rely on emerging technologies in the LAWS domain. The second session of the 2023 GGE on emerging technologies in the domain of LAWS culminated in the adoption of a report. The GGE has concluded, in accordance with the advanced version of the final report (CCW/GGE.1/2023/2), that the consideration of potential future advancements in emerging technology is essential when characterizing weapon systems in the field of LAWS. The group additionally confirmed that it is imperative for states to adhere to specific compliance with IHL during the entire lifespan of weapon systems of this nature. It is recommended that states restrict the types of targets and the duration and scope of operations in which weapon systems are permitted to engage. Should the weapon system founded on technologies in the realm of LAWS fail to conform with international law, its deployment is prohibited.

6.2. Direction of further research of AWS

The future of AW holds both promise and challenges. Advancements in AI robotics and autonomous systems are likely to lead to increasingly sophisticated and capable weapons platforms. These technologies have the potential to enhance military capabilities, improve precision, and reduce risks to human being in conflict situation.

AI will be seen in future battle zones. Notwithstanding the oppositions, this will take place. A low-cost, fully automated system that can recognize, locate, and communicate with a human fighting a lethal fire can be easily constructed with hobbyist level expertise. This isn't science fiction. It's accurate. There are tons of tutorials, how-to videos, and even preprogrammed AI software available online that can be easily adjusted to function with a variety of weapons.

AI will soon be used to assist decision-makers in military applications. AI is already being put into automobiles by the automotive sector to assess driving conditions and give drivers augmented reality through heads-up displays that can avert collisions. These systems can be used to enhance navigation in low-visibility fog by making use of additional sensors, determining whether other vehicles are slowing down, or analyzing the context of road signs. Even fail-safe technology has been introduced by automakers to prevent collisions in the case that the driver is inattentive. The same technology will be used by the military to assist soldiers in making judgments.

AI will be used to analyze the battlefield and provide soldiers with augmented reality information in weapon control systems and heads-up displays. In addition to identifying and classifying threats and prioritizing targets, these technologies will be utilized to find friendly troops and show the safe distances surrounding them. With the use of numerous sensors placed across the battlefield, this technology will collect data to create an image based on information that modern warriors would never even be aware existed. In the near future, human soldiers will continue oversee the majority of military operations, but AI will provide insightful analysis and recommendations based on enormous datasets that are too large for humans to comprehend on their own.

AI has already taken over our everyday life. The AI market is expected to have risen by more than nine times by 2025, from its valuation of over \$21 billion in 2018. AI systems use predictive analysis to examine human inputs, establish our most likely desires, and then give incredibly useful information to us. AI is no longer a technology confined to a few pricy fighter jets. The development of hardware technology has made it possible to combine more powerful, small, and inexpensive processors into the gear worn by individual soldiers in their hundreds of thousands.

Networking capabilities will also allow automatic coordination to assign priority targets to individual soldiers, therefore eliminating targets as soon as feasible and avoiding wasting time having many soldiers engage the same target. Furthermore, networked smart weaponry will allow logistics systems to initiate resupply operations immediately upon the commencement of a fight, enabling just-in-time logistics up to the forward edge. Supply and transportation assets can redirect truckloads of supplies to the locations of need around the battle space. Tactically, miniature robots will be able to provide loaded magazines to soldiers when their weapon's basic combat load runs out. Additionally, this lessens the soldiers' physical imprint in the field.

All of the aforementioned events will take place throughout the next ten to twenty years. The technology is there; it just needs time, investigation, and cost-benefit analysis. However, this raises an extremely fascinating query: When referring to a weapon, what does "fail-safe" mean? What error rate is "safe" for a weapon to maybe not fire when a soldier presses the trigger? Some have voiced concerns about the increasing autonomy of armed systems. Two groups have called for the complete prohibition of the development of AW and the limitation

of AI research to civilian uses: the International Committee for Robot Arms Control and the Campaign to Ban Killer Robots.

Researching them no longer won't stop the development of AWS that can distinguish between non-combatants and legitimate military targets and save innocent lives; that will only prevent responsible governments from building "slaughterbots" that kill without mercy. We have to admit that mistakes are made by people when using lethal weapons in combat. In the long run, machine precision will surpass human accuracy in combat-kill decision-making. When that occurs, several fascinating queries are raised, including: Should humans continue to be involved in weapon systems when machines are more likely to make mistakes? Does the idea that only humans should be allowed to kill people outweigh the need to lower the number of civilian deaths? Are we willing to put up with more avoidable fatalities in order to preserve human control over potentially deadly decisions? Is the need for retribution and someone to "hold accountable" for the nature of humanity more urgent than rationally balancing interests to reduce suffering?

Because of the need to retain human control and the general suspicion of autonomous systems, the next systems, which could appear in the next 30 to 50 years, will most likely still be semi-autonomous. Human operators will be able to depend on these systems with ever-greater confidence as underlying technology develops. It is reasonable to assume that as time goes on, automated sections will get more potent and human-machine interactions will progress. Therefore, with less direct control over detail, human operators will be able to exercise more control over a larger number of systems (Cooke).

The groups also argue that since the militaries of the US, Russia, China, South Korea, and the EU are investing the most in AWS, the world is about to enter an expensive and destabilizing new arms race. One possibility is that this new and dangerous technology ends up in the hands of terrorists and other non-governmental actors (Dawes, 2023).

Within the next two years, the US military plans to deploy hundreds of autonomous missile systems in an attempt to counter China's growing influence. In the last ten years or so, there has been a proliferation of military systems with different levels of autonomy. But the scope and magnitude of the US statement show that a new era of robotic warfare has arrived and that warfare itself has changed.

Significant progress has been achieved in the development of sophisticated robotic systems for military use throughout the last ten years. Utilizing commercial technology, which has improved in terms of usefulness, cost, and availability, has provided the foundation for many of them. Over the course of the following 18 to 24 months, the new Replicator program would deploy attritable autonomous systems at a scale of several thousand in various locations. The term "attritable" describes a robot that is so inexpensive that it can be lost if the task is truly vital. Such a robot would be reasonably priced, even though it's not exactly designed to be thrown away; this would enable the purchase of multiples and the replacement of lost ones.

Future warfare will be radically modified by AI and autonomous technologies, which will push strategists to design new deterrent strategies. Innovation in emerging technologies, such as biotech, robotics, drones, quantum computing, 3D printing, and AI, is evolving quickly and could have a big impact on business, governance, and geopolitics, among other things.

As for drones:

The Second Nagorno-Karabakh War between Azerbaijan and Armenia demonstrated autonomous weaponry provided a glimpse of the battlefield of the future. Using a variety of drones it had purchased from Israel and Türkiye, Azerbaijan quickly decimated the Armenian army, which was numerically superior. Azeri forces made deadly use of Israeli-built "Harop" loitering weapons, which are designed to hover high above the battlefield until a target is identified for them to crash their explosive payload into. This earned them the moniker "Kamikaze drones". UAV Bayraktar TB-2 is seen firing missiles and explosives upon Russian tanks in drone footage. Utilized by the Ukrainian military since 2019, the 6.5-meter-long and 12-meter-wide drone can reach a maximum speed of 220 kilometers per hour. Due to its export hit, the Bayraktar-UAV, the Turkish arms manufacturer "Baykar" has had tremendous success in previous years. Poland became the first member of NATO in 2021, and it is said that 16 countries have already ordered the drone. Thus, as in earlier battles in Libya, Iraq, Nagorno-Karabakh, or elsewhere, UAVs have demonstrated their military prowess for contemporary combat. It is anticipated that militaries will become more interested in enhancing their operational capacity through autonomous systems as UAVs continue to show themselves to be useful and effective in contemporary combat (Heinemann, 2022).

There is a tremendous competition among nations to build or purchase cutting-edge drone systems. For instance, China and Russia are investing much in research and development and intend to create AW. AI has been given top priority in both the UK's and Israel's new defense plans.

Moreover, even more ground-breaking drone technology may be approaching. The advancement of Li-ion batteries has made it possible to produce low-cost, compact quadcopters. Several air forces are now testing networked drone swarms that can overwhelm radar systems. The development of inexpensive autonomous drones with machine-like coordination capabilities could result in a novel coercive tool capable of undermining costly legacy military systems and raising the possibility of an offensive attack (Diwakar, 2020).

Even with significant advancements in AI-driven target tracking and drone technology, particularly in the aftermath of the crisis in Ukraine, killer drones remain a rarity in today's technological landscape. Still, drone autonomy and affordability have increased noticeably in recent years. Grand View Research predicts a 266% increase in investments in the commercial drone market over the next 10 years.

We anticipate further advancements in drone autonomy as well as greater load carrying capacity, longer flight times, reduced prices, and enhanced user-friendliness. The business sector is always refining these drones in every way, with the exception of explosive components. This implies that the efficiency of killer drones will keep increasing. Historically, the military sector has been the primary driver behind the development and proliferation of drone technology. Armed forces all throughout the world have pushed the boundaries of drone technology, moving from simple surveillance applications to more complex precision strike purposes. Defense departments have invested heavily in research and development of drones in order to gain tactical and strategic advantages in combat, which has resulted in a rapid advancement of drone technologies.

Significant collaborations with IT firms and defense contractors have led to innovations including enhanced AI algorithms, longer flight durations, and more efficient target collection methods. The truth is that a great deal of today's commercial drone applications are either direct derivatives of technologies first introduced in military applications or have drawn inspiration from military prototypes.

With its massive military budget, the US was the only nation employing strike drones capable of carrying out accurate strikes at the start of the twenty-first century. These days, this technology is being exploited by several non-state actors to launch precision attacks, but with a smaller payload, shorter range, and shorter endurance.

The democratization of drone technology stands out as a significant advance in the midst of all of this. Large, resource-rich nations are no longer the only ones with access to drone technology; smaller nations and even non-state organizations can make use of them. This decentralization changes the dynamics of modern conflict and intensifies the need for international norms and limitations on their use.

There is no inherent issue with the potential use of autonomous weaponry. When used responsibly, their increased precision can help reduce civilian casualties during counter terrorism and combat operations. However, there's a compelling argument to be made that allowing armies to utilize killer drones may normalize their usage and accelerate the technological arms race. States might be forced to give machines increasing control over decision-making because human reactions would be too slow. A change of this kind could lead to a flash war.

Commercial companies and military initiatives are closely related, as the latter aims to keep drone technology affordable. Due to its declining cost, this technology is now accessible to rogue organizations and even private individuals, making national military arsenals unable to acquire it.

Concerns of non-state actors are compounded by the rapidly diminishing obstacles to entry in the commercial sector. Utilizing readily available consumer products, groups such as ISIS were able to create combat drones, according to the Combating Terrorism Center's 2016 report detailing the use of drones in warfare by various non-state entities. Given the advancements in autonomy, the capacity of drones to carry heavier loads and fly for extended periods of time, and their increasing accessibility, there are worrisome possibilities. Imagine, for instance, that a terrorist group such as ISIS—which is notorious for its obsession with drones—uses consumer drones in conjunction with open-source AI models to target people who are exclusively of a specific age, gender, or race.

Drones with AI capabilities are the newest tactical and technological advancement in the rapidly evolving military industry. Beyond their tactical advantages, they represent a deeper social change: a growing reliance on machines in place of human judgment, which is seen in daily life and is now more pronounced in times of conflict. But as the lines between machine-driven efficiency and human morality blur, we are left with critical questions about the direction and effects of technological progress. Are we laying the groundwork for a safer future, or are we about to enter a new phase of warfare driven more by faceless algorithms than by moral precepts? The industries that propel these advancements must also think carefully about the thin line that separates progress from peril.

It is clear that when it comes to linking the ethical and technological context of killer drones with the broader subject of weapons control, history can teach us valuable lessons. The trend for drone usage restrictions and regulations can be viewed as a continuum, much like earlier weaponry.

As Knutsson under-stroked, every significant development in armament technology has caused considerable concern and, often, prompted concerted efforts to restrict or criminalize its use. Considering the issues posed by autonomous drones, it is imperative to examine these historical examples in order to formulate a feasible plan for the responsible use of modern warfare technology. We must also take lessons from their successes and setbacks. The most significant obstacle that modern military face is not a lack of technological advancements, but rather the exorbitant prices that accompany them. An aircraft carrier can cost ten times more than a modern submarine, which can cost billions of dollars. Moreover, the most recent tanks with advanced armor and aiming systems, as well as fifth-generation aircraft, each cost more than \$100 million.

With these rapidly rising expenses, maintaining a military force akin to that of World War II is all but impossible. However, autonomous drones—regardless of size—are much less costly, allowing armies to operate much larger fleets. Another reason accelerating the development of lethal autonomous vehicles is the fact that these machines are growing faster and more efficient than humans. Leading military nations are currently vying with each other to develop robotic weapon systems that are autonomous. These weapons offer a number of advantages, and nations that adopt an autonomous robotic policy first stand to gain a great deal

militarily, at least initially. Fully autonomous drones are probably going to take over the skies in the not too distant future, even though it won't happen this year or next. The implications of autonomous weapons must be properly considered right away because politics and governance tend to evolve far more slowly than technology. The course of human history and the nature of combat in the future will be shaped by the choices we make now (Knutsson, 2023).



7. FINDINGS

There are two perspectives on whether the international community should support the development and use of LAWS. The first perspective strongly emphasizes the value and significance of LAWS. Due to the lack of feelings like dread, revenge, resentment, rage, selfishness, exhaustion, hysteria, etc., LAWS is able to conduct unbiased evaluations and make judgments without prejudice or feelings clouding its judgment. Autonomous systems can quickly recognize and analyze complicated information, decide more quickly and accurately, save lives by taking the place of human combatants, and lower the overall number of deaths. As for the second perspective, LAWS pose a threat to the world community. When a machine can decide whether to kill, there won't be any value placed on human life, according to this perspective. Additionally, LAWS is thought to be the start of an arms race, our collective demise, and a tool that society will exploit and misuse (Magbagbeola, 2021, p. 5).

The following questions should be addressed for the findings regarding the development, deployment, and use of LAWS as Magbagbeola pointed out.

Can LAWS comply with the principle of distinction?

The question is whether LAWS can abide by the principle of distinction. This principle involves recognizing the difference between civilians and enemy combatants, as well as between civilian and military targets. For LAWS to make accurate distinctions, it must be able to understand human intentions and the context in which it is operating. This requires situational awareness, which is crucial for LAWS to comply with the principle of distinction. However, it remains uncertain whether LAWS can effectively identify these factors in complex and unclear environments.

Technology supporters say that AW may be more skilled at identifying combatants and civilians than human soldiers in the future. Due to the fact that LAWS are not affected by stress and emotional intensity and do not require self-defense, they may be better suited to handle uncertain situations than soldiers. One example might be delaying retaliation in the face of threats until hostilities actually break out. Governments can enhance Lethal Autonomy by adopting universal standards for testing and consulting ethicists for difficult decisions.

Is it possible for LAWS to comply with the principle of proportionality?

The purpose of the proportionality concept is to guarantee that, when LAWS are employed in a specific attack, the harm to civilians is proportionate to the military advantage realized. To safeguard civilians, this rule is in force. The use of LAWS should be forbidden to prevent harm to civilians if it is obvious that the harm to people is excessive and disproportionate to military gain (Roff, 2015). Given the evidence presented above, it is unclear if LAWS is qualified to carry out proportionality analyses. The concept of proportionality is difficult, thus LAWS would need to be constructed with a clear understanding of how to discern between civilian harm and military advantage. Additionally, LAWS would need to understand when a military advantage causes more harm to civilians than ever. It would take specialized programming and expertise in military strategy, tactics, and operational difficulties for LAWS to be able to distinguish between these two situations and recognize excessive civilian injury. According to Egeland (2016), LAWS would also need to understand shifts in goals and objectives, their relative significance, and the military value of accomplishing them. Deciding on proportionality involves making judgments, which LAWS are not capable of doing without human intervention. It seems doubtful that LAWS will ever be able to make these decisions in a way that is satisfactory, even with advances in technology. Although the challenges may seem surmountable at present.

LAWS may not be able to determine whether the collateral impact is excessive because it requires human judgment of reasonableness, which is based on common sense and shared human values. Conversely, proponents of technology envision the commander activating the LAWS and assessing the expected collateral impact of the whole system, based on pre-established reliability measurements. Critics argue that judgments cannot be pre-programmed as they are time-sensitive. The estimation of collateral damage caused by present weapon systems is routinely carried out by utilizing empirical data and scientific algorithms. Some LAWS supporters argue that in modern warfare, individuals may drop bombs or fire missiles without assessing the target or considering the proportionality of the attack (Boulain & Brunn & Goussac, 2021, p. 7).

Can the precautionary principle be used for LAWS to bring about societal safety?

Article 57 of Additional Protocol I to the Geneva Convention of 1977 reinforces this requirement: "...in the conduct of military operations, constant care shall be taken to spare the

civilian population, civilians and civilian objects". It is important to ensure that the targets identified are indeed military objectives. It is necessary to take all possible measures to select methods and means of attack that minimize harm to civilians and non-military objects and to avoid launching attacks that violate the principle of proportionality. The actions that align with this principle vary greatly depending on the situation and can quickly change in unpredictable ways. Therefore, it's essential to regularly confirm the choice of weapons, selection criteria for targets, timing, and methods of attack to avoid unexpected outcomes. Engagement should be stopped or paused if there is excessive civilian suffering relative to the military advantage gained or if the target is no longer a valid target because it has surrendered, etc. Additionally, it's crucial to take safeguards by informing the general public. During deployment or active combat missions, unforeseen circumstances and challenges may arise. Some contend that the precautionary principle demands human involvement in order to keep humans in the loop, under supervisory control, and able to react to unforeseen circumstances that might arise during the deployment of LAWS. Others, however, contend that LAWS can comprehend massive quantities of data and respond to their surroundings more swiftly than a human. This raises the question of whether humans can function as quickly as LAWS in combat situations and prevent them from violating IHL principles (Alston, 2011; Weizmann et al, 2014). Many analysts are of the opinion and have come to the conclusion that due to their highly contextual nature and the requirement for constant reassessment as a requirement for the precautionary principle, LAWS cannot make these necessary analyses continually and independently without human participation (Herbach, 2012).

States and the international community have voiced their apprehensions and doubts about the legal review of weapons, particularly the technical capability of all countries to carry out the weapons review process properly. Other countries have voiced their reservations regarding the implementation of distinct national regulations of arms examination, questioning CCW if the dissimilar regulations are enough to ensure that LAWS are in line with IHL. To address the questions raised by the States, the US Delegation proposed that the GGE should develop a document that outlines a thorough review of weapons. This document will serve as a guideline for a unified process and will be used by any State in the production, acquisition, or deployment of LAWS.

A conclusion drawn from the aforementioned considerations is that fully autonomous lethal weapon systems require human interaction to comply with the risk regulation rules that ensure societal safety and security. As a result, there has been a lot of pressure from the worldwide civil society and other opponents of the law on various States and governments to "ban killer robots." However, outlawing LAWS would present some practical difficulties. First and foremost, it is challenging to distinguish between LAWS and non-LAWS in situations where there is a ban because of the lack of agreement on the definition of a lethal autonomous weapons system. Additionally, when it comes to development of LAWS, the government is not the only consideration. Since private corporations have played a significant role in the study and development of LAWS, it may be challenging for a democratic government to outlaw LAWS. LAWS may be restricted to a weapon system with some autonomy. This kind of weapon system will require human interaction or a human in/on the loop in order to activate LAWS and act as a built-in fail-safe in the event of potential malfunctions and accidents.

Private industries ought to be involved in talks about risk regulation of LAWS and adherence to IHL standards. The International Committee for Robot Arms Control is attempting to include the business sector more in conversations since doing so is necessary when talking about risk controls and international humanitarian values. A unified discussion between the private sector, humanitarians, governments, and other international groups is vital for the successful development, deployment, and adherence to risk norms and the principles of IHL.

Therefore, ongoing diplomacy and negotiations spanning many industries must take place as LAWS development occurs. States have a well-established tradition of working together, particularly when it comes to innovation and the development of universal rules. To unify the development of universally accepted norms and standards for the deployment and application of LAWS, there should be ongoing worldwide, reciprocal conversation and cooperation between States and commercial entities. This is seen as an important instrument for managing potential strategic risks and potentially harmful effects that LAWS may experience as a result of its development, dissemination, and use. The international community must be ready for and accept the fact that the development and use of LAWS do not conform to the framework of risk rules that currently regulate weapons. We can all start taking the required actions to

address the problems that LAWS will probably present once the international community has a clearer knowledge of these challenges.

Regarding public perceptions of LAWS;

A survey conducted in summer and fall 2015 in the US using Amazon's Mechanical Turk (MTurk) service sets a sample if LAWS is developed or used. When compared to the baseline scenario, 61% of 1043 respondents favor developing AWS to defend US forces when they will be more effective than alternatives. Support for US development also rises when other nations or non-state actors pursue AWS, rising from 29% to 49% (Horowitz, 2016).

In order to ascertain public awareness as a source of ethical inquiry and useful conversation and to contribute to upcoming rule-making processes, one of the most recent studies was conducted in Japan in 2022. This study assisted in bridging the gap between ethical research and empirical evidence, examining how people's attitudes toward regulations are generally perceived. 445 out of 1200 responses were examined based on the caliber of the online data gathered. A scenario illustrating military activities and their effects was developed, presented, and answers were gathered. This allowed LAWS to demonstrate their awareness of ethical dilemmas (Arai & Matsumoto, 2023).

The following five working hypotheses are assumed.

- (i) It is unlikely that LAWS will be used. According to prior research, it is predicted that fewer people will prefer to utilize LAWS since human judgment-based intervention is thought to be more reliable and respects dignity.
- (ii) Compared to combatant casualties, civilian casualties have a bigger impact on the choice to utilize LAWS. Utilizing LAWS is to minimize the number of civilian casualties.
- (iii) The use of remote weapons is more likely than the use of LAWS. The use of human judgment in weapons makes them less disturbing than those that do not. Given that the question is whether or not the weapon is a LAWS, the ethical significance of the presence or absence of human judgment is particularly important. Using LAWS for national security is more likely.
- (iv) Using LAWS for homeland defense is more likely. In a hypothetical circumstance involving a foreign country, it is assumed that people are conscious of ethical

considerations and are reluctant to utilize LAWS. However, it is anticipated that the benefits of using LAWS for homeland defense will surpass any negative feelings.

(v) Males and younger respondents are more likely to use LAWS (Arai & Matsumoto).

In this study following questions asked and tables prepared. The tables derived from ‘Public perceptions of autonomous lethal weapons systems. *AI and Ethics*’ by Arai, K., & Matsumoto, M. (2023).

Table 7.1. What decision would you make about using LAWS?

	Number of selected	Percentage (%)
I would use LAWS	217	48.8
I would not use LAWS	107	24.0
It is difficult to decide	121	27.2

Table 7.2. Do you think that using LAWS will increase or reduce civilian casualties in Country X?

	Number of selected	Percentage (%)
LAWS will increase Country B civilian casualties	165	37.1
LAWS will reduce Country B civilian casualties	153	34.4
It is difficult to decide	127	28.5

Table 7.3. Relationship between views on the increase or decrease in the number of Country X civilian casualties and the decision to use LAWS

	LAWS will increase Country X civilian casualties	LAWS will reduce Country X civilian casualties	It is difficult to decide	Total
I would use LAWS	68	119	30	217
I would not use LAWS	65	12	30	107
It is difficult to decide	32	22	67	121
Total	165	153	127	445

Table 7.4. What decision would you make about using remote weapons?

	Number of selected	Percentage (%)
I would use remote weapons	254	57.1
I would not use remote weapons	92	20.7
It is difficult to decide	99	22.2

Table 7.5. What decision would you make about using LAWS in homeland defense?

	Number of selected	Percentage (%)
I would use LAWS	260	58.4
I would not use LAWS	88	19.8
It is difficult to decide	97	21.8

The tables demonstrate that hypothesis (i) was disproved. It was strongly and considerably confirmed that civilian losses (number) rather than combatant casualties will affect the employment of LAWS (Table 7.1) .

Regarding hypothesis (ii), a significant number of respondents indicated that they would employ LAWS if they thought that doing so would lower the number of civilian casualties in Country X (Table 7.2, 7.3).

There was minimal evidence to support hypothesis (iii), which states that remote weapons are more likely to be employed than LAWS (Table 7.4).

The idea that LAWS are more likely to be utilized in homeland defense (hypothesis iv) received some acceptance (Table 7.5).

Younger and males are more likely to use LAWS, according to hypothesis (v), and this finding was strongly and significantly verified for males but not for ages.

Additionally, the study demonstrated that the most frequent justification for not utilizing LAWS was the belief that it was unethical for LAWS to kill or harm people, and that this justification differed significantly from other explanations (see Table 7.6.)

Table 7.6. Which of the following is your reason for not using LAWS?

	Number of selected	Percentage
Because it is against human dignity for machines to kill or injure humans	51	48,6
Because machines cannot be held responsible for misfires or accidental shootings	31	29,5
Because it is illegal	5	4,8
Because of the possibility of technical failure	13	12,4
It is difficult to decide	7	6,7

This study's perspective within the field of AI and Ethics is to affirm that the ongoing discussion of ethics and technology in general is founded on people's awareness, divergence,

and interactions. The primary drawback of this study is that it merely looked at sentiments among civilians. In other words, it's crucial to investigate the viewpoints of many groups of people, including academics, soldiers, and politicians, and to explore the causes and consequences of these viewpoints. (Arai & Matsumoto).

Given the lack of such earlier studies, the significance and implication of this work lie in its ability to close the awareness gap between ethical research and the general public. Additionally, it was discovered that public perception, which had previously been unfavorable to the employment of LAWS, is now generally favorable. The study also showed that minimizing combatant and civilian losses is a crucial factor that should be taken into account while using LAWS, and that it may even carry more weight. A deep understanding that it is against human dignity for LAWS to kill and injure people was another argument against the adoption of LAWS. Future ethical study ought to address and take into account this fact.

8. CONCLUSION AND RECOMMENDATIONS

The development and deployment of AI for civilian applications cannot be clearly isolated from that of LAWS in the military, and merely calling for the outlawing of LAWS could inhibit scientific advancement (Arai & Matsumoto, 2023),

The employment of LAWS will transform the nature of war. Given that the autonomy changes the conduct of war will have a significant impact on how the law of war is now understood and applied. LAWS provides obvious military benefits in terms of lowering the number of one's own personnel killed during hostilities (Trumbull, 2020, p. 534, 535).

The legality of autonomous weapons was debated, with the assertion that they are not inherently illegal and could be employed in warfare if they possess enough reliability and the ability to distinguish between targets (Krishnan, 2016, p. 145). Any attempt at a universal ban will fall short because AWS must eventually be developed and deployed. Even if a treaty prohibiting LAWS is signed, it would either be too ambiguous to have any significant impact on how nations behave or, worse. It will also have little effect because many nations that have invested heavily in this technology are unlikely to endorse such a limitation. Even though the concerns raised for Autonomous Weapons, the development of AWS is of utmost importance for maintaining international security dynamics as it serves as a means of deterrence (Horowitz 2021; Anderson and Waxman 2013; Stercke, 2022, p. 2,3).

The development, use, and control of AWS have already been constrained by IHL and CIL, which has limited their potential. Furthermore states engaged in more in-depth discussions on the meaning of respecting and ensuring respect for IHL in relation to AWS and adopted 11 guiding principles. They emphasized that the choice to employ LAWS cannot be wholly left to machines; rather, it must be considered throughout the weapon system's existence.

AWS can be categorized incompatible with IHL if they are operated completely the absence of MHC and a responsible chain of command; being inherently indiscriminate; designed to target humans directly; exhibits unpredictable behaviour; incapable of complying with the principles of distinction, proportionality and precaution and intends to wipe out a certain group of individuals based on their ethnicity, gender, nationality, or any other factor.

If IHL and CIL are followed, there is no justification for banning specific weapons. In reality, it is necessary to evaluate each AWS and circumstance separately in order to ascertain whether

or not they can adhere to IHL. On the other hand, there is no accountability gap created by the development of autonomous systems because each States are responsible for authorizing and directing the use of AWS, how they are used, and in what operational environment. Additionally, implementing a non-proliferation policy for LAWS would simplify the regulation of their development, transmission, and use of those weapons.

As recommendation;

Weapon systems must not be developed with the intention of causing unintentional civilian casualties, injuries, or property damage that would always be out of proportion to the expected direct and tangible military advantage; limits should be established for the types of target, duration, geographical scope, and scale of use and situations of use should be regulated; the proponents of LAWS must take into account the objections made by opponents (Loss of civilian life, lack of accountability, destabilizing arms races, and the morality of allowing machines to make life-or-death decisions) because, beyond a certain point, these weapons may accidentally intensify conflicts and threaten international peace; the absence of substantive international regulation over the adoption and procurement of these technologies encourages non-state actors to use LAWS for terrorist activities. Given the seriousness of the situation, dual-use technology rules should be established before these technologies spread globally; the states may be unable to entirely renounce their LAWS efforts, particularly in the absence of a verification system to assure that their enemies are not covertly developing LAWS. For this reason, the states should offer opportunities for compromise and increased transparency regarding their LAWS development initiatives and operational plans and address certain technical issues such as providing MHC and human-machine interaction; the private sector, humanitarians, governments, and other international groups must have a common dialogue for the successful development, deployment, and adherence to risk rules and the tenets of IHL and there should be ongoing worldwide, reciprocal conversation and cooperation between States and commercial entities to unify the development of universally accepted norms and standards for the deployment and application of LAWS.

Given the advancement of technology today, States will not step back in their efforts to develop autonomous weapon systems and use them in armed conflict. This situation makes it inevitable to develop and use autonomous weapon systems in accordance with international law, with a more pragmatic approach (Özer, 2019, p.265).

A human-centered strategy ensures AI systems that are secure, well-being and effective for humans. Legal and ethical issues could surface when humans are excluded from the process since the computer cannot be held responsible for any wrongdoing or criminal activity. Thus, effective regulation strikes a balance between reaping the benefits of autonomy and mitigating risks associated with misuse.

In this sense, LAWS may on occasion be used lawfully to support the regulation rather than being forbidden.



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ANNEX

Annex 1. Guiding Principles affirmed by the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons System

Guiding Principles affirmed by the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons System It was affirmed that international law, in particular the United Nations Charter and International Humanitarian Law (IHL) as well as relevant ethical perspectives, should guide the continued work of the Group. Noting the potential challenges posed by emerging technologies in the area of lethal autonomous weapons systems to IHL, the following were affirmed, without prejudice to the result of future discussions:

(a) International humanitarian law continues to apply fully to all weapons systems, including the potential development and use of lethal autonomous weapons systems;

(b) Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. This should be considered across the entire life cycle of the weapons system;

(c) Human-machine interaction, which may take various forms and be implemented at various stages of the life cycle of a weapon, should ensure that the potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems is in compliance with applicable international law, in particular IHL. In determining the quality and extent of human-machine interaction, a range of factors should be considered including the operational context, and the characteristics and capabilities of the weapons system as a whole;

(d) Accountability for developing, deploying and using any emerging weapons system in the framework of the CCW must be ensured in accordance with applicable international law, including through the operation of such systems within a responsible chain of human command and control;

(e) In accordance with States' obligations under international law, in the study, development, acquisition, or adoption of a new weapon, means or method of warfare, determination must be made whether its employment would, in some or all circumstances, be

prohibited by international law;

(f) When developing or acquiring new weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, physical security, appropriate non-physical safeguards (including cyber-security against hacking or data spoofing), the risk of acquisition by terrorist groups and the risk of proliferation should be considered;

(g) Risk assessments and mitigation measures should be part of the design, development, testing and deployment cycle of emerging technologies in any weapons systems;

(h) Consideration should be given to the use of emerging technologies in the area of lethal autonomous weapons systems in upholding compliance with IHL and other applicable international legal obligations;

(i) In crafting potential policy measures, emerging technologies in the area of lethal autonomous weapons systems should not be anthropomorphized;

(j) Discussions and any potential policy measures taken within the context of the CCW should not hamper progress in or access to peaceful uses of intelligent autonomous technologies;

(k) The CCW offers an appropriate framework for dealing with the issue of emerging technologies in the area of lethal autonomous weapons systems within the context of the objectives and purposes of the Convention, which seeks to strike a balance between military necessity and humanitarian considerations.

Source: UN document - CCW/MSP/2019/9 Annex III