CHAPTER I

INTRODUCTION

1.1 Background

As time progresses, humans have become more reliant on the use of technology and automation in various aspects of their increasingly digitalized lives. Recently, this includes military and defense purposes as well, which leans more towards giving increased autonomy to machines and weapons, namely to select and attack targets. This is evident through States' willingness to invest more funds to develop new weapon technologies, and even through the already existent use of these weapons in some countries. For instance, in 2018, US' Pentagon pledged to dedicate USD 2 billion over the next five years to develop AI technologies through the Defense Advanced Research Projects Agency (DARPA).[1] South Korea utilizes a machine-gun wielding sentry robot along the Korean Demilitarized Zone, which uses a software to detect intruders and issue a verbal warning to them. If the intruder does not comply, the robot can fire at the intruder either remotely through the command of a soldier who has been alerted by the robot, or by the robot itself if it is in fully automatic mode even if the latter is not done in practice.[2]

Weapons that use autonomous systems which give them partial, or even full autonomy, are known as Autonomous Weapon Systems ["AWS"], though they are

[1] Kristen Gronlund, "State of AI: Artificial Intelligence, the Military and Increasingly Autonomous Weapons",< https://futureoflife.org/2019/05/09/state-of-ai/>, accessed 22 September 2020

[2] "Future Tech? Autonomous Killer Robots Are Already Here", <www.nbcnews.com/tech/security/future-tech-autonomous-killer-robots-are-already-here-n105656>, accessed 22 September 2020

sometimes dubbed as Lethal Autonomous Weapon Systems ["LAWS"] due to the dangers they potentially pose. There are various definitions of what an AWS is. Essentially, AWS are weapon systems with autonomy in their functions that are able to select and attack targets without human intervention.[3] A senior researcher of the Arms Division at the Human Rights Watch defined AWS based on three categories of autonomy according to the level of human involvement: the first category is "humans-in-the-loop" weapons, which are weapons that can select targets and deliver force only with human command. The second category is "humans-on-the-loop" weapons, which are weapons that can select targets and deliver force with a human operator's oversight, who can override the weapon's actions. An example of a weapon in this category is the aforementioned robot deployed in the Korean Demilitarized Zone. The final category is "human-out-of-the-loop" weapons, which are capable of target selection and attacks without any human input or interaction.[4] Weapons that fall under the last category are what some people deem as "lethal", or are even labelled as "killer robots" as they may take deadly actions that are beyond the predictability and control of humans.

AWS use autonomous systems, which are systems that use probabilistic reasoning when given a set of inputs, making guesses about the best possible course of action and then producing a range of behaviors that can be taken.[5] They are different from automated systems, which only produce a fixed type of output based

[3] US Department of Defense, Directive 3000.09 on Autonomy in Weapon Systems, 21 November 2012
[4] Docherty, B. *Losing Humanity: The Case Against Killer Robots*, (Washington DC: Human Rights Watch and International Human Rights Clinic, 2012), p.2
[5] M.L. Cummings, "*Artificial Intelligence and the Future of Warfare*", International Security Department and US and the Americas Programme, January 2017. p.3.

on the input given, meaning that if input "A" is given, then output "B" will definitely be the result.[6] This autonomous system allows AWS to form a range of decisions based on the situations in the battlefield, which may differ from time to time. For AWS to work, they heavily rely on data input based on the functions expected of them.[7] As an example, a drone weapon needs to be given input of the surroundings they'll be operating in and the targets that they must identify.

Despite the controversies of using AWS in the battlefield, these weapons are still developed and deployed nonetheless due to several reasons. Firstly, they reduce the number of human soldiers that need to go to war and risk their lives, and those that still go to the warzones can be stationed in less dangerous locations to reduce casualties. These weapons can be put in the frontline, or their technologies can be used to detect threats that may not directly be registered by humans.[8] Secondly, in the long run, deploying AWS may be less costly than human soldiers. It is estimated that the Pentagon has to spend around $850.000 a year to send one soldier to Afghanistan, while a robot that can be equipped with weapons may cost approximately $230.000 a year.[9]

While AWS and their usage have their benefits, there are also shortcomings from the system and moral issues that make people reluctant to permit the use and development of AWS. Firstly, their heavy reliance on data input means that the

[6] *Ibid*.
[7] *Ibid*.
[8] Amitai Etzioni and Oren Etzioni, "*Pros and Cons of Autonomous Weapons Systems"*, Military Review: The Professional Journal of the US Army, 2017, pp. 72–80.
[9] David Francis, "How a New Army of Robots Can Cut the Defense Budget", <www.thefiscaltimes.com/Articles/2013/04/02/How-a-New-Army-of-Robots-Can-Cut-the-Defense-Budget>, accessed 20 July 2020

technology will be less predictable and reliable when they have to work with new patterns, information or events which it was not programmed to anticipate.[10] This unpredictability and unreliability can lead to severe consequences, such as the AWS attacking objects and people they are not supposed to, or trouble in pinning human responsibility to a party, as it then comes to question whether it is the programmer at fault, or the soldier who launched the AWS. Furthermore, AWS' "reasoning" cannot be understood,[11] unlike humans who can be interviewed later on after conducting an attack. So far, many scientists are unconvinced that there is enough scientific evidence these weapons could operate the way they are needed to in the future.[12]

As for the morality of using these weapons, there are also two opposing sides to the debate. Those in support of AWS argue that AWS would be able to execute its functions without being clouded by emotions or mental constraints, which humans on the field can experience. Roboticist Ronald C. Arkin also believes that AWS do not need to be programmed with a self-preservation instinct, which may eliminate the attitude of "shoot-first, ask questions later", making them apparently able to act more "humanely" in the future.[13] Then, as aforementioned, there's the fact that less humans would have to go to the field and possibly lose their lives or suffer from damages that may come from the battlefield.

[10] Cummings, 2017, *op. cit.*, p.8
[11] Vincent Boulanin and Maaike Verbruggen. *Mapping the Development of Autonomy in Weapon Systems*, (*SIPRI*, 2017), p.17
[12] "Computing Experts from 37 Countries Call for Ban on Killer Robots", < http://www.icrac.net/wp-content/uploads/2018/06/Scientist-Call_Press-Release.pdf>, accessed 22 September 2020
[13] Etzioni and Etzioni, 2017, *op. cit.*, pp. 72–80.

Those who do not support AWS and its use argue in terms of morality that no decision on a human being's life or death should be delegated to a machine. This was the view of experts such as Elon Musk and the three co-founders of AI company "Google DeepMind", who have pledged not to develop AI weapons. They, and thousands of other AI experts, have opposed the existence of autonomous weapons that rely on AI without sufficient human control. Morally, they argued that "the decision to take a human life should never be delegated to a machine."[14] This is morally disturbing to them not just because a non-living object devoid of emotions, conscience and moral standards could kill human beings, but also because it becomes more difficult to place human responsibility for the actions of the weapon. The latter means that someone could potentially get away with using an AWS inappropriately and blame it on the machine or a flaw in the development process.

As AWS' use in the field would impact the way wars are fought in the future, it is necessary to assess its legality under International Humanitarian Law ["IHL"], also known as the law of war or the law of armed conflict. IHL is a set of rules which regulates the conduct of warfare to limit its effects, protecting those that are not military objectives. It upholds four important principles: the principle of distinction between military personnel and objects with civilians and civilian objects, for attacks to be carried out proportionally, to give precautions prior to attacks to minimize casualties, and to prohibit the use of weapons that can cause

[14] "Autonomous Weapons: an Open Letter from AI & Robotics Researchers", <https://futureoflife.org/open-letter-autonomous-weapons/?cn-reloaded=1>, accessed on 18 November 2020

superfluous harm and injury.[15] To limit violence in armed conflicts, the scope of what IHL regulates includes the means and methods of warfare, which are inseparable from one another.[16] In the past, it has regulated weapons that are prohibited such as poison gas and biological weapons, and it also regulates conventional weapons that are not yet stipulated in specific treaties, such as AWS. The guardian and promoter of IHL is the International Committee of the Red Cross ["ICRC"], an independent organization which ensures humanitarian protection and assistance for victims of war and armed conflict, and promotes IHL along with its implementation in national law.[17] For the past few years, the ICRC has been active in gathering and publishing research as well as convening meetings to discuss AWS and its methods of use.

In terms of conventional weapons and its employment, Article 36 of Additional Protocol I to the Geneva Conventions ["AP I"] stipulates that "In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party." The ICRC Commentary on the Additional Protocols explains that the words "methods and means" include weapons in the widest sense, as well as the way in

[15] Henckaerts, Jean-Marie and Doswald-Beck, Louise. *Customary International Humanitarian Law Volume I: Rules* ["CIHL"], (Cambridge University Press, 2005)
[16] ICRC, "*A Guide to the Legal Review of New Weapons, Means and Methods of Warfare*", Publication, ICRC, 2006
[17] "Who We Are", <https://www.icrc.org/en/who-we-are>, accessed 22 September 2020

which they are used.[18] Thus, if parties want to employ AWS, they must make sure that the weapon itself and the way they employ it is in accordance with AP I and other provisions of law that they are parties to. This would include the four Geneva Conventions, which are important treaties in the regime of IHL that has been ratified by all States, making it binding not only to State armed groups but also non-State armed groups, who are subjects that are also regulated under IHL.

While IHL does apply in assessing the legality of conventional weapons and their use, such as AWS, some are concerned that the legal regime is not sufficient to regulate AWS. The consideration is that IHL was designed to be implemented by humans, and the laws did not foresee the employment of machines instead of humans on the battlefield.[19] In a 2018 meeting, the parties to the Convention on Certain Conventional Weapons ["CCW"] still debated on how IHL applies to AWS. Furthermore, some parties deem that IHL is insufficient and a new legally binding provision should be created. Their concerns were namely that IHL does not clearly define the notion of human control which would be needed when using weapons such as AWS, as once again, IHL did not foresee the use of such weapons. As there are no clear provisions, each party ends up relying on their own understanding of how much human control is necessary. They were also concerned with the possibility of a responsibility and accountability gap when the weapon is

[18] ICRC, "*A Guide to the Legal Review of New Weapons, Means and Methods of Warfare*", Publication, ICRC, 2006

[19] Heyns, Christof. *Autonomous weapons systems: living a dignified life and dying a dignified death*, Autonomous Weapons Systems: Laws, Ethics, Policy, (United Kingdom: Cambridge University Press, 2016), p.8

employed.[20] Thus, apart from IHL treaties, parties are also required to look into the Martens Clause when considering the use of a new weapon.[21]

The Martens Clause is a clause regarding the principles of humanity and dictates of public conscience. It stipulates that "until a more complete code of the laws of war has been issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between civilized nations, from the laws of humanity and the requirements of public conscience."[22] This clause was first established in the 1899 Hague Convention II when there was a disagreement between large military powers and smaller states for the purpose of ensuring in the event that there are no written provisions of a certain matter, judgments made by military commanders on the matter will not be arbitrary.[23]

Currently, the Martens Clause is deemed to be a customary rule.[24] It has also been stipulated in few IHL treaties, namely the four Geneva Conventions in their respective articles regarding "denunciation", and the two Additional Protocols to the Geneva Conventions. The clause is invoked to fill gaps from matters that are not regulated by treaties so that they are not arbitrarily decided upon, and it is

[20] Report of the 2018 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems ["CCW/GGE.1/2018/3"]
[21] ICRC, "*A Guide to the Legal Review of New Weapons, Means and Methods of Warfare*", Publication, ICRC, 2006
[22] Theodor Meron, "*The Martens Clause, Principles of Humanity, and the Dictates of Public Conscience*", The American Journal of International Law, vol. 94, no. 1, Jan. 2000, p.79
[23] Rupert Ticehurst, "*The Martens Clause and the Laws of Armed Conflict*", International Review of the Red Cross, Vol. 37, Issue 137 April 1997
[24] Legality of the Threat or Use of Nuclear Weapons ["Nuclear Weapons Case"], Advisory Opinion, July 8, 1996, ICJ Rep. 1996, p.226, paragraph 78-84; available on http://www.icj-cij.org.

important as it supports that IHL provides protection and regulation not only through their treaties, but also through customs, principles of humanity, and morals, especially since there are occasions when the written law is yet to catch up with the latest developments of warfare.

The Martens Clause has been invoked in relation to the regulation of the use of new technologies and weapons. For instance, the International Court of Justice [ICJ] in the Nuclear Weapons case, acknowledged that the Martens Clause "has proved to be an effective means of addressing the rapid evolution of military technology."[25] While at the end of the proceeding the ICJ was unable to determine whether the use of nuclear weapons would be lawful or not in extreme circumstances, the Court still decided that the threat or use of nuclear weapons should be used based on the principles and rules of IHL, and also points to the existence of the Martens Clause to affirm this. Furthermore, a dissenting judge in the case, Judge Shahabudden, was of the opinion that the dictate of public conscience in the Martens Clause can be viewed to oppose the use of nuclear weapons as unacceptable in all circumstances, making use of the Clause in his analysis.[26] The clause still remains regarded to this day, and existing academic articles now regarding AWS also try to assess the legality of AWS under the Martens Clause, as there is no specific IHL treaty which clearly regulates this new weapon yet.

[25] Nuclear Weapons Case, paragraph 78
[26] Legality of the Threat or Use of Nuclear Weapons, Dissenting Opinion of Judge Shahabuddeen, 1996, ICJ Rep.1996, p.117

This thesis is written to assess how the Martens Clause can fill the legal gaps IHL is presently unable to in regulating AWS. It focuses particularly on what level of autonomy would be allowed and the level of human involvement in using the weapon which would be needed for the weapon's employment in response to the ongoing legal and moral debates.

1.2 Formulation of Issues

In accordance to the topic of this thesis, this paper attempts to discuss, and elaborate on the following questions:

1. What are the legal gaps from IHL in regulating AWS?
2. How can Martens Clause complement IHL in regulating AWS?

1.3 Research Purposes

Responding to the comprehensive questions proposed above, this thesis namely attempts:

1. To apply the current IHL towards the usage of AWS, particularly in relation to weapon autonomy, how the weapon is used, and the element of human control, and to assess what are the existing legal gaps in regulating AWS through IHL.
2. To assess the use of AWS under the principles of humanity and dictates of public conscience, or "Martens Clause", which goes hand in hand with IHL and complements IHL treaties in the event a certain matter is not yet regulated.

1.4 Research Benefits

The benefits of this research are divided into 1) theoretical and 2) practical benefits.

1. Theoretical Benefits

   This thesis aims to fill in the gap of existing literature with regard to how AWS is currently regulated by IHL, and how Martens Clause can complement the regime when assessing the legality of the weapon in areas that IHL is still unable to regulate.

2. Practical Benefits

   In practicality, this thesis is hoped to provide better understanding on how AWS should be used when assessed through IHL and the Martens Clause. It focuses on how the Martens Clause can fill legal gaps from IHL in regulating AWS, so that even if it may take an indefinite amount of time for states to come up with a new treaty to specifically regulate AWS, states may consider how the Martens Clause views the matter, which should always be complied with considering that the clause is customary in nature.

1.5 Framework of Writing

This section will briefly highlight the content of the five chapters constituting this thesis:

CHAPTER I: INTRODUCTION

The first chapter introduces the starting point of this thesis. It informs readers of the background of the topic, briefly explaining what AWS is, how it is currently being used and developed, the legal problems and moral debates arising from its usage, the IHL regime which seeks to regulate the usage of this new type of weaponry, and additionally, the Martens Clause in complementing IHL. Following the background, the chapter stipulates what issues this research seeks to comprehend and resolve, the purpose and benefits of this research, and the framework of the thesis.

CHAPTER II: LITERATURE REVIEW

The second chapter discusses theoretical background of the writing's paradigm, addressing relevant concepts, terminologies, elucidation, and legal provisions which will be pertinent in the following chapters. This involves exploring international law, international humanitarian law and the martens clause in the theoretical framework. It will also look into existing theories and literature from experts regarding autonomous systems, the utilization of AWS, the benefits and problems that may potentially arise from such utilization, and the element of human control in using those weapons.

CHAPTER III: RESEARCH METHODS

The third chapter explains the type of research applied in this thesis, the legal research materials, the data gathering method, the legal research approach, as