Magister Juris Dissertation

Harder, Better, Faster, Stronger

Lethal Autonomous Robots under International Humanitarian Law

Gunnar Dofri Ólafsson

Instructor: Pétur Dam Leifsson

Associate Professor

May 2015

HÁSKÓLI ÍSLANDS
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It's not where you get; it's how you get there. This thesis is the last step in what turned out to be an unusually long journey to this final point. The journey, with all its stops and detours, has been paved with good friends, memories, teachers, mentors and, above all, a good education. International Law caught my attention on the very first year of law school and reached a pinnacle during my exchange studies at the University of Vienna, where International Humanitarian Law and the regulation of algorithms sow the seeds of what later became this thesis. Out of the many good teachers at the Law Faculty of the University of Iceland, I would especially like to extend my gratitude to my instructor Mr. Pétur Dam Leifsson for his guidance, patience and the confidence he has shown in me for recognizing the potential of the topic of this thesis.

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1. Introduction

"*Inter arma enim silent leges.*"[1]

Warfare has rapidly changed since the end of World War II. The vast majority of international humanitarian law was written with national armies and states in mind, as is evident from Article 4 of Geneva Convention III, being the classic definition of combatants under international humanitarian law.[2] The article divides combatants into two different categories: In the first category there are members of the regular armed forces of a party to the conflict. The second category is made up of other armed groups that; are under responsible command, bear a fixed, distinctive sign recognizable at a distance, carry arms openly and respect the requirements of international human rights law.

A brief study of the situation in the Middle East, northern Pakistan and other troubled regions would quickly reveal that the definition above has gone somewhat stale. Article 43, in particular paragraph 2, of the Additional Protocol I to the Geneva Conventions of 1949 goes a long way to remedy this, but the definition of the third Geneva Convention is nevertheless the recognized customary rule in international humanitarian law.[3] Asymmetric warfare has taken the spotlight from conventional national armies fighting one another with tank columns and distinctively recognizable soldiers.[4] The most prominent example at the time when this is written is without a doubt the terrorist organization ISIS that threatens to further destabilize the Middle East with various unconventional and outright illegal acts of violence.

The main questions posed in this thesis will be relating to a phenomenon that has been called "Lethal Autonomous Robots", LARs for short, that are "weapon systems that, once activated, can select and engage targets without further human intervention."[5] LARs raise far-reaching concerns about the protection of life during war and peace.

This includes the question of to what extent Lethal Autonomous Robots can be programmed to comply with international humanitarian law and the standards protecting life

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[1] Trans: "For among times of arms, the laws fall mute." Cicero: *Pro Milone,* IV.
[2] The terms "international humanitarian law", "law of armed conflict" and "law of international armed conflict" will be used interchangeably in this thesis.
[3] Paragraph 2 of Article 43 reads: "Members of the armed forces of a Party to a conflict (other than medical personnel and chaplains covered by Article 33 of the Third Convention) are combatants, that is to say, they have the right to participate directly in hostilities."
[4] David Galula: *Counterinsurgency Warfare: Theory and Practice,* p. 3 A conflict is asymmetric when there is a "disproportion of strength between the opponents at the outset, and from the difference in essence between their assets and liabilities." See also chapter 2.5.4. in this thesis.
[5] U.S Department of Defense: *Autonomy in Weapons Systems*, Directive Number 3000.09 p. 13-14.

under international human rights law. Even if they will be capable of meeting all those criteria the question remains whether their use would still in some way violate the spirit of the rules of international humanitarian law. Will they be capable of distinction and proportionate attacks? Is the taking of a life an inherently human action, aside from the acts of nature? These questions are fundamental in gauging whether Lethal Autonomous Robots can be legally put into action on the battlefield. These robots, whose workings will further be explained in chapters 3 and 4 of this thesis, have colloquially come to be known as "killer robots." Although they will in all likelihood not exist for a number of years to come, LARs are already on the drawing board, or at least being conceptualized in research facilities of many modern armies.

Chapter 2 of this thesis will give a brief overview of the development of international humanitarian law, as well as exploring the fundamental principles of international humanitarian law and challenges to the current legal regime, especially how the terrorist attacks on September 11th in 2001 affected military operations of Western militaries in ways no one could have foreseen.

International humanitarian law therefore faces a number of challenges due to changes in how wars are fought in modern times. The main topic of this thesis will, however, not be that of how previous changes in the battlespace have been a constant source of questions and challenges for those that fight for humanitarianism in war-torn areas, but that of how advances in robotics and autonomous machines are likely to bring new and even more challenging questions to the table.

Chapter 3 of the thesis will focus on the technological aspect of the weapons that can be considered predecessors to Lethal Autonomous Robots. These machines, although not fully autonomous in nature, have functions that offer advanced automation in their respective field, and have in a sense relegated human operators to the role of green-lighters, only having seconds to decide whether a weapons system engages the target it has automatically designated.

Armies have for decades fielded weapons with some autonomous capabilities, such as the MK 15 Phalanx CIWS. Drones may also be considered a stepping-stone in this development. First, remove the soldier from the battlefield. Then, remove the "soldier" entirely, replacing him with a machine. If and when these machines enter the battlefield, they will most likely be less like the Terminators and HALs of science fiction, and more like a fighting computer,

without personality, without humanity, and without remorse, since the actions of the machines will only be based on programming.

Chapter 4 focuses on how, when looking forward, Lethal Autonomous Machines will be able to adhere to the fundamental principles of international humanitarian law and the legal and technological challenges Lethal Autonomous Machines are likely to face in the near future. Although fully Autonomous Lethal Machines have not (yet) emerged, a number of NGOs, humanitarian watch groups and scholars in the fields of law and robotics have warned of the potential (mis)use of Lethal Autonomous Robots in the battlespace. The debate over whether these machines should be outlawed, even before they emerge, will feature heavily in the chapter.

Christof Heyns, the United Nations Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions (Special Rapporteur for short) has in his report already encouraged the Human Rights Council to call on all States to declare and implement a national moratoria on at least the testing, production, assembly, transfer, acquisition, deployment and use of LARs until such time as an internationally agreed upon framework on the future of LARs has been established.[6]

In *Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics,* Michael N. Schmitt argues that since LARs are not illegal *per se,* they should not be categorically banned, but rather considered to be in their infancy and require further testing, and it would be "irresponsible to prohibit autonomous weapons at this stage in their development."[7] Schmitt further argues that at one point they might become better than humans at distinguishing legitimate targets from illegitimate ones, and thereby banning them would in the end cause more loss of civilian life than would otherwise have been "necessary". These arguments will be further broken down and explored in chapter 4.

Currently, humans remotely control all robots intended for assault in the theatre of war.[8] To the best knowledge of the author of this thesis, knowledge that is at best limited, due to the highly secretive nature of weapons development, fully autonomous LARs do not yet exist.[9]

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[6] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 21.
[7] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 35-36. Michael N. Schmitt is an international law scholar Director of the Stockton Center for the Study of International Law at the United States Naval War College.
[8] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", EAP. 1.
[9] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 3.

However "technology is moving in the direction of their development and precursors are already in use."[10]

Other fundamental questions that LARs raise are of a more philosophical nature. Are autonomous robots that select and engage targets without further human intervention to be considered new weapons systems in light of Article 36 of Additional Protocol I of the Geneva Convention, or are they rather to be treated as a new form of combatants?[11] If so, who can be responsible for them, if their actions violate international humanitarian law? Would LARs be the end of the "guns don't kill people, people kill people" logic, be replacing the people with a computer?

Finally, the author's conclusions and thoughts will be summarized in the 5th and final chapter of this thesis.

[10] Human Rights Watch: *Losing Humanity*, p. 3.
[11] Article 36 of Protocol I puts a duty on party States to make sure new weapons systems are compatible with international humanitarian law. See also chapter 4.4.1. in this thesis.

2. Development and principles of international humanitarian law

> "International humanitarian law exemplifies all the weakness and at the same time the specificity of international law. If the end of all law is the human being, it is critical for our understanding of international law to see how it can protect him or her even, and precisely, in the most inhumane situation, armed conflict."[12]
>
> - Marco Sassòli

2.1. Introduction

2.1.1. International law and international humanitarian law

International law, or public international law or the law of nations, is the set of rules and norms that regulate the conduct of States and other entities which at any time are recognized as being endowed with international personality.[13] International law governs international relations, both in time of peace and in time of armed conflict. It covers, for example, international trade, the law of the sea, air and space law, the delimitation of international boundaries, human rights, environmental protection as well as a number of other areas of international relations.[14]

International law is not imposed on States, unlike national or municipal legislation that is forced upon the citizens of each State.[15] There is no international legislature whom all other States must obey, no judicial branch that handles disputes between States, whether they like it or not, and no executive power entrusted with enforcing international law, a flaw often brought to light by the skeptics of the workings and effectiveness of international law.[16] Even so, the introduction of the Permanent International Criminal Court, as well as a number of other judicial bodies for the peaceful settlement of international disputes highlights the fact that States are increasingly committed to the international rule of law.[17] International law is based on the willing cooperation of individual States, where no State, at least formally, has any power over the other. This has given rise to the Latin phrase *par in parem non habet imperium*; an equal has no power over an equal.

International law also regulates the circumstances in which States may use armed force, the so-called *jus ad bellum*, the right to resort to force. One of the underlying principles of *jus*

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[12] Marco Sassòli: *How does law protect in war?* p. 102.
[13] Rebecca MM Wallace & Olga Martin-Ortega: *International Law*, p. 2.
[14] UK MoD: *The Manual on the Law of Armed Conflict,* p. 1.
[15] Rebecca MM Wallace & Olga Martin-Ortega: *International Law*, p. 4.
[16] Ibid.
[17] Ibid.

ad bellum is to prevent the use of armed force, as is enshrined in Article 2, paragraph 4 of the Charter of the United nations.[18]

International humanitarian law, sometimes referred to as the law of armed conflict or *jus in bello*, is a part of international law, and governs international relations in a time of armed conflict between two or more parties.[19] The Committee of the International Red Cross clarifies International humanitarian law as being:

> "[A] set of rules which seek, for humanitarian reasons, to limit the effects of armed conflict. It protects persons who are not or are no longer participating in the hostilities and restricts the means and methods of warfare. International humanitarian law is also known as the law of war or the law of armed conflict.[20]"

A major part of contemporary international humanitarian law can be found in the Geneva Conventions of 1949, which every member state of the United Nations (UN) is a party to.[21] The Conventions, written in 1949, are however by no means the oldest source of international humanitarian law, as will be explored later in this thesis. The Conventions have been further developed by the two Additional Protocols of 1977 and Protocol III of 2005. Additionally, the Hague Conventions of 1899 and 1907 are important sources of international humanitarian law. Furthermore, a large part of international humanitarian law is considered to be customary international law.[22] It is important to note, in order to begin to understand international humanitarian law, that no man, nor machine for that matter, is held to the standard of perfection. In international humanitarian law the standard is always one of reasonableness.[23]

2.1.2. The relationship between jus ad bellum and jus in bello[24]

International humanitarian law, *jus in bello*, is as previously mentioned, not to be confused with the international laws regarding the legitimacy of engaging in armed conflict, the *jus ad bellum.* Although related and in nearly all cases a precursor to the application of *jus in bello*, the study of the rules that govern the legality and legitimacy of the use of force, most notably

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[18] The paragraph reads: "All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations."
[19] UK MoD: *The Manual on the Law of Armed Conflict,* p. 1.
[20] International Committee of the Red Cross: *What is International Humanitarian Law?,* p. 1.
[21] Ibid.
[22] International Committee of the Red Cross: *What is International Humanitarian Law?,* p. 1.
[23] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 21.
[24] The relationship between jus ad bellum and jus in bello will not be explored in detail in this thesis, as it is not essential to the topic of the thesis. For a more detailed discussion on the subject, see e.g. pages 9 through 28 in "An introduction to international law of armed conflict" by Robert Kolb and Richard Hyde.

the Charter of the United Nations of 1945, in particular Article 2(4) of the Charter, as well as customary international law, are not the subject of this thesis.[25] In a thesis that explores the concept of international humanitarian law, it is still unavoidable to briefly address *jus ad bellum.* Both *jus ad bellum* and *jus in bello* deal with the same material object, the waging of war, but each from a different perspective.[26]

Alongside Article 2(4) of the Charter of The United Nations, Articles 39 through 51, i.e. Chapter VII of the Charter, are the main provisions of the Charter regarding *jus ad bellum*. Article 51creates an exception from Article 2(4) that prohibits the use of force:

> "Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defence shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security."

States are therefore justly allowed to defend themselves from aggression, as well as call upon other States to come to their defence. This principle is intentionally narrowly constructed, and interpretation of the Article has been fraught with problems.[27] States have "constantly and abusively" attempted to extend the reach of this exception, e.g. by introducing the concept of pre-emptive self-defence.[28]

It is, however, important to note that a violation of the rules relating to *jus ad bellum,* the waging of illegitimate war, does in no manner dilute or erode the value and applicability of international humanitarian law. In other words, no matter how an international armed conflict started, once it has started, international humanitarian laws of armed conflict apply.[29] International humanitarian law applies to all parties of a conflict, to combatants who have themselves violated the rules of international humanitarian law, even in the gravest of manner. This can be summarized in the words of Sassòli, Bouvier and Quintin:

> For practical, policy and humanitarian reasons, however, International Humanitarian Law has to be the same for both belligerents: the one resorting lawfully to force and the one resorting unlawfully to force. From a practical point of view, respect for International Humanitarian Law

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[25] Rebecca MM Wallace & Olga Martin-Ortega: *International Law*, p. 289; Christine Gray: *International Law and the Use of Force*, p. 148.
[26] Robert Kolb and Richard Hyde: *An Introduction to the International Law of Armed Conflicts,* p. 21.
[27] Ibid*,* p. 11-12.
[28] Ibid p. 12.
[29] The question of applicability of International humanitarian law in non-international conflicts will be explored in the next chapter, as well as chapter 2.4.7. of this thesis.

> would otherwise not be obtained, as, at least between the belligerents, which party is resorting to force in conformity with *jus ad bellum* and which is violating *jus contra bellum* is always a matter of controversy. In addition, from the humanitarian point of view, the victims of the conflict on both sides need and deserve the same protection, and they are not necessarily responsible for the violation of *jus ad bellum* committed by "their" party.
>
> International Humanitarian Law must therefore be respected independently of any arguments if, and be completely distinguishing from, *jus ad bellum*. Any past, present and future theory of just war only concerns *jus ad bellum* and cannot justify (but is in fact frequently used to imply) that those fighting a just war have more rights or fewer obligations under International Humanitarian Law then those fighting an unjust war.[30]

2.1.3. International and non-international armed conflicts

Traditionally, international humanitarian law has distinguished between international armed conflicts, where the belligerents are two or more States, and non-international armed conflict, in which case the belligerents are different factions of the same State. Until the Geneva Conventions of 1949, non-international armed conflicts, often called civil conflicts, were viewed as falling outside of the scope of international humanitarian law.[31]

Protracted civil conflicts, such as the Spanish Civil War (1936-1939), where civilians on both sides suffered immensely, gave rise to the notion that international humanitarian law should, at least in part, apply also to non-international conflicts, and it is now widely accepted that some common guarantees apply in conflicts of both types.[32] After all, the vast majority of armed conflicts since World War II have been of a non-international character, meaning that international law would not be relevant in modern conflicts if it only applied to purely international armed conflicts.[33] However, as the *Customary Study* of the International Committee of the Red Cross (ICRC) shows, the merger of the two branches has already progressed impressively.[34] For example, the fact that in 2001 the Convention on Certain Conventional Weapons was amended to extend its scope to non-international armed conflicts is an indication that this notion is gaining currency within the international community.[35] The international and non-international character of conflicts will be further explored in Chapter 2.4.7. in this thesis.

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[30] Marco Sassòli, Antoine A. Bouvier & Anne Quintin: *How does law protect in war?* p. 114-115.
[31] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 17.
[32] Ibid.
[33] Jean Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law Volume 1: Rules,* p. xxxv.
[34] Ibid.
[35] Ibid.

2.1.4. The moral strangeness of regulating killing

The guiding principles of international humanitarian law arise from the need to place limits on the conduct of armed conflict.[36] Laws of armed conflict may seem strange to those unfamiliar with humanitarian law. The purpose of war is after all to neutralize the enemy. Even so, there are rules that must be followed as to how one goes about doing just that. Legitimate targets must be distinguished from illegitimate ones, and having distinguished the target, certain rules apply as to how the target can be neutralized. Enemy combatants cannot be attacked with weapons that inflict superfluous injury, i.e. cause unnecessary suffering, to render them ineffective in combat. Civilians cannot be targeted directly, but still civilian casualties are the result of nearly every war, especially during and after World War II.

This certainly seems odd, as it is the principal role of any criminal justice system, armed with police officers, courts and prisons, to prevent people from using violence or causing death to their fellow citizens. The view on warfare is therefore a radical exception to these rules.[37] In order to be better able to explore the challenges that the introduction of Lethal Autonomous Robots will bring about, it is first necessary to briefly explore the development and fundamental principles of international humanitarian law.

2.2. Origins of international humanitarian law, the law of armed conflict

2.2.1. Humanitarianism before 1864[38]

Despite this moral strangeness, humanitarian law can be found in customs regulating warfare amongst Ancient Greek city-states, as far back as 700 BC. These rules were concerned, among other things, with the treatment of prisoners of war and the manner of how defeated forces should be pursued.[39] The aforementioned rules were interestingly only in place between the Ancient Greek city-states. When fighting forces from outside the Greek peninsula, all bets were off. In Plato's *Republic*, written around 375 BC, these rules still chime, where he states that citizens of territories occupied by Greek forces should not be

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[36] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 1.
[37] Ibid.
[38] For a comprehensive overview of the development and codification of international humanitarian law, see e.g. Leslie C. Green: *The contemporary law of armed conflict,* p. 26-64 (Chapter 2). This thesis will only provide a small glimpse of the history of international humanitarian law in ancient times, since past development in the field is undoubtedly in some ways indicative of the future. In the words of the Spanish philosopher and novelist George Santayana: "Those who cannot remember the past are condemned to repeat it."
[39] Josiah Ober: "Classical Greek Times".

enslaved, corpses should not be robbed and houses should be left undamaged.[40] As mentioned above, these rules only applied to other Greek city-states, not so called barbarians, people of other races than Greek.

The people of Ancient Greece were not the only ones concerned with early humanitarian law. In Cicero's *De Officiis*, written in 44 BC, he states that certain standards must be met in warfare. Those standards are, i.al. that troops should not cause unnecessary devastation in occupied territories, and that prisoners of war should be protected, and that these rights should be given to all peoples.[41] This was all in spite of the fact that Roman troops were known for fierceness in combat.[42] Humanitarianism and some form of rules to mitigate the devastation of war have been a part of history for a very long time, much like conflict.

As previously mentioned, conflict has been governed by rules of some sort since antiquity, long before they were ever formally codified.[43] Even the Old Testament contained "limitations imposed by God" on warfare.[44] Sun Tzu, in his *Art of War*, stated that in war, one should attack the enemy armies. Cities, however, should only be attacked when there is no alternative.[45] This was undoubtedly his advice to generals both to spare their men an attack on a fortified city, but also to prevent the inevitable human suffering that would result in an attack on a densely populated area.

In the *Mahabharata*, kings were proscribed never to injure "a foe as would rankle the latter's heart." In a later passage, it states that a sleeping enemy should not be attacked, and that "with death, our enmity has terminated," and therefore, desecration of corpses was forbidden. Additionally, the poem prohibits the killing of those suffering from any natural, physical or mental incapacity, and that "he is no son of the Vishni race who slayeth a woman, a boy or an old man."[46] Furthermore, in ancient India, it was held that war should be waged on the basis of equality and proportionality. Therefore, "a car warrior should fight a car warrior. One on horse should fight one on horse. Elephant riders must fight with elephant riders, as one on foot fights a foot soldier."[47]

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[40] Plato: *Republic,* p. 197-199.
[41] Cicero: *De Officiis*: p. 37, 83.
[42] Robert C Stacy: "The Age of Chivalry".
[43] Leslie C. Green: *The contemporary law of armed conflict,* p. 26.
[44] Ibid.
[45] Sun Tzu: *The Art of War,* p. 78.
[46] The Mahabharata is an Epic Sanskrit poem based in Hindu ideals. The poem is in all probability composed between 200 BC and AD 200. William Staveley Armour, "Customs and warfare in ancient India," p. 71, 76, 77, 81.
[47] William Staveley Armour: "Customs and warfare in ancient India," p. 74.

On a side note it should be observed that this rule, seemingly obscure and outdated in modern times, where sophisticated modern armies use Tomahawk missiles and stealth bombers against insurgents armed with automatic rifles and rocket-propelled grenades, this sentiment is still in a sense observed in modern warfare, as seen in the *principle of proportionality,* one of four fundamental principles of international humanitarian law. The concept of proportionality is in modern times not intended to encourage a "fair fight" on the battlefield, but rather that one should not use a cannon to kill a housefly because of the possibility of collateral damage.[48]

In the Middle Ages, the Catholic Church had become so powerful that it could forbid Christian knights to use certain weapons, as they were hateful to God.[49] Among these was the crossbow. In 1139 the Second Lateran Council condemned the use of crossbow and arc, a view that coincided with the concept of chivalry, which regarded such weapons as disgraceful, since they could be fired from a distance, thus enabling a man to strike without the risk of them being struck.[50]

That was not the only reason for this condemnation. Knights were generally of noble birth and needed extensive, and expensive training to be able to fight as knights. The introduction of the crossbow meant that "men not of the knightly order could fell a knight. That was bad in itself."[51] Honor and courage were the hallmarks of knights, even thought the restraints imposed on knights by their status were only in full effect when fighting one another, and tended to loosen when fighting combatants not of the knightly order.[52]

These rules of chivalry did not apply to soldiers other than knights. The actions of foot soldiers were governed by national military codes, with military commanders possessing what is known as "rights of justice" over their men, and clear orders were issued delimiting their powers.[53] Under rules issued by Richard III, all men-at-arms had to be listed in an official muster and were subject to punishment if they violated rules, e.g. regarding the distribution of

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[48] The principle of proportionality, along with the other fundamental principles of international humanitarian law, will be explained in Chapter 2.4. of this thesis.
[49] G.I.A.D. Draper: "The interaction of Christianity and chivalry in the historical development of the law of war." p. 18-19.
[50] Ibid, p. 19; Leslie C. Green: *The contemporary law of armed conflict,* p. 30.
[51] G.I.A.D. Draper: "The interaction of Christianity and chivalry in the historical development of the law of war." p. 19.
[52] Ibid.
[53] Leslie C. Green: *The contemporary law of armed conflict,* p. 31.

booty, where pillaging and the destruction of private property was prohibited.[54] In addition, respect for priests, women, children and the sick were not to be harmed.[55]

This very brief overview of the position of humanitarianism during warfare in antiquity goes to show that humans have from a very early time been concerned with mitigating the calamities of war in one way or the other. In chapter 2.3. of this thesis, the modern developments and codification of international humanitarian law will be further explored.

2.2.2. The purpose of international humanitarian law

Despite developments in the field of international humanitarian law, certain fundamental aspects have largely remained unchanged. That is because the underlying purpose and goals of the laws of armed conflict have essentially always been the same:

> Humanitarianism responds to the unusual situation that arises in armed conflicts by adopting an approach of moderation. Although war necessarily involves suffering, there are basic values that unite humans even in wartime. This means that even war has its limits. [...] International humanitarian law aims to ensure respect for the most basic human values, such as dignity, community and freedom from suffering. It represents the last-ditch hold-out position of the human community against absolute warfare.[56]

The most important aspect of war is therefore to eventually bring about peace. Although absolute warfare, warfare with no regard for humanity, might bring about a swift conclusion to a conflict, but is by no means the best way to secure a peaceful conclusion. Humanitarianism puts restraints on war by seeking to moderate the effects of warfare in the name of human ideals.[57]

The rules of international humanitarian law are extensive and complex, but perhaps the four most basic principles are the prohibition on inflicting superfluous injury, the principle of military necessity, the principle of distinction and the principle of proportionality. In order to be able to distinguish whether Lethal Autonomous Robots will be capable of acting in accordance with international humanitarian law, it is important to explore to some extent these most basic principles.

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[54] Leslie C. Green: *The contemporary law of armed conflict,* p. 31.
[55] Ibid.
[56] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 3.
[57] Ibid, p. 2.

2.3. Modern development and codification of international humanitarian law

Modern international humanitarian law has had a few important milestones over the past 150 years. This chapter will explain a few of the most important ones, ranging from unilateral declarations of humanity in the battlefields from the American Civil War to complex international conventions of the 20th century.

2.3.1. The Lieber Code

The *Lieber Code* is considered to be the most important early codification of the customs and usages of war. The code was issued by President Lincoln in 1863 to the Union forces in the American Civil War as General Order 100: Instructions for the Government of Armies of the United States in the Field.[58] The code was written by the German-born lawyer Francis Lieber, and represents an ambitious attempt to set out guidelines for the conduct of land-based warfare. Article 49 of the *Lieber Code* was the first example of an expressed prohibition to issue orders of "no quarter", stating that "enemies who have thrown away their arms and ask for quarter, are prisoners of war, and as such exposed to the inconveniences as well as entitled to the privileges of a prisoner of war."

The *Lieber Code* was, however, a purely internal document among Union troops, and was undermined by the discretion given to commanders of Union forces in the name of military necessity. The code nevertheless inspired and influenced international attempts to regulate the means and methods of war.[59]

2.3.2. The Early Geneva Documents

Another very early attempt at regulating armed conflict were the Early Geneva Documents. The Geneva Conference of 1864 culminated in the adoption of the Convention for the Amelioration of the Condition of the Wounded in Armies in the Field, giving protective status to all ambulances, hospitals and medical personnel during armed conflict, as well as to impose a duty on forces to care for wounded combatants. Delegations from 16 states attended the conference, which was hosted by the Swiss government.[60] The Convention also acknowledged the protective status of the symbol of the Red Cross. The duty to care for the wounded was irrespective of affiliation and imposed on all parties to a conflict.

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[58] UK MoD: *The Manual on the Law of Armed Conflict,* p. 7.
[59] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 31.
[60] UK MoD: *The Manual on the Law of Armed Conflict,* p. 8.

The Convention's scope was eventually broadened with the adoption of a treaty in 1899 to protect wounded or shipwrecked sailors, as well as in 1906 extended the scope to all naval activities. These instruments lay the foundation for what would eventually become known as the Geneva branch of international humanitarian law, where the protected persons are specific groups rendered vulnerable by conflict, such as civilians, the sick and wounded.[61]

2.3.3. The St. Petersburg Declaration

In 1868, the Russian government invited a convention of military experts to St. Petersburg to discuss concerns about the use of light explosives in warfare. This discussion has been hailed as an important event in the development of international humanitarian law, as the discussions lead to the creation of the St. Petersburg Declaration. The light explosives in question were designed to only neutralize one combatant, but when used in the field they usually caused the target tremendous suffering, much more so than an ordinary rifle bullet.[62] The result was to prohibit the use of any explosives that weighed less than 400 grams.[63]

Even though the declaration targeted only one very specific type of weapons, the reasoning by the delegates to the conference would provide a basis for the future developments of international humanitarian law when regulating means and methods of warfare. One of the issues the delegates emphasized was that even in war, suffering of combatants was only allowed to overcome the enemy resistance, and no more. Given the fact that the explosives that spurred the conference caused what the delegates found to be unnecessary suffering, these explosives were banned.[64]

The Lieber Code and the St. Petersburg declaration are considered to have served as important models for what has been called Hague law in international humanitarian law. Hague law is primarily concerned with mitigating the suffering of combatants in warfare by limiting the weapons permitted in war, and tactics that forces have at their disposal.[65] This is carefully phrased in the Preamble to the Declaration, which states:

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[61] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 30; UK MoD: *The Manual on the Law of Armed Conflict,* p. 8.
[62] This is a good example of concerns over superflous injury motivating the development of international humanitarian law. The principle of humanity, or the prohibition of superflous injury and unnecessary suffering will be explored later on this chapter.
[63] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 31.
[64] Ibid.
[65] Ibid.

> That the progress of civilization should have the effects of alleviating as much as possible the calamities of war; That the only legitimate object which States should endeavor to accomplish during war is to weaken the military forces of the enemy; That for this pursuit it is sufficient to disable the greatest possible number of men; That this object would be exceeded by the employment of arms which uselessly aggravate the suffering of disabled men, or render their death inevitable; That the employment of such arms would, therefore, be contrary to the laws of humanity.

2.3.4. The First Hague Conference of 1899

Following the 1868 St. Petersburg Declaration, the Russian government encouraged further international discussion on the rules and customs of warfare. Over three decades later, in 1899, delegates from a number of states arrived in The Hague to discuss how to prevent further wars in Europe. The conference was held at Russia's ongoing instigation and calls for discussions. The aim of the Hague Peace Conference was the *jus contra bellum*, to create a compulsory arbitration mechanism for when disputes rose between nations. The delegates also discussed the need for rules to govern the conduct of war.[66]

The most prominent outcome of the Conference was not the creation of a compulsory arbitration mechanism, but the emerging of rules to govern the means and methods of warfare, the Convention with Respect to the Laws and Customs of War on Land, accompanied by a collection of Regulations.[67] These Hague Regulations are considered to represent an ambitious attempt to codify the existing customs of land warfare, drawing inspiration from e.g. the reasoning underlying the St. Petersburg Declaration.[68] Even today, over a century later, one of the Declarations of 1899 is still relevant, the Hague Declaration III which prohibits dum-dum bullets.[69] The rules laid out at the Hague in 1899 clarified many important issues concerning the conduct of warfare, including the treatment of prisoners of war, obligations of occupying forces and restrictions on certain types of weapons and tactics, as explained earlier.[70] The Preamble to the Hague Convention on Land warfare is, in retrospect, considered to be one of the most important document to come out of the Hague Conference of 1899. The Preamble is known as "the Martens Clause".

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[66] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 32.
[67] Ibid.
[68] Ibid.
[69] UK MoD: *The Manual on the Law of Armed Conflict,* p. 8. Dum-dum bullets are a type of rifle ammunition that expands on impact, causing larger wounds than regular bullets and a great deal of suffering.
[70] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 32.

2.3.5. The Martens Clause

The so-called *Martens Clause* was written by the Russian delegate Fyodor Fyodorovich Martens in the Preamble to the II Hague Convention of 1899. The clause reads as follows:

> Until a more complete code of the laws of war is 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 the public conscience;
>
> They declare that it is in this sense especially that Articles 1 and 2 of the Regulations adopted must be understood.[71]

Since 1907, the clause has generally been hailed as a turning point in international humanitarian law, as it recognizes the existence of "principles of international law". Proponents of this understanding have argued that it represents the first time in which the notion that there exist international rules of humanitarianism, and that these rules are no less binding than those put forth with other motives in mind, such as military or political motives.[72] However, Cassese argues that the Martens Clause was first and foremost a "clever diplomatic expedient" to cut short a dispute between large and small powers.[73] The larger states, confident of victory in armed conflict, wanted humanitarian rules to restrict warfare as little as possible, while the smaller states, knowing they would be at the mercy of the big players in times of war, wanted the rules to offer protection for their civilian population in occupied territories. At the Hague Conferences, an effort was therefore seemingly made to both protect persons, but also the interests of states.[74]

When reviewing the Marten Clause, it must be observed that it is only applicable in the absence of treaty law, as made clear by the first sentence of the clause. Michael N. Schmitt therefore argues that the clause is a failsafe mechanism, meant to only apply when other laws are not in place, and not to be understood as an overarching principle that must be considered in every case. In today's international humanitarian legal environment, treaty and customary laws cover the vast majority of possible scenarios of the laws of armed conflict, relegating the Martens Clause to the history books. Therefore, in the 21st century, it is unlikely that e.g.

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[71] Antonio Cassese points to the fact in "The Martens Clause: Half a Loaf or Simply Pie in the Sky?" that commentators and courts have neglected the last provisio of the clause. He finds it essantial in understanding the historical understanding of the clause.
[72] Antonio Cassese: "The Martens Clause: Half a Loaf or Simply Pie in the Sky?", p. 188.
[73] Antonio Cassese: "Current Challenges to International Humanitarian Law", p. 6.
[74] Ibid.

future weapons systems would be in a violation of the Martens Clause, seeing that treaties and conventions in the field of humanitarian law would in most, if not all instances address and resolve a particular subject before the Martens Clause itself would have to be considered.[75] In the *Nuclear Weapons* advisory opinion, the International Court of Justice stated that:

> A modern version of [the Martens] clause is to be found in Article 1, paragraph 2, of Additional Protocol I of 1977, which reads as follows:
>
> "In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience."[76]

This would indicate that although the clause is over a hundred years old, the principle behind the clause is as relevant as ever.

2.3.6. The Second Hague Conference of 1907

At the end of the first Hague Convention, it was envisaged that regular follow-up conventions would be held. Thus, the second, and last, Hague Peace Conference convened in 1907. The Conference echoed the spirit of the first Conference, wishing for a lasting peace in Europe, but made few changes to the 1899 Regulations on land warfare.[77] The main advances made in 1907 were in naval warfare, where the delegates adopted a number of conventions in this area, the most important ones being the Convention Concerning Bombardment by Naval Forces in Times of War and the Convention Relative to the Laying of Automatic Submarine Mines, which restricted the use of naval mines and torpedoes to protect commercial vessels and their operations. At the end of the Conference, the delegates expected a third Conference to be held in the near future.[78] That never happened, the Peace Conferences in Hague failed to meet their main goal: insuring peace in Europe.

2.3.7. The interwar years and The League of Nations

The outbreak of the Great War in 1914 meant that there never was held a third Hague Peace Conference. Sadly, the period between the First and Second World War was not one of lasting

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[75] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 32.
[76] *Legality of the Threat or Use of Nuclear Weapons,* ICJ Advisory Opinion, July 8th 1996, paragraph 78.
[77] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 33.
[78] Ibid, p. 34.

improvements of the law of warfare, the Hague-branch of international humanitarian law.[79] The League of Nations, created in 1920 following the conclusion of the Versailles Peace Conference, had little impact on the law of warfare. The main noteworthy exception to this was the 1925 adoption of the Geneva Gas Protocol prohibiting the use of chemical agents in warfare, such as chlorine, phosgene and mustard gas, which had all been weaponized and used controversially in the previous World War. The aforementioned prohibition also extended to bacteriological agents, that, although they had not been weaponized and used in the First World War were perceived as a possible weapon in future conflicts.[80] This protocol did, however, not prohibit the manufacturing or acquisition of the aforementioned agents. Additionally, some states, including England, entered reservations to the Protocol, stating that it would cease to bind the state if the enemy preemptively used gases in warfare. The Protocol was therefore effectively only a prohibition on preemptive use of gas by these states.[81]

Areal bombardment had presented itself as a prominent threat to civilians during the First World War. Although early areal bombardments consisted of simply dropping hand-held bombs on enemy troops, they soon escalated and all those capable of strategic areal bombardment employed it against the enemy in his own territory. Intentions on both sides of the war were of course only to strike military objectives, but both circumstances and technology at the time permitted limited targeting from the skies. Civilian losses were therefore extensive and often disproportionate to the military advantage gained from the bombardment.[82] In 1923, an attempt was made to create international agreements to limit areal bombardments, with the creation of the Draft Hague Rules of Areal Warfare. Although never adopted, they reflected the general principles and customary rules at the time and treated as an attempt to apply these rules and customs to air operations. Despite that, there were several instances of indiscriminate areal bombardment during the interwar years.[83] Even so, J.M. Spaight, an expert on the law of war, wrote in 1933:

> If a military objective is situated in such a densely populated neighborhood, or if the circumstances of the case are otherwise such that any attack upon it from the air is likely to involve a disastrous loss of non-combatant life, aircraft are bound to abstain fro bombardment.[84]

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[79] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 34.
[80] Ibid.
[81] UK MoD: *The Manual on the Law of Armed Conflict,* p. 11.
[82] Ibid, p. 10.
[83] Ibid.
[84] James Molony Spaight: *Air Power and War Rights,* p. 210.

Although little progress was made in the Hague-branch of international humanitarian law in the interwar years, the development of Geneva-law was more extensive. In 1929, the International Committee of the Red Cross initiated a meeting in Geneva where the rules from 1864 and 1906 were refined in light of the experience of the First World War in terms of treatment of the sick and wounded in land warfare. The 1929 conference also saw the separation of instruments governing treatment of prisoners of war. Rules on the issue were in the 1899 Hague Regulations, but lacked details and were considered an uneasy balance between restrictions on warfare and military necessity.[85] These regulations would dominate the field until the creation of the Geneva Conventions of 1949.

2.3.8. The Geneva Conventions of 1949

After the atrocities of the Second World War, the ICRC called for a conference on international humanitarian law. The purpose of the meeting was to update the previous Geneva treaties in light of both the Second World War and the Spanish Civil War, the former being considered a watershed for international humanitarian law.[86] The Spanish Civil War illustrated a new challenge to international humanitarian law: non-international humanitarian law, where the armed conflict was not between national armies, but a conflict between a national army and a non-state group. Prior to the Geneva Conventions of 1949 (hereafter: Geneva Convention or Geneva Conventions), international humanitarian law had solely focused on international armed conflict, since states did not want international laws dictating internal affairs. Last but not least, the absence of treaties addressing deportation and exterminations of civilians as part of a genocide became painfully obvious.[87]

The brutality and atrocities of the Spanish Civil War served to change this view to some degree. Article 3, common to all four Geneva Conventions and known as Common Article 3 was therefore inserted to the updated version of the Geneva Conventions. Common Article 3, set to apply as a minimum standard, is considered a critical step in the development of international humanitarian law, being the first, and only article regulating non-international armed conflicts until the drafting of Additional Protocol II of 1977.[88] In light of the fact that a

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[85] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 34.
[86] Ibid, p. 35; UK MoD: *The Manual on the Law of Armed Conflict,* p. 12.
[87] UK MoD: *The Manual on the Law of Armed Conflict,* p. 12.
[88] See chapter 2.4.7. in this thesis for more on the challenges of international and non-international armed conflict.

vast majority of modern day armed conflicts are of a non-international nature, the Common Article 3 and Additional Protocol II are key components of international humanitarian law.

Three of the Geneva Conventions served to supersede previous Geneva treaties and subsequently replacing them. Geneva Convention I, superseding the agreements of 1864 & 1906, serves to protect wounded and sick combatants in conflicts on land. Geneva Convention II replaced the treaties of 1899 and 1907, protecting wounded, sick and shipwrecked combatants at sea, while Geneva Convention III deals with prisoners of war, replacing the agreement of 1929. However, Geneva Convention IV on the Protection of Civilian Persons in Time of War broke ground in the field of international humanitarian law, extending very detailed protections to civilians caught in armed conflict. Even thought the Hague documents had offered some protection to civilians, as well as the 1929 Geneva Convention on prisoners of war, Geneva IV meant even more protection for civilians than had previously been envisaged.[89]

The decision to adopt a separate Convention for the protection of civilians was a result of the realities of both the Spanish Civil War and the Second World War. During these conflicts, forces had encountered numbers of civilians in unprecedented amounts with little or no guidelines of how to treat them. Prolonged occupation, experienced by many nations during the Second World War, also served as a reminder of the need for rules dictating the actions of forces occupying hostile territories, for instance organized resistance movements, which were given special protection under certain conditions.[90] A key aspect of the Geneva Conventions is also the fact that, unlike the Hague Regulations of 1907, their application is general. Even if one or more parties to a conflict is not a party to the Geneva Conventions, the belligerents who are party to the Geneva Convention are still obligated to uphold its principles in the battlefield.[91]

The substantive law of the Geneva Conventions is very extensive and falls for the most part outside the scope of this thesis.[92] The most relevant principles and Articles of the Geneva Conventions will be brought up and discussed later in this thesis if the Articles are directly relevant to the topic of Lethal Autonomous Machines under international humanitarian law.

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[89] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 35-36.
[90] Ibid, p. 36.
[91] UK MoD: *The Manual on the Law of Armed Conflict,* p. 12.
[92] For a more detailed coverage to the content of the Geneva Conventions of 1949, the author recommends reading chapters 4 and 5 of Crowes and Weston-Scheubers *Principles of International Humanitarian Law,* published in 2013.

The most important principles of international humanitarian law, many derived in one way or the other from the Geneva Conventions, will be explored in chapter 2.4.

2.3.9. The Additional Protocols of 1977

After the creation of the Geneva Conventions of 1949, the international community soon realized that the protection of the Conventions needed revision. This revision was formally begun in 1974 when the ICRC presented draft documents aimed at updating key aspects of international humanitarian law. The draft documents were presented in Geneva, where they were refined in four annual conferences from 1974 to 1977, producing Additional Protocols I and II to the Geneva Conventions of 1949. The Protocols were adopted in 1977.[93] Additional Protocol I sought to update and extend the rules of conduct relating to international armed conflict. Additional Protocol II was, however, solely devoted to non-international humanitarian law.[94] As is made clear in the introductory note of Additional Protocol II that:

> The only provision applicable to non-international armed conflicts before the adoption of the present Protocol was Article 3 common to all four Geneva Conventions of 1949. This Article proved to be inadequate in view of the fact that about 80% of the victims of armed conflicts since 1945 have been victims of non-international conflicts and that non-international conflicts are often fought with more cruelty than international conflicts. The aim of the present Protocol is to extend the essential rules of the law of armed conflicts to internal wars.

Additional Protocol II thereby continued the extension of international humanitarian law that started with Common Article 3 of the Geneva Conventions, as the application of international humanitarian law to non-international armed conflict had gained traction in the years before the adoption of the Additional Protocols, but remained controversial. Even to this day, fewer States have ratified Additional Protocol II than Additional Protocol I.[95]

2.4. Four core principles of international humanitarian law

In international humanitarian law or the law of armed conflict, four principles are recognized to apply to every combat situation. These principles are: the prohibition on superfluous injury and unnecessary suffering, the principle of military necessity, the principle of distinction and the principle of proportionality.[96] These principles, like any other principles of law, do not exist in a legal vacuum, and can have complicated relationships and interactions with each

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[93] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 39.
[94] Ibid.
[95] Ibid.
[96] Gary D. Solis: *The Law of Armed Conflict,* p. 250.

other. In order to be able to gauge if and then how well Lethal Autonomous Robots will comply with international humanitarian law, it is necessary to briefly explore the scope and extent of these fundamental principles.

2.4.1. The basic principles of the Geneva Conventions

The Geneva Conventions are without a doubt the principal source of law in the field of international humanitarian law of armed conflict. The basic rules of said Conventions can very roughly be boiled down to the following very basic principles:

> "1. Persons *hors de combat* and those who do not take a direct part in hostilities are entitled to respect for their lives and their moral and physical integrity.[97] They shall in all circumstances be protected and treated humanely without any adverse distinction.
>
> 2. It is forbidden to kill or injure an enemy who surrenders or who is *hors de combat*.
>
> 3. The wounded and sick shall be collected and cared for by the party to the conflict [that] has them in its power. Protection also covers medical personnel, establishments, transports and equipment. The emblem of the [Red Cross or the [Red Crescent] is the sign of such protection and must be respected.
>
> 4. Captured combatants and civilians under the authority of an adverse party are entitled to respect for their lives, dignity, personal rights and convictions. They shall be protected against all acts of violence and reprisals. They shall have the right to correspond with their families and to receive relief.
>
> 5. Everyone shall be entitled to benefit from fundamental judicial guarantees. No one shall be held responsible for an act he has not committed. No one shall be subjected to physical or mental torture, corporal punishment or cruel or degrading treatment.
>
> 6. Parties to a conflict and members of their armed forces do not have an unlimited choice of methods and means of warfare. It is prohibited to employ weapons or methods of warfare of a nature to cause unnecessary losses or excessive suffering.
>
> 7. Parties to a conflict shall at all times distinguish between the civilian population and combatants in order to spare civilian population and property. Neither the civilian population as such nor civilian persons shall be the object of attack. Attacks shall be directed solely against military objectives"[98]

2.4.2. Prohibition of superfluous injury and unnecessary suffering

The first of these fundamental principles is the prohibition of inflicting superfluous injury or unnecessary suffering.[99] This principle has also been called the principle of humanity. The principle is one of two principles that the International Court of Justice (ICJ) has described as

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[97] Combatants that are *hors de combat* are combatants that are no longer capable of taking part in hostilities.
[98] International Committee of the Red Cross: *Basic rules of the Geneva Conventions and their Additional Protocols*, p. 1.
[99] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 51.

one of the cardinal principles in international humanitarian law, the other being the principle of distinction.[100] Humanity forbids the infliction of suffering, injury, or destruction not actually necessary for the accomplishment of legitimate military purposes.[101]

In *The Manual of the Law of Armed Conflict,* written for the United Kingdoms Ministry of Defence, describes the principle of humanity as being "based on the notion that once a military purpose has been achieved, the further infliction of suffering is unnecessary."[102] The principle also confirms the basic immunity of civilian populations and civilian objects from attack, because such attacks make no contribution to military action. Despite this, civilian immunity does not make unlawful the "unavoidable incidental civilian casualties and damage which may result from legitimate attacks upon military objectives, provided that the incidental casualties and damage are not excessive in relation to the concrete and direct military advantage anticipated."[103] This is the result of the principal of proportionality, which will be explained later in this chapter.

The reason and rationale behind this principle is that in the atrocity that is war, combatants are only allowed to use the force necessary to remove enemy soldiers or combatants from active combat. This principle was first codified in the St. Petersburg Declaration of 1868. The main purpose of the Declaration was to prohibit explosive bullets that were considered to cause superfluous injury and suffering to whomever they struck. However, the Preamble to the St. Petersburg contains a wide-ranging statement concerning customary law that this principle is rooted in.[104]

The pages of history contain many examples of weapons that have either been banned or criticized for causing unnecessary suffering to combatants. A prominent example of this from the era before the 19th century is the crossbow.[105] The Second Lateran Council in 1139 condemned the use of the crossbow and arc, a view that coincided with the concept of chivalry at the time. Such a weapon had the capability of striking an enemy from a great distance, enabling a man to "strike without the risk of him being struck."[106] Noticeably, the Church condemned this new weapon in conflicts of Christian armies, but saw little reason to

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[100] *Legality of the Threat or Use of Nuclear Weapons,* ICJ Advisory Opinion, July 8th 1996, paragraphs 76.
[101] UK MoD: *The Manual on the Law of Armed Conflict,* p. 23.
[102] Ibid.
[103] Ibid.
[104] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 52.
[105] Leslie C. Green: *The Contemporary law of armed conflict.* p. 30.
[106] G.I.A.D. Draper: "The interaction of Christianity and chivalry in the historical development of the law of war." p. 3, 19.

condemn its use against people of other beliefs.[107] Another reason for the opposition to the crossbow could be that crossbows were relatively cheap to make and easy to operate with little training. With this new weapon, a peasant could defeat an armored knight after only few hours of instruction and training, whereas the training of knights took a number of years.[108] The crossbow therefore had great and obvious military advantage for whoever wielded it. Banning this new weapon therefore ultimately proved ineffective. The principle of humanity is also codified in Article 22 of the Hague Regulations:

> "The right of belligerents to adopt means of injuring the enemy is not unlimited."

This codification of the principle in the Article 22 appears very similar to Article 35 of Additional Protocol I to the Geneva Conventions:

> "1. In any armed conflict, the right of the Parties to the conflict to choose methods of warfare is not unlimited. 2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering. 3. It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment."

As well as being codified in Article 22 of the Hague Regulations and similarly in Article 35 of Additional Protocol I, a study by the International Committee if the Red Cross describes the prohibition on superfluous injury or unnecessary suffering to be in effect in both international and non-international armed conflicts.[109]

2.4.3. Principle of military necessity

The principle of military necessity "permits a state engaged in an armed conflict to use only that degree and kind of force, not otherwise prohibited by the law of armed conflict, that is required in order to achieve the legitimate purpose of the conflict, namely, the complete or partial submission of the enemy at the earliest possible moment with the minimum expenditure of life and resources."[110]

Military necessity was originally defined in the *Lieber Code,* as "those measures which are indispensible for securing the ends of the war, and which are lawful according to the

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[107] Robert C Stacy: "The Age of Chivalry".
[108] G.I.A.D. Draper: "The interaction of Christianity and chivalry in the historical development of the law of war." p. 19.
[109] Jean Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law Volume 1: Rules,* rule 70, p. 273.
[110] UK MoD: *The Manual on the Law of Armed Conflict,* p. 22.

modern law and the usages of war."[111] The *Manual of the Law of Armed Conflict* cites the Hostages Case in describing the principle in practical application, in that instance in the context of a belligerent occupation:

> Military necessity permits a belligerent, subject to the laws of war, to apply any amount and kind of force to compel the complete submission of the enemy with the least possible expenditure of time, life and money. In general, it sanctions measures by an occupant necessary to protect the safety of his forces and to facilitate the success of his operations. It permits the destruction of life of armed enemies and other persons whose destruction is incidentally unavoidable by the armed conflicts of the war; it allows the capturing of armed enemies and others of peculiar danger, but it does not permit the killing of innocent inhabitants for purposes of revenge or the satisfaction of a lust to kill. The destruction of property to be lawful must be imperatively demanded by the necessities of war. Destruction as an end in itself is a violation of international law. There must be some reasonable connection between the destruction of property and the overcoming of the enemy forces. It is lawful to destroy railways, lines of communication, or any other property that might be utilized by the enemy. Private homes and churches even may be destroyed if necessary for military operations. It does not admit the wanton devastation of a district or the willful infliction of suffering upon its inhabitants for the sake of suffering alone.[112]

The Manual further states that "military necessity cannot justify departure from the law of armed conflict."[113] Formerly it was argued, mostly by German theorists between 1871 and 1914, that "necessity might permit a commander to ignore the laws of war when it was essential to do so to avoid defeat, to escape from extreme danger, or for the realization of the purpose of the war."[114] Any such voices have long been silenced, as modern law of armed conflict takes full account of military necessity. Necessity can therefore not be used to justify actions prohibited by international humanitarian law.[115] It is therefore clear that when waging war, no means or actions that are not justified by military necessity can be engaged in. War is no justification for rape or other kinds of sexual abuse, violations of the physical or moral integrity of people held at gunpoint, pillaging, theft, harassment, constraints or threats.[116] Such acts, that are crimes on times of peace, are also crimes in times of war. Concerns not to let such crimes go unpunished when committed in a state of war led to the introduction of the idea of war crimes for serious breaches of international humanitarian law, as well as the demand for punishing for such crimes on the national level. If States fail to do so, universal jurisdiction and international courts, such as the International Criminal Court, are intended to

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[111] Article 14 of the Lieber Code. See also Chapter 2.3.1.
[112] The Hostages Case (United States v. List and others).
[113] UK MoD: *The Manual on the Law of Armed Conflict,* p. 23.
[114] Ibid.
[115] Ibid.
[116] Yves Sandoz: "Land Warfare", p. 93. See also the *Lieber Code*.

ensure that individuals that are not prosecuted in their home country cannot simply evade responsibility for certain heinous war crimes, and are a cornerstone in the individual responsibility for war crimes.[117]

Military necessity has been described as *permissive,* permitting a party to a conflict to do whatever is needed to achieve the desired military outcome. A better way to view the principle is seeing it as a *restrictive* principle, so that a party "may do what is necessary to achieve the objective and no more." [118] Military necessity must therefore be dissociated from wanton acts that have "no operational rhyme or reason."[119]

Yoram Dinstein points to the fact that the objective need to win the war is not to be confounded with the subjective whim or caprice of individual soldiers, no matter their rank. Therefore, lawful violence in war must be leveraged to some discernible military advantage as a *direct* result.[120] Military necessity must be viewed in conjunction with the other principles of international humanitarian law. The simple fact that there is a military advantage in pursuing a particular form of action is by no means the end of the matter. If military necessity were the sole beacon to guide the path of armed forces in wartime, no limitation of any significance would be imposed on the freedom of action of the parties to a conflict.[121] The determination of what action or inaction is permissible or demanded in war is not answered by military necessity alone. Countervailing humanitarian considerations, such as the principle of humanity and proportionality, shaped by the "global Zeitgeist" affect these matters greatly. These considerations, although both inspiring and instrumental, cannot dictate the course of warfare.[122]

> "If benevolent humanitarianism were the only factor to be weighed in hostilities, war would have entailed no bloodshed, no human suffering and no destruction of property; in short, war would not be war."[123]

Dinstein further states that the law of armed conflict must, in order to be effective, always take the middle road between what is necessary to win the war on the one hand, and humanitarianism on the other. In doing so, parties to the conflict are given leeway in the name of military necessity, but must accept certain restraints to their freedom of action in the name

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[117] Yves Sandoz: "Land Warfare", p. 93.
[118] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 52-53.
[119] Yoram Dinstein: *The Conduct of Hostilities under the Law of International Armed Conflict*, p. 4.
[120] Ibid.
[121] Ibid.
[122] Ibid.
[123] Ibid, p. 4-5.

of humanitarianism, or, according to the St. Petersburg Declaration to alleviate as much as possible the calamities of war.[124] In order to do so, international humanitarian law has a number of checks-and-balances, "intended to minimize human suffering without undermining the effectiveness of military operations.[125]

2.4.4. Principle of distinction

The principle of distinction, often also referred to as the principle of discrimination, is in a sense the principle in international humanitarian law that no other principles could function without. The principle is one of two principles that the ICJ has described as one of the cardinal principles in international humanitarian law, the other being the principle of humanity.[126] The core of the principle is in theory very simple, but incredibly tricky in practice. Simply put, combatants must be able to distinguish civilians, civilian objects or combatants that are *hors de combat* from combatants and objects, such as bunkers or other military installations, that are considered active in the armed conflict. As long as civilians don't take part in hostilities, they are protected from attack. This protection extends to civilians that can in some sense be considered to be contributing to the war effort, by working in a munitions factory or supplying combatants in other ways.[127] Any other understanding of the protection of civilians could seriously erode the protection of civilians, e.g. by considering farmers and utilities workers as providing food, water and electricity to the war effort. Munitions *factories* are, however, considered legitimate targets, so any civilians that happen to be working in the factory are there at their own risk.[128] Another principle, the principle of proportionality, dictates when and how to attack military targets when there is a significant chance that illegitimate targets, such as civilians, would be in harms way.

On the flip side, only combatants are under international humanitarian law permitted to directly take part in hostilities. Therefore, they may legally be attacked.[129] Military operations are to be conducted only against the enemy's armed forces and military objectives, so there must be a clear distinction between armed forces and civilians.[130] One can argue that without

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[124] For more on the St. Petersburg Declaration, see Chapter 2.3.3. in this thesis. Yoram Dinstein: *The Conduct of Hostilities under the Law of International Armed Conflict*, p. 5.
[125] Ibid.
[126] *Legality of the Threat or Use of Nuclear Weapons,* ICJ Advisory Opinion, July 8th 1996, paragraphs 76.
[127] UK MoD: *The Manual on the Law of Armed Conflict,* p. 24.
[128] Ibid.
[129] Ibid.
[130] Ibid.

proper respect for the principle of distinction, the other three fundamental principles serve little purpose. The essence of the principle is codified in Article 48 of Additional Protocol I:

> "In order to ensure respect for and protection of the civilian population and civilian objects, that Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives."

It is clear from Article 48 that the principle takes the form of an absolute prohibition, placing further limitations on means of attack with regard to the principle of military necessity.[131] Furthermore, an attack may never be directed or otherwise targeted at civilian objects, even if such an attack would prove beneficial in a tactical or even strategic sense.[132] The principle therefore places a clear and consistent limit on the conduct of warfare. The law could easily have been less stark in nature and place only limited restrictions on which civilians would have been considered legal targets in particular circumstances. However, "a relaxed interpretation of the principle would carry serious risks for the security of civilian populations, leaving them open to attacks and reprisals for perceived military gain,"[133] and "would deprive the international community of a clear basis for condemning attacks on civilian objects."[134]

In addition, the principle of distinction protects humanitarian workers, such as medical personnel or Red Cross officials from attack. Anyone risking their life to reduce the harm and suffering deserves nothing less than "the best protection international law can offer."[135] The misuse of protected emblems such as the symbol of the Red Cross has however long been problematic in international humanitarian law. The ubiquity of the Red Cross emblem in popular culture has posed a new type of problem. It's use on television, in movies, as well as in computer games in recent decades, poses the risk of the protection it should offer the wearer will be diluted, causing not deliberate abuse of the emblem, but rather "casual or inadvertent misuse in peacetime:"[136]

> "A famous example arose in relation to the 1987 James Bond film, *The Living Daylight,* which depicts opium being smuggled in sacks marked with the Red Cross and a man being kidnapped in a helicopter bearing the emblem. More recently, similar issues have arisen from depiction of

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[131] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 53.
[132] Ibid, p. 54.
[133] Ibid, p. 55.
[134] Ibid.
[135] Ibid.
[136] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 87.

> the Red Cross symbol in computer games and on the internet. The Red Cross is widely used in war-based computer games to denote medical equipment or installations, and is sometimes shown on personnel or vehicles taking part in combat. The use of the emblem in these contexts led the Canadian Red Cross society to write to game manufacturers in early 2006, but the practice has proved difficult to change."[137]

Treaty[138] and customary[139] international humanitarian law not only prohibits attacks against civilians, but also against medical personnel in general, as well as religious and civil defence personnel of the armed forces, since these protected persons do not participate directly in hostilities.[140]

The principle of distinction, being one of the most important rules applicable in situations of armed conflict, does not only apply in international armed conflict, but has been recognized as customary international law and is therefore applicable in situations of non-international armed conflicts as well as in international armed conflicts.[141] The customary rule of distinction has been spelled out as follows:

> "The parties to the conflict must at all times distinguish between civilians and combatants. Attacks may only be directed against combatants. Attacks must not be directed against civilians."[142]

This means that in non-international armed conflicts, treaty and customary international humanitarian law offers protection for the same basic categories of persons as it does in international armed conflicts.[143]

The principle of distinction, as is the case with the other principles, is measured based on the information, knowledge and intelligence to a commander at the time of the attack, as well as the quality of said factors. If a commander makes *reasonable efforts* to gather intelligence and reviews that intelligence to the best of his abilities and concludes, *bona fide*, that a target is in fact a legitimate target, the reasonable commander would not automatically have violated the principal of distinction if the target, upon further inspection, turns out to be of a civilian

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[137] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 87. This improper use of the emblem of the Red Cross would constitute a war crime, see e.g. Article 44 of Geneva Convention I of 1949.
[138] Article 51 of Additional Protocol I.
[139] Jean Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law Volume 1: Rules,* Rule 1 p. 3.
[140] For further clarification, see Nils Melzer*:* "The Principle of Distinction Between Civilians and Combatants" in *The Oxford Handbook of International Law in Armed Conflict*, pages 296-331, esp. page 299.
[141] Nils Melzer*:* "The Principle of Distinction Between Civilians and Combatants", p. 307.
[142] Jean Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law Volume 1: Rules,* Rule 1 p. 3.
[143] Nils Melzer*:* "The Principle of Distinction Between Civilians and Combatants", p. 307.

nature.[144] The principle of distinction is by many considered the principle of international humanitarian law where Lethal Autonomous Robots will face their greatest challenges.[145]

2.4.5. Principle of proportionality

Even when a target has been identified as legitimate, that does not permit the use of all or any amount of force in attack on that target. An attack on a legitimate target may in some instances entail to many foreseeable civilian casualties, that even though the target has been properly distinguished, and military necessity requires it to be destroyed, loss of civilian life and damage to civilian properties may rule out the attack.[146] This principle, the regulation of these harmful side effects, is known as the principal of proportionality. The principle of proportionality requires that the losses resulting from a military action should not be excessive in relation to the expected military advantage.[147]

The principle is spelled out in two articles of Additional Protocol I. Article 51(5)(b) of the protocol uses an example and prohibits attacks "which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the *concrete and direct* military advantage anticipated". The almost identical Article 57(2)(a)(iii)[148] and (b)[149] of Additional Protocol I covers precautions in attacks, and requires commanders to reevaluate proposed attacks if they believe they will offset the principle of proportionality.[150]

The Additional Protocol is the first treaty to specifically set out the principle of proportionality.[151] The principle has also gained a foothold as customary law, both in international and non-international armed conflicts.[152] Michael N. Schmitt considers the principle of proportionality to be "among the most complex and misunderstood" rules in

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[144] UK MoD: *The Manual on the Law of Armed Conflict,* p. 24.
[145] See chapter 4.4., esp. 4.4.3. of this thesis.
[146] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 55.
[147] UK MoD: *The Manual on the Law of Armed Conflict,* p. 25.
[148] Art57(2)(a)(iii): With respect to attacks, the following precautions shall be taken: those who plan or decide upon an attack shall: refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;
[149] Art57(b): an attack shall be cancelled or suspended if it becomes apparent that the objective is not a military one or is subject to special protection or that the attack may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;
[150] UK MoD: *The Manual on the Law of Armed Conflict,* p. 26.
[151] Ibid.
[152] Jean Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law Volume 1: Rules,* Rule 14.

international humanitarian law, both with respect to interpretation and application.[153] A common example Schmitt brings forth is one of collateral damage caused by an attack or the failure of an attack to meet its goal when characterizing an attack as violating the principle of proportionality. Schmitt describes such examples as being counter-normative, "because the rule of proportionality is evaluated *ex ante,* not *post factum*." If an attacker "reasonably expects to cause five incidental deaths, but the strike causes fifteen, the proportionality rule was not violated," at least so long as the five incidental casualties would not have been excessive in light of the military advantage that was gained or expected to be gained from the attack.[154]

Proportionality is evidently very closely linked to the principle of military necessity. An attack that causes incidental damage to civilian objects can only be justified when the damage is, as Article 51(5) of Additional Protocol I states, proportionate to a *concrete and direct* military advantage, i.e. where military necessity demands it.[155] As with all other attacks, attacks justified by the principle of proportionality cannot hide behind improper distinction of targets, linking the principle strongly to the principle of distinction.[156] The reasonable commander must therefore first ensure attacks are only directed at legitimate targets and second assess the proportionality of the attack, making sure the attack will not cause disproportionate civilian casualties or damage to civilian objects in respect to the proposed *concrete and direct* military advantage. The UK MoD Manual of the Law of Armed Conflict describes the principle of proportionality as being the link or the balance between the principles of military necessity and humanity.[157]

To revisit the example of the civilians and the munitions factory; a munitions factory may be such an important military objective that the inevitable death of civilians working in the factory would not be disproportionate to the military advantage gained by destroying the factory.[158] In this example, a more significant factor may be the number of incidental civilian casualties and the scale of destruction caused to civilians living nearby the factory, if the factory is in a populated area.[159] It would therefore seem that a civilian minding his own

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[153] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 18.
[154] Ibid.
[155] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 56.
[156] Ibid.
[157] UK MoD: *The Manual on the Law of Armed Conflict,* p. 26.
[158] Ibid.
[159] UK MoD: *The Manual on the Law of Armed Conflict,* p. 26.

business in a neighborhood near a weapons plant has more protection under international humanitarian law than a civilian working in what he could very well know is a legitimate military objective.

It may therefore seem peculiar that international humanitarian law distinguishes between direct attacks on civilians, that are under all circumstances prohibited, and attacks that may incidentally cause civilian casualties or damage to civilian objects based on proportionality assessments. An obvious reason for this is that proportionality assessments are often far from clear-cut. International humanitarian law seeks to impose as many rules as possible that can be generally accepted. An absolute prohibition on attacks directed against civilians is a rule that is much more likely to be generally accepted than one of proportionality, which requires constant balancing of military necessity. Any relaxation of the prohibition on targeting civilians would hold clear potential for abuse, and the civilian population in war-torn areas would live in greater fear of attack in the name of military necessity.[160]

This distinction, between direct attacks on civilians and incidental harm seems to have some basis in the *doctrine of double effect.*[161] According to Crowe and Weston-Scheuber, this principle holds that it is sometimes permissible to cause harm as a foreseen, but unintended, side effect of an act, although the same harm would not be permissible if intentionally inflicted.[162] It is therefore generally worse to "intentionally harm than to harm as an unintended side effect of an otherwise reasonable act."[163]

Modern developments in weaponry have in a sense made the principle of proportionality stricter. So-called "smart weapons" have increased the options for commanders in the field. This has in turn lead attack planners to consider not only the potential collateral damage of an attack, but also the method of attack.[164]

Another aspect that must be taken into consideration regarding this principle is the risk to own forces. In some cases, a method of attack that would put the attacking combatants in more danger is likely to result in less risk to civilians, while another one would put civilians at risk, but be more likely to keep combatants out of harms way. International humanitarian law is not clear on this issue. The attacker must always accept a certain amount of risk, but the principle itself does not require him to take increased risks, but rather to refrain from attacks

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[160] Jonathan Crow & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 56.
[161] Ibid.
[162] Ibid, p. 56-57.
[163] Ibid, p. 57.
[164] UK MoD: *The Manual on the Law of Armed Conflict,* p. 25.

that may be expected to cause excessive collateral damage. Therefore, an attacker may under certain circumstances be forced to take the option of risking own forces to avoid risk to civilians, or else call off the attack.[165]

Yet another consideration regarding the principle of proportionality is the use of human shields, when the defenders intentionally place civilians in or close to military installations in order to prevent the attacker to target said installations.[166] In such instances, this is to be taken into account in favor of the attacker when considering the legality of attacks on targets that have been shielded with civilians.[167]

Proportionality calculations, whether an attack is proportionate considering factors such as the military objective, harm to civilian lives and property etc. can be very difficult. A system known as CDEM, the **C**ollateral **D**amage **E**stimate **M**ethodology, exists for this purpose. In the procedure, the attacking forces consider factors such as the precision of a weapon, blast effects, attacking tactics, probability of civilian presence near the target to name a few factors. However, the CDEM does not resolve whether a particular attack will comply with the principle of proportionality. It is rather a policy-related instrument to determine the level of command needed to authorize an attack that is likely to cause collateral damage. The higher the likely collateral damage, the higher demand for required approval authority.[168]

2.4.6. How do the principles interact?

As with all rules, the rules of international humanitarian law do not exist in a vacuum. Each of the four fundamental principles has some interaction with at least one of the other principles. The *principle of distinction* is perhaps the most fundamental principle of them all. Without distinction, the *principle of proportionality* would not be effective. If one cannot distinguish civilians and civilian objects from combatants and military objects, one cannot estimate if an attack will be proportionate. As mentioned earlier, the *principle of humanity* confirms the basic immunity of civilian populations and civilian objects from attack, because such attacks

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[165] UK MoD: *The Manual on the Law of Armed Conflict,* p. 25-26.

[166] The use of human shields is unlawful under international humanitarian law. Article 51(7) of the Additional Protocol addresses the issue, stating that Article 51(7) of the 1977 Additional Protocol I provides:
"The presence or movements of the civilian population or individual civilians shall not be used to render certain points or areas immune from military operations, in particular in attempts to shield military objectives from attacks or to shield, favor or impede military operations. The Parties to the conflict shall not direct the movement of the civilian population or individual civilians in order to attempt to shield military objectives from attacks or to shield military operations."

[167] UK MoD: *The Manual on the Law of Armed Conflict,* p. 26.

[168] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 19-20.

make no contribution to military action, and therefore serve no purpose under the principle of *military necessity*. Despite this effect of the *principle of distinction*, civilian immunity does not make unlawful the "unavoidable incidental civilian casualties and damage which may result from legitimate attacks upon military objectives, provided that the incidental casualties and damage are not excessive in relation to the concrete and direct military advantage anticipated."[169] This is, as stated earlier, the result of the *principle of proportionality*.

2.4.7. International Humanitarian Law in non-international conflicts

"By definition, the law of armed conflict only applies to armed conflicts. This raises the question; when is there an armed conflict?"[170] The law of armed conflict originally applied only to *international armed conflicts*. The reason for this is not that civil wars, often referred to as internal or non-international conflicts, did not exist, but rather because states held that civil wars were a domestic affair and were not willing to let international law meddle with internal affairs.

The first codification of international humanitarian law that expressly addressed non-international armed conflicts is Article 3, an article common to all the Geneva Conventions of 1949.[171] With the passing of time, a number of articles have joined the once-lonely Article 3 of the Geneva Conventions. Additional Protocol II from 1977 contains 18 substantive provisions that are entirely devoted to non-international armed conflicts and it is the first instrument of humanitarian law devoted to non-international armed conflict.[172] Furthermore, international humanitarian law has in more recent years recognized serious non-international violations of Article 3 and other rules as war crimes under customary rules, as is evident from the seminal decision of the International Criminal Tribunal for the former Yugoslavia (ICTY) in the *Tadic case*.[173]

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[169] UK MoD: *The Manual on the Law of Armed Conflict,* p. 23.
[170] Eric David: "Internal (Non-International) Armed Conflict", p. 353.
[171] The article reads: "In the case of armed conflict *not of an international character occurring in the territory of one of the High Contracting Parties,* each Party to the conflict shall be bound to apply, as a minimum, the following provisions: [...]. The article details certain principles that shall apply to non-international conflicts, such as a prohibition of (1) attacking people not taking part in the hostilities or members of the armed forces that are placed *hors de combat,* (a) torture and mutilation, (b) the taking of hostages, (c) humiliating and degrading treatment, (d) show trials and summary executions, and places the a duty upon Parties that (2) the sick and wounded are to be cared for. Argentina and Portugal both made reservations to this article on signature, but both withdrew their reservations on ratification.
[172] See Eric David: "Internal (Non-International) Armed Conflict", p. 354-355 for a list of the applicable rules.
[173] ICTY Appeals Chamber, *Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction*, October 2nd 1995, esp. paragraphs 128-134.

The fundamental rules of international humanitarian law are, however, only applicable in certain kinds of domestic non-international armed conflicts.[174] Police operations that turn violent during a protest would for example not be considered an armed conflict of a non-international nature, but rather a matter of domestic human rights legislation.[175]

Were the protests to turn into a full-blown conflict, perhaps because an ethnic group belonging to a certain state starts a fight for independence, then international humanitarian law would apply in the ensuing conflict.[176]

Another aspect of the applicability of international humanitarian law is that the underlying idea requires a degree of external accountability of the protagonists so that they can appear as actual "parties to the conflict". "States are willing to accept the applicability of IHL to armed hostilities on conditions that the actors demonstrate their ability to 'play the game' like the 'big boys'. If this condition is not met, the situation is not outside the law but falls more under the domestic law of the state, without prejudice to the application of international rules other than those found in [international humanitarian law] - namely human rights law and international criminal law."[177]

Extending international humanitarian law to cover armed conflicts of a non-international nature has in the past decades become increasingly important. In some cases a conflict even borders being international or non-international, but ends up being neither. This peculiar case will be discussed in the chapter relating to how the *War on Terror* has presented new challenges for international humanitarian law, especially when it comes to identifying enemy combatants and classifying them.

The ICTY Appeals Chambers addressed the problem of non-international conflicts and the lack of protection in such conflicts. In the aforementioned *Tadic-case* the decision read that:

> Why protect civilians from belligerent violence, or ban rape, torture or the wanton destruction of hospitals, churches, museums or private property, as well as proscribe weapons causing unnecessary suffering when two sovereign States are engaged at war, and yet refrain from enacting the same bans or providing the same protection when armed violence has erupted 'only' within the territory of a sovereign State?[178]

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[174] ICTY Appeals Chamber, *Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction*, October 2nd 1995, esp. paragraphs 94-127.
[175] Eric David: "Internal (Non-International) Armed Conflict", p. 355.
[176] Ibid.
[177] Ibid, p. 362.
[178] ICTY Appeals Chamber, *Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction*, October 2nd 1995, paragraph 97.

In light of the nature of modern day armed conflicts, Lethal Autonomous Robots would most likely be deployed in non-international conflicts. Their usage in international conflicts can however not be ruled out.

2.5. Modern day challenges of international humanitarian law

The previous chapter of this thesis set the stage by looking into the principles of international humanitarian law. The core of these principles is largely immune to changes in tactics and technology. New tactics and technology do, however, bring about new challenges for these principles. Lethal Autonomous Robots, the main topic of this thesis, are without a doubt one of the greater challenges international humanitarian law will face in the near future. In the years following the attacks on the Twin Towers, international humanitarian law has seen a fresh batch of legal questions, many relating to the War on Terror, as will be explored in chapter 2.5.2.

2.5.1. Looking back to regulate the future

The main body of current international humanitarian law was written in what can be described as militarily simpler times. The Geneva Conventions of 1949 were written in the wake of the Second World War, where national juggernauts pitched their uniformed soldiers, marked tanks and easily recognizable aircrafts against each other in a war that shaped global politics and sentiment for decades, probably to this day.

Modern conflicts, and in fact the vast majority of conflicts after World War II have been of a non-international nature, when the mainstay of international humanitarian law is written with international conflicts in mind, soldiers fighting soldiers, tanks fighting tanks, battleships fighting battleships, in effect, nations fighting nations.[179] The reality is, especially in the aftermath of the September 11th attacks and the so-called *War on Terror*, that many and prominent conflicts are conflicts of a technologically superior enemy fighting insurgents that fly no flag, hail from no one nation and deploy unconventional and even illegal tactics, such as disguising themselves as civilians until the moment of attack.

[179] Jean Marie Henckaerts and Louise Doswald-Beck (eds), *Customary International Humanitarian Law Volume 1: Rules,* p. xxxv.

2.5.2. The War on Terror

The so-called *War on Terror,*[180] "declared" shortly after September 11th 2001, when terrorists attacked the Twin Towers in New York, the Pentagon, as well as hijacking a fourth plane that seemingly missed it's intended target, has had profound effects on international humanitarian law. From the perspective of the United States of America, the key figure in the now over decade long conflict, the impact of the *War on Terror* is well understood. Major General Charles J. Dunlap Jr. of the USAF observes that the "most serious setbacks for the American military involve not an adversary's battlefield successes, but rather alleged violations of the [international humanitarian] law by the U.S.'s own forces."[181] This, he concludes, was no revelation for those serving in the armed forces.

The significance of legal legitimacy at the strategic, operational and tactical level had become axiomatic for those professional soldiers that came of age between the Vietnam War and the September 11 attacks.[182] Professors Reisman and Antoniou pointed out in *Law of War* that democracies will not support military operations "no matter how worthy the political objective, if people believe that war is being conducted in an unfair, inhumane or iniquitous way."

Even so, scholars and commanders alike do not contradict that the September 11 attacks had a profound effect, so profound even that " the legal framework for the regulation of armed conflict, the framework that guided military lawyers ant that influenced decisions mate in reliance on their advice, was thrown into disarray."[183] Before September 11, virtually every law expert in the world, including members of the U.S. military legal profession, assumed that the laws of war, international humanitarian laws, could only apply in two distinct situations. One was international armed conflict, the other non-international armed conflicts.[184] This understanding was derived from common articles 2 and 3 of the Geneva Conventions of 1949, article 2 relating to international armed conflicts and article 3 to non-international conflicts. Military lawyers in the United Stated based their entire legal knowledge on this paradigm, but recognized the limits of this doctrine, as early as the Vietnam War, namely that the nature of many conflicts is such that the conflict fits only partly into each one of these clear-cut

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[180] Or more precisely, in the words of Geoffrey S. Corn: "The military component of the struggle against transnational terrorism" in "What Law Applies to the War on Terror".
[181] Michael W. Lewis et. al.: *The War on Terror and the Laws of War,* p. ix.
[182] Ibid.
[183] Geoffrey S. Corn: "What Law Applies to the War on Terror", p. 1.
[184] Geoffrey S. Corn: *The War on Terror and the Laws of War,* p. xiii.

categories. Therefore, U.S. forces were for decades ordered to comply with the principles of the law of war during all and any military operation, no matter how that operation was legally categorized.[185]

2.5.3. Unlawful enemy combatants

The "policy gap filler", described in the previous chapter, worked well until the attacks on September 11th 2001. As soon as U.S. boots hit the ground in Afghanistan, less than two months after the attacks in New York, the soldiers were faced with an urgent and immediate problem. Unlike prior U.S. military operations in the period between the Vietnam War and the war in Afghanistan, U.S. troops began to capture and detain enemy fighters en masse.[186] Within a very short period of time, commanders were ordered to stop treating captured personnel "as if" they were prisoners of war under international humanitarian law, because a new "status" had been adopted for these detainees.[187] This was the controversial categorization of "unlawful enemy combatant", created to denote a detained enemy operative who did not qualify for status as a prisoner of war, and was therefore not protected by international humanitarian law.[188] Captured Al Qaeda operatives therefore had no rights according to this new U.S. doctrine, since the conflict in which they were captured was neither covered by Common Articles 2 or 3 of the Geneva Conventions.[189]

> The incongruity of this theory was readily apparent: the United States was engaged in an armed conflict that provided the authority to engage, destroy, capture and detain the newly defined enemy; however, it was an armed conflict that did not fit into the traditional Common Article 2/3 "either/or" law-triggering paradigm, the LOAC [Law of Armed Conflict] did not apply to constrain or regulate U.S. operations. With regard to execution of combat operations, this incongruity had little impact due to the military practice of following LOAC principles during all operations as a matter of policy. However, as the U.S. began to capture and detain alleged terrorist operatives, it became quickly apparent that the inapplicability of LOAC obligations would be a key component to the development of detainee treatment and interrogation policies.[190]

The study of the effects of the *War on Terror* on international humanitarian law is, although very intriguing, not the subject of this thesis. This chapter is therefore not intended to be a definitive study of the effects of the ongoing war, but rather to shed a light on how this

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[185] Geoffrey S. Corn: *The War on Terror and the Laws of War,* p. xiii-xiv.
[186] During the Vietnam War, captured North Vietnamese Army combatants were held by the South Vietnamese, not the US Armed Forces.
[187] Geoffrey S. Corn: "What Law Applies to the War on Terror", p. 3.
[188] Ibid.
[189] Ibid, p. 4.
[190] Ibid, p. 4-5.

historically unconventional armed conflict, that was categorized by the United States military as neither a inter-state nor intra-state conflict under international humanitarian law, can complicate matters severely with regard to the potential deployment of Lethal Autonomous Robots, especially when it comes to identifying enemy combatants and distinguishing them from civilians.

The next segment of this thesis will be dedicated to exploring *asymmetric and unconventional warfare*, a key component of modern warfare, and yet another foreseeable challenge to for Lethal Autonomous Robots in the modern battlefield.

2.5.4. Asymmetric and unconventional warfare

Modern warfare differs greatly from what in history can be described as "conventional warfare". Defining asymmetric and unconventional warfare has proven difficult, although it is easy to understand how it affects the application of international humanitarian law and exacerbates the challenges of applying the law in combat situations. These difficulties would present a great challenge for Lethal Autonomous Robots.

As shown in the previous chapter, the main body of international humanitarian law was written with international or non-international conflicts in mind, not conflicts that could in some way fall between those definitions, such as terrorism. The so-called *asymmetric warfare* is, however, not a creature born in the ruins of the Twin Towers on September 11th. Asymmetric warfare is when in a conflict there is a "disproportion of strength between the opponents at the outset, and from the difference in essence between their assets and liabilities."[191] This definition was put forth as early as 1964, even though asymmetric warfare of some kind has existed throughout history. David Galula argues that insurgents are always the ones to initiate conflict using asymmetric warfare, but points to the fact that the insurgents are by no means always those who are the first to use force. They simply choose to fight using "unconventional" methods.

This term, "conventional warfare", is not defined in the US DoD Joint Publication 1-02 Dictionary. However, "conventional forces" are defined as:

> "1. Those forces capable of conducting operations using nonnuclear weapons. 2. Those forces other than designated special operations forces."[192]

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[191] David Galula: *Counterinsurgency Warfare: Theory and Practice,* p. 3.
[192] U. S. Department of Defense Dictionary of Military and Associated Terms: *Joint Publication 1-02*. p. 51. Available at http://fas.org/irp/doddir/dod/jp1_02.pdf (Accessed March 12th 2015)

This particular definition is not useful in the context of this thesis, as it defines conventional forces as being forces that do not use nuclear weapons or as special operations forces. "Unconventional forces" would therefore have to be either special forces, or forces that deploy nuclear weapons. The same DoD Publication defines unconventional warfare as being:

> "Activities conducted to enable a resistance movement or insurgency to coerce, disrupt, or overthrow a government or occupying power by operating through or with an underground, auxiliary, and guerrilla force in a denied area."[193]

The University of Missouri in Saint Louis's Political Geography Glossary defines conventional warfare as being:

> Armed conflict between States and/or nations in which combatants appear in organized military units that are often outfitted with standard uniforms, weapons, and equipment. It typically involves major combat operations that overtly seize control of territory, inhabitants, and resources.[194]

The same Glossary defines asymmetric conflict as:

> Conflict that features an imbalance of power between combatant groups. In such cases, the weaker side may opt for guerrilla warfare and/or terrorism rather than risk defeat by engaging superior forces in conventional warfare.[195]

All these definitions prove to be helpful in understanding the realities of the modern battlefield. The targeting of enemy forces and military objectives, and not civilians and civilian property, has always been challenging. These challenges are only exacerbated by the nature and context of transnational, or non-international, armed conflict against terrorism and the uncertainty regarding the boundaries of military objectives and the unconventional nature of the non-state enemy.[196] Subjects such as the proper identification of e.g. terrorists, their willingness to blend in with the civilian population and the desire to interdict those who support them in their terrorist acts, and the length of time those either conducting and supporting terrorist acts can be targeted are questions that highlight the difficulty in applying the *core principles* of targeting enemy combatants, the principle of distinction, to a "terrorist

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[193] U. S. Department of Defense Dictionary of Military and Associated Terms: *Joint Publication 1-02*. p. 255. Available at http://fas.org/irp/doddir/dod/jp1_02.pdf (Accessed March 12th 2015)
[194] Political Geography Glossary, available at http://www.umsl.edu/~naumannj/geog%202001%20glossaries/political%20geographyh/POLITICALL%20GEOGRAPHY%20GLOSSARY.doc.
[195] Ibid.
[196] Lieutenant Colonel Eric T. Jensen: "Targeting Persons and Property", *The War on Terror and the Laws of War,* p. 37.

conflict".[197] Complying whit the principle of distinction is therefore exponentially increased on a transnational armed conflict.

> This is because such conflicts are not, by definition, armed conflicts between the armed forces of warring states. Instead, at least one party to the conflict will be composed of non-state fighters. Much like the typical non-international or internal armed conflict, these fighters will normally appear to be civilian and utilize objects that would otherwise be civilian in nature and protected from attack.[198]

2.5.5. Drones - Unmanned Aerial Vehicles

Yet another challenge to international humanitarian law is the introduction of Unmanned Areal Vehicles, UAVs, and their armed counterpart, Unmanned Combat Areal Vehicles, UCAVs - commonly known as drones. These relatively new additions to the arsenals of states pose serious challenges for international humanitarian law.

Drones are currently employed by e.g. the United States to execute what has been called "targeted killings" within the borders of States that the U.S. is not at war with, such as Pakistan. The Pakistani Government has understandably condemned these practices of the U.S., which has done little to prevent them from continuing their strikes. Drones touch on the subject of Lethal Autonomous Machines as they can in a sense be seen as a stepping stone between removing the combatant from the battlefield and placing him squarely in the comfort of the airbase nearest to his home to simply having no human combatant operating war machines, but having war machines simply operate on their own.

Another aspect of this is the fact that when employing remotely piloted drones, combatants of the attacking side are completely safe from harm. Although not a prerequisite for war to be considered war, it is hard to acknowledge that conflict where one side essentially assassinates combatants of the other side from great distances and without even slightly risking their own forces can in fact be considered war, or if such a conflict borders on simply being one-sided killing. The effects of drone warfare will be explored later in this thesis/in chapter 4.2. of this thesis.

Drones, both in civilian and military use, pose pressing questions regarding privacy, security and responsibility. Their increasing use around airports and restricted areas will prove to be a challenge, both for national legislators and the international community. These unmanned areal vehicles can in a sense be considered an evolutionary step on the road to full

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[197] Lieutenant Colonel Eric T. Jensen: "Targeting Persons and Property", *The War on Terror and the Laws of War,* p. 37.
[198] Ibid, p. 55.

lethal autonomy. First, the combatant is physically removed from the battlefield, but remains in charge of targeting decisions and the execution of the attack. With Lethal Autonomous Robots, this human overseer would be no more, making robots and programming entirely responsible for the decision to use deadly force. Lethal Autonomous Robots and their predecessors will be the subject of next chapter of this thesis. When looking for answers to the complex legal questions LARs pose, such as whether they can operate in accordance with international humanitarian law, it is important to remember that these machines do not (yet) exist, but the idea of robot soldiers has certainly caught the attention of military theorists and scholars, as well as raised concerns among humanitarian watch dogs.

3. Lethal autonomous robots

> "The Three Laws of Robotics:
>
> 1: A robot may not injure a human being or, through inaction, allow a human being to come to harm;
>
> 2: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law;
>
> 3: A robot must protect its own existence as long as such protection does not conflict with the First or Second Law;
>
> The Zeroth Law: A robot may not harm humanity, or, by inaction, allow humanity to come to harm."[199]
>
> -Isaac Asimov

3.1. Introduction to Lethal Autonomous Robots

Robots in science fiction are, although a far-fetched notion, a definite indicator as to how humans see or even hope how robots will evolve in the future, as can be deduced from the Three Laws of Robotics. Lethal Autonomous Robots, as envisaged by modern roboticists and military theorists, are by no means the fruition of these aspirations, but far more rudimental machines.

Lethal Autonomous Robots, LARs for short, have been defined as being "robotics weapons systems that, once activated, can select and engage targets without further intervention by a human operator. The important element is that the robot has an autonomous "choice" regarding selection of a target and the use of lethal force."[200] Although weapons with full autonomous capabilities are yet to enter the battlefield, their potential has already caught the attention of both military theorists and human rights activists. The introduction of LARs is likely to pose new questions in the field of international humanitarian law, questions that will be explored later in this thesis. This chapter will explore the meaning of "autonomous" when discussing autonomous weapons systems, as well as give a brief overview of weapons systems that are considered to have some autonomous capabilities.

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[199] Isaac Asimov: *I, Robot.*
[200] US Department of Defense Directive, *Autonomy in Weapons Systems*, Number 3000.09, Glossary Part II; Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 2.

3.1.1. A revolution on par with gunpowder and nuclear weapons

Military technology is driven by change, constantly striving to be harder, better, faster, stronger.[201] Scholars, international organizations, NGOs and the UN Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions have described the development and possible introduction of Lethal Autonomous Robots as being on par with the introduction of gunpowder and the threat of nuclear weapons into the battlespace, thereby being the next major revolution in military affairs.[202]

Lethal Autonomous Robots are without a doubt in their very infancy, so their impact on the battlefield is currently hard to both fathom and fully realize. If their development will continue, which it very likely will, even though the Special Rapporteur has called for a moratorium on their continued development, only time will tell if and then how the battlefields of the future will be shaped by LARs.[203]

Early firearms, such as the hand cannon, were very cumbersome, inaccurate and in early stages vastly inferior to the much more primitive bow and arrow. Even with the introduction of muskets, skilled soldiers could only fire a few shots every minute, making swords and bayonets effective weapons even during the Great War. Rapid developments in the field of gun making in the past 100 years have all but eliminated non-gunpowder weapons from the battlefield, with modern firearms capable of firing thousands of rounds per minute, a very different reality from a century ago, let alone two centuries. The limitations and drawbacks of primitive versions of weapons systems can in light of that only be used to make limited assumptions.

The introduction of LARs is, however, of a completely different nature. Firearms were a change, albeit a major change, in *how* projectiles were propelled towards the enemy. Take away the need for great strength training to properly handle an English Longbow and replace it with the ability to load fast and aim skillfully. With LARs, the change will not be of *how* weapons will be used against targets, but *who* wields them and *when* they will be used.[204] As

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[201] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 274.
[202] Peter Singer: *Wired for War,* p. 179 and further; UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 5-6.
[203] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 21.
[204] Ibid, p. 5-6.

the Special Rapporteur points out, this risks blurring the line between weapon and soldier, "as the former would take autonomous decisions about their own use".[205]

Official government statements from States with the ability to develop and produce LARs offer a quantum of solace, as they indicate that their use in armed conflict is currently not envisioned.[206] Even so, this vision can change very rapidly. Airplanes were used in warfare only years after they first took off, and drones were initially used only for surveillance, with their usefulness as weapons platforms was downplayed due to perceived adverse conditions in the skies. Initial intentions are often cast aside for potential military advantage. [207]

3.1.2. The meaning of "autonomous" and defining Lethal Autonomous Robots

When looking at the potential legal ramifications of Lethal Autonomous Machines, it is important to understand the meaning of both "autonomous", as explained by robotics, how it differs from "automatic", as well as "Lethal Autonomous Machines".

Dr. Noel Sharkey defines an *automatic robot* as being a robot that "carries out a pre-programmed sequence of operations or moves in a structured environment. A good example is a robot arm painting a car."[208] An autonomous robot is, however, "similar to an automatic machine except that it operates in open and unstructured environments. The robot is still controlled by a program but now receives information from its sensors that enable it to adjust the speed and direction of its motors (and actuators) as specified by the program."[209] Examples of semi-autonomous or relatively advanced automatic defensive weapons systems will be illustrated later in this chapter.

Finally, "*Lethal Autonomous Machines"* have been defined, e.g. by the U.S. Department of Defence and Human Rights Watch, as "robotics weapons systems that, once activated, can select and engage targets without further intervention by a human operator. The important element is that the robot has an autonomous "choice" regarding selection of a target and the use of lethal force."[210]

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[205] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 6.
[206] US Department of Defense: *Unmanned Systems Integrated Road Map FY2011-2036,* p. 50.
[207] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 6.
[208] Noel Sharkey: "Automating Warfare" p. EAP 2.
[209] Ibid.
[210] U.S. Department of Defense: *Autonomy in Weapons Systems*, Directive Number 3000.09, Glossary Part II; Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 2.

It is important to remember that theses autonomous machines will be far from being considered "intelligent", "self-aware", "sentient" or any other description denoting humanity in the machines. The machines will be only very complex lines of code, as will be explored briefly in the next chapter. Even so, the UK MoD uses a definition that invokes these sentiments in the readers mind. Their definition, as pointed out by Dr. Sharkey, states that autonomous systems will be capable of understanding higher level intent and directions.[211] The problem with that, according to Dr. Sharkey, is that "no system is capable of "understanding", never mind "understanding higher level intent"", and adds that this is not just pickiness of language on his part. "Correctly defining what is meant by "autonomous" has very important consequences for the way that the military, policy makers and manufacturers think about the development of military robots."[212] In the same article, Sharkey criticizes the UK MoD for stating that "artificial intelligence", as opposed to complex and clever automated systems, will be available in 5 to 15 years. He points to the fact that the study of artificial intelligence started in the 1950s, and a number of programs use "artificial intelligence methods". Sharkey suggests that the MoD is with their improper choice of words, that AI programs will become as intelligent as humans in a few years time, something that he considers out of the question, stating that true artificial intelligence, where machines will be on par with or surpass human intellect, will be a game changer in modern life, not only in the military sense. Such AI is, however "uncertain and unlikely" before the next 2 epochs.[213]

Autonomy does in no way mean that robots are thinking for themselves. The often-misunderstood decision making process of robots should not, except for a weak analogy, be compared to that of humans, especially in the context of making life-or-death decisions. Computers, the "brains" of robots, have a very simple decision making process, although they can make very many decisions in a very short time. If a robot is designed to navigate an unpredictable obstacle path, then its sensors would simply detect obstacles and navigate around them in the simple IF/THEN fashion. IF there is an obstacle on the right, THEN turn left. IF there is no obstacle in the way, THEN continue to designated location in a straight line.[214] This is the decision making process that would ultimately be tasked with the application of potentially lethal force: IF legitimate target, THEN engage. This, however, is

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[211] Noel Sharkey: "Automating Warfare" p. EAP 2.
[212] Ibid.
[213] Ibid, p. EAP 2-3.
[214] Ibid, p. EAP 3.

only the tip of the iceberg, as will be discussed in Chapter 4 on the foreseeable technical challenges to LARs.

3.1.3. Not "self-aware"

The Lethal Autonomous Robots currently envisaged would without a doubt not be self-aware, where self-awareness has been defined as representing "a state in which one actively identifies, processes, and stores information about the self".[215] Hollywood, with its numerous incarnations of seemingly human robots, has undoubtedly led the discussion, or at least the public image of what will become known as LARs, very much astray.[216] Examples of this include all incarnations of the Terminator, the advanced computer systems and robots of The Matrix series, Battlestar Galactica, I, Robot and Wall-E just to name very few. Hollywood is just as wrong in depicting robots as it is when depicting e.g. the legal profession.

On a side note it is worth mentioning how incredibly powerful modern computers have become, without having a sliver of consciousness, let alone self-awareness. In the popular science fiction series *Star Trek: The Next Generation,* one of the crewmembers of the USS Enterprise is Lt. Commander Data, a sentient robot or android, fully functional with a "positronic brain" and an urge to become human. In the episode "Measure of a Man", Data is cited as being capable of 60 trillion operations per second, i.e. 60 teraflops. When the episode aired, in 1989 that made him about 60.000 times more powerful than supercomputers of that time. In 2015, 26 years after the episode aired and 323 years prior to Data's fictional date of creation, the fastest computer known to man has the operating capabilities of 34 petaflops, around 500 times more than Data.[217] That computer is in no way conscious, let alone self-aware. The Human Rights Watch believes LARs could be fielded and would enter the battlespace in 20 to 30 year, machines that will by no means be self-aware.[218] This goes to show not only how imagination and the entertainment industry have in some ways derailed the debate of LARs, that are likely to be what most would consider cumbersome or even crude pieces of machinery when they emerge, compared to what is depicted on the silver screen.

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[215] Alan Morin: "Levels of consciousness and self-awareness: A comparison and integration of various neurocognitive views".
[216] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 7.
[217] "U.S. sets sights on 300 petaflop supercomputer", available at: http://www.computerworld.com/article/2847865/us-sets-sights-on-300-petaflop-supercomputer.html
[218] Human Rights Watch: *Losing Humanity*, p. 1.

3.2. Examples of weapons systems with some autonomous capabilities

As stated previously in this thesis, there are currently no examples of fully autonomous lethal robots in existence.[219] Even so, "technology is moving in the direction of their development and precursors are already in use."[220] Currently, many States employ weapons systems that are programmed to respond automatically to threats from incoming munitions. Others have begun experimenting with perimeter defence weapons, weapons that engage targets that enter certain areas.

The best know examples of such technology are perhaps the US made Phalanx close-in weapon system (CIWS or see-whiz) and the Israeli Iron Dome. Some understanding of these weapons systems is essential to understand the legal and ethical questions a fully autonomous lethal robot poses. A segment of this thesis will therefore be used to explain the functions of defence systems that behave in a somewhat autonomous way. What most of these weapons systems have in common is that they are intended for defensive purposes in a responsive manner, not to autonomously engage targets as an aggressor.

3.2.1. MK 15 Phalanx Close-in Weapons System (CIWS)

Figure 1: Phalanx Close-in Weapons System (United States Navy Photograph)

[219] Human Rights Watch: *Losing Humanity*, p. 3.
[220] Ibid.

The US-made Phalanx Close-in Weapons System, CIWS, pronounced "sea-whiz", or "The R2D2 with an attitude," a nickname derived from the weapons systems similarities with the fictional android of the same name in the *Star Wars* saga, is a weapons system designed to identify and fire at incoming missiles or threatening aircraft. This automatic weapons defense system is, according to the Human Rights Watch, one step on the road to full autonomy.[221]

The CIWS was first installed on a warship in 1980, and upgraded versions of the weapons system are still in use today, both by the United States and its allies.[222] The CIWS is designed to detect approaching anti-ship missiles or even threatening aircraft and respond with its six barrel 20mm M61 Vulcan Gatling gun, firing between 3.000 and 4.500 rounds per minute at incoming missiles.[223] According to the United States Navy, the Phalanx CIWS "automatically engages functions usually performed by separate, independent systems such as search, detection, threat evaluation, acquisition, [tracking], firing, target destruction, kill assessment and cease fire." Recent models of the CIWS also aim to defend against small gunboats, artillery munitions and helicopters.[224]

The CIWS can currently operate on four settings: “semiautomatic”, where humans retain control over the firing decision; “automatic special,” where humans set the priorities but the weapons system determines how to carry out the priorities; “automatic,” where humans are kept in the loop but the system works without their input; and “casualty” where the system does what it thinks necessary to save the ship.[225]

The CIWS is a part of the Aegis Weapons System, a very sophisticated guidance system used on a number of surface vessels of the United States Navy, as well as being a part NATO's European Missile Defence System.[226] Despite its sophistication, the Aegis Weapons System was involved in the destruction of Iran Air Flight 655, causing the death of hundreds civilians. The incident in question will be explored in chapter 4.3.4. of this thesis.

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[221] Human Rights Watch: *Losing Humanity*, p. 14.
[222] Federation of American Scientists, “MK 15 Phalanx Close-In Weapons System (CIWS),” January 9, 2003, http://www.fas.org/man/dod-101/sys/ship/weaps/mk-15.htm (accessed March 2nd, 2015); “MK 15–Phalanx Close-In Weapons System (CIWS),” US Navy fact sheet.
[223] Ibid.
[224] “Phalanx CIWS: The Last Defense, On Ship and Ashore,” Defense Industry Daily press release, January 22nd 2008; “MK 15–Phalanx Close-In Weapons System (CIWS),” US Navy fact sheet, available at http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=487&ct=2, last accessed March 2nd 2015.
[225] Peter W. Singer: *Wired for War,* p. 124-125.
[226] White House Press Secretary: *Fact Sheet on U.S. Missile Defense Policy: A "Phased, Adaptive Approach" for Missile Defense in Europe,* September 17th, 2009. Available on http://www.whitehouse.gov/the_press_office/FACT-SHEET-US-Missile-Defense-Policy-A-Phased-Adaptive-Approach-for-Missile-Defense-in-Europe. Accessed March 3rd 2015.

3.2.2. CIWS SeaRAM

The CIWS SeaRAM anti-ship missile defence system is a variant of the MK 15 Phalanx CIWS utilizing the Rolling Airframe Missile (RAM) Guided Missile Weapon System. SeaRAM combines the Phalanx CIWS Block 1B search-and-track radar and Elector Optic sensors, along with its threat evaluation and weapon designation capability, with a RAM 11-round launcher assembly missile system on a single mount.[227] The SeaRAM was developed in response to concerns about the performance of gun-based systems against modern, super-sonic sea-skimming anti-ship missiles, capable of altering their flight path mid-air and perform erratic maneuvers to evade counter measures. While the Phalanx is an ultimate last line of defence, with an effective range of only about 3 kilometers, the SeaRAM can destroy incoming projectiles at a much greater range.[228]

The SeaRAM CIWS is a complete combat weapon system that automatically detects, evaluates, tracks, engages, and performs kill assessment against ASM and high-speed aircraft threats in an extended self-defense battle space envelope around the ship.[229] The SeaRAM is currently in trial stages, set to be fitted to the Independence Class Littoral Combat Ship.

3.2.3. Goalkeeper CIWS

The Goalkeeper CIWS is a Dutch variant of the U.S. made Phalanx CIWS. According to Thales Group, the Goalkeeper CIWS is "an autonomous and completely automatic weapon system for short-range defence of ships against highly maneuverable missiles, aircraft and fast maneuvering surface vessels."[230] Sadly, Thales Group does not further clarify what is meant by "autonomous" in this sense.

The system is more advanced than the Phalanx CIWS in the sense that it automatically performs the entire process from surveillance and detection to destruction, including selection

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[227] "SeaRAM Close-in Weapon System (CIWS) Anti-Ship Missile Defense System" US Navy Fact Sheet, available at http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=456&ct=2. Accessed March 4th, 2015.

[228] "SeaRAM stands guard - System protects Navy's new shallow-water fighters", available at http://www.raytheon.com/news/feature/searam.html, accessed March 4th, 2015.

[229] "SeaRAM Close-in Weapon System (CIWS) Anti-Ship Missile Defense System" US Navy Fact Sheet, available at http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=456&ct=2. Accessed March 4th, 2015.

[230] Thales Group: "Goalkeeper - Close-in Weapons System", available at: https://www.thalesgroup.com/en/netherlands/defence/goalkeeper-close-weapon-system. Accessed March 23rd 2015.

of the next priority target, and has, according to its manufacturer, proven its importance as a defence system of last resort on numerous occasions.[231]

3.2.4. Counter-Rocket, Artillery, Mortar, the C-RAM

The C-RAM, (Counter-Rocket, Artillery, Mortar) is essentially a land-based version of the aforementioned CIWS. Conceived in 2004, the C-RAM was designed to counter the constant threat of rocket, artillery and mortar rounds fired at U.S. military bases in Iraq, it entered service in 2005 and in 2007 was credited for the destruction of 100 enemy mortar rounds.[232]

The Human Rights Watch argues that even though weapons like the C-RAM, deployed on land and often in populated areas warrant further study, they seem to present less danger to civilians than the idea of Lethal Autonomous Robots because they are both stationary weapons systems and intended for defence and are not to be used offensively.[233] Human supervision could however be limited, as "automation bias" is likely to present itself, where human operators simply trust the decision of the machine they are intended to supervise, often having very little time to veto the machines decision.[234]

Additionally, automatic weapons systems deployed in populated areas can potentially harm civilians. Even if the C-RAM successfully destroys an incoming projectile, shrapnel could cause harm to innocent bystanders, a problem that is only likely to be exacerbated by fully autonomous machines.[235]

3.2.5. Iron Dome

The Iron Dome is a mobile all-weather air defence system, deployed near the Israeli border with Gaza and Eilat.[236] As explained in a graph on the next page, the Iron Dome is a three-piece system of interceptor batteries, designed to intercept rockets and 155mm artillery shells fired at Israel by shooting them out of the sky.[237] When a rocket is fired towards Israel, a radar tracks the projectile, feeding information into an advanced system that predicts the projectile's

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[231] Ibid.
[232] "Army C-RAM Intercepts 100th Mortar Bomb in Iraq", Defence Update International, Online Defense Magazine, available at: http://defense-update.com/newscast/0508/news/news2105_c_ram.htm. Accessed March 23rd 2015.
[233] Human Rights Watch: *Losing Humanity*, p. 12.
[234] Human Rights Watch: *Losing Humanity*, p. 12.
[235] Ibid.
[236] Yaakov Katz, "Air Force to Get Two New Iron Dome Batteries," Jerusalem Post, July 29th 2012, http://www.jpost.com/Defense/Article.aspx?id=279256 (accessed March 5th 2015).
[237] Rafael Advanced Defense Systems Ltd., "Iron Dome: Defense against Short Range Artillery Rockets," 2010, http://www.rafael.co.il/Marketing/186-1530-en/Marketing.aspx (accessed March 5th 2015).

trajectory.[238] This information is then used to guide the Tamir interceptor missile to the incoming projectile. Each Iron Dome battery is armed with 20 missiles.[239] The Tamir missile explodes in close proximity to the incoming projectile, preventing it from landing in its intended target location. The Israeli government claims that the Iron Dome has been effective in shooting down over 90% of incoming missiles.[240]

The system has an obvious drawback: its cost. Each intercept costs between $70,000 and $100,000, making it an expensive defensive system.[241] In addition, Hezbollah is estimated to possess around 100,000 rockets, meaning that the Iron Dome could be both physically and fiscally overwhelmed by sheer numbers.[242] For this reasons, the system is programmed to discriminate between projectiles that are bound for residential areas and respond to them by shooting them from the sky, and those that are bound for the sea or open fields, and ignore them.[243]

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[238] Ibid.
[239] Ibid.
[240] Yaakov Katz, "Iron Dome ups its interception rate to over 90%," Jerusalem Post, October 3rd, 2012 http://www.jpost.com/Defense/Iron-Dome-ups-its-interception-rate-to-over-90-percent (accessed March 5th 2015).
[241] Dave Bender, " Boeing Israel Chief Touts Laser Weapon as Alternative to Iron Dome Anti-missile Defense System" The Algemeiner, December 14th 2014, http://www.algemeiner.com/2014/12/14/boeing-israel-chief-touts-laser-as-alternative-to-iron-dome-anti-missile-defense-system-video/ (accessed March 5th 2015).
[242] Ibid.
[243] Rafael Advanced Defense Systems Ltd., "Iron Dome: Defense against Short Range Artillery Rockets," 2010, http://www.rafael.co.il/Marketing/186-1530-en/Marketing.aspx (accessed March 5th 2015).

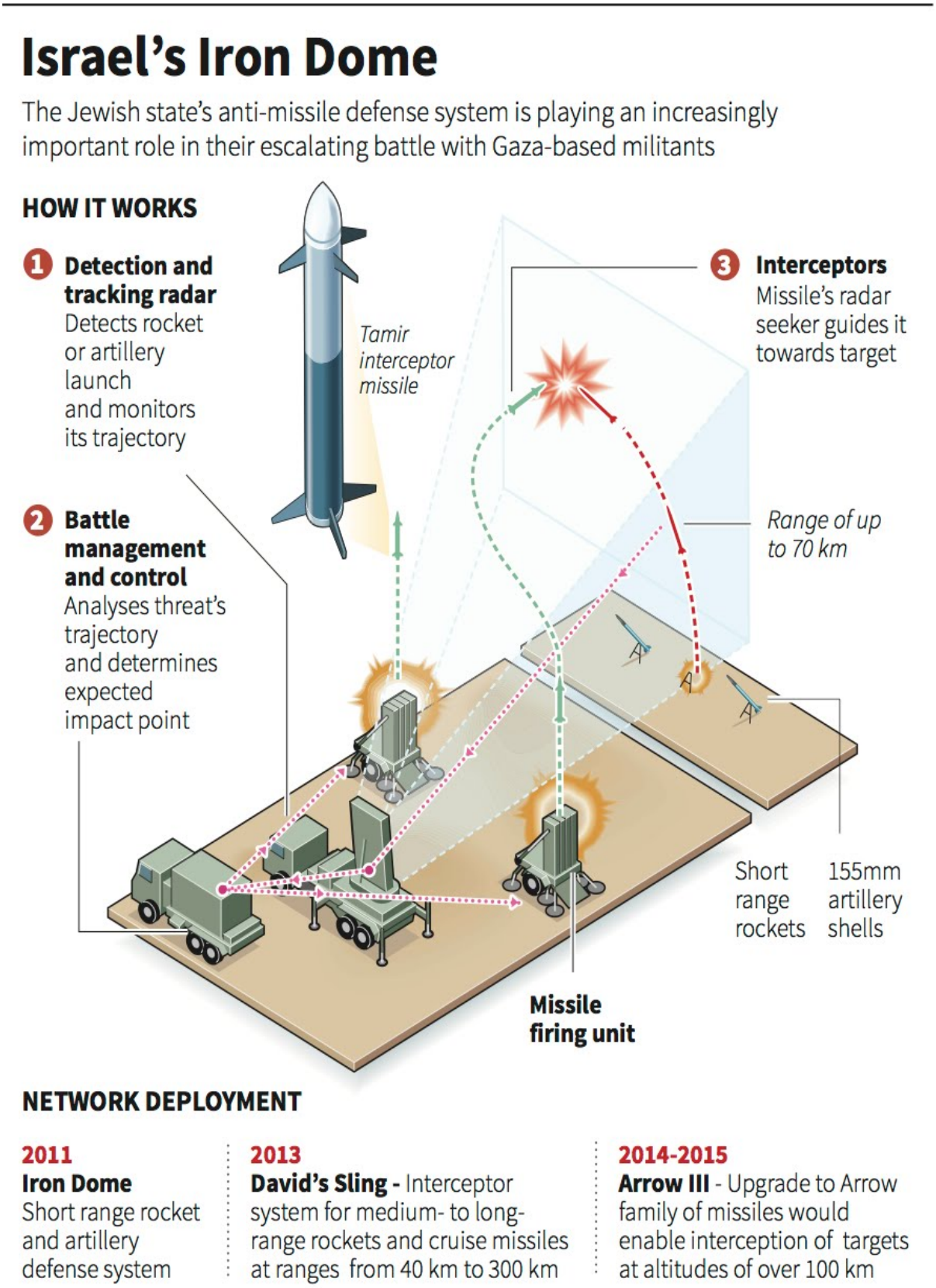

Figure 2 A graph explaining how the Iron Dome works. (Thomson-Reuters)

3.2.6. The TALON SWORD

Figure 3 The TALON SWORD Photo from the U.S. Department of Defense

The TALON SWORD has already been tested in Iraq and Afghanistan and carries a M240 or M249 machine gun or a .50 Caliber Barrett rifle. The TALON is a remotely operated vehicle, and although having little or no autonomous capabilities, it has proven effective in the field, and has been in use since 2000.[244] The TALON can be considered a likely manifestation of early LARs when they eventually enter the battlefield.

3.2.7. Samsung SGR-A1

The Samsung SGR-A1 is a South Korean military robot, designed to replace humans in the demilitarized zone between South and North Korea. According to South Korean authorities, "the system uses its voice recognition to identify approaching persons. If the intruder is unable to provide the necessary access code when at a distance of ten meters, the Samsung SGR-A1 can either sound an alarm, fire rubber bullets or make use of its Daewoo K3 5,56mm

[244] Army-guide.com: *TALON*. Available at: http://www.army-guide.com/eng/product1795.html

machine gun." [245] Samsung claims that the system is "designed to replace human-oriented guards, overcoming their limitation of discontinuous guarding mission due to its severe weather condition or fatigue, so that the perfect guarding operation is guaranteed."[246] A key component of the use of the sentry robot is, however that "for use on the DMZ, the sentry bot doesn't need to distinguish friend from foe. When someone crosses the line, they are automatically an enemy. The robot can verbally command an enemy to surrender. It can understand the soldier's arms held high to indicate surrender, and then not fire. Normally the ultimate decision about shooting would be made by a human, not the robot. But the robot does have an automatic mode, in which it can make the decision."[247]

3.2.8. Summary

The weapons systems presented in the immediately preceding sections of this thesis are by no means "autonomous", but have a significant degree of autonomy, since they are capable of sensing and attacking targets with minimal human input. The Phalanx can under certain conditions operate without human intervention, and so can the Iron Dome.[248] They fall short of being fully autonomous, and should perhaps be classified as automatic.[249] As for the C-RAM, humans can certainly veto the decision of the machine, but people experience an "automation bias" when faced with questions like that, simply trusting the machine.[250] As explained in the beginning of Chapter 3, an automatic robot is a robot that "carries out a pre-programmed sequence of operations or moves in a structured environment. A good example is a robot arm painting a car."[251] An autonomous robot is, however, "similar to an automatic machine except that it operates in open and unstructured environments. The robot is still controlled by a program but now receives information from its sensors that enable it to adjust the speed and direction of its motors (and actuators) as specified by the program."[252]

Armin Krishnan, author of *Killer Robots,* uses a different definition, but also finds that a number of the weapons systems described in previous sections, are automatic or of a "pre-

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[245] GlobalSecurity.org: " Samsung Techwin SGR-A1 Sentry Guard Robot" available at: http://www.globalsecurity.org/military/world/rok/sgr-a1.htm
[246] Ibid.
[247] Ibid.
[248] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 4.
[249] Human Rights Watch: *Losing Humanity*, p. 17.
[250] See previous chapter on C-RAM
[251] Noel Sharkey: "Automating Warfare" p. EAP 2.
[252] Ibid.

programmed autonomous" nature rather than fully autonomous. He uses the Phalanx as an example, saying that it:

> "Carries out a particular function by following instructions that have been inserted into the machine by a designer or user. Normally, a pre-programmed machine is computer-controlled and it does its work with very little variation. This means that such machines have no or little capacity to vary from the original instructions or from pre-programmed movements."[253]

This short summary of the technological reality of what could in the near future be Lethal Autonomous Robots, as well as the glimpse into currently fielded machines with some autonomous capabilities, serves as a backdrop for the main topic of this thesis, the potential advantages, but to a larger degree the challenges fully autonomous lethal robots are likely to present in terms of legality and accountability. These advantages and challenges, challenges of legal, technical and ethical nature, will be explored in the next chapter.

[253] Armin Krishnan: *Killer Robots,* p. 43-44.

4. Lethal autonomous robots and international humanitarian law

> "Crimes against International Law are committed by men, not by abstract entities, and only by punishing individuals who commit such crimes can the provisions of International Law be enforced."[254]

4.1. Introduction

When looking at the foreseeable challenges of the introduction of Lethal Autonomous Robots into the battlespace, one must both assess the current and likely future state of autonomous technology, as well as if and then how well these technologies are capable of complying with the relevant international humanitarian law. Chapter 2 of this thesis offered a summary of the most fundamental rules of international humanitarian law that combatants must comply with. These are the rules that LARs, for all intents and purposes, robot soldiers, must be able to comply with. Chapter 3 presented a brief overview of the current state of autonomous technology. Chapter 4 will dig deeper in terms of technology, and provide some application of the current international humanitarian law to the currently envisaged LARs.

As has been stated on a number of occasions, fully autonomous lethal robots do not exist. There are, however, a number of machines being currently fielded that have major autonomous capabilities, and are tasked with delivering what would be deadly force if directed towards humans. Many of these robots have been in the field for decades, some even being the center of debate after causing loss of life do to malfunction or malpractice of their operators.[255] Dr. Noel Sharkey, an expert in the field of robotics, states that he has read "valid robotics reports" from over 50 countries, indicating a massive build up of military robots.[256] Dating back as far as 2004, all "Roadmaps" of the U.S. forces have discussed the possibility and need for autonomous battlefield robots, with the United Kingdom joining in in 2011.[257] Plans to take humans "out of the loop", i.e., remove the need for human operators of robots, are well underway. Autonomy is predicted to arrive in stages, first in takeoff, landing, navigation and maneuvering obstacles, then in target selection.[258]

Even if LARs will in the near or distant future be capable of complying with the rules of international humanitarian law on the surface of the question, performing on par with or even better than their human counterparts, philosophers have argued that an implicit requirement

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[254] The Trial of Major War Criminals: Proceedings of the International Military Tribunal Sitting at Nuremberg Germany, Part 22, paragraph 447.
[255] See chapter 4.3.4. of this thesis.
[256] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", p. EAP. 1.
[257] Ibid.
[258] Ibid, p. EAP. 2.

can be found in international humanitarian law that the decision to use lethal force cannot be delegated to an automated process.[259] Deaths resulting directly from the deployment and usage of LARs could therefore even still be considered "arbitrary" under international humanitarian law.[260] This chapter will explore what lessons can be learned from gradually placing humans further away from the battlefield, the potential advantages of Lethal Autonomous Machines, but also their technical, legal and ethical challenges. This chapter will also go into how responsibility for the potential failures or wrongful acts of LARs can be assigned, as well as look into examples where human decision making resulted in disaster an autonomous machine might have averted. Lastly, this chapter will look into means that might be used to either prevent LARs from entering the battlefield, or enter the battlefield under a number of conditions.

4.2. The lesson from drones

4.2.1. Away from the battlefield

Warfighters have throughout history tried to distance themselves as much as possible from the battlefield. When primitive clubs, spears and rocks were the pinnacle of warfare, those using the instruments of death had to be very close to their enemy. As time progressed, weapons became capable of projecting force greater distances, from the cumbersome trebuchets of the Middle Ages to gunpowder cannons of the British Navy and currently, intercontinental ballistic missiles that can be used with pinpoint accuracy between continents, thousands of kilometers apart.

The ruling authorities have on a number of occasions opposed this development in history. As mentioned before the Second Lateran Council in 1139 condemned the use of the crossbow and arc, a view that coincided with the concept of chivalry at the time. Such a weapon had the capability of striking an enemy from a great distance, enabling a man to "strike without the risk of him being struck."[261] As with the early introduction of gunpowder, in 1439, when the army of Bologna used the "new handgun":

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[259] Peter Asaro: "On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-making" p. 708.
[260] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 17.
[261] Leslie C. Green: *The Contemporary law of armed conflict.* p. 30.

> "Feeling ran so high at this disregard for the game of war, that the victorious Venetians massacred all prisoners who had stooped so low as to use this 'cruel and cowardly innovation', gunpowder. It would, unchecked, they said, make fighting a positively DANGEROUS profession."[262]

Now, the development described above has reached beyond the wildest imaginations of the warfighters of 1439. Drones have in many instances removed the combatant from the battlefield, and in the future, it may end up removing human combatants from combat entirely, replacing them with LARs.

To underscore the power of drones, even unarmed ones, it is worth mentioning that there are examples of enemy combatants surrendering to unarmed surveillance drones. In the first Gulf War, Iraqi soldiers surrendered to an RQ-2A Pioneer UAV, used for damage assessment for shelling from the battleship U.S.S. Wisconsin. The Iraqis made makeshift white flags to surrender, avoiding another shelling from the battleship, indicating that drones don't need to be armed to pose a threat.[263]

Unmanned Areal Vehicles, UAVs - drones - are one of the latest developments in this long and gradual evolution. Early drones were used for surveillance, but in more recent years, drones, particularly in the hands of operatives of the United States government, have been used for "targeted killing," the preemptive attack on targets that have been deemed a risk to the security of the United States.[264] On a side note, it is interesting to consider that these "targeted killings" are not strictly a violation of Executive Order 11905, issued by Gerald Ford in an attempt to reform the United States intelligence community and prohibit employees of the United States Government, the Central Intelligence Agency (CIA) in particular, from carrying out political assassinations, as was common during the Vietnam War.[265] These drone strikes are, however, highly controversial and are among the reasons for why Pakistan is a

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[262] Treece and Oakeshott: *Fighting Men: How Men have Fought through the Ages*, p. 207-208.

[263] Rebecca Maksel: Predators and Dragons, Air & Space Magazine, July 1, 2008, available at http://www.airspacemag.com/history-of-flight/Predators_and_Dragons.html (accessed March 17th 2015).

[264] For a thorough exploration of targeted killings and the legal challenges they pose, the author recommends reading the Human Rights Watch: *Q&A US Targeted Killings and International Law*, available at: http://www.hrw.org/news/2011/12/19/q-us-targeted-killings-and-international-law, as well as the International Human Rights and Conflict Resolution Clinic at Stanford Law School and Global
Justice Clinic at NYU School Of Law: *Living Under Drones: Death, Injury, And Trauma To* Civilians From US Drone Practices in Pakistan, available at: http://www.livingunderdrones.org/wp-content/uploads/2013/10/Stanford-NYU-Living-Under-Drones.pdf. The topic of targeted killing *per se* does however fall outside the scope of this thesis.

[265] Section 5 (g) of "Executive Order 11905: United States Foreign Intelligence Activities": "No employee of the United States Government shall engage in, or conspire to engage in, political assassination."

staunch opponent of LARs, being a country that has seen an unprecedented number of drone strikes within its borders.[266]

4.2.2. Drones strikes - a moral disengagement

The use of drones has come under fire from many directions. In a statement by Pakistani delegation in the Interactive Dialogue with the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions during the 23rd Session of the Human Rights Council, regarding i.al. Lethal Autonomous Robots, the Pakistani delegation stressed the need for the proposed national moratoria on LARs and calling for an international ban on LARs before they even exist, citing that "the experience with drones demonstrates that once these technologies are developed and operationalized, it is almost impossible to restrict their use. It is, therefore, necessary to impose the necessary restrictions at the earliest possible stage in their development in order to prevent violations of human rights."[267] The Pakistani delegation was the only one calling for a ban, while others endorsed the call for a moratorium.[268]

Pakistan has every reason to voice its concerns over the development of drones in light of their recent experience with targeted killings at the hands of "cubicle warriors", drone pilots sitting half way across the world from them. Pilots of these drones don't have to risk their own life to take the life of another, sitting on home ground, safer than any pilot has ever been. This has given rise to the "PlayStation mentality" towards killing, making the decision to take a human life almost whimsical, even unreal.[269] This can cause emotional and moral disengagement from the drone operators towards actions that can result in the loss of life and massive destruction of property, especially in recruits from the latest generation of gamers that held the controller for a game console from before they could talk.

These pilots are, however, not removed from the horrors of war. Unlike their flying counterparts, they often get to see the aftermath and consequences of their actions on high-resolution monitors, where F-15 pilots would be long gone before their ordinance lands. This might even serve to make them *less* morally disengaged than fighter pilots. Remote pilots are

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[266] Statement by Pakistan in the Interactive Dialogue with the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, 23rd session of the Human Rights Council, May 30th 2013. Available here: http://stopkillerrobots.org/wp-content/uploads/2013/05/HRC_Pakistan_09_30May2013.pdf

[267] Ibid.

[268] For further information on the opinions expressed during the Dialogue, visit: http://www.stopkillerrobots.org/2013/05/nations-to-debate-killer-robots-at-un/

[269] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", EAP. 6.

also thought to undergo a new kind of stress by going home to their families after each day, being remotely "stationed" on a battlefield on the other side of the planet.[270]

4.2.3. Drone strikes and civilian casualties

The effects the drone strikes on those operating the drones, from the safety of their cubicle, is dwarfed by the effects these strikes have on the ground. The CIA was the first in the US to use armed drones, when in 2002 a drone strike against an SUV in Yemen killed five men.[271] This attack was justified by lawyers at the DoD as being a defensive preemptive strike on legitimate in the war against al-Qaeda. Since 2002, the number of these strikes has risen fast under the guise of "decapitation strikes," in states that the US is not at war with, such as Pakistan, where drone strikes are intended to eliminate heads of terrorist cells.[272]

Although hard to pinpoint exactly how many drone strikes have taken place, both the Brookings Institute and the New America Foundation have published information regarding the strikes, both estimating them to be in the lower hundreds in the period of 2004 through 2011.[273] The legality of these strikes in the eyes of international humanitarian law is questionable at best, but it is not the subject of this thesis so that question will not be answered here. Even so, the fact remains that these strikes, intended to paralyze terrorist cells by killing their leaders, have in all probability caused a large number of civilian deaths, with limited success when it comes to killing terrorist leaders. The New American Foundation estimates that for every leader killed, as many as 50 other people lost their lives.[274] In a story published in the Guardian, it is estimated that for the 41 individuals targeted, 1.147 people were killed.[275] Although near impossible to find out exactly how many of these were civilians, drone accuracy has come under heavy fire. Both the Predator and Reaper UAVs are equipped with high-resolution cameras that provide state of the art visualization for all those involved in the decision making process before issuing a strike order. Despite that, accuracy in drone strikes is an illusion, at least if any heed is paid to civilian casualties estimates in these strikes. It is easy to falsely identify targets from the air.

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[270] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", p EAP. 5-6.
[271] Ibid, p. EAP. 8. Israel has been accused of having used armed drones before that time, but has always denied these accusations.
[272] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", p. EAP. 8.
[273] Ibid.
[274] Ibid.
[275] Spencer Ackerman: "41 men targeted but 1,147 people killed: US drone strikes – the facts on the ground".

On June 23rd 2009, up to 60 people attending the funeral of a Taliban fighter were killed in South Waziristan when a CIA drone attacked them.[276] In February 2010, a drone operated by the US military was involved in an attack in Oruzgan in Afghanistan. In total, 23 civilians, including women and children were killed in the attack. The people were travelling in a convoy and were misidentified as insurgent fighters.[277] These numbers show that even with human operators, attacks like the ones employed in Pakistan and other countries the War on Terror stretches to, civilian casualties are no exception. With this in some sense being considered acceptable losses, on must think how the elimination of the human operator would affect the outcome.

4.2.4. Technical limitations of UCAVs

Although drones have proven themselves useful in the battlefield, both for surveillance and to engage targets, drones have a number of limitations, some which could be removed using autonomous technology. Remote controlled robots are for example more expensive to operate, can be cut off from their operator using jamming technology and need human operators, unlike autonomous machines, where a large number of machines could be overseen by a single operator. Furthermore, remote controlled robots cannot react in real time due to a 1.5 second time delay because of satellite technology, making them e.g. useless dogfighting vehicles for fighting other aircrafts, where every second is precious.[278] This would not be a problem for LARs, as their decisions making would not be dependent on a communication link with the home base, but be made by the robot itself, eliminating the lag in communications faced by drones.

4.3. Advantages of LARs

Although many have criticized the idea of Lethal Autonomous Robots, others have pointed to their numerous potential advantages. Apart from huge military advantages, these include the inability to commit heinous crimes such as rape or deliberately murder of civilians. LARs could in the future be fearless, unrelenting soldiers that might surpass humans when adhering the rules of international humanitarian law. LARs would also not, unless specifically programmed to do so, commit heinous acts such as rape and torture, suffer from "scenario

[276] Pir Aubair Shah and Salman Masood: "U.S. Drone Strike Said to Kill 60 in Pakistan". New York Times.
[277] Karin Brulliard: "Drone operators blamed in airstrike that killed Afghan civilians in February". Washington Post.
[278] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", EAP. 5.

fulfillment", where people ignore information that contradicts their predisposed end result, nor act based on fear to protect themselves without regard for collateral damage.

4.3.1. Fearless, unrelenting soldiers

An obvious advantage of robotic soldiers, capable of fighting autonomously, is that they would be able to operate without fear, spite, vengeance and selfishness. They would not hesitate to risk their own "life" if they were called upon to put themselves in grave danger either to fulfill their mission or to protect the lives of human beings, perhaps even civilians. As Gordon Johnson of the now defunct Pentagon Joint Forces Command stated: "They don't get hungry. They're not afraid. They don't forget orders. They don't care if the guy next to them has just been shot. Will they do a better job than humans? Yes."[279] LARs would therefore be able to operate continuously at peak performances, long after their human counterparts would have needed rest, for as long as their batteries, engines or solar panels allow them.[280] They would effectively be harder, better, faster and stronger than human soldiers, more efficient and perhaps even more ethical.

Robotic soldiers also offer greatly increased force projection through preserving the lives of one's own soldiers and so-called force multiplication, where a single operator could monitor a swarm of LARs.[281] They could penetrate enemy lines without fear and greatly expand the battlefield, are not susceptible to factors such as G-force, and are prime candidates for what is described as dirty, dull and dangerous work.[282]

4.3.2. More humane than humans?

Although it is hard to imagine, it can be argued that robots would in fact be capable of applying international humanitarian law better than humans. With prime sensor capabilities, they could be more conservative when engaging targets and only engage when they are certain that they have identified a legal target.[283] That means that a LAR operating in a populated area, riddled with civilians, would prefer the course of action to be destroyed rather

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[279] Tim Weiner: "'GI Robot' Rolls Toward the Battlefield" New York Times (1 February 2005), available at: http://www.nytimes.com/2005/02/16/technology/16iht-robot.html?pagewanted=all&_r=0. Accessed March 23rd 2015.
[280] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 275.
[281] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 10.
[282] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 275.
[283] A real life example of just how poor humans can be at this will be presented in chapter 4.3.3.

than open fire at suspected targets, or even just to engage something, in order to preserve itself, as might be the logical course of action for human combatants.[284]

Although the technology is currently not advanced enough to permit accurate autonomous distinction of combatants in the battlefield, sensors are likely to become progressively more advanced and accurate, eventually surpassing the human brain in distinguishing combatants from civilians.[285] LARs may also at some point be able to deploy more challenging but more humane methods of incapacitating the enemy, such as disarming or immobilizing them rather than killing.[286]

Skeptics of the unbelievably fast-paced advances in technology are reminded of the fact that not so many decades ago this thesis would have been typed on a typewriter, not a laptop that with more processing power than the computers that put man on the moon, and weighs no more than *The Oxford Handbook of International Law in Armed Conflict*, whilst source materials were not printed or photocopied but read from a fairly affordable nine-inch touch screen!

The human psychological problem known as "scenario fulfillment" would also not factor into the decisions of LARs. Scenario fulfillment is considered to be one of the factors leading to the U.S.S. Vincennes shooting down Iran Air Flight 655, where contradictory information is neglected or distorted in stressful situations, and where new information is only used to in ways that fit the preexisting belief pattern.[287] Robots can be developed to avoid this problem.[288] Robots are also capable of processing more information better than human beings in a shorter amount of time than humans and then decide whether to employ deadly force.[289] Robots could also, when operating in conjunction with human soldiers, monitor soldiers to prevent violations against international humanitarian law by recording everything that they sense. This alone might be enough to prevent said violations.[290] In this context it should be noted that these surveillance robots would not themselves have to be capable of employing lethal force, although it would undoubtedly increase their chances of returning to base in one piece. Humans are after all in a sense the weakest link in the fast paced modern battlefield.

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[284] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 280.
[285] Ibid.
[286] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 10.
[287] A detailed description of the events surrounding Iran Air Flight 655 is given in chapter 4.3.4. in this thesis.
[288] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 280.
[289] This was also a factor in the Iran Air Flight incedent, where the CO of the U.S.S. Vincennes was monitoring another engagement when information came in about the possibly imminent air attack on the vessel.
[290] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 280.

The reaction time of autonomous systems, such as the ones described in chapter 3 of this thesis, far exceeds that of human beings.

Gary Marchant et. al. believe the trend in warfare to be clear: "Warfare will continue and autonomous robots will ultimately be deployed in the conduct of warfare."[291] On a similar note, Michael Schmitt argues that, although current robotic technology may not be able to comply with the rules and customs of international humanitarian law, there is no guarantee that technology will not catch up and eventually surpass humans in the battlefield. Therefore, he argues, that since LARs have not yet left the drawing board, their potential has not been realized and that they are at best in their infancy.[292] It would therefore be a ban based on speculation, one that would deprive commanders of the future of LARs, even if, allowing development to continue, their use on the field would minimize harm to civilians and civilian objects compared to current human operated weapons systems.[293]

The Special Rapporteur point to a number of factors where LARs would without a doubt perform better than human soldiers. In his report, the Special Rapporteur e.g. states that LARs will not be susceptible to some of the human shortcomings that may undermine the protection of life. They would not act out of revenge, panic, anger, spite, prejudice or fear, and unless they were specifically programmed to do so, something that would without a doubt be a grave infraction of international humanitarian law, robots would not intentionally torture. Robots also do not rape.[294]

4.3.3. The fault, Dear Brutus, is not in our stars, but in ourselves[295]

One major challenge of international humanitarian law is the fact that it is only in effect during an armed conflict. That means that monitoring and enforcing the laws of armed conflict can be difficult at best, since there is no international and neutral police force or some other entity monitoring combatants in armed conflict.

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[291] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 281.
[292] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 36.
[293] Ibid.
[294] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 10.
[295] From Shakespeare's *Julius Caesar*. Cassius, a nobleman, is speaking with his friend, Brutus, and trying to persuade him that, in the best interests of the public, Julius Caesar must be stopped from becoming monarch of Rome. Brutus is aware of Caesar's intentions, and is torn between his love of his friend Caesar and his duty to the republic. Cassius continues by reminding Brutus that Caesar is just a man, not a god, and that they are equal men to Caesar. They were all born equally free, and so why would they suddenly have to bow to another man? On another level this phrase has been interpreted to mean that fate is not what drives men to their decisions and actions, but rather the human condition.

Human error, where soldiers under immense pressure and acting in good faith fail e.g. to properly distinguish targets is therefore common but reluctantly accepted as part of war. What is worse are the atrocities that cast a dark shadow on conflict in most of the 20th century and have indeed been prominent in the 21st century, predominantly in the Middle East. Having humans in charge of decision-making in combat is therefore by no means a guarantee that the rules of international humanitarian law go unbroken. Decisions in combat are often made in a split-second, and when looking into possible violations of international humanitarian law, so unbiased report can be hard to come by.

However, one such report, or story rather, *The Killer Elite,* appeared on the pages of Rolling Stone magazine, when reporter Evan Wright accompanied Bravo Company of the First Reconnaissance Battalion, the very first US soldiers to enter Iraq in the coalition invasion of 2003. Reconnaissance Marines are considered among the best trained and toughest in the Marine Corps.[296]

The story was also published as a book, *Generation Kill,* and was later adopted into a HBO mini-series of the same name. The story, although impossible to verify beyond all doubt, is written by a reporter who rode in the back seat of the first U.S. Humvee into Iraq. The story is written in the first person, and Sgt. Brad Colbert and Cpl. Harold Trombley are soldiers riding in the same vehicle as the reporter. Corpsman 2nd class Robert Timothy Bryan functions as platoon medic. The following texts are quotes from his article, and are intended to shed some light on how frail humans can be in combat:

> "We stop next to a green field with a small house set back from the road. Marines from a different unit suspect that gunshots came from the house. A Bravo Marine sniper observes the house for forty-five minutes. He sees women and children inside, nobody with guns. For some reason, a handful of Marines from the other unit opens fire on the house. Soon, Marines down the line join in with heavy weapons.
>
> One of Recon's own officers, whom the Marines have nicknamed Encino Man because of his apelike appearance, steps out of his command vehicle. He is so eager to get in the fight, it seems, he forgets to unplug his radio headset, which jerks his head back as the cord, still attached to the dash unit, tightens. Colbert, who believes the house contains only noncombatants, starts screaming, "Jesus Christ! There's fucking civilians in that house! Cease fire!" [...].
>
> Colbert sits in the Humvee, trying to rationalize the events outside that have spiraled beyond his control: "Everyone's just tense. Some Marine took a shot, and everyone has just followed suit."

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[296] Evan Wright: "The Killer Elite", p. 1.

> Before this event can be fully resolved, some Marines insist gunshots did come from the house [...]."

The day after, First Recon is ordered to capture an enemy airfield. An unnamed commander has apparently issued a command stating that "[e]verything and everyone on the airfield is hostile.":[297]

> "Everything and everyone on the airfield is hostile," Colbert says, passing on a direct order from his commander.
>
> Next to me in the rear seat, Trombley says, "I see men running."
>
> "Are they armed?" Colbert asks.
>
> "There's something," Trombley says.
>
> I look out Trombley's window and see a bunch of camels.
>
> "Everyone's declared hostile," Colbert says. "Light them up."
>
> Trombley fires a burst or two from his SAW. "Shooting motherfuckers like it's cool," he says, amused with himself."[298]

Not long later, a Bedouin woman approaches the soldiers, dragging a bundle. In that bundle is a young boy with four gunshot wounds from a U.S. weapon, obvious from the size of the entry wound. The incident was investigated, but both Trombley and Colbert were cleared of all accusations of violations of international humanitarian law.[299]

In light of this example, one can only wonder just *how* good LARs would have to be in order to be as good as or better than humans at assessing combat situations and apply the applicable principles of international humanitarian law.[300] Bear in mind that the description above is one of highly trained soldiers, so their ability to correctly assess a pressing combat situation should be better and more honed than those of ordinary soldiers.[301] Even so, with current technology, humans are undoubtedly more capable than the imagined LARs to operate within the parameters of international humanitarian law. As will be explored later in this

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[297] This order is highly controversial, as if might be in direct violation of the principle of distinction.
[298] Evan Wright: "The Killer Elite", p. 7-8.
[299] Ibid, p. 8.
[300] See chapter 2.4. of this thesis for an overview of the principles of international humanitarian law.
[301] Evan Wright: "The Killer Elite", p. 1. For further details of the activities of the First Reconnaissance Battalion the author recommends the other two parts of Wrights story, published in Rolling Stone issues 926 on July 10 and 927 on July 24 in 2003 and *Generation Kill,* the 2004 book by Wright about the same subject, as well as the HBO miniseries of the same name.

thesis, even if LARs eventually become more capable than humans, that still might not justify their usage on moral and ethical grounds.

4.3.4. The USS Vincennes and the Iran Air Flight 655 incident

As mentioned earlier in this thesis, the CIWS is a part of the Aegis Weapons System (AWS), a very sophisticated guidance system used on a number of surface vessels of the United States Navy, as well as being a part NATO's European Missile Defence System.[302] Despite its sophistication, the AWS was involved in a very serious incident, causing the death many civilians.

On July 3rd 1988, a missile was launched from the guided missile cruiser USS Vincennes at an Iranian passenger jet, known as Iran Air Flight 655, mistakenly believing it was a fighter attacking the vessel. All 274 passengers and 16 crewmembers were killed in the incident, a total of 290 civilian casualties. In the immediate aftermath, there was significant debate about the cause of the incident. A US Department of Defence report found that "combat induced stress on personnel may have played a significant role in this incident" and called for a study into "stress factors impacting on personnel in modern warships with highly sophisticated command, control, communications and intelligence systems, such as AEGIS."[303] It also, however, called for further investigation into certain design features of the Aegis system. Whatever the cause of the incident, it is safe to say that great care should be employed in the use of automatic weapons defense systems.

The warship's computers did accurately indicate that the aircraft was ascending and did not seem to be attacking the vessel. Nevertheless, *human error* led the crew to believe it was descending in an attack profile and engaged the aircraft. The DoD report states that "the downing of Iran Air 655 was not the result of any negligent or culpable conduct by any U.S. Naval personnel associated with the incident."[304] Even so Michael N. Schmitt points to the fact that "human error led the crew to believe it was descending in an attack profile, and, in order to defend the ship, they shot down the aircraft.[305] The report further states that the

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[302] White House Press Secretary: *Fact Sheet on U.S. Missile Defense Policy: A "Phased, Adaptive Approach" for Missile Defense in Europe,* September 17th, 2009. Available on http://www.whitehouse.gov/the_press_office/FACT-SHEET-US-Missile-Defense-Policy-A-Phased-Adaptive-Approach-for-Missile-Defense-in-Europe. Accessed March 3rd 2015.
[303] U.S. Department of Defense: *Formal Investigation into the Circumstances Surrounding the Downing of Iran Air Flight 655 on 3 July 1988.*
[304] *Ibid.* p. 61.
[305] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 13.

"AEGIS Combat System's performance was excellent - it functioned as designed. Had the CO (Commanding Officer) USS VINCENNES used the information generated by his C&D (command and decision) system as the sole source of his tactical information, the CO might not have engaged [Iran Air 655]."[306]

The report continues, citing the fact that time compression played a significant role in the incident. Only approximately three minutes and 40 seconds passed from the time the CO was informed of the possible threat to the vessel until he made the decision to engage the target. In addition, the CO was, according to the report, monitoring an ongoing surface engagement with enemy forces, giving him little time to personally verify the information presented to him by his crew - a crew that had his full confidence.[307] The so-called "fog of war and those human elements which affect each individual differently - not the least of which was the thought of the Stark incident[308] - are factors that must be considered."[309]

In examining psychological factors relating to the decision of the CO to engage what turned out to be a commercial aircraft, the report points to factors such as "stress, task fixation and unconscious distortion of data may have played a major role in this incident."[310] Additionally, the TIC[311] and the IDS[312] on duty on USS Vincennes became convinced that the aircraft being traced by the Aegis system was an Iranian F-14 fighter, after having received no identification report from the aircraft. After that, the TIC is believed to having unconsciously distorted data flow in order to "make available evidence fit a perceived scenario."[313] This is known as "scenario fulfillment," where an individual, perhaps unknowingly, alters the facts to make them fit their entrenched perception of the scenario.

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[306] U.S. Department of Defense: *Formal Investigation into the Circumstances Surrounding the Downing of Iran Air Flight 655 on 3 July 1988*, p. 61.
[307] Ibid.
[308]The USS Stark incident occurred during the Iran–Iraq War on 17 May 1987. An Iraqi fighter fired missiles at the American frigate USS Stark. Thirty-seven U.S. Navy personnel were killed and twenty-one were wounded. For a report of the incident, see the *Formal Investigation into the Circumstances Surrounding the Attack on the USS STARK on 17 May 1987,* available at: http://www.jag.navy.mil/library/investigations/uss%20stark%20basic.pdf
[309] U.S. Department of Defense: *Formal Investigation into the Circumstances Surrounding the Downing of Iran Air Flight 655 on 3 July 1988*, p. 61.
[310] Ibid, p. 63.
[311] The Tactical Information Coordinator (TIC) operates the Tactical Digital Information Links, which communicate tactical data among the ships and aircraft in the battle group.
[312] The Identification Supervisor (IDS) does Identification Friend or Foe (IFF) challenges on unknown aircraft and, when directed, initiates query or warning procedures for contacts.
[313] U.S. Department of Defense: *Formal Investigation into the Circumstances Surrounding the Downing of Iran Air Flight 655 on 3 July 1988*, p. 63.

Had the crew of the USS Vincennes not misinterpreted information from the computer system, most of us would ever have heard of Iran Air Flight 655. Instead, 274 passengers and 16 crewmembers lost their lives. If the Aegis system itself had had to make the decision to use lethal force, chances are it would not have, since a number of psychological factors that affected the crewmembers would not have had any effect on the computer.

4.3.5. Will robots be better at upholding the law than humans?

As has been illustrated in this thesis and further explored in the next chapter, Lethal Autonomous Robots seemingly have a long way ahead of them before they can be deployed on the battlefield without constantly running the risk of them committing war crimes. That does not change the fact that technology improves at such a great pace that what seems impossible to day will in the near future be not only possible but feasible and cheap. Michael Schmitt therefore asks what the consequences of prohibiting LARs at this stage would entail.[314]

Critics of autonomous weapons systems often miss the fact that they may be used to achieve military objectives with *less* threat of collateral damage than a human controlled system.[315] An autonomous weapons system could e.g. be armed with a less lethal weapon that for some reasons is not available to human combatants. The sensors of LARs could also eventually surpass the human eye, thereby being better suited to apply the principle of distinction and offer more precision, resulting in less harmful takedowns of enemy combatants and less unnecessary suffering.[316] With this, Schmitt argues that banning LARs at this stage could in the end result in more harm than good.

4.4. The legal, technical and ethical challenges of Lethal Autonomous Robots

When exploring whether Lethal Autonomous Robots will be a reality on the battlefields of the future, it is important to be able to pinpoint the challenges these machines are likely to face. The most obvious one, explored in this chapter, are the requirements of Article 36 of Additional Protocol I, the Martens Clause, the principles of distinction, proportionality and humanity, as well as the importance of humanity in international humanitarian law. Lastly,

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[314] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 25.
[315] Ibid.
[316] Ibid.

this chapter will consider the implications of derogating from having a human decide to use lethal force, and whether LARs can be considered illegal *per se.*

4.4.1. Article 36 of Additional Protocol I

Article 36 of Additional Protocol I to the Geneva Conventions places a burden on States to review new and modified weapons for their compliance with international law.[317] The ICRC has specifically highlighted autonomous weapons as a possible area of concern in its commentary on Article 36.[318] The commentary is as follows:

> The use of long distance, remote control weapons, or weapons connected to sensors positioned in the field, leads to the automation of the battlefield in which the soldier plays an increasingly less important role [...]. All predictions agree that if man does not master technology, but allows it to master him, he will be destroyed by technology.[319]

The Human Rights Watch argues that the review of weapons should take place at the earliest stage possible and continue throughout the development process.[320] Michael N. Schmitt points to the fact that this is clearly a legal requirement for States party to the Additional Protocol. Other States, such as the United States, have no obligation to review weapons systems in the fashion Article 36 spells out, but simply before the weapons are used.[321] He non the less agrees with the Human Rights Watch in arguing that early legal reviews can shape the development stages of weapons systems. According to Schmitt, the U.S. policy is to conduct two legal reviews, one before entering development and again before the weapons systems is fielded.[322]

Both the requirements of Article 36 and the internal revision protocols of the United States are likely to provide some reassurance that if and when LARs will eventually be fielded, they will be capable of following the rules of international humanitarian law.

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[317] Article 36: "In the study, development, acquisition or adoption of a new weapon, means or method of war, 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."
[318] Human Rights Watch: *Losing Humanity*, p. 21.
[319] International Committee of the Red Cross: *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949.*
[320] Human Rights Watch: *Losing Humanity*, p. 22.
[321] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 28.
[322] Ibid.

4.4.2. The Martens Clause

The Martens Clause is yet another guideline that must be kept in mind when reviewing the legality of Lethal Autonomous Robots.[323] Scholars are non the less skeptical, in light of how international humanitarian laws have been codified in the latter half of the 20th century, that the Martens Clause would ever be considered when estimating the legality of a weapons system.[324]

4.4.3. The principle of distinction

The Special Rapporteur points out that robots might never meet the requirements of international humanitarian law.[325] The biggest challenge facing LARs will definitively be that of distinguishing legal targets from illegal ones, i.e. to be able to identify whether an individual in a combat zone is a civilian or a combatant, and furthermore whether that combatant is *hors de combat,* having laid down his weapon and surrendered or is wounded beyond the point of being able to continue fighting.

In *Killer Robots,* Armin Krishnan furthermore points to three main concerns when exploring if and how LARs will be able to act in accordance with the principle of distinction, *weak machine perception*, a *frame problem* deriving from the problems resulting from weak machine perception and *weak software.*[326] These three issues will be separately explored in this chapter.

Distinction requires an evaluation based on sensory input to the robot's computer. Currently, the sensors available to robots are in no way capable of distinguishing targets properly in order to recognize a legitimate target from an illegitimate one. This would result in *weak machine perception.* In the modern day asymmetric warfare, human soldiers often have great difficulty distinguishing between enemy combatants and civilians. This problem is only likely to be exacerbated by the fact that programming a LAR to recognize civilians and combatants, and being able to tell one from the other, would be a great feat, one that at this point is probably not within our technological grasps in the near future.

Dr. Noel Sharkey, an expert in the field of robotics even stated that currently, albeit in 2013, that "the idea of a weapons system going off and finding its own targets at the minute is

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[323] The Martens Clause and its effects and implications were explored in chapter 2.3.5. of this thesis.
[324] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 32.
[325] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 6.
[326] Armin Krishnan: *Killer Robots,* p. 98-99.

ridiculous, because there is no way that a robot can discriminate between a child and a soldier."[327] Dr. Sharkey continues, describing a program being launched by robotics departments from six respected European universities, with seven million euros of funding over five years. Their project, Dr. Sharkey describes, is to create an autonomous system "that can tell the difference between an old person lying on the ground collapsed, and a duffel bag. That's how advanced we are."[328] He concludes by asking that if this is the pinnacle of autonomous robotic technology, how can there be people contemplating sending LARs to war, it being "absurd and morally outrageous."

Current robotic technology is therefore only beginning to distinguish between humans and non-humans, let alone civilians and combatants.[329] In the modern battlefield, the non-international conflicts are far more common than international armed conflicts; non-uniformed combatants have become the norm rather than the exception. In the case of non-uniformed combatants, a soldier can only engage if the target is directly engaged in hostile activity or intends to engage in hostile activity. A great deal of situational awareness would therefore be required on behalf of the robot, as well as understanding of human intentions.[330] Operating LARs in environments where civilians reside could therefore, if LARs will never be capable of distinction, not be an option. That does not mean they could not be deployed in areas void of civilians, such as in desert warfare.[331] Although correct as far as it goes, this approach is unrealistic as modern warfare is leaning more towards urban fighting that the clashes of tanks. It is therefore doubtful that any State would field expensive LARs only in such extreme situations.

The result oft the problem of weak machine perception would lead to the *frame problem.* Given all the information the LAR would have to process before making the decision to use lethal force, the window of opportunity might already have closed. LARs would therefore have to be able to discern between relevant and irrelevant information, but in order to do that they would nevertheless have to process all available information. This could lead to incorrect interpretation of information, leading to indiscriminate attacks. Krishnan therefore argues that

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[327] "The Case Against Killer Robots with Dr. Noel Sharkey," from 03:30 through 04:00. Available at: https://www.youtube.com/watch?v=d2M1GVs0FT4. (accessed February 12th 2015.)
[328] "The Case Against Killer Robots with Dr. Noel Sharkey," from 04:00 through 04:40. Available at: https://www.youtube.com/watch?v=d2M1GVs0FT4. (accessed February 12th 2015.)
[329] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", EAP. 4.
[330] Noel Sharkey: "Saying 'No!" to Lethal Autonomous Targeting", p. 379.
[331] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 11.

LARs would simply be too slow to be deployed in the modern battlefield.[332] This is made even more complicated by the fact that an attack is considered unlawful if there is significant doubt regarding the legitimacy of the target.[333] This problem does, however not give rise to the assumption that a target is automatically considered unlawful if its legitimacy is questionable, the doubt must rather cause "a reasonable attacker in the same or similar circumstances to hesitate before attacking," the threshold of which is framed in terms of human reasonableness, causing further complications for LARs.[334] Schmitt suggest solving this by not programming the doubt thresholds of the LARs unreasonably high, i.e. program LARs to be more likely to attack than not, essentially giving less weight to any doubts, LARs would be able to operate without violating the principle of distinction.[335]

A well-known fact of software is that it becomes less predictable as it becomes more complicated. When programming LARs, no single programmer could realistically be aware of all possible outcomes of the software of a LAR after it has entered the battlefield.[336] Furthermore, an argument has been made that LARs will not be able to distinguish civilians from combatants. Although it might at one point in time be possible for LARs to make this distinction, there is no clear-cut definition of a "civilian" or "combatant".[337] The challenges the principle of distinction puts before Lethal Autonomous Robots therefore looks like one that they will not be able to meet in the near future.

4.4.4. The principle of proportionality

The principle of proportionality, as explored previously in this thesis, requires a contextual weighing of two factors: the potential military advantages of an attack and the potential harm to civilians. Military commanders already have collateral damage calculators to assess this damage, known as the CDEM.[338] Assessing the potential military advantage could, however, prove more difficult. The evaluations of the reasonable military commander allow for operational discretion, one that LARs might not be capable of, even if they were capable of very complex calculations. Therefore, the "contextual and discretionary nature of

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[332] Armin Krishnan: *Killer Robots,* p. 106.
[333] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 16.
[334] Ibid.
[334] Ibid.
[335] Ibid, p. 17.
[336] Armin Krishnan: *Killer Robots,* p. 100.
[337] Noel Sharkey: "Automating Warfare: Lessons Learned from the Drones", EAP. 4-5.
[338] See chapter 2.4.5. of this thesis.

proportionality is what causes concern that [LARs] may be incapable of adhering to the principle [of proportionality]."[339] Proportionality and distinction, although separate concepts of international humanitarian law, are still in a sense two faces of the same coin. Without distinction there can be no weighing of proportionality, and when distinction has been made, even then certain foreseen civilian casualties may be considered proportionate in light of the military advantage.

Adherence to the principle of proportionality requires some degree of subjective assessment, and can be difficult to apply in practice. The weighing of military advantage and collateral damage has to be done on a case-by-case basis, meaning that it would be a great challenge to program LARs to be able to accurately establish proportionality.[340] LARs would have to be able to anticipate the results of all possible decisions and how many civilian lives might be lost, and be able to react accordingly.[341] As previously mentioned, there are currently systems capable of assessing collateral damage and determining the level of command required to authorize an attack. The higher the probability of collateral damage, the higher the rank needed to issue the attack.[342] In order for a LAR to calculate collateral damage, it would have to make assumptions based on limited information, which could take such an excessive amount of time that the decision would be obsolete in the fast paced battlefield before the robot could react.[343] This would therefore be yet another challenge for LARs. At present, there is also no system capable of calculating military advantage, although Schmitt argues that such a system would not be impossible to make.[344] These calculations would be plagued by the same problem as collateral damage calculations, a very vast number of possible outcomes, both long and short term, leading to the inability of the robot to act or worse, errors and disproportionate attacks. Both collateral damage and military advantage are constantly shifting and dependent on context.[345] Although humans are not perfect at assessing these situations, they presently seem a lot more qualified than LARs.

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[339] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 56.
[340] Ibid, p. 59.
[341] Ibid.
[342] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 19-20.
[343] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 60.
[344] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 19-20.
[345] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 60.

One scholar has suggested that these challenges would render LARs "almost useless except in the narrowest of circumstances."[346] If LARs cannot be programmed to meet the standard of the reasonable military commander, they might never be able to execute a proportionate attack. The aforementioned weighing of collateral damage and military advantage might even present such challenges that LARs could never be programmed to perform these calculations adequately and with the necessary certainty.[347]

4.4.5. The principle of humanity

The aforementioned challenges that Lethal Autonomous Robots are likely to face, i.e. acting within the boundaries of the principle of distinction and proportionality, are not likely to give rise to concerns whether they will cause unnecessary or superfluous injury, since their autonomy will as such not have a bearing on the probability of whether they would cause such injuries, even if individual LARs could be programmed to violate all and every rule of international humanitarian law. Humans already do that themselves. International humanitarian law would nonetheless limit their usage in certain situations, as is the case with any type of weapon.[348]

4.4.6. Just war theory

If one is to assume the existence of a just cause, where armed conflict is a viable and justifiable option, such as in self-defence, the option of sending robot soldiers rather than actual soldiers should be celebrated under the *Just war theory.*[349] This reduced cost of life might however affect the rigor in which non-violent alternatives are pursued, thereby encouraging unnecessary, and inevitably, unjustifiable wars. Maximizing the potential cost of war is of course not a viable strategy when trying to ensure peace, the inevitable loss of life in war can be considered a necessary evil in the decision making process of national security decision-makers.

Lethal Autonomous Robots could profoundly effect the decision to go to war. Sending an army of machines to war, rather than young men with wives and kids waiting at home, could

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[346] Markus Wagner: "The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems," EAP 9.
[347] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 284.
[348] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 35.
[349] The Just war theory, (Lat. *Jus Bellum Justum*) is a compilation of criteria that is needed to fulfill if a war is to be considered morally and ethically justifiable.

end up making the decision to go to war a lot easier, as the loss of human life is a fundamental impediment on the decision to go to war.

Additionally, Peter Singer argues that LARs could undermine counterinsurgency efforts, where the respect and trust of the local population is vital in creating a chance of success of the overall campaign.[350] Unmanned weapons systems may be recognized and perceived as being indicative of flawed characters and a lack of commitment, and are incapable of creating and nurturing necessary personal relationships with local citizens. And even LARs would be better than soldiers sometime in the future, they would probably be perceived as inferior."[351]

4.4.7. The human factor in international humanitarian law

Even though humans are in a sense the weakest link in the modern battlefield, humans possess an element that could prove difficult to teach machines, i.e. humanity. Sometimes it takes the human eye, or brain, to make judgments based on common sense, gut feeling or behavior of the observed target, the ability to look at the big picture and understanding motives and intentions behind the actions of other human beings.[352] The Special Rapporteur states that:

> Decisions over life and death in armed conflict may require compassion and intuition. Humans – while they are fallible – at least might possess these qualities, whereas robots definitely do not. While robots are especially effective at dealing with quantitative issues, they have limited abilities to make the qualitative assessments that are often called for when dealing with human life. Machine calculations are rendered difficult by some of the contradictions often underlying battlefield choices. A further concern relates to the ability of robots to distinguish legal from illegal orders. While LARs may thus in some ways be able to make certain assessments more accurately and faster than humans, they are in other ways more limited, often because they have restricted abilities to interpret context and to make value-based calculations.[353]

In a previously mentioned radio interview, Dr. Noel Sharkey brought up the case of when during massive protests against President Hosni Mubarak of Egypt; the Egyptian military commanders issued a statement in January of 2011 stating that Egyptian troops would not fire at protesters.[354] The protests, that later spread through the Arab world, later became known as

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[350] Peter Singer: *Wired for War,* p. 299.
[351] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 285.
[352] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 10.
[353] Ibid, p. 10-11.
[354] "Egypt protests: Army rules out the use of force", http://www.bbc.co.uk, January 31st 2011, last updated at 22:45 on that date. Available at: http://www.bbc.co.uk/news/world-middle-east-12330169 (accessed February 23rd 2015.)

the Arab Spring, a wave of protests in a number of Arab countries where dictators were overthrown.[355] In stating his case, Dr. Sharkey points to:

> "[a] dictatorship or some sort of authoritarian regime, imagine the Arab Spring. In Egypt, the soldiers refused to fire [...]. Autonomous robots are not going to refuse to fire on anybody, they just do what you program them to do. [...] [A]ll you need is a bunch of very loyal henchmen that are programmers and you're away. You're going to be able to kill people left, right and center, particularly if you are not very moral like Syria at the moment, and you are not really concerned for civilians. That's a perfect place for robots at the moment. [...]. That would be ideal for [Assad], to just have robots slaughtering everybody. And it wouldn't be that hard when you are not worried about morality.

Dr. Sharkey paints a very bleak picture with his monologue, but at the same time he underscores the importance of keeping humans involved in armed conflict so that the principles of international humanitarian law can prevail in times of armed conflict. Using Dr. Sharkey's words, once LARs have entered the battlespace, there is no preventing those that seek to remain in power despite opposition from the population, such as President Assad in Syria, or those that wish to cause unspeakable suffering to others, as is the case with ISIS in Syria in Iraq, to simply reprogram LARs to "forget" the rules of international humanitarian law, most importantly the principle of distinction, thereby making the other fundamental principles null and void.

One can of course argue that these indiscriminate killings are already taking place. Syria is in a prolonged state of civil war, and ISIS militants have little regrets over killing innocent civilians and burning POW's alive, both examples of very serious violations of international humanitarian law.[356] Adding LARs to the battlefield to do the illegal dirty work would therefore hardly add much harm. That argument for LARs is not a particularly strong one, especially in light of the experience from Egypt, where, although no order to engage civilians was officially given, human soldiers with human emotions and empathy, preemptively declared that such an order would not be carried out.

4.4.8. Arbitrary killings of a machine

Even if Lethal Autonomous Robots will eventually be able to comply perfectly with international humanitarian law, perhaps even better than humans themselves can, the Special Rapporteur has pointed to another factor that needs to be considered. He argues that in most

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[355] "Arab Uprisings 3 years on", http://www.bbc.co.uk, November 12th 2014. Available at: http://www.bbc.com/news/world-middle-east-12813859 (accessed February 23rd 2015).
[356] BBC: "Jordanian pilot hostage Moaz al-Kasasbeh 'burned alive'", http//:www.bbc.co.uk, February 3rd 2015. Available at: http://www.bbc.com/news/world-middle-east-31121160 (accessed February 13th 2015).

legal, moral and other codes, the underlying assumption is always that the decision to take life or to subject people to other grave consequences, such as the destruction of property, should be made by humans.[357] In this argument, he points to the fact that Article 1(1) of the 1907 Hague Convention requires that combatants have "to be commanded by a person". Furthermore, the Martens Clause demands the application of "the principle of humanity" in armed conflict.[358] It is questionable how to apply humanity when humans are no longer in control.

Furthermore, the philosopher Peter Asaro maintains that international humanitarian law has an underlying principle that only humans can be given the power over life and death. Therefore, all non-human decisions to en a life or use deadly force would result in inherently arbitrary killings.[359]

Despite this, it is clear that machines will not make decisions of their own. As has been pointed out in this thesis, the "decisions" of machines can, simply put, be boiled down to IF/THEN code. A programmer or, more likely, a team of programmers, will write this code. It can therefore be argued that the programmers had in fact already made the life-or-death decisions the LARs would "make" based on its code. In the modern battlefield, it could be difficult to discern the decision of a cruiser commander to launch a missile at a target very far away and a programmer who creates a machine that decides to use lethal force. This logic does, however, not add up. The creation of a set of predetermined conditions on which a robot operates cannot be compared to pulling the trigger of a rifle or deciding to launch a Tomahawk missile. Such decisions are made by humans on the spot when faced with the reality of the situation.

The Special Rapporteur believes this argument, of the arbitrariness of machine killing, to overshadow all other arguments. Even if LARs, could comply with the rules of international humanitarian law and would *on average* be better than humans at complying with the law, the question still remains whether it is inherently wrong to let autonomous machines decide who and when to kill.[360] This thesis has largely focused on whether LARs will ever be capable of distinguishing civilians from enemy combatants and act accordingly. The Special Rapporteur

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[357] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 16.
[358] Ibid, p. 16-17.
[359] Peter Asaro: "On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-making" p. 699.
[360] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 17.

brings up the argument that even if LARs will be able to do that, the question remains whether their usage would still be a violation of international humanitarian law if such usage would entail non-human entities deciding to use lethal force. If the answer to that question is no, LARs would by default be in violation of international humanitarian law, no matter how technologically advanced they will eventually become. That would not only create a loophole when it comes to legal responsibility, but moral responsibility as well.[361] When humans decide to use lethal force, there is the option of deliberation and morality, an aspect that is hard to imagine machines possessing. By giving LARs the power to kill would therefore dehumanize armed conflict even further.[362]

The choice of word in the report of the Special Rapporteur is interesting.[363] By using the phrase *non-human entities,* one is immediately thrown back to the Nuremberg trials, as quoted on the first page of this fourth chapter:

> "Crimes against International Law are committed by men, not by abstract entities, and only by punishing individuals who commit such crimes can the provisions of International Law be enforced."[364]

This is no coincidental use of words by the Special Rapporteur. The experience of the two World Wars of the last century highlighted the importance of "requiring humans to internalize the costs of armed conflict, and thereby hold themselves and their societies accountable for these costs."[365] It would therefore be dangerous to measure the performance of LARs against a minimum human standard during conflict, as human beings have proven themselves to be able to take actions above and beyond this minimum standard, showing grace and compassion even in times of war. Replacing them by entities that operate on the margin, never falling below the minimum standard set by international humanitarian law, but never rising above it, risks "giving up on hope for a better world."[366]

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[361] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 17.
[362] Ibid, p. 17.
[363] "The question here is whether the deployment of LARs against anyone, including enemy fighters, is in principle acceptable, because it entails *non-human entities* making the determination to use lethal force." - UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 17.
[364] The Trial of Major War Criminals: Proceedings of the International Military Tribunal Sitting at Nuremberg Germany, Part 22, paragraph 447.
[365] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 18.
[366] Ibid.

4.4.9. Inherent illegality of Lethal Autonomous Machines

Lastly, it is worth exploring whether LARs could potentially be considered illegal *per se* under international humanitarian law. In order for a weapon or weapons system to be considered illegal *per se*, it has to cause superfluous injury or unnecessary suffering, or is wholly incapable of adhering to the principles of international humanitarian law.[367] In the *Nuclear Weapons* advisory opinion the International Court of Justice concluded that even nuclear weapons were not inherently incapable of distinction or proportionality, nor would they in all cases cause superfluous injury. Since nothing indicates that LARs, provided they are capable of distinction, would cause any more suffering than conventional weapons wielded by humans, they could not be considered illegal *per se* on those grounds. Furthermore, if nuclear weapons are not to be considered illegal *per se*, despite other weapons having been deemed illegal, then it would be very hard to argue that LARs should be treated as illegal *per se* before ever leaving the drawing board.[368]

4.5. Assigning responsibility for the acts of Lethal Autonomous Robots

Responsibility is a key factor in upholding international humanitarian law and to ensure accountability for infractions. Without responsibility and accountability, the deterrence and prevention mechanism of international humanitarian law are reduced, resulting e.g. in less protection for civilians.[369] International humanitarian law has a number of ways of implementing responsibility.

Historically, international humanitarian law has imposed obligations upon States. This dramatically changed in the aftermath of the Second World War, as well as applying international humanitarian law to non-international conflicts with the adoption of Common Article 3 of the Geneva Conventions.[370] Following the atrocities of the war, the victorious nations brought individual perpetrators of the atrocities to justice in the Nuremberg Trials conducted by the International Military Tribunal.[371] The judgment of the Tribunal is notable for the notion that wars are fought and orchestrated by individuals, not States.[372] Another

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[367] *Legality of the Threat or Use of Nuclear Weapons,* ICJ Advisory Opinion, July 8th 1996, paragraphs 74-87.
[368] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 53.
[369] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 42-45.
[370] Jonathan Crowe & Kylie Weston-Scheuber: *Principles of International Humanitarian Law,* p. 164.
[371] Ibid, p. 166-167.
[372] Ibid, p. 167-168.

important stance by the Tribunal is that combatants cannot hide behind commands of superior officers by stating they were simply following orders. This has become known as the "Nuremberg defence".[373]

The obvious question in the case of LARs is that if they were to violate international humanitarian law, who could be held responsible? The Human Rights Watch points to four options: the military commander, the programmer, the manufacturer or even the robot, but argues that none of these options is satisfactory. Granting fully autonomous robots complete control over targeting decision would therefore undermine civilian protection, effectively creating a vacuum on responsibility.[374] In the following chapter, different possible forms of responsibility over LARs will be explored. If no one can be held accountable for the actions of LARs, their legality under international law would seriously be called into question, granting impunity for all LAR use.[375]

4.5.1. Command responsibility

The first option is to hold the commander of the LAR accountable for the actions of the robot in the battlefield. Commanders in the battlefield are held responsible for the actions of autonomous human beings, so assigning them responsibility over LARs under their control may seem obvious.[376] Command responsibility is the preferred approach of the military forces seeking to deploy LARs.[377]

Command responsibility is, however, only considered when the commander "knew or should have known that the individual planned to commit a crime yet he or she failed to take action to prevent it or did not punish the perpetrator after the fact."[378] Schmitt suggests that a commander or a civilian commander of a LAR would be accountable for war crimes committed by the robot "*if he or she knew or should have known* that the autonomous weapon system had been so programmed [to commit war crimes] and did nothing to stop its use, or later became aware that the system had been employed in a manner constituting a war crime

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[373] Ibid, p. 168.
[374] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 42.
[375] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 15.
[376] Ibid.
[377] Robert Sparrow: "Killer Robots," p. 70.
[378] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 15; Arts. 86 (2) and 87 of Additional Protocol I to the Geneva Conventions.

and did nothing to hold the individuals concerned accountable."[379] His conclusion is obviously derived from the text of the Additional Protocol, but he fails to recognize the extremely complex programming that is likely to be necessary for LARs to be able to operate, let alone operate in accordance with international humanitarian law in the battlefield. Military commanders, capable as they may be, might not be in a position to understand this complex programming and it might therefore not be right to assign criminal responsibility to said commanders.[380] This possible responsibility would however be considered if the commander knew of the flaws of the LAR and decided to deploy it anyway.[381] The complex programming would however in most cases render commander responsibility ineffective, creating another potential responsibility gap.

4.5.2. Programmer responsibility

In light of this aforementioned complex programming of lethal autonomous robots, holding the programmer responsible for unlawful acts of the LAR might therefore be in order. This could be justified if the war crimes committed by a LAR could be considered a design flaw of some sort, a glitch or improper code. Complex systems are however prone to failures and malfunctions, and computer programs are often not nearly as predictable as programmers, or in fact end users, would like them to be. Increasing complexity may furthermore lead to emergent behavior in programs; something the program was not programmed to do but arises simply from the complexity of the program.[382]

There is also difficulty when it comes to placing blame on the "programmer". When programming complex systems, teams of programmers usually work together on a single project, often not fully aware of the roles of other programmers or what the end result of their work will be. Given the difficult situations LARs would most likely face on the modern battlefield, their code would be millions of lines, with no single programmer responsible for the entire programming. Even seemingly simple rules such as Asimov's Law of Robotics could create dilemmas. [383] If LARs eventually make it onto the battlefield, they will after all be autonomous. On the battlefield, the robot could make "decisions" the programmers had not

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[379] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 33.
[380] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 15.
[381] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 43.
[382] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 284.
[383] Ibid. See also first page of chapter 3.

foreseen or encounter a number of unpredictable scenarios, so the possibility of a robot making other choices than those the programmers had foreseen is after all a part of being autonomous.[384] When programming the Space Shuttle, as many as 260 people were responsible for overseeing the code that gave a green light for launch in a very protected and predictable environment. The code was 420.000 lines long.[385] Coding all possible versions of a "civilian" is likely to need far more than that. Holding programmers responsible under international humanitarian law would therefore "only be fair if the situation described occurred as a result of negligence on the part of the design/programming team."[386] Lastly, in order for programmers to be held criminally liable under international humanitarian law the programmer would have to have caused the unlawful act intentionally. Inadvertent or unforeseeable effects would free programmers from responsibility.[387] Additionally, as is feared with drone pilots, having programmers living in constant fear of being tried for war crimes that resulted from their code indefinitely would hardly serve any purpose for upholding international humanitarian law.

Even so, Schmitt finds that even though a LAR is not operated by a human that does not mean no human is responsible for it. A human, he argues, must decide how to program the system, making the individual accountable for the programming accountable for the actions that amounted to war crimes.[388] In light of the problematic nature of this approach, illustrated in this chapter, the author of this thesis must conclude that it would be difficult to place criminal liability under international humanitarian laws on the programmers of LARs.

4.5.3. Manufacturer responsibility

Some have suggested the strict product liability of manufacturers as a model for holding manufacturers of LARs responsible for their potential violations of international humanitarian law.[389] Holding manufacturers strictly liable for shortcomings of their products is argued to encourage these manufacturers to produce highly reliable LARs in order to avoid liability.[390] This still falls short of an adequate solution according to the Human Rights Watch.

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[384] Robert Sparrow: "Killer Robots," p. 69-70.
[385] Charles Fishman: "They write the right stuff," Fast Company Magazine.
[386] Robert Sparrow: "Killer Robots," p. 69.
[387] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 44.
[388] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 33.
[389] Patrick Lin, George Bekey, and Keith Abney, "Autonomous Military Robotics: Risk, Ethics, and Design," p. 55-56.
[390] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 44.

Manufacturers are usually not punished for how their weapons are used, especially if they explicitly disclose that these weapons are not infallible.[391] If this strict liability were to be applied to LARs, it is highly unlikely that any arms manufacturer would produce the weapons in the first place, knowing the company could be held strictly liable for any use that would violate international humanitarian law.[392] Additionally, product liability requires a civil suit, putting the onus on the victim. It is hardly an option for those victims to sue for relief in a foreign court. Strict manufacturer liability is therefore not a realistic way to place responsibility of lethal autonomous machines.[393]

4.5.4. Pre-determined responsibility

Novel ways to establish legal responsibility have emerged when debating LARs Ronald Arkin has suggested that pre-determining who is responsible.[394] In the case of LARs, technology would enable a meticulous review of all of the robots actions, making a recording device a precondition for their legality and operations.[395] Splitting the responsibility by amending the rules of command responsibility might also be considered, and a stronger emphasis on State responsibility as opposed to individual responsibility may be an option in cases of state usage of LARs.[396] However, as established by the International Military Tribunal, "war crimes are committed by men, not by abstract entities, and only by punishing individuals who commit such crimes can the provisions of International Law be enforced."[397] Shifting the burden of responsibility away from individuals and placing that burden on an "abstract entity" would therefore not be in the spirit of contemporary international humanitarian law.

4.5.5. Holding the robot responsible

One final option when assigning responsibility of LARs, brought to the discussion by Robert Sparrow, would be to hold the robot itself responsible.[398] Starting out, this form of justice would require a fundamental change to the practices of courts such as the International Criminal Court. In Article 25(1) of the Rome Statute of the ICC, the Court clearly only has

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[391] Robert Sparrow: "Killer Robots," p. 69.
[392] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 44.
[393] Ibid.
[394] Ronald Arkin: *The Robot didn't do it*, p. 1.
[395] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 281.
[396] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 15.
[397] The Trial of Major War Criminals: Proceedings of the International Military Tribunal Sitting at Nuremberg Germany, Part 22, paragraph 447.
[398] Robert Sparrow: "Killer Robots," p. 71.

jurisdiction over natural persons. Trying machines, silicate and software, would therefore be hard, if not impossible.

Apart from these legal complications, it is hard to see *how* a robot could be held responsible. Sparrow illustrates this by stating that:

> To hold that someone is morally responsible is to hold that they are the appropriate locus of blame or praise and consequently for punishment or reward. A crucial condition of the appropriateness of punishment or reward is the conceptual possibility of these treatments. Thus in order to be able to hold a machine morally responsible for its actions it must be possible for us to imagine punishing or rewarding it.[399]

In the case of robots that are by no means self-aware, imprisoning them would provide little deterrence on further machine violation of international humanitarian law.[400] Sparrow further argues that LARs can in this sense be compared to child soldiers. Children are only responsible for their own actions to a certain point. Punishing child soldiers that might not possess less than full moral agents of adults would seem not only cruel but also pointless and offering little retribution for victims.[401] Of the proposed forms of responsibility for the actions of LARs, this option can almost immediately be stricken from the list.

4.6. The way forward - how to handle Lethal Autonomous Robots

Having reviewed the case of Lethal Autonomous Robots, their possible advantages in the battlefield, but also the technical, legal and ethical challenges they will face on their way to, and perhaps on, the battlefield, one must also summarize the possible ways forward when structuring rules for this futuristic concept. International organizations and scholars have put forth a number of possibilities. This final segment of Chapter 4 will look into some of these options.

4.6.1. Relying on the current international humanitarian legal regime

In light of the fact that Lethal Autonomous Robots would unlikely be considered illegal *per se*, one could argue that the current international humanitarian legal regime will be sufficient when confronted with LARs. Schmitt argues that their autonomy would not affect their ability to operate within the boundaries that humans operate within, and therefore they cannot be

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[399] Robert Sparrow: "Killer Robots," p. 71.
[400] The study of a robots conscience falls far outside the reach of this thesis. The author suggests reading Sparrows Killer Robots from page 71 and onwards for a theoretical discussion of the subject.
[401] Robert Sparrow: "Killer Robots," p. 73-74.

categorically rejected.[402] International humanitarian law already restricts the use of weapons in most combat situations, and the thought of machine autonomy in the battlefield raises unique questions, but the current legal system is, according to Schmitt, adequately prepared to deal with these questions.[403] Article 36 of Additional Protocol I requires all member States to "determine whether [a weapons system] employment would, in all or some circumstances, be prohibited by this Protocol or by any other rule of international law [...]." By including "any other rule of international law", it serves as a sort of Martens Clause for the development of weapons. The downside is that not all States, such as the United States, are signatories to the Additional Protocol. It would, however, appear that they are obligated to review weapons systems and make sure they are capable of complying with the rules of international humanitarian law.[404] This assumption is based on the DoD Directive 3000.09, where the U.S. publicly declares that autonomous weapons systems must be reviewed before they are put to use, but is somewhat lacking in the sense that is proposes keeping humans in the loop in the decision making process of the robot.[405]

4.6.2. Keeping humans in the loop

Keeping humans in the loop is an operational solution rather than a legal solution. It entails having humans supervise LARs, thereby effectively making them non-autonomous. In his award-winning article, James Foy suggests that humans should simply be kept in the loop when it comes to targeting decisions of LARs, and would thereby be capable of complying with international humanitarian law.[406] Foy points to the fact that in the DoD Directive 3000.09 on autonomy in weapons systems, the DoD states that "autonomous and semi-autonomous weapons systems shall be designed to allow commanders and operators to exercise appropriate levels of human judgment over the use of force."[407] He adds that this would, however, not offer any guarantees as to their compliance with international humanitarian law in the future.

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[402] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 35.
[403] Ibid.
[404] Ibid.
[405] US Department of Defense: *Autonomy in Weapons Systems*, Directive Number 3000.09 p. 2.
[406] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 64-65.
[407] US Department of Defense: *Autonomy in Weapons Systems*, Directive Number 3000.09 p. 2.

Furthermore, as pointed out previously in this thesis, robots are at this point not capable of sufficiently distinguishing civilians from combatants.[408] Removing humans from the loop at this point would therefore serve no purpose, and might very well lead to violations of international humanitarian law. The possibility of eventually removing humans from the loop will grow as technology improves, which it most likely will. Foy lists less expenses, lower reliance on communication networks and faster response times of robots as examples of these benefits.[409] These are benefits that militaries are unlikely to be willing to give up without a fight. Keeping humans in the loop is therefore a premature and temporary solution to a future problem, as humans would eventually be taken out of the loop.

4.6.3. Employing an Ethical Governor

Ronald C. Arkin has proposed that LARs could be embedded with ethics to ensure their compliance with international humanitarian law. By limiting the actions LARs can take through an "ethical governor", Arkin suggests that LARs will be capable of obeying international humanitarian law, and at some point be able to surpass humans in their obedience of the law.[410]

In his article, Arkin tries to "translate" the rules of international humanitarian law into a programmable and logical structure. This is very pragmatic approach to solving the problem of LARs' compliance with international humanitarian law. Arkin however assumes that there will be a way for situational assessment in the battlefields, something that has so far yet to emerge.[411] Furthermore, since the ethical governor is likely to be a very sophisticated and complex program, it could, at this stage, only be implemented in larger LARs, capable of immense calculation in a short period of time.[412]

4.6.4. Banning Lethal Autonomous Robots before they leave the drawing board

One course of action in dealing with LARs would be to ban them before they ever exist. This must be viewed as an unlikely option, as States have in the past not been willing to preemptively proscribe the use of fielding of new weapons or weapons systems before they

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[408] See chapter 4.4.3.
[409] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 64-65.
[410] Ronald Arkin: "Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/ Reactive Robot Architecture," Georgia Institute of Technology GVU Technical Report GIT-GVU-07-11", p. 61.
[411] Ibid, p. 22.
[412] James Foy: "Autonomous Weapons Systems: Taking the Human out of International Humanitarian Law", p. 65.

enter the battlefield. The only example of this is the ban on permanently blinding lasers.[413] Schmitt points out that this preemptive ban deprived States of very little military advantage, since temporarily blinding lasers generally have the same military effect as permanently blinding ones.[414] Without having explored the full potential of LARs, States are therefore very unlikely to be willing to accept an outright ban on LARs at this point.[415] It is important to note that the militaries of today do not exist in a vacuum and are well aware of the humanitarian implications of these systems, as is demonstrated by the US DoD directive on autonomous weapons systems.[416]

Even so, the Human Rights Watch has proposed the development and production of fully autonomous weapons should be preemptively banned, stating that the threats that LARs will pose to civilians in a time of war are to great.[417] They argue that a prohibition would ensure that the decision to use lethal force would be in the hands of humans that are better than machines when it comes to interpreting a targets' actions and intentions, are better at judging complex situations and are empathetic beings, capable of acts of mercy. This would also make accountability for unwarranted actions easier, increasing deterrence on unlawful actions and enable just retribution.[418] The Human Rights Watch envisages a ban that would apply to robotic weapons that make the choice to use lethal force without human input or supervision. The prohibition should in their view also apply to weapons with limited human involvement in targeting decisions that effectively mean that humans are out of the loop.[419] As seen in Chapter 3 of this thesis, these weapons, or weapons that are tantamount to having eliminated human involvement are arguably already present in the battlefield.

The government of Pakistan has stated its desire to have the international community preemptively ban the development, production and eventual fielding of LARs. This was made clear, as previously mentioned in this thesis, when the Pakistani delegation addressed the Special Rapporteur and other delegations during the Interactive Dialogue with the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, 23rd session of the Human Rights Council. There, the delegation pointed to the fact that "the experience with drones

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[413] Protocol IV on Blinding Laser Weapons to the Convention on Prohibition or Restriction on the Use of Certain Conventional Weapons, which may be Deemed to be Excessively Injurious or to have Indiscriminate Effects.
[414] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 36.
[415] Ibid.
[416] US Department of Defense Directive: *Autonomy in Weapons Systems*, Number 3000.09 p. 11-12.
[417] Human Rights Watch, "Losing Humanity: The Case Against Killer Robots", p. 46.
[418] Ibid.
[419] Ibid.

demonstrates that once these technologies are developed and operationalized, it is almost impossible to restrict their use. It is, therefore, necessary to impose the necessary restrictions [on LARs] at the earliest possible stage in their development in order to prevent violations of human rights."[420]

Schmitt furthermore points out, counterintuitive as it may seem, that it would be irresponsible to prohibit autonomous weapons at this stage in their development, since these weapons would offer enormous protection for combatants, that would not have to risk their lives in combat.[421] Although this fact has been criticized, as apparent from the words of the Pakistani delegation above, the protection of combatants was the main purpose of international humanitarian law up until the conception of the Geneva Conventions of 1949, even though the protection of civilians has taken the spotlight in the past six decades. There is, however, no basis in international humanitarian law that combatants must risk their lives if they have a safer option, even if that means their enemies will never have a chance to fight them in person.[422]

As is clear from the case of gases, cluster munitions, land mines and other weapons that have been outlawed from warfare, the leitmotif has always been that of use first - ban later. In the case of the aforementioned weapons, however, their fault usually lies in the fact that they are virtually unable to distinguish civilians from combatants, are incapable of respecting the principle of proportionality or cause superfluous injury to anyone exposed to them. Their usage therefore prompted States to ban them. The case with LARs is, however, more complicated, as they are both non-existent nor can they be categorically described as being unable to abide the principles of distinction, proportionality and humanity, given that their hard- and software will be sophisticated enough to follow these, and other, principles of international humanitarian law, even, as Schmitt suggests, at one point out-perform humans. It is therefore unlikely that development of LARs will at this point be banned.

An outright ban might realistically be a step too far, but it has been argued that by proposing a ban has enhanced discussion on the topic, and considers serious considerations of the issues faced by implementing LARs. It is therefore clear that other solutions are more

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[420] Statement by Pakistan in the Interactive Dialogue with the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, 23rd session of the Human Rights Council, May 30th 2013. Available here: http://stopkillerrobots.org/wp-content/uploads/2013/05/HRC_Pakistan_09_30May2013.pdf
[421] Michael N. Schmitt: "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", p. 36.
[422] Ibid.

likely to be successful in mitigating the potential danger of LARs. The UN Special Rapporteur has already called for a national moratorium, as will be explored in the next chapter, but other options, such as multilateral or framework conventions have also been suggested for this effect.

4.6.5. Imposing a national moratorium

The Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions calls in his report for a national moratorium of the development and eventual creation of LARs. In his report, the Special Rapporteur notes that:

> As with any technology that revolutionizes the use of lethal force, little may be known about the potential risks of the technology before it is developed, which makes formulating an appropriate response difficult; but afterwards the availability of its systems and the power of vested interests may preclude efforts at appropriate control. This is further complicated by the arms race that could ensue when only certain actors have weapons technology. The current moment may be the best we will have to address these concerns. In contrast to other revolutions in military affairs, where serious reflection mostly began after the emergence of new methods of warfare, there is now an opportunity collectively to pause, and to engage with the risks posed by LARs in a proactive way. This report is a call for pause, to allow serious and meaningful international engagement with this issue. One of the reasons for the urgency of this examination is that current assessments of the future role of LARs will affect the level of investment of financial, human and other resources in the development of this technology over the next several years.[423]

In his report, the Special Rapporteur finds that the there is every reason to approach the possible introduction of LARs with caution. The report also finds that while it is presently not clear how LARs could operate in accordance with international humanitarian law, their usage could foreseeably be lawful, especially if used with human soldiers. Even so, the concern that allowing robots to kill may denigrate the value of life to a point where such actions would not be in compliance with international humanitarian law, stating that:

> The onus is on those who wish to deploy LARs to demonstrate that specific uses should in particular circumstances be permitted. Given the far-reaching implications for protection of life, considerable proof will be required.[424]

4.6.6. Adopting multilateral Conventions

Weapons development has in the past given rise to multilateral convention, dedicated to banning the use, stockpiling or development of certain weapons. The most prominent of these conventions is the Convention on Certain Conventional Weapons (CCWC) and its many

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[423] UN Human Rights Council: *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, p. 7.
[424] Ibid, p. 20.

protocols. Protocol I on Non-Detectable Fragments prohibits the use of any weapon the primary effect of which is to injure by fragments which are not detectable in human body by X-rays.[425] Protocol II, as amended in 1996, prohibits or restricts the use of landmines (both anti-personnel and anti-vehicle), booby-traps and certain other explosive devices.[426] Protocol III regulates incendiary weapons. Incendiary weapons are weapons that are primarily designed to set fire to objects or to burn persons through the action of flame or heat, such as napalm and flamethrowers.[427] Protocol IV prohibits permanently blinding lasers and Protocol V on explosive remnants of war requires the parties to a conflict to take measures to reduce the dangers posed by explosive remnants, such as ordinance that failed to explode and abandoned ordinance in the battlefield.

These multilateral conventions have been successful in restricting the use of the aforementioned weapons because they have largely been recognized to be incompatible with international humanitarian law. LARs have, however, not entered the battlefield, so branding their usage preemptively as a violation of international humanitarian law is not likely to be successful. Further development, and even fielding, can therefore be considered a prerequisite for a multilateral convention regulating their use. An active dialogue in the time period when LARs are in development is nevertheless important to keep States and NGOs aware of the issues that are likely to rise during said development.

4.6.7. Adopting framework Conventions

Marchant et. al. have proposed adopting framework conventions with more flexibility that binding international conventions. A number of framework conventions exist today, such as the Vienna Convention for the Protection of the Ozone Layer, the Framework Convention on Tobacco Control and the Framework Convention on Climate Change. Framework conventions often recognize that a problem exists and the need for a more substantive approach, and would bring experts and States to the table, as well as raise the awareness of the general public.[428] A framework convention could target specifically at the unique challenges raised by Lethal Autonomous Robots, that of removing the human from the battlefield.

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[425] 1980 Convention on Certain Conventional Weapons – Factsheet - https://www.icrc.org/en/download/file/1028/1980-convention-on-certain-conventional-weapons-icrc-eng.pdf
[426] Ibid.
[427] Ibid.
[428] Gary E. Marchant et al, "International Governance of Autonomous Military Robots", p. 306.

5. Conclusions and Final Thoughts

This thesis concludes in the same key as it starts: Warfare is changing. The very existence of warfare depends on constant change. The change, however, is not in the ends of warfare, but in the means of warfare. The super-weapons of "yesteryear" are the cumbersome dinosaurs of tomorrow. In this ever-evolving world of warfare, humanitarianism has been critical in protecting the innocent and mitigating the sufferings of those either caught in war, or the "dogs of war" themselves. The role, might and respect for humanitarianism have nevertheless evolved over the centuries, with the years after 1949 ushering in an unprecedented codification and recognition of international humanitarian law and legal protection of civilians.

The changes of warfare are therefore those of technology, of tactics and strategy. This thesis began with an exploration of the development of international humanitarian law, its principles and application. Among the most fundamental principles explored are the principle of distinction, proportionality, military necessity and humanity - the prohibition of unnecessary suffering. These principles, and how they interact, are perhaps the most fundamental rules of international humanitarian law. The purpose of this exploration was to lay the foundation for the main topic of this thesis: Lethal Autonomous Robots, LARs, the many legal and ethical challenges they will face, and if and the how how these futuristic weapons systems will be able to comply with the rules of international humanitarian law.

At present, there are no operational Lethal Autonomous Robots. Therefore, all exploration regarding their legality under international humanitarian law is largely of a speculative nature. Nevertheless, militaries are already funding research programs to develop LARs. There is no universal definition of a Lethal Autonomous Robot. However, in this thesis, they have been defined as being "robotics weapons systems that, once activated, can select and engage targets without further intervention by a human operator. The important element is that the robot has an autonomous "choice" regarding selection of a target and the use of lethal force."

These robots, once they enter the battlefield, would represent a fundamental change in warfare, a change that has been said to bear similarities to the changes introduced with the effective usage of gunpowder and the eternal fear of nuclear weapons. With them would, however, arise a great number of challenges to international humanitarian law. Robots with the ability to operate on their own in hostile territories, without fear, need for sleep or even human supervision could change warfare forever. The risk of losing ones own forces could be brought to a minimum, while the enemy would be faced with soldiers that would be

undeterred by incoming fire and casualties in their own ranks - until "the enemy" could make LARs of their own.

Lethal Autonomous Robots could furthermore prove better than their human counterparts, both in the battlefield and during the possible ensuing occupation. Unless intentionally programmed to do so, robots would e.g. not torture, would not seek revenge on enemy combatants responsible for killing their "friend". They could furthermore be programmed not to open fire, even when fired upon, if there was a reasonable chance that civilians would be caught in the crossfire, making it prioritize civilian human lives over its own existence. LARs could therefore ultimately be better than human soldiers in upholding the rules and values of international humanitarian law. These robots would nonetheless not possess any kind of human intelligence nor self-awareness. Robots with these capabilities are likely to be confined to the silver screen for the unforeseeable future.

A number of weapons systems currently possess some form of limited autonomy. The best known of these weapons systems is probably the MK 15 Phalanx Close-in Weapons System, CIWS, used as a defensive weapon of last resort to target incoming anti-ship missiles. The weapons system has a number of setting with varying human oversight and intervention possibilities, one of them being a fully "automated" setting, activated when the ship is in danger of being destroyed, giving the CIWS full control over targeting and fire-control.

Most of these weapons systems are, however, only used for a very specific purpose, and almost exclusively in a defensive role. LARs would on the other hand be intended both for offensive and defensive purposes, operating in the very unpredictable environment of the modern battlefield in any weather conditions, during both night and day.

Sadly, the picture of the responsible robot painted above is, at least in light of current technology, a great vision at best, but an illusion at worst. With modern technology, robots would have great difficulties complying with one of the most fundamental principle of international humanitarian law, the principle of distinction. Currently, a robot has a hard time distinguishing a human being from a duffel bag. Giving such unsophisticated machinery the power of life and death would not only be grossly irresponsible, but could also constitute a violation of international humanitarian law.

Lethal Autonomous Robots must be considered in their infancy, just like when gunpowder was initially far inferior to the more battle-tested bow and arrow. The potential military advantages of further developing LARs is likely to outweigh the many obstacles that will face them on their way from the drawing board to the battlefield. It is therefore unlikely that their

development and creation will be stopped, as is the plea of a number of roboticists and the Human Rights Watch. Furthermore, the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions has called for a national moratorium of further development of LARs, fearing they will never be able to adhere to international humanitarian law.

These warning are not without merit. As illustrated in this thesis, despite their potential in both sparing the lives of civilians and combatants and mitigating the atrocities of war, LARs have a very long way to go. Even if LARs could be designed and programmed to respect the minimum standards of international humanitarian law, it is hard to see how they could do more than just respect the bare minimum and not rise above the law in an act of kindness and mercy. In the modern battlefield, enemy combatants are known to employ the tactic of blending in with the civilian population. Defining "combatant" and "civilian" could therefore be a great challenge for the programmers of LARs, bringing the debate back to the principle of distinction. That still does not address the case of e.g. civilians that have been coerced to take indirect part in armed conflict, such as by transporting weapons. The human eye would probably be better at discerning body language of those acting not out of their free will than robots. These fears can, however, all be put aside by the simple answer that technology will become better with time and even surpass humans. Discontinuing their development at this early stage could thereby later on cause more violations of international humanitarian law than if their development is continued, provided that LARs could at some point be more humane than humans.

Another challenge facing LARs is the question of responsibility. Even if they eventually enter the battlefield, there is no guarantee that they will be perfect. Their action could be called into question if they malfunction and attack civilians or their hard- or software fails to distinguish between civilians and combatants in a situation where humans would have performed better, and open fire on illegitimate targets. If these actions could be considered war crimes, grave breaches of international humanitarian law, the question of responsibility cannot be ignored. Trying the robot itself before the International Criminal Court is far fetched at best, some would say outrageous, and holding commanders, programmers or manufacturers responsible would, as is explored in this thesis, neither be in accordance with international humanitarian law nor offer any satisfactory form of deterrence or retribution for the actions of a machine. This gap in criminal responsibility for LARs could therefore ultimately be their demise by granting impunity to those who deploy them. Given the

questionable humanitarian record of drones, the battlefields of tomorrow may eventually see LARs with limited capability to act according to international humanitarian law.

Another aspect is the innate humanity of killing. Be delegating the ultimate decision to take a life to a computer program, albeit a program developed by humans, could in itself run contrary to the spirit on international humanitarian law. Facing the possibility of being not at the mercy of another human being, but of a machine of steel and silicate, inherently incapable of humanity or mercy is a grim view of the future, even if the robot has somehow been programmed to encompass the complexity of humanity and the humanity of mercy.

A number of solutions have been proposed to address the possible emerging of lethal autonomous technology. The Human Rights Watch has called for an outright ban, while the Special Rapporteur on extrajudicial, summary or arbitrary executions has called for a national moratorium on the development and creation of LARs. In light of the potential military advantages fully autonomous lethal robots, it must be considered unlikely that the militaries are willing to discontinue their development at such an early stage. Other possible means of regulating their use are e.g. multilateral or framework conventions with the aim of restricting the use of LARs, without banning them, before they enter the battlefield, or to raise awareness of their creation, and the unique challenges that will inevitably follow; the removal of the human from the battlefield.

Once Lethal Autonomous Robots are "out of the box", fielded and ready for war, it is unlikely that they can ever be caged again. It is therefore imperative to address the challenges that international humanitarian law will face *before* they enter the battlefield. Unlike with many other developments in warfare, the beacons have already been lit; Lethal Autonomous Robots are no longer the stuff of science fiction, but a not-so-distant possibility. These challenges will be unlike the ones brought about by any other weapon. Even nuclear weapons did not change the fact that human beings had to make the decision to use them in war. Lethal Autonomous Robots would, however, blur the line between weapon and soldier, something that is unprecedented in the history of warfare.

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