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School of Global Studies

Autonomous Weapons – the “Kalashnikovs” of Tomorrow?

An Analysis of the Meetings of Experts on Lethal Autonomous Weapons Systems within the framework of the United Nations' Convention on Certain Conventional Weapons

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Abstract

After the invention of gunpowder and the development of nuclear weapons, the world faces a third revolution in warfare: lethal autonomous weapons systems (LAWS). Since 2014, states, scientists and civil society activists have been discussing the risks of such systems and possibilities to regulate them within the framework of the United Nations' Convention on Certain Conventional Weapons (CCW). After three years of meetings, in which there has been a lot of talk but little progress, the debate is in danger of getting into a gridlock and neglecting potential consequences of autonomous weapons systems. This thesis explores how a more comprehensive understanding of the legal and ethical challenges that autonomous weapons systems pose can be obtained. The main findings illustrate that the debate focuses around efforts to define autonomy and to enclose LAWS within established regulatory systems, particularly international humanitarian law (IHL) and human rights based principles. The study further shows that the concept of meaningful human control has emerged as the main imperative in the debate, reflecting a dominant instrumentalism in arms control practices. Moreover, the debate is dominated by a binary view of the relation between technology and society which results in different perceptions of the implications of LAWS. This study thus argues that only wide-ranging debate about the relationship of autonomous weapons systems to the nature and purpose of military violence can adequately address the risks of mechanised, dehumanised violence, lethal or non-lethal, and find adequate ways of regulating it.

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Abbreviations

AI	Artificial Intelligence
CCW	Convention on Certain Conventional Weapons
DOD	US Department of Defence
GGE	Group of Governmental Experts
HRW	Human Rights Watch
ICRAC	International Committee for Robot Arms Control
ICRC	International Committee of the Red Cross
IHL	International humanitarian law
IHRC	International Human Rights Clinic
IR	International Relations
LAWS	Lethal autonomous weapons systems
NGO	Non-governmental Organisation
MOD	UK Ministry of Defence
SIPRI	Stockholm International Peace Research Institute
STS	Society and Technology Studies
UAV	Unmanned aerial vehicle
UMS	Unmanned military system
UN	United Nations
WILPF	Women's International League for Peace and Freedom

1. Introduction

For many decades, technological innovation has been a central part of the preparations for war. Throughout the entire history better technology has brought advantages for war fighting up to radical superiority of the party in its possession (Altmann, 2008). This dynamic continues until today. The latest battlefield technology is becoming increasingly sophisticated taking over evermore tasks that used to be performed by human soldiers. Approximately 40 states are currently developing a new generation of autonomous weapons systems that would be able to identify and engage targets without human intervention (Singer, 2009:241). These new weapons are argued to offer exceptional speed and precision over any human controlled system and are already being called the biggest step change since the creation of gunpowder and nuclear weapons. In an open letter, researchers from the field of Artificial Intelligence (AI) Robotics warned that “autonomous weapons will become the Kalashnikovs of tomorrow” (Russell et al., 2015) since their development does not require costly or unobtainable materials and thus could be cheaply produced by any significant military power. Yet, the extensive use of unmanned aerial vehicles (UAVs), or better known as 'drones', has already led to significant public policy concerns. The question arose whether such systems and in particular fully autonomous weapons systems would be compatible with international humanitarian law (IHL) and principles linked to the right to exert military violence. Under pressure from civil society, the international community began discussing in 2014 the potential legal and ethical implications as well as possibilities to regulate such weapons systems within the framework of the United Nations' Convention on Certain Conventional Weapons (CCW), which constitutes the major institutional space on international level to approach this issue. So far, three international expert meetings on lethal autonomous weapons systems (LAWS) were held, mainly focussing around efforts to define autonomy and to enclose autonomous systems within established regulatory systems, particularly IHL and human rights based principles. However, until now no profound agreement has been reached.

This study argues that the current discussions within the CCW are in danger of getting into a gridlock and neglecting crucial ethical and societal consequences LAWS might evoke as it is dominated by a binary view of technology. On the one side, technology is understood as a neutral, passive tool used by political and social actors as means to an end. On the other side, the vision of LAWS as an unleashed 'killer machine' beyond any human control is being portrayed within the discussions. The study argues that interpretations like these provide one-dimensional and simplistic visions of the military as the merely user of scientific, technological resources. Above all, they obscure the view for the essentials: the dynamics within and between society and technology. This

thesis argues to use a more balanced account in order to fully identify the legal and ethical challenges that autonomous weapons systems pose in today's global politics. As such, it tries to discover something new, as well as to see what is known in a new light.

1.1. Aim and Research Questions

Against this background the thesis examines contemporary international efforts to develop laws and regulations of autonomous weapons systems within the framework of the United Nations' **Convention on Certain Conventional Weapons (CCW)**. The study aims at identifying the main controversies in the current CCW discussions and analyses their theoretical implications. The thesis is guided by the following research question:

How can we come to a more comprehensive understanding of the legal and ethical challenges that autonomous weapons systems pose in today's global politics?

The research question will be broken down into the following sub-questions:

1. What are the main characteristics that distinguish LAWS from other arms technologies and what are the implications for an international regulation mechanism?
2. What are the main challenges and gaps in the current CCW negotiations about regulating autonomous weapons systems?
3. What can we learn from these challenges?

The first question acknowledges the problematic characteristics of LAWS, which are important to identify. Therefore, a critical examination of existing research and literature on this issue will be conducted, considering differing concepts of autonomy, the technological state of the art as well as legal and ethical requirements for new weapons of warfare to foster a comprehensive understanding and explore potential implications for international regulation mechanisms. In addition, a document analysis of official documents produced by participants of the CCW meetings will be conducted as this specific context builds the focus of the thesis.

The second question directs the study to the particular challenges and gaps in the CCW discussions on LAWS. Examining this question involves an exploratory analysis of official documents produced by participants of the CCW meetings to identify common themes, differing perspectives and potential tensions.

Answering the third question follows an interpretative approach. By drawing on the theoretical perspectives elaborated prior to the analysis of the empirical data, a better understanding of the reasons for the existence of the challenges in the current CCW debate will be promoted and meta-theoretical and philosophical considerations applied to the study context.

1.2. Delimitations

As stated in the research question the main focus of this study is on the legal and ethical dimension of autonomous weapons systems. Therefore, it is not intended to examine all potential and critical facets of such systems (e.g. technological aspects) as these are highly complex systems which, depending on the different accounts of autonomy, do not yet exist at all or only partly. Furthermore, since the research is focussing on the specific case of the CCW discussions on LAWS, the findings will be to some extent limited to this context. However, some general deliberations will be made as the theoretical implications of the identified controversies within the debate on LAWS will be explored. It is important to emphasise that all information presented in the analysis is based on the written delivery found in the official documents. Content which may have been expressed in the negotiations, but which has not been recorded in the documents, can not be taken into account. More methodological limitations that may affect the outcome of the study will be discussed in chapter five.

1.3. Relevance for Global Studies

The subject under study is of major global relevance. The US use of remote-controlled drones for targeted killing of terrorists has already sparked a global, ethical and legal debate. Amnesty International denounced several US drone attacks in Yemen and Pakistan, in which numerous civilians were assassinated, as war crimes (Amnesty International, 2013). The debate is in full swing and deeply affects global politics and thus the field of Political Science, International Relations (IR) and Global Studies. Autonomous weapons systems, which are argued to be a ‘game changer’ in modern warfare, are taking this debate a step further. The impact these systems may have is not only restricted to the military sphere but is taken stock across a wide spectrum of global issues. They raise a set of questions regarding the viability and practicability of international law, the role of scientists in the development of new technologies, international security, liberal and democratic values in relation to the use of force and many more (Human Rights Watch (HRW), 2012; Geiss, 2015; Krishnan, 2009). As such, the discussion on LAWS can also be embedded in a broader debate on the relationship between society and technology. Furthermore, the CCW is an

exemplary expression of the increasing growth and importance of global governance. States are no longer separate actors but integrated into a global system where individual decisions may have severe impacts beyond national borders (Scholte, 2005:281). Civilian organisations from all over the world have joined forces to participate in the negotiations reflecting that political decision-making processes are no longer confined to the state alone. Ultimately, arms control is not a mere topic of management of certain technologies; instead it is a transformative process which affects the global but also the local level. The participants of the CCW discussions on LAWS are now at the crossroads to not only decide on the future of such systems but the future of global society.

2. Background

This section will give a short overview over the current public and scientific debate on autonomous weapons and exemplify the main controversies. A synopsis of the CCW in general and the expert meetings on LAWS in particular will follow as an introduction to the study context of this thesis.

2.1. Context and Problematisation

The current drone technology has already altered the understanding of warfare and conflict resolution. The proceeding development of autonomous systems is, however, rated by experts as an absolute revolution and paradigm shift in the field of military technology (Geiss, 2015; Bieri and Dickow, 2014). Autonomous weapons systems would not only change the performance and possible military deployment of such systems, but also downsize human decision-making to the basic question whether to use them or not. It is feared that all subsequent decisions concerning the concrete engagement of targets would be left to the autonomous system itself (Heyns, 2013). Due to the rapid pace of technological progress, experts are already warning of a renewed international arms race between states as the technology is easily accessible and promises military superiority for the party in its possession (Wallach, 2013).

In the eyes of their proponents, autonomous weapons systems have numerous advantages. For one, they are much better than humans in capturing and processing new information. They would act more precisely, more quickly, and more flexibly in their decisions as well as in the execution of the strikes themselves (Bieri and Dickow, 2014:2). The combination of precision-guided munition, real-time intelligence, surveillance and reconnaissance would allow, so the argument goes, to wait for the optimal moment for target engagement, increasing the level of precision and thus minimising the number of civilian casualties (Sauer and Schörnig, 2012:370). Moreover, the

systems are expected to be particularly suitable for the “dull, dirty and dangerous missions” (US Department of Defence (DOD), 2013:20) and henceforth directly reduce the need to expose human soldiers to the danger to life and limb. They would not be affected by emotions or physical exhaustion and would eliminate the risk of excess due to the absence of fear, anger or hatred in stressful situations (Geiss, 2015:4). Critics of the technology, on the other hand, warn that the value of human life would be depreciated if the decision to kill would be left to a machine. The absence of emotions is also argued to have a significant downside as emotionless autonomous weapons systems would neither know grace nor empathy. A "video game mentality" of the soldiers deploying the weapons, which has already been observed in relation to conventional drone attacks, could be intensified (Sauer, 2014:347). Moreover, it is by no means clear whether such systems would be immune to the risks of serious malfunctions. While any computer system is in principle susceptible to hacking, greater complexity, which would come with greater autonomy, can make it even harder to identify and correct vulnerabilities (Scharre, 2016:14).

In addition to purely technical questions about the performance and capabilities of such systems, it is increasingly the ethical dimension that determines the public and scientific debate. There is an increasing automation tendency in many areas of social life which raise the very fundamental question of how much ‘dehumanisation’ society can (and will) allow in its social process (Ford, 2015). If computer-controlled machines take over tasks independently, the society has to clarify how the algorithms ‘decide’ in moral boundary situations: where, for example, should a fully automated car drive to, when a child runs onto the road? (Lin, 2016:69). Is it possible for a medical robot to administer strong painkillers independently to patients without a doctor monitoring the decision in a particular case? (Marantz Hening, 2015). The possibility that a machine could also autonomously decide about the offensive killing of humans is obviously creating even greater discomfort. The public and scientific debate revolves around the central question whether a human being should be the object of a mathematically, pre-calculated “death by algorithm”, as the former UN Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions Christof Heyns (2013) had called it. Some scholars argue that a weapon type which reduces the acute risks of the conflicting parties to zero is inherently unethical as the right to ‘kill’ in warfare is founded on the imposition of mutual risk (Gregory, 2014:7; Kahn, 2002:4). This, however, reduces the ethical dimension of LAWS to the autonomisation of target engagement. As the use of armed drones, that have become an instrument of power and dominance of technologically advanced states reinforcing asymmetric warfare, has already shown, autonomous weapons systems could have severe impacts on social, political and cultural relations. Unlike in other fields of science, above all Science, Technology and Society Studies (STS), current research in Political Science and IR seems to

neglect broader questions about the relationship between society and technology in general, and autonomous weapons in particular. This represents a dangerous gap undermining mutual correlations. History has shown that military technological developments often outpace the political and scientific sphere. Ethics are then used as "tying-up system" with which the threatening technology is to be controlled (Münkler, 2009).

Thus, while public and scientific debate is in full swing scrutinising potential benefits and consequences of autonomous weapons systems, fundamental questions about the relationship between society and technology are neglected. This is also reflected in the current CCW negotiations on LAWS which mainly focus around how much human loss of control is acceptable to not jeopardize compliance with international laws and ethical principles of warfare. In order to enable a better understanding of the specific context of this study, a short introduction to the background and structure of the CCW in general as well as the expert meetings on LAWS within this framework will follow.

2.2. The United Nations' Convention on Certain Conventional Weapons (CCW)

The CCW is along with the Geneva Conventions of 1949 and their Additional Protocols of 1977, which will be discussed in more detail later, one of the principal instruments of IHL. The agreement is formally known as the "Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects". It is also sometimes referred to as the "Inhumane Weapons Convention" (, 2001). The purpose of the Convention is to protect combatants and civilians from unnecessary, unjustifiable and indiscriminate suffering by banning or restricting the use of specific types of weapons in armed conflict. The Convention itself only contains general provisions, all prohibitions or restrictions on the use of specific weapons are anchored in the Protocols annexed to it. In this way, sufficient flexibility for the regulation of future weapons systems is to be ensured (ibid.). The present CCW consists of five Protocols which apply to non-detachable fragments, the uses of mines, booby traps and other devices, incendiary weapons, blinding lasers and explosive remnants of war. The negotiations on a sixth Protocol on the prohibition of the use of cluster munition have failed because of the differing positions of the parties. Currently 115 States are parties to the Convention with a further five having signed but not yet ratified it (UN Office at Geneva, no date). States that become a member of the CCW do not have to sign all Protocols, but must become party to at least two of them. For a new Protocol to be added, all states-parties must agree. Each Protocol is only binding on those states that ratify it. So far, only a little less than half of the member states (54)

have signed all protocols. The main point of criticism regarding the Convention is its lack of mechanisms for verification and enforcement as well as formal processes for resolving compliance concerns (Ambramson, 2007).

2.3. The CCW Meetings of Experts on LAWS

In 2013, the former Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, Christof Heyns, introduced LAWS to the UN through his annual report to the Human Rights Council. In his report, Heyns stressed the need to approach the issues surrounding the debate on LAWS within the framework of the CCW as “they could have far-reaching effects on societal values, including the protection and the value of life and international stability and security” (Heyns, 2013:20). At the same time, the pressure by civil society actors increased and was given expression in a global call for a pre-emptive ban of such systems (Campaign to Stop Killer Robots, 2013). As a result, three one-week informal expert meetings were held in 2014, 2015 and 2016. The majority of the states, ethicists, lawyers and human rights activists that have spoken publicly in the multilateral forum of the CCW over the past three years have raised concerns on the development and deployment of LAWS, which, however, varied in their scope and content. So far, 65 Non-governmental organisations (NGOs) and 19 countries have called for a pre-emptive ban on autonomous weapons systems operating without any human supervision. This list, however, does not include the states that are the main drivers of the development – such as the US, the UK, Israel and Russia (Reaching Critical Will, 2016). The probably most significant, thus formal, development so far came in the end of 2016 during the fifth CCW Review Conference, when the state-parties agreed to establish a Group of Governmental Experts (GGE) on LAWS to meet in 2017. This is a tried and tested multilateral work format in the UN context open to all interested states and civil society. The format also has the advantage that important documents are translated into official UN languages, thus facilitating a broad participation (Küchenmeister; Weidlich, 2015). Critics, above all the International Committee for Robot Arms Control (ICRAC), hope that through this formalisation the debate will make meaningful progress towards a pre-emptive ban of LAWS (ICRAC, 2017).

However, since the challenges posed by LAWS were first brought to the UN’s forum in 2013, there has been a lot of talk but little progress. The negotiations will not resume until November 2017, more than one year after the last substantive meetings. The first formal discussions of the newly established GGE, that were scheduled to April and then postponed to August, have been cancelled because several states, most notably Brazil, failed to pay their dues for the convention’s meetings (Campaign to Stop Killer Robots, 2017). Given the slow pace of the negotiations, first

doubts arouse whether the CCW is the right format to adequately counteract the risks of LAWS in terms of arms control (Küchenmeister and Weidlich, 2015).

3. Review: Autonomous Weapons Systems, Autonomy and International Law

This chapter will direct the study to the specific context of autonomous weapons and international law. It is of major importance to examine the current technological possibilities as well as future tendencies in the area of autonomous weaponry as those technological advancements risk to outpace existing, regulatory frameworks of IHL and arms control agreements. Therefore, the state of the art in autonomous weapons technologies will first be delineated, which is then followed by a brief discussion of the varying conceptions of autonomy. The chapter will close up with an outline on IHL and the requirements to review new weapons technologies.

3.1. State of the Art in Autonomous Weaponry

While for some people the idea of living in a world in which machines or robots are eligible to engage targets without human involvement and thus ‘decide’ over life and death seems like dystopia still a long way off, others argue that we already have been living with autonomous weapons systems for some years. Today, it is estimated that 40 or more countries are developing ‘unmanned military systems’ (UMS) (Singer, 2009:241). Yet, this number is based on assumptions and difficult to verify. Nonetheless, there is a number of UMS equipped with differing degrees of autonomy and limited human oversight that are already being used within different environments. Partly, autonomously operating defence systems are deployed all over the world, such as the Israeli antiballistic missile system ‘Iron Dome’, the US Navy’s short-range ship protection system ‘Phalanx’, the counter rocket artillery and mortar ‘C-RAM’ system or the ‘guard robots’ deployed by South Korea in the demilitarised zone between itself and North Korea (Williams, 2015:180). The main task of these systems is almost always the same: detect incoming munition, such as missiles, and in response neutralise the threat. Human involvement is usually limited to accepting or rejecting the system's preprogrammed plan of action (HRW, 2012:9). For some critics, these defence systems represent the cornerstone for autonomy and it seems to be only a question of time until the systems’ restricted, defensive roles will change (Williams, 2015:180). In the field of ‘unmanned aerial vehicles’ (UAVs) the development and use of weapons systems, operating with a certain level of autonomy, is far more ahead. In 1994, General Atomics was commissioned to build the ‘RQ-1

Predator' drone, able to transmit video footage in real time over satellite link and guided by ground-based controllers who are operating the system from miles away. By 2001, the system has been upgraded to carry 'Hellfire' missiles. A step which heralded the era of "killer drones", that since then have become a regular tool in the US war on terrorism (Singer, 2009). Only within the last four years, the US military has made huge progress on its way to greater autonomy and succeeded in launching and landing a drone of the type 'X-47B' on an aircraft carrier, a manoeuvre that is rated as one of the most difficult even for the most experienced pilots, as well as fuelling it in the air (Northrop Grumman, 2015). While the missions were monitored by a human operator, the operator did not actively 'fly' it via remote control as it is the case for other drones, unlocking the full potential of what UAVs will be capable of doing within a few more years. The Secretary of the Navy, Ray Mabus, commented that:

It isn't very often you get a glimpse of the future. Today, those of us aboard USS George H.W. Bush got that chance [...]. The operational unmanned aircraft soon to be developed have the opportunity to radically change the way presence and combat power are delivered from our aircraft carriers (US Navy, 2013).

Yet, it seems that this future is not that far away any more. While the UK Ministry of Defence (MOD) estimated that AI "as opposed to complex and clever automated systems" (MOD, 2011:51) could be achieved in five to fifteen years and that fully autonomous swarms could be available by 2025, such a system was tested by the US Military in the beginning of 2017 – eight years earlier than predicted. The swarm, consisting of about a hundred micro-drones, is completely controlled without human intervention (DOD, 2017). The bird-sized drones function like a collective organism, sharing one distributed brain for decision-making (Baraniuk, 2017). Although, from official site it was being said, that the swarm was only to be used for surveillance missions, there are a multitude of imaginable ways of deployment (Mizokami, 2017). Both test flights of the drone swarm and the X-47B exemplify the rapid dynamics in the development of autonomous warfare and the need for regulatory policies to keep pace.

3.2. Concepts of Autonomy

The expanding role of autonomous systems, especially with regard to target engagement, challenges traditional human responsibilities more than ever before. Nonetheless, the precise definition of autonomy is still highly debated among scientists, experts and officials. As a prelude it might therefore be useful to examine what automation and autonomy in weapons systems entail in practice and how the concepts of autonomous systems differ.

In 2015, the Stockholm International Peace Research Institute (SIPRI) convened an expert seminar on LAWS and the challenges associated with its legal review. In his concluding paper, Boulanin (2015:8) defines automation as “the process in robotics where a machine is designed or programmed to execute a predefined task”. Based upon the level of human involvement as well as the system’s ability to adapt to the context of its use, the categorisation of robotic systems into remotely controlled, automated or autonomous systems is suggested. However, the precise definition of the specific categories has not been further elaborated. For Boulanin, a weapon system even needs to be able to learn and adapt its functioning in response to changing conditions in the environment in which it is deployed in order to be considered autonomous. This results in a wide technological and definitional spectrum for each category itself. Yet, autonomy does not mean that a system can define its goals and tasks freely or that it acts after its own free will. It always operates within the constraints of its predefined design by a human (ibid.:8; Horwitz and Scharre, 2015:6). For the International Committee of the Red Cross (ICRC):

Autonomy is an umbrella term that would encompass any type of weapons with autonomy in its ‘critical functions’, meaning a weapon that can select (i.e. search for, detect, identify, track or select) and attack (i.e. use force against, neutralise, damage or destroy) targets without human intervention (ICRC, 2016:71).

Hence, it is the system itself that performs the targeting process and actions after its initial activation. HRW (2012) has chosen a three-step approach to define autonomy which became widely used, both in the literature and in the public debate. The starting point of the definition is the degree of human participation in the actions of the system in relation to the individual functions of observing, orienting, deciding and acting in response to a given situation or a particular environment. Unmanned weapons systems are divided into three categories:

- *human-in-the-loop systems* which can select targets and exert force only with a human command,
- *human-on-the-loop systems* which can select targets and exert force under the oversight of a human operator who can override the system's action, and
- *human-out-of-the-loop systems* which can select a target and exert force without any human input or interaction.

While HRW labels all three types of unmanned systems as robotic weapons, it refers to autonomous weapons as both, out-of-the-loop systems and those that allow a human on-the-loop, arguing that their level of human supervision is so limited that they effectively function as out-of-the-loop systems. Scharre refers to all three types as autonomous weapons, however, based upon the level of autonomy he distinguishes between semi-autonomous, supervised-autonomous and fully-

autonomous systems (Scharre, 2016:9). This thesis will apply the categorisation suggested by HRW, yet, refer to all three stages as autonomous weapons since the term “robot” often induces an anthropomorphic depiction of the technology in the notion of a “terminator”. Depending on which level of autonomy is addressed, a more precise denotation is added.

The rapid technological advances of recent years reflect how difficult it is to limit and frame the concept of autonomy. At the same time, the differing conceptions indicate how difficult it will be to regulate autonomously operating systems as it remains unclear where to draw the line between the specific levels of autonomy. Nonetheless, it is important to emphasise that states are legally limited in choosing their weapons of warfare (Boulanin, 2015:3). This derives from general principles and rules enshrined in IHL as a result of the recognition that the safety of humanity imposes certain limits to all means and methods of warfare. The following sections will therefore give a short overview over the principles and rules of IHL and the requirements to review new weapons technologies.

3.3. International Humanitarian Law and the Requirement to Review New Weapons

In the course of its development, IHL has repeatedly been confronted with new weapons systems. Technical development is always a challenge, particularly for the static and often lengthy legal processes. This is especially true when it is not just a specific new weapon, but a technology that, like increasing autonomy, is capable of structurally altering or even revolutionising military operations and warfare as a whole. Throughout the public and scientific discussions on autonomous weapons systems, the importance of Article 36 of the 1977 Additional Protocol I to the 1949 Geneva Conventions (Additional Protocol I, 1977) has repeatedly been stressed (Boulanin, 2015:2). Article 36 of Additional Protocol I states that:

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 (Art. 36, Protocol I).

This article requires states to conduct a legal review of all new weapons systems, means and methods of warfare in order to determine whether their employment is in compliance with international law. Some experts allege that Article 36 is binding on all states, whether or not they are party to Protocol I, while others see it as a guide for best practice (HRW, 2012:21). The ICRC argues that the obligation to review new weapons systems in accordance with Article 36 applies to

all states, because “the faithful and responsible application of its international law obligations would require a state to ensure that the new weapons, means and methods of warfare it develops or acquires will not violate these obligations” (ICRC, 2006:3). Regardless of their position to Article 36’s legal status, many weapons producing states are obliged to conduct such review processes, including the US, which is not party to Protocol I.

3.3.1. Review Criteria

Article 36 provides that the requirement to review weapons applies throughout the different phases of the procurement process and should begin at the earliest stage and continue through the process of development (HRW, 2012:21). The legal review process can be broken down to three steps. First, a state has to determine whether the use of the reviewed weapon, means or method of warfare is already prohibited or restricted by customary international law or a treaty to which it is a party. Second, the state needs to examine the weapons, means or method of warfare considering the general rules found in Additional Protocol I. These prohibit on using weapons that: (a) cause superfluous injury or unnecessary suffering (Art. 35, Protocol I) and (b) are indiscriminate (if no distinction between military objectives and civilians is being made) and disproportionate (if civilian harm outweighs military benefits) (Art. 51, Protocol I). Moreover, (c) those who conduct a military operation need to take all feasible precautions in the choice of means and methods of this attack (Art. 57, Protocol I). The obligations of distinction and proportionality represent arguably the fundamental principles of IHL and require a subjective balancing of the military and civilian impacts of an attack as anticipated before it is launched (HRW, 2012:25). The criteria of military necessity is not clearly articulated in any legal text, it became, nonetheless, a central concept of customary law. As Krishnan (2009:91) described it, “Military necessity dictates that military force should only be used against the enemy to the extent necessary for winning the war.” Third, in case there are no relevant legal or customary rules, the state must assess the weapon in the light of the ‘Martens Clause’ and examine whether it contravenes ‘the principles of humanity’ or ‘the dictates of public conscience’ (Art. 1, Protocol I). It provides custom, conscience, and humanity as criteria for assessing actions and decisions for situations in wars and armed conflicts, which are not expressly regulated by written international law. According to the ICRC (1987:39), the Martens Clause “should be seen as a dynamic factor proclaiming the applicability of the principles mentioned regardless of subsequent developments of types of situation or technology”. It is therefore expected to be a useful tool for reviewing and evaluating emerging military technology which develops faster than international law (HRW, 2012:26).

Based on this legal foundation, HRW called upon all states interested in developing or acquiring autonomous weapons systems to initiate a review process of the existing or proposed technology (HRW, 2012). While the CCW expert meetings on LAWS have addressed this issue intensively, the discussions mainly focused on technological requirements for autonomous weapons systems in order to comply with the principles and rules of IHL. However, as will be elaborated later in this study, a much more fundamental question arises from the debate, namely, whether the customary legal framework is at all sufficient to adequately address the challenges of LAWS.

4. Theoretical Perspectives

As already indicated before, scientific debate on autonomous weapons systems is vital, but in danger of neglecting potential consequences these systems may have. Although technological military developments have long played an important role in the discipline of IR, it has until now not succeeded in providing adequate tools to analyse the relationship between technology and society. This chapter will therefore seek to identify more comprehensive approaches to technology and society outside but also within IR, as a small discussion has evolved in connection to the development of nuclear weapons acknowledging a mutual influencing between these two complexes, which will be shown below. As such, the chapter starts with a description of the motivation that has led to the choice of theory, which is followed by a discussion on the different approaches to the relationship between society and technology in the broader discourse of Science, Technology and Society Studies (STS). The role of technology in Realism and more precisely Nuclear Realism as specific school of thought within IR will then be elaborated on. This section concludes with a closer examination of the relationship between technology, society and arms control.

4.1. Choice of Theory

The importance of technological progress and its impact on global politics is constantly growing. As the distinction between technology and society is becoming increasingly interwoven, attempts to fit modern technologies into traditional analytical frameworks will likely prove inadequate (Roland, 1991:96-97). However, within the discipline of IR the theoretical incorporation of technology as a driving force for structural change and transformation in the global system remains until today an often neglected account. In contrast to the field of STS which has been examining the implications of social, political and cultural actions on technological innovation and how these, in turn, influence

politics, society and culture for decades, IR seems to be a latecomer in this context (Fritsch, 2014:117). Therefore, conceptual perspectives derived from STS will form the foundation for the theoretical discussion in this thesis as this enables a comprehensive understanding of the relationship between technology and society and provides an adequate tool for analysing the CCW discussions on LAWS which the established IR theories are missing. Broadly speaking, one can distinguish three major conceptions of technology in STS: technological determinism, according to which technological progress determines society; social constructivism arguing human agency alone determines technological evolution; and a middle ground between these two emphasising a mutual dependence.

Building on these insights, the gap to IR theorising will be bridged in order to identify and understand dominant rationales on technology and society and the context of their genesis. However, this study considers only Realism as major theory in IR since the theoretical pluralism of this discipline would unnecessarily complicate the discussion of the fundamental role of technology in global politics. Furthermore, Realism was foundational for systematic social science and research on the international system so that most of the subsequent theories such as Liberalism or Constructivism were either formulated in a modifying way or based on its rejection (Furlong and Marsh, 2010).

Particular emphasis is put on Nuclear Realism as a special school of thought which emerged during the thermonuclear revolution within the field of Realism. It is important to note that this theoretical, small movement has only recently received its distinctive name from the two scientists Rens van Munster and Casper Sylvest (2016). It was not a self-ascription by the great political scientists who are grouped together under this term and will be introduced later. In order to reflect the clear relation to the context and the distinction to other theories of IR, the term Nuclear Realism is used in this study. In response to the relentless technological expansion which culminated in the production of the atomic bomb, Nuclear Realism dismissed the hitherto dominating approaches to technology and society and instead promoted more comprehensive accounts of their correlations as can be found in STS. This allowed for globalist alternatives to the state-centered view of the international system to emerge (ibid., 2016). Notwithstanding the analytical qualities of this theoretical approach, Nuclear Realism also succeeded in applying ethics to the structural foundations of the international system. While classical realist thinkers perceived moral categories and judgements as simply out of place in the realm of international affairs (Cohen, 1984), Nuclear Realism criticised the amoral pursuit of power and explored the broader ethical dimension of nuclear weapons (Van Munster; Sylvest, 2016). With regard to the core of this study, this represents a good guidance to understand the various perspectives in the CCW discussions on LAWS and its

implications for arms control since it is precisely the ethical dimension that makes these discussions so special. This thesis pursues a rather conceptual-philosophical approach. This means the theory presented is not used as a static framework to explain reality, but the historical and theoretical considerations are rather intended to contribute to the understanding of the CCW negotiations on LAWS.

4.2. Society and Technology

Classical theorising within the field of STS differentiates between two major influential perspectives on technology and society: technological determinism and social constructivism. Characteristic for both perspectives are their different approaches to the relationship between society and technology regarding the impact of technological progress and the possibility of human governance of it.

Technological determinism identifies technology as the central driving force for political, social and cultural relations. In this view, technological progress has an autonomous logic that subsumes, shapes and expands to the whole of social life, inhibiting humanity's ability to fully control it (Fritsch, 2014:118). According to Feenberg, modern technology constitutes "a new type of cultural system that restructures the entire social world as an object of social control" (Feenberg, 1991:7). Turning away from the emphasis of the total loss of human control over technology, later works of STS promoted a more nuanced account of unintended side effects, however, still based on the vision that humanity can never anticipate all possible consequences of technological progress. In order to face the challenges this would evoke, technological determinists suggested the democratisation of decision-making processes on new technologies to allow societal debate on its impact and future development (Fritsch, 2014:118).

In response to determinism's rather pessimistic assessment of technological progress, social constructivists promoted a more practical and contextual interpretation of technology. It understands the relationship between technology and society as interdependent, where technological progress is determined by human agency based on needs and interests (ibid.:119). As such, technology is a socially constructed artefact of cultural, political, societal and economic power structures and can only be understood with the context of its evolution and application. This account, however, does not acknowledge the influence of technological progress on social relations as it portrays technology as simple means to an end.

As an attempt to get away from the political and ethical closure that comes with either view, a recently more prominent school of thought within STS promotes a more balanced explanation of the

technology-society nexus by consolidating findings from both sides. This so-called “middle ground” (Hughes, 1986) understands technological evolution as shaped by human agency just as much as by the internal dynamics of the technology itself (Roland, 1991:89). The relationship between technology and society is determined by mutual dependence in which both are modified by coming together as things might authorise, encourage, suggest, influence, block and so forth. As Latour (1999:307) has exemplified it figuratively: “You only wanted to injure, but with a gun now in your hand, you want to kill...Which of them, then, the gun or the citizen, is the actor in this situation?” Hence, action is not just the result of human consciousness and decision-making, but rather of a range of “many metaphysical shades” that affect goals and outcomes (Bourne, 2012:156-161). Both human and object, citizen and gun, and state and weapon, participate together such that both shape the roles played by each others, and so that neither of them is in control.

These insights provide an appropriate base for a discussion of Realism, Nuclear Realism and their technology conceptions to better understand the role of technology in global politics and arms control.

4.3. Realism and Technology

Realism is closely linked to the practical world of politics, usually alleged to aim at the preservation of the status quo and most certainly not offering any place for constructive or deterministic perspectives on technological change and its pathological or at least ambivalent consequences (Scheuermann, 2009:563). However, though unknown, it has picked up precisely the questions that need to be addressed in order to fully understand and identify the impacts technology might have on society and vice versa.

Realism defines the international system as fragmented and anarchic, in which the most important objective of states is to protect their national interests defined as military and economic strength beyond their sovereign borders. This self-help character forces them to develop survival strategies, resulting in a system where power is distributed between the states. Put simply, if a state gains power in this system, another state loses power – and vice versa. In this system technology simply represents a passive tool in the power arsenal of states (Fritsch, 2014:121). This is based on a fundamental instrumentalism, according to which technological evolution does not affect states’ behaviour and the interactions between the various actors of the international system. Material objects and technologies are seen as universally neutral, used to ensure military security and economic progress (Bourne, 2012:142). For Wyn Jones (1999:86), this view can nowadays be illustrated by the US’ National Rifle Association slogan saying “It’s not the gun, it’s the person

holding the gun that kills” suggesting that technology has no significant influence on the end to which it is put. For realist thinkers, and particularly neo-realists such as Waltz, this view also applied to nuclear weapons of mass destruction (Fritsch, 2014:121). In the constant strive for power, nuclear weapons became the ultimate answer to enhance military capacity and thus a guarantor for survival in the archaic state-centred system. However, in the wake of growing anxieties about the horrific vision of nuclear homicide, some realist thinkers promoted a more comprehensive approach of the relationship between modern technology, politics and society, scrutinising realist keystones such as state sovereignty and national security. Their theoretical deliberations, which became recently better known under the notion of Nuclear Realism will be explored in the following section.

4.4. Approaching Technology, Society and Morality: Nuclear Realism

United in their view that the thermonuclear revolution represented the peak of a world gone out of joint, Herz, Anders, Mumford and Russell, who were significant political thinkers of the nuclear age though have not received the scholarly attention they deserve (Van Munster; Sylvest, 2016:1), articulated an important, oppositional and progressive conception of political thought that put liberal ideals of human survival, freedom and globality at its heart. Nuclear realists’ analyses of the ‘technological-scientific process’ still provide a fruitful starting point for effective political thinking on modern technological development and its profound significances. As van Munster and Sylvest (2014:533) have interpreted it, Nuclear Realism is to be understood as “an analytical category of political realism that seeks to formulate an ethico-political response to the visceral combination of industrial warfare, mass democracy, nationalism and the development of unprecedented technologies”. The core findings of Nuclear Realism encompassed a more balanced understanding of society and technology as well as a moral approach to international relations.

In response to the offensive realist view that nuclear weapons have become the key to survival, nuclear realists condemned the notion that technology and its careful management would guarantee security. Arguing that the discovery of technological solutions to humankind problems has led to an uncritical fidelity to natural sciences, their attention was drawn to the political dangers of this naive faith in modern technology, which risked to create apolitical and irresponsible views of international politics. While nuclear weapons were interpreted as the climax of a relentless process of scientific and technological expansion marked by an ever-more rapid pace with a destabilising and incalculable character, account was also taken of the political interests and drivers behind this technological evolution (Scheuermann, 2009:565). As such, Nuclear Realism did not imply the

rejection of science and technology per se, but instead called for a more balanced exploration of the relationship between technology and society which considers the impact of human decision-making for technological progress just as much as the impact of certain technologies on the structure of the international system.

Moreover, proceeding from the realist premise that the behaviour of states was defined by the strive for power, nuclear realists, however, contradicted the conviction that the most advanced military armament would automatically lead to superiority as nuclear weapons would not increase national security but risked examining global humanity (ibid.:573). Arguing that nuclear weapons would represent an unacceptable hazard to global society, they raised the question if this policy could be morally reconciled with national interests (Doyle, 2010:300) to which the clear answer was 'no'. As such, they understood the use of armed force as an extreme measure that needs to be justified in relation to democratic and liberal principles and challenged the moral supremacy of the state to do this assessment. The only good that would be valid enough to justify the merit of the use of nuclear weapons would be peace, which, however, could never be reached by deploying this technology (van Munster, Sylvest, 2014:535). Their critique was not only state-centred, but also directed to modern society, which, they argued, was dazzled by the dominant conceptions of technology, as either deterministic and beyond human control or as socially constructed to serve human interests, hindering a critical examination of the moral dimensions of military force in the nuclear age (ibid.:537). As they understood the world as a single physical and socio-political place, their quest for globalist alternatives to politics and security required a sense of political imagination, which nuclear realists considered crucial for overcoming the social and political gridlock of the Cold War (Scheuermann, 2009:539). Imagination was thus an important political tool to keep the future open, which had to be thought of as a subject of political struggle and decision-making and not as a simple condition to be managed (ibid.:532).

Overall, Nuclear Realism introduced an alternative and progressive framework for analysing technology, society and international politics, which was based on a straightforward understanding of each of these notions. By questioning the moral acceptance of modern, military technology in relation to human security, it called for a more balanced approach to technological progress that accounts for broader societal implications of weapons and explores new ways of control. But even almost 70 years later, this fundamental understanding still does not appear in IR theorising on emerging weapons technology. This is especially true for classical, yet also more recent conceptions of arms control as will be discussed in the following section.

4.5. Arms Control, Society and Technology

Both, deterministic and constructivist claims of technological change are found in theorising of arms control. Yet, the differing perspectives have one thing in common: They share a kind of dualism between politics and technology, in which the various accounts of technology are concerted and produce specific views on the objectives, possibilities, scope, pace and location of the governance of weapons and arms dynamics.

For classical realists, asserting the neutrality of weapons being only a passive tool in states' force, arms control itself is caught in a dilemma: it is only needed when it is impossible and it is only possible when it is not needed. As technological change does not affect the nature of the static model of the international system, only the way capabilities are distributed within it, technology, politics and society are clearly separated which only allows for a limited ability of control. (Bourne, 2012:144). For the scholars that adopted a deterministic view of technology, technological progress is encountered as a process which subsumes political and social actions, producing uncertainties which challenge arms control. As Schelling and Halperin (1961:35) noted in relation to the nuclear age "some of the danger of war resides in the very character of modern weapons" resulting in uncalculable incentives which are only gradually controllable. Hence, arms control can only proceed through short-term measures as the future is not predictable.

Despite the different theoretical reflections, in arms control practices or in what Krause and Latham (1998:28) have called "non-proliferation, arms control and disarmament culture" that produces a "matrix of belief and dispositions" a foundational and dominant instrumentalism can be identified. This rests upon a particular western "manipulative approach to negotiation and a commitment to a step-by-step process", in which man is able to "manipulate his environment for his own purposes and set his objective, develop a plan designed to reach that objective, and then act to change the environment in accordance with that plan" (ibid.). This approach reflects the understanding of arms control as a gradual process, which is operationalised by analysing problems constitutively with technical problems and which draws upon a constructivist claim about "human mastery of nature and technology" (Bourne, 2012:150). As a result, arms control is rarely understood in transformative terms, but rather used as a tool for finding a workable identification of the problem and, thus, a way to manage it but not necessarily solve it. As Bull notes:

It is commonly assumed that the only important questions that arise in connection with disarmament or arms control concern how it may be brought about. But the question must first be asked, what is it for? Unless there can be some clear conception of what it is that disarmament or arms control is intended to promote, and to what extent and in what ways it is able to do so, no disciplined discussion of this subject can begin (Bull, 1961:3).

Recent arms control practice seems to acknowledge more balanced narratives for particular weapons, but it still lacks a comprehensive understanding of the politics in which their use might cause certain perceptions. Rather, it is attached to particular meanings that serve to legitimate or deligitimate particular weapons and their deployment (Cooper, 2006:353). Price argues the reasons why some weapons are subject to a complete ban and others of similar indiscriminate nature and cruelty are not, “lie not simply with the objective and essential characteristics of the weapons themselves but with how civilisations and societies have interpreted those characteristics and translated them into political and military practices”(Price, 1997:6). Considering these theoretical reflections arms control can be characterised as a process of enlightenment and instrumental control over weapons and technology that is reflected in the various notions of categorising weapons, but does not necessarily strive for transformation.

Wyn Jones offers a convincing argument by rejecting both deterministic and constructive views of technology and instead arguing for an exploration of the relations between technology and society in dialectic terms: “The army is not merely accidentally related to its weapons but it is structured around the activities they support” (Wyn Jones, 1999:87). This reflects nuclear realists’ incentives on technology and society in a system of mutual dependence and influence. Thus, the key challenge for IR in general and arms control theory and practices in particular is now to develop a set of concepts or a sort of language that allows discussing modern technology without falling into determinism or instrumentalism. It also needs to account for the moral ontology of the technologies and the social context in which they are embedded as actions are not reducible to fixed properties of people (or states) or objects.

5. Methodology

This section will provide an overview of the methods applied in this study in order to enable the reader to understand how empirical knowledge and understanding was developed. It begins with the research design and nature of the study, which is followed by an examination of the chosen method considering the motivation, justification as well as methodological limitations of it. The process of data selection and collection as well as analysis of the empirical material is then examined in more detail. Finally, the role of the researcher in relation to the study will be discussed.

5.1. Design and Nature of the Study

This research is designed as a single case study of the CCW discussions on LAWS and conducted in a qualitative manner as this allows engaging with the findings in a more flexible and open way, focusing on individual meaning in a specific context which represents the central point of analysis (Creswell, 2014:4; Bryman, 2012:66). The study follows an interpretative epistemological approach, and thus strives towards the meanings and understandings of the different accounts on LAWS and their legal and ethical implications. By doing so, the research accounts for a view of reality as socially constructed, where meanings, ideas and practices are being scrutinised. Other than in the case of a positive approach establishing rules and regularities of human behaviour, which are applicable in all suitably defined circumstances, the focus of this thesis is to understand the meanings and motives of human and social action (Bryman, 2012:).

5.2. Choice of Method and Methodological Concerns

As the purpose of this thesis is to examine the CCW discussions on LAWS in a comprehensive and interpretative manner in order to explore and identify rationales, gaps and tensions in the current debate, a qualitative document analysis of the different documents produced in this context was chosen. Although qualitative document analyses are one of the most common method in political science research, they often remain underrated (Bowen, 2009:27). However, as the documents used in this study were originally created outside of this scientific scope, they provide a rich source of data, considering the day-to-day activities surrounding the specific case of the CCW meetings (Olson, 2012:320). In the centre of this qualitative document analysis is the examination and interpretation of data with the purpose to evoke meaning, promote understanding and develop empirical knowledge (Corbin and Strauss, 2015, Bowen, 2009:27) on the CCW discussions on LAWS. Even though the analysis of organisational and institutional documents has been applied in qualitative research for many years, there are also a number of weaknesses inherent in the documents which need to be considered. Since the documents, that qualitative analysis examines, are, as already stressed, produced for some other purpose than research, they risk to provide insufficient information to answer a research question. Furthermore, documents sometimes may not be traceable or retrievable, hampering authentic and verifiable research. Such a limited access to documentation suggests a 'biased selectivity' since it represents an incomplete collection of information which might be important for the case under study (Bowen, 2009:32). In an organisational context, the accessible documents are likely to be subject to corporate policies and principals. Merriam (2002) therefore suggested that the research must take into account the source

of the documents in order to determine their likely purpose and the perspective from which they were created.

In order to encounter these limitations and guarantee the ‘trustworthiness’ of this research, special attention was paid to a set of standards for social scientific analysis that is based on Guba’s and Lincoln’s deliberations (1985) and transferred to the context of qualitative document analysis. It comprises four main concerns: authenticity, portability, precision and impartiality.

First and probably most important, qualitative document analysis must ensure the authenticity of the research, which is often referred to as ‘credibility’ in the qualitative-interpretivist tradition and implies a precise reading and veritable interpretation of the meanings found in the documents (Bowen, 2009:30). In order to do so, the main findings of the analysis were compared critically to reporting and other sources of interpretation such as press releases, background papers and position papers submitted in the course of the CCW discussions. Furthermore, the qualitative interpretations of the documents were supported by a more quantitative approach of analysing the text (Hesse-Biber and Leavy, 2011:326-330). As such, the process of coding of particular ‘themes’, which will be discussed in more detail below, was supplemented by an examination of the quantitative appearance of a particular set of keywords in the documents.

By doing so, the precision of the analysis was as well reinforced, which leads to the second concern that needs to be addressed – precision. Qualitative analysis of political documents must account for precision which also determines the level of authenticity. This requires detailed information about the process of analysis, illustrating how the findings were reached (Wesley, 2009). A description of how the analysis was done, follows below.

Third, portability is an important concern in relation to qualitative analyses as most research is aimed at contributing to a broader scientific debate, extending the lines of the particular cases under examination. However, unlike in the case of quantitative studies, usually no general schemes can be developed as the specific context is of importance to the results (Bryman, 2012:539). As this study is focussing on a particular case, it was not conducted with the purpose of generalisation. Nevertheless, the results are intended to add to a broader understanding of the dynamics and relations between war, technology and society.

Fourth and final, researchers analysing documents must remain impartial or objective, ensuring that the conclusions evoked from the findings in the documents and not that the findings were selected according to the hypothesis (Merriam, 2002:5). To avoid the risk of only concentrating on information that serves to confirm the interpretations being made, Esterberg (2002:175) recommends applying the “null hypothesis trick”. With this in mind, the analysis was conducted without pre-assuming any patterns or particular themes within the CCW debate on LAWS. The

themes that emerged from the analysis are based on evidence from the documents. By constantly addressing these concerns throughout the research, the trustworthiness of this study is ensured. Furthermore, the findings and interpretations presented in this research can be verified as all documents that have been examined are accessible online at the website of the UN office at Geneva. The respective sources can be found in the bibliography. This also encourages the reader to engage with the research in a critical manner and constantly weigh the question if he or she would have reached the same conclusions, given the chance to analyse the same documents under similar conditions.

5.3. Data Selection and Collection

Since the number of statements by the states and other experts that participated in the three rounds of the CCW meetings on LAWS exceeds more than 300 documents, it was necessary to delimitate the empirical data needed in order to answer the research questions. To gain a broad overview of the key actors involved in and guiding the discussions, the respective reports that were submitted by the Chairs in the aftermath of the meetings were studied. Along with the previously conducted literature review, the following states have been identified as key actors in the discussions: the US, the UK, Germany, Israel, Switzerland, China and Russia. On the side of civil society actors, ICRC, HRW, Article 36 and ICRAC appeared as dominant actors in the discussions. The analysis therefore always took into account all the documents of these actors. Furthermore, all documents related to the experts that made presentations during the meeting were considered as their insights constituted the basis for the discussions; as well as at least ten additional participant statements were included in the analysis per round of meetings to increase impartiality. Other documents such as media coverage, publications, background papers and especially conference reports from Reaching Critical Will, a project of WILPF which provides coverage of various CCW meetings, have supplemented the research with useful information to further frame the different views and themes addressed in the documents and provide a comprehensive understanding of the debate on LAWS. As presented above, the theoretical perspectives on technology and society were not applied as a fixed framework of the research, but rather served to guide the selection and analysis of the documents and the empirical observations. The insights drawn from the theoretical discussions helped understanding the differing approaches to autonomy, and the legal and ethical challenges posed by LAWS.

5.4. Process of Analysis

In order to offer a trustworthy and systematic account (Wesley, 2009), a three-stage process adapted from Altheide's "Process of Document Analysis" (1998) was implemented to analyse the selected and collected empirical data. This approach entails three steps of analysis referred to as 'open-coding', 'axial-coding', and 'selective-coding' and combines elements of content and thematic analyses (ibid.). Content analysis offered a convincing way to organise the empirical data into categories related to the central questions of the research, while thematic analysis served as a tool to identify patterns within the data with emerging themes becoming the categories for analysis (Bowen, 2009:32). Since the different understandings of the legal and ethical implications are central to answer the research question, it would not have been suitable to apply predetermined concepts or categories to explore the data.

The first step of the analysis consisted of a holistic reading of the selected documents produced during the CCW meetings on LAWS to obtain a profound and comprehensive understanding of the discussions and the various perspectives presented in it. By gaining a broad overview of the raw material, meaningful and relevant passages of the texts were identified and separated from information which was determined as not pertinent to answer the research questions (Corbin, Strauss, 2015). This process allowed to determine (a) what arguments exist on defining the main characteristics that distinguish LAWS from other weapons systems, (b) how these different perceptions of the characteristics affect a potential international regulation of such systems, (c) whether the different evaluations done by different actors participating in the CCW discussions contain some common themes, and (d) at which points the debate begins to stagnate. As a result of this process, the following categories emerged as always recurring themes: defining autonomy, compliance with IHL, referring in particular to the principles of distinction, proportionality and precaution as well as to the question of accountability and moral and ethical concerns considering human rights and human dignity related challenges. In addition, one particular theme was identified as omnipresent in the discussions beyond the lines of the specific categories: meaningful human control, mainly in relation to target engagement. These categories provide the framework for the analytical discussion in this study. However, it must be emphasised that the determined categories do not cover all facets of the debate. Points such as technological aspects and national arms review processes have also made up a big part in the discussions. While they were classified as not relevant for answering the research question, they are still touched upon in the distinctive categories in the analysis. The process of open-coding was followed by a more detailed step-by-step examination or axial-coding of what was stressed and articulated exactly, for what reasons and what kind of meanings and implications this resulted in. By reviewing the entire sample of documents, specific

passages were assigned to the various theme-categories identified in the initial phase. During the third and final phase of selective-coding, the selected documents were examined again in search of mis-coded or discrepant passages in order to ensure trustworthy and valid interpretations of the data collected.

5.5. Role of the Researcher

The role and position of the researcher in the conduction of a study is crucial and can have major impacts on the results and findings. Since researchers are human beings, it appears logical that their personal identities may influence the outcome of the study as it is constructed and shaped by subjective interpretations, experiences and views of political and social contexts. Since this study is based on personal interest of the topic and a rather critical position towards autonomous weapons systems, the research was conducted under a process of constant self-reflexivity to avoid a distortion of the results (Bryman, 2012). As the purpose of this study is to explore the different understandings of the legal and ethical challenges that LAWS pose, it was necessary to dismiss any personal biases. By constantly questioning and being aware of the own subjectivity while identifying and interpreting the collected data, neutrality was being fostered. Nonetheless, the burden can not be completely shifted away from the reader to assess the trustworthiness of the findings and results presented in this study.

6. Results and Analysis

This chapter is divided into two major parts. First, it will present and discuss the main controversies in the current CCW discussions on LAWS that were identified in the process of analysis as this helps to understand the challenges and implications of such systems. It starts by examining how the varying notions of autonomy hamper finding a common definition. The subsequent section will explore the dilemmas encountered in relation to the compliance with IHL, in particular referring to the principals of distinction, proportionality and precaution as well as to the question of accountability of LAWS. Moral and ethical concerns related to human rights and human dignity were identified as another controversial point which will then be analysed. As the need for meaningful human control over targeting and attack decisions has emerged as the main imperative throughout the course of the discussions, an examination of this notion and the encountered dilemmas connected to it will close up the first part of the analysis. The second part of this chapter, will analyse the theoretical implications of the identified controversies. Drawing upon the

historical-theoretical perspectives that have been presented earlier in this thesis, enables to understand the theoretical implications that come with the controversial discussion on LAWS and the legal and ethical concerns they raise. The subsequent two sections will therefore investigate the differing understandings of technology and society and the role of arms control noticeable in the CCW discussions as well as explore the implications that LAWS might have from a more balanced perspective of the relationship between society and technology.

6.1. The Main Controversies in the CCW discussions on LAWS

6.1.1. Finding a Workable Definition of Autonomy

All three rounds of informal expert meetings over the last three years have dedicated a large part of their agenda on finding a workable definition of autonomy and LAWS. Numerous concepts have been proposed so far from policy-makers, civil society and scientists which can be categorised as either legal or technical approaches to LAWS or as being based on a prescriptive dimension. Despite the varying notions of autonomy, there seems to be basic consensus that the definition of autonomy will be a decisive factor for a possible regulation of LAWS. Among others, the US repeatedly stressed the need for clarification of terminology and concepts in order to move forward in the discussions, at the same time acknowledging that this represents one of the biggest challenges (Statement of the US, 13/04/2015 and 11/04/2016). However, after three years of meetings, discussions have remained at an abstract level not answering what autonomy means. As many others, 2016 panellist Lucy Suchman, from Lancaster University, has defined LAWS as “robotic weapon systems in which the identification and selection of human targets and the initiation of violent force is carried out under machine control” (Statement of Lucy Suchman, 12/04/2016). The US follows this line of interpretation but does not confine it to human targets. It classifies weapons systems as autonomous when:

once activated, they can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation (DOD, 2012:13).

In contrast, the UK sets the bar for autonomy much higher arguing that:

Autonomous systems will, in effect, be self-aware and their response to inputs indistinguishable from, even superior to, that of a manned system. As such, they must be capable of achieving the same level of situational awareness as a human (MOD, 2011:14).

According to the latter, this would mean that autonomous weapons do not yet exist, whereas, following the proposition for autonomy of the US, a number of existing systems could already be classified as autonomous. With regard to a potential regulation of such systems, the complexity of the ideas behind autonomy and automation as well as the floating transition between them pose a major challenge as the classification of different systems is a matter of contention (Boulainin, 2015:8).

After a closer examination of the different approaches, the capacity to select and engage targets without further intervention by a human operator can be identified as the key element pertinent to define autonomy emphasising target engagement as the decisive moment. Against this background the concept of meaningful human control has been used to distinguish between varying stages of autonomy in weapons system which is in line with the three-stage model of autonomy promoted by HRW. As Japan has emphasised: “elements, such as ‘meaningful human control’ [...] are useful indicator to measure autonomy of the weapons” (Statement of Japan, 11/04/2016:2). Over the past three years the notion emerged as the instrumental imperative to define autonomy, but has also come forth as a point of coalescence on how to potentially regulate autonomous systems. While the majority of the participating states has argued that any weapon system needs to have meaningful human control (Campaign to Stop Killer Robots, 2015), the term is of great nebulous terminological nature and has until now not been absolutely determined.

What, however, stands out of the debate on what in particular is needed to consider human control as meaningful, is that the concept is always referred to targeting and engaging humans. As HRW explained in its report in 2012, that paved the way for the CCW meetings, existing weapons systems that operate with arguably varying degrees of autonomy, should not be the focus of regulative discussions as “they seem to present less danger to civilians because they are stationary and defensive weapons that are designed to destroy munitions, not launch offensive attacks” (HRW, 2012:12). In line with this argumentation, the US stressed that the meeting should focus on “future weapons, or in the words of [the US] mandate, ‘emerging technologies’” and thus not refer to existing systems with lower levels of autonomy (Statement of the US, 13/04/2015). Spain also suggested it would be important to consider the context in which LAWS could be applied distinguishing between an offensive or defensive use and underlining the right of self-defence (Statement of Spain, 11/04/2016, *own translation from Spanish*).

Thus, distinguishing between acceptable levels of autonomy and an unacceptable loss of human control seemingly rests on two factors: the nature of the target and the context of the operation environment. This highlights how context and circumstances are crucial for defining autonomy and acceptable levels of human control. When targeting incoming munitions, weapons systems have

more license than when targeting people. Thus, autonomy seems to be a matter of degree and context (Williams, 2015:181). Whereas in some military operations human monitoring of activities carried out by a machine is sufficient, other missions require direct human control due to the environment or complexity of the mission. This suggests that a differentiation between the automation of certain operational tasks and the acquisition of autonomy over the decision-making process is not possible without accounting for context, including type of target and process of engagement. This contextual approach contrasts with claims made during the CCW meetings for the need for a clear and distinctive definition of autonomy and results in regulatory and policy implications. As Canada has emphasised in its food for thought paper in 2016 “it seems likely that the implications of LAWS will vary considerably depending on the specific circumstances under which LAWS might be used” (Canada, 2016:2). Switzerland called in an informal working paper for a more “inclusive understanding of autonomous weapons systems, which would also cover means and methods of warfare that do not necessarily inflict physical death” (Switzerland, 30/03/2016).

This brief discussion of the CCW debate on defining autonomy implies two conclusions. First, it suggests that autonomy is not a static concept. Autonomy can not be broken down to a fixed set of characteristics as in the case of chemical or biological weapons that deploy definable means aiming at a particular military effect, but instead the meaning and level of a weapon system's autonomy may change in different contexts. Hence, regulatory approaches need sufficient flexibility to grasp the contextual implications of autonomous weapons. Second, regulatory debate focuses on target engagement as the main point of decision. The loss of control over who is targeted and how seems to represent a threat to established regulatory policy and practice and an undermining of deep-rooted ethical concerns, which will be discussed in more detail later.

6.1.2. Compliance with International Humanitarian Law

6.1.2.1. The Principles of Distinction, Proportionality and Precaution

Potential issues surrounding LAWS' compliance with IHL or accountability for violations of such laws were covered in all three informal meetings. Although, the approaches to these issues were quite different as well, there was a basic agreement that autonomous weapons systems, if ever used, would have to meet criteria applicable to all weapons. The debate focused on the question if LAWS would be able to comply with the IHL principles of distinction, proportionality and prevention.

The distinction principle is based on the premise that civilians are never a legitimate target even in the armed conflict. For the context of autonomous weapons systems, several questions have been

raised throughout the CCW negotiations. First of all, the need for clarification whether the sensors of such systems could ever meet the required distinction with sufficient reliability was stressed. While this constitutes a rather technical challenge, robotic experts doubt a successful implementation. According to Professor Noel Sharkey from the University of Sheffield “IHL compliance with LAWS cannot be guaranteed for the foreseeable future” nor “the predictability of LAWS to perform mission requirements” (Presentation by Noel Sharkey, 13/05/2014). Beyond this purely factual distinctiveness, account was also taken of the fact that compliance with the principle of distinction requires highly complex weighing processes. Coping with critical situations in armed conflicts is always a question of value judgement (Geiss, 2015:14). Even if one presupposes very advanced sensor technology, the question remains whether this could ever be achieved by algorithms. This applies in particular to situations of present armed conflicts characterised by increasing complexity. Keywords such as "asymmetric warfare" and "urban warfare" (Heyns, 2013:13) have been raised throughout the discussions as indicative for the enormous difficulties of distinguishing irregular fighters and other legitimate targets from the civilian population. A sensory detection of certain armament or enemy uniforms would, however, not be sufficient as distinction requires an interpretation of immediate behaviour, which is currently not possible to translate into software. It was also pointed out that this principle does not only encompass the protection of civilians, but that combatants who have surrendered or are injured are also ought to be protected by IHL. It is at least questionable whether autonomous weapons systems will be able to reliably recognise these distinctive criteria as they would need to register gestures, facial expressions and emotions and to assess them correctly, which is an extremely high requirement (Geiss, 2015:14).

In addition, the principle of proportionality was emphasised as one of the fundamental pillars of IHL allowing indirect damage to the civilian population, if, for example, a military object is directly attacked and civilians injured as far as the harm is proportionate. Balancing between the expected military advantage and the possible collateral damage is a mental operation based on complex, value-based case by case decisions, which depend on the specific circumstances. The question is again whether this calculation could be achieved by algorithms. Most experts participating in the CCW meetings had strong doubts that autonomous systems could be programmed in a way that allows for such an assessment in the near future. If this would not be the case, or if autonomous systems could not safely distinguish between protected civilians and hostile combatants and fighters, some experts argued that the systems would likely be used from the outset only in environments without a civilian population present. As Paul Scharre from the Centre for a New American Security argued:

Precisely because it is so difficult to build a robot that could accurately discriminate among combatants in ground conflicts where civilians are present, autonomous weapons are most likely to be introduced, if they are built, in areas where there are few if any civilians, such as undersea, in the air, or in space or cyberspace (Presentation of Paul Scharre, 13/04/2015).

While this would be a way to work around the problem, it would not be a solution to the underlying issue.

According to the third principle of IHL, autonomous weapons systems must finally be able to obey the precautionary principle. The precautionary obligation to take all ‘feasible measures’ to prevent civilian losses applies to the entire planning phase of an armed operation and concerns all those involved in the preparation such as commanders, but also the manufacturers and programmers of the systems. As Kimberly Trapp, from the University College London, emphasised in her presentation in reference to the Geneva Convention:

‘everything feasible’ is understood in terms of “everything that was practicable or practically possible”, making it absolutely clear that the obligation to take precautionary measures is understood in terms of efforts made. An assessment of compliance with the obligation to take precautionary measures must therefore focus on the process of verification and collateral damage assessment, rather than outcomes. Obligations of conduct, unlike obligations of result, are subject to a due diligence standard [...]. (Presentation of Kimberly Trapp, 13/04/2016).

This suggests that the original planning of the military operation must still be valid and relevant once the deployment has begun. Since many unforeseen things can happen during the course of a military operation, Trapp argued that this would result in the implicit duty of a human soldier to remain on-the-loop as he or she would be able to react spontaneously to changed conditions. Others had doubts about this mode. Since computer-controlled weapons systems could process information much faster than human beings and thus shorten the reaction time, it was questioned to what extent one could actually assume that soldiers on-the-loop would be able to intervene before an attack, when the weapons system is ready to break a rule of IHL (HRW, 2012).

Overall, the question whether LAWS will be able to comply with the principles of IHL takes a large part of the debate within the CCW discussions, while much remains speculative. For the majority of the participating states, the Additional Protocol to the Geneva Convention guarantees that, should LAWS not meet these conditions, they will not be used under applicable law. Switzerland, therefore, argues the focus should lay on the enforcement of IHL. A new regulation, as in the form of a new Protocol to the CCW, would not be binding to all states and, thus, might even weaken this standard. Here, too, the imperative of maintaining meaningful human control over the

process of target engagement was put forward as the decision point as to whether legal requirements are being met or not:

Given the current state of robotics and artificial intelligence, it is difficult today to conceive of an [autonomous weapons system] that would be capable of reliably operating in full compliance with *all* the obligations arising from existing IHL without any human control in the use of force, notable in the targeting cycle (Switzerland, 30/03/2016).

This approach, however, runs the risk of turning into a technical prescription that, put simply, needs to be translated into the engineering process of LAWS. The US has identified compliance with IHL as a design requirement of any future weapons system (Statement by the US, 13/04/2015). But the legal implications of autonomous weapons systems are not simply reducible to the level of human control. The experiences gained with the use of armed drones which until now operate with a human on-the-loop have raised a set of questions as to whether their deployment is covered by customary law since human agency in a drone strike is of different nature than when flying an air fighter. If human control is limited to making the final decision about whether the button is pressed at the end of a targeting process, but the selection and targeting is being replaced by machine processes, as is already the case with some drones, it is quite questionable to what extent this is realised in compliance with IHL. Doubts in this direction are based on a more fundamental consideration, which has only recently been taken up in the CCW discussion on LAWS and goes far beyond the above considerations: Is not the whole set of IHL implicitly based on the assumption that it refers to genuinely human decision makers in armed conflicts? If the addressees of the imposed obligations and prohibitions are people, whose emotions, errors and drive for self-preservation are already included in the basic legal decisions, then the question whether autonomous weapon systems are able to comply with IHL may be wrong. The question rather has to be whether the principles contained in this legal framework are still effective and sufficient if LAWS are used for warfare. As Ecuador noted in the third informal meeting “law is written by and for humans. Without human deliberation, law does not retain its meaning” (Statement of Ecuador, 11/04/2016; *own translation from Spanish*). Kimberly Trapp expressly underlined during her presentation in the 2016 meeting that “these technological developments – unforeseen at the time relevant treaty standards were negotiated – raise very difficult legal questions [...]”, particularly if “the standards of IHL compliance [are] sufficiently flexible to respond to the rate of technological development of the modern era [...]” (Presentation of Kimberly Trapp, 13/04/2016). Poland criticised in this context the “use [of] anthropomorphic analogies to describe [autonomous weapons]

systems” as this might lead to confusion about the capabilities and the nature of its performance (Statement of Poland, 2016).

Here, too, one can conclude that a focus on target engagement as a critical decision point is only partly useful. From the above considerations one could even suggest that autonomous systems, irrespective of their level of human control, have to meet much higher standards which raises the question whether IHL is still keeping with the times of modern warfare or if the principles and rules it contains need revision themselves. As already scrutinised above, IHL refers to the human being as the main actor and decision-maker in armed conflict. It thus raises the question why technologies that work on pre-programmed algorithms should also be captured under this legal framework. This fundamental issue receives only little or no attention in the current negotiations on LAWS.

6.1.2.2. Accountability

Throughout the course of the CCW discussions states, experts and civil society activists have repeatedly raised concern about the accountability of LAWS. Alongside the aforementioned pillars, IHL is founded on the principle that any individual should be held responsible for his or her actions violating law. Among others, Bonnie Docherty of HRW argued LAWS would undermine this fundamental norm and warned against the far-reaching implications as:

they would have the potential to create an accountability gap because under most circumstances a human could not be found legally responsible for unlawful harm caused by the weapons. Operators, programmers, and manufacturers would all escape liability (Statement by HRW 13/04/2016).

The majority of the participants agreed that the legal situation is quite clear as far as intentional war crimes are concerned (Campaign to Stop Killer Robots, 2015). Thus, if a programmer deliberately writes algorithms in such a way that the system subsequently attacks civilians and designs it precisely with this purpose, the criminal responsibility is undoubtedly given. The same is true of a commander who knows the machine's deficits, but still uses it in an area with a high proportion of civilians resident disregarding the risk of civilian casualties. The question of accountability apparently only becomes difficult when all people involved assume that the weapons system works properly, and does not aim to engage persons protected under the law. The UK's answer to this issue is that:

There must always be human oversight in the decision to deploy weapons. It is with this person/people that responsibility lies. Responsibility will flow up through the Chain of Command, which is so important in military structures (Statement of the UK, 13/04/2016)

Thus, the person who would deploy the weapons system would be responsible for its actions suggesting that accountability for LAWS would be no different than for any other weapon. This, however, raises significant concerns on how someone would exercise control over an autonomous system operating without human supervision. This again reflects target engagement in relation to human control as very thin cutting line. The more autonomous a system operates, the greater becomes the potential responsibility and accountability gap as responsibility is determined by control. Robin Geiss, from the University of Glasgow and panellist in the 2016 meeting argued in this context that:

accountability challenges can be overcome by way of regulation and clarification of existing laws. There is no conceptual barrier for holding a state (or individual human being) accountable for wrongful acts committed by a robot or for failures regarding risk minimization and harm prevention (Statement of Robin Geiss, 13/04/2016).

But here, too, weaknesses can be identified with regard to the use of armed drones. Investigations of potentially unlawful killings through drone strikes, which operate with a human-on-the-loop, are rare, making accountability even rarer. Although Amnesty International in its report on US drone strikes in Pakistan has raised profound concerns on the international legal basis for individual attacks that were conducted in Pakistani Tribal Areas, the US had not to face any legal or political consequences, yet. Amnesty International argues that with greater ‘dehumanisation’ of the targeting and killing decisions, ensuring accountability will prove even more difficult (Amnesty International, 2013).

Thus, while approaches to face accountability by holding those concerned in the programming, manufacturing or deployment process of autonomous systems responsible would serve as an instrument of control, they would, nonetheless, turn out to be insufficient as it would be impossible to foresee any potential malfunction due to the complexity of the systems themselves. The problem of a prospective accountability vacuum would not be solved.

6.1.3 Ethical and Moral Implications

Although a variety of states have articulated strong moral and ethical concerns about the deployment of LAWS in armed conflict during the CCW meetings, much of the diplomatic debate has largely focused on determining autonomous systems and their compliance with IHL. While in the 2014 CCW meeting ethical issues constituted a separate item on the agenda, they were subsumed with other, mainly security related considerations, under the point “overarching issues” in 2015. As the Republic of Korea agreed “it would be appropriate for the meeting to focus on aspects of international humanitarian law and military security, while touching upon the issues related to

ethics and human rights” (Statement of the Republic of Korea, 13/04/2015). However, particularly due to the pressure of civil society activists and ethicists, ethical considerations in relation to human rights concerns were reintroduced as a separate topic in the 2016 meetings (Statement by ICRC, 16/04/2015).

Overall, a general discomfort with the idea to allow machines to make decisions over life and death can be identified in the different arguments. These considerations go beyond customary law and address the principles of humanity and the dictates of public conscience, also known as the aforementioned ‘Marten’s Clause’. Chile and Amnesty International have stressed what Chile’s delegation has called the “terrible impact” LAWS would have on human rights as they would threaten the right to life, the right to security of individuals, the right to human dignity, the right to a fair trial and possibly the right to freedom of peaceful assembly (Statement of Chile, 13/04/2015, *own translation from Spanish*; Statement by Amnesty International, 15/04/2015).

The impact of LAWS on the right to human dignity has particularly been highlighted by lawyers, ethicists, and others participating in the CCW discussions over the past three years. Heyns again stressed that leaving the decision over life and death to a machine operating on the basis of algorithms turns humans into objects undermining human dignity (Statement of Christofer Heyns, 14/04/2016). This emphasises the need for moral agency in relation to engaging human targets as perceiving this process as fully rationalisable would have severe implications. It is precisely the inherent irrationality which is expressed by the human decision to kill that could be regarded as the basic prerequisite for a minimum of morality (Geiss, 2015:18). Even if a soldier, according to the principles of IHL, has the right to kill an opponent's combatant in a concrete situation, the action still presupposes a highly personal conscience or examination. Such a process of human reasoning, which involves judgement and compassion, is not accessible to autonomous weapons systems. The functioning of such a system, on the contrary, makes it possible to carry out killing decisions with literally merciless consistency and without prior moral weighing (*ibid.*). In addition, the person targeted by an autonomous weapon system is basically lacking the opportunity to appeal to the humanity of the attacker. Factors such as grace or compassion are removed from the battlefield as LAWS lack an understanding of the inherent value of human life.

Considering the various ethical and moral implications stated during the CCW meetings, the different morality-based arguments can be broken down to three core issues: First, the lack of human qualities necessary to make moral decisions; second, the threat to human rights and human dignity; and third, the absence of moral agency.

Against this background, several states have argued maintaining meaningful human control would be a moral duty. As the Holy See has emphasised in a paper submitted in 2015, which

represents the most in-depth discussion on ethical implications in the CCW negotiations, “it is fundamentally immoral to utilise a weapon the behaviour of which we cannot completely control” (Statement of the Holy See, 16/04/2015). Chile underlined, that the idea of meaningful human control was not to be interpreted in technological terms, but instead to be understood as an “ethical imperative” (Statement of Chile, 13/04/2015; *own translation from Spanish*). Heyns stressed in line with this argumentation that fully autonomous weapons systems would represent a moral unacceptability so that “no other consideration can justify the deployment of lethal autonomous robotics, no matter the level of technical competence at which they operate” and thus suggested that a pre-emptive ban would be the only solution to this irreconcilable ethical obstacle (Heyns, 2013:17). Others, on the contrary, warned of a hasty moral condemnation of autonomous weapons systems. In the aftermath of the CCW Review Conference, lawyer Chris Jenks, panellist in the expert meetings in 2016, criticised the Campaign to Stop Killer Robots and others to employ “moral panic” in order to engender attention and support for their cause projecting hypothetical visions of ‘killer robots’ and thus preventing an unbiased examination of autonomy in warfare (Jenks, 2016:32).

After all, one might come to the conclusion that the ethical debate on LAWS is vital and based upon a comprehensive foundation. Again, the approach is pursued, that the ethical and moral concerns raised by LAWS could be addressed and wiped out by requiring meaningful human control over target engagement. This suggests so long as humans retain control of life and death in the last resort, the legal and ethical rules and principles on the just conduction of war seem to be respected, again reflecting an instrumentalist approach to arms control. However, even with systems where a human remains in-the-loop or on-the-loop in critical functions, a point may be reached where the spatial and temporal distance from the selection and engagement of targets becomes so big that human decision-making over the use of force is substituted with machine processes. Overall, the points of concern raised in the CCW discussions only relate to one aspect of the problematic, ethical dimension surrounding LAWS and warfare, which becomes even clearer if one acknowledges a more balanced perception of science and technology as will be shown in the last part of the analysis.

6.1.4. Meaningful Human Control

For a better understanding, the essential points mentioned in relation to the concept of meaningful human control are briefly summarised in the following. However, since the conceptuality itself

requires an extensive debate, this section is intended to give only a brief idea of the main issues surrounding this notion.

As shown in the sections above, the concept of meaningful human control has been discussed since the first CCW meeting on LAWS in 2014 and has become indicative for the course of the debate. Albeit its consistency in the discussions, states have approached this concept with different degrees of openness. However, over the past three years, at least 30 countries have specifically stressed the need for human control in relation to the use of force, usually referred to as meaningful, appropriate or effective (Campaign to Stop Killer Robots, 2015). Maintaining meaningful human control has emerged as a practicable solution to many of the problems associated with autonomous weapons emphasising target engagement as the key decision point for much of the debate. It is argued that weapons systems operating under meaningful human control respect human rights and protect human dignity, enable compliance with IHL and promote accountability. In addition, it was also stressed that the concept would help defining autonomy and regulating corresponding weapons systems as permissible or not. As HRW has argued together with the International Human Rights Clinic (IHRC) in a memorandum to the CCW meetings in 2016 meaningful human control would represent “viable means to address the problems posed by emerging weapons” (HRW; IHRC, 2016). However, particularities of its content and scope of application have until now remained open as to foster a potential agreement (Article 36, 2016). The ICRC refers to meaningful human control as “control over the selection and engagement of targets, that is, the ‘critical functions’ of a weapon” (Statement of ICRC, 13/04/2015). According to the NGO Article 36 “this means when, where and how weapons are used; what or whom they are used against; and the effects of their use” (Article 36, 2016). It is, however, unclear what exactly would make human control meaningful.

Despite the fact that the concept has gained currency among a vast number of experts that participated in the CCW meetings, among which some even see it as the basis for a diplomatic agreement, others see it more critically (Campaign to Stop Killer Robots, 2015). Pakistan, which already has to cope with the consequences of the so-called ‘drone war’, stressed that:

Although the concept of ‘meaningful human control’ has gained some currency and traction in the context of LAWS, we are of the view that the concept of ‘meaningful human control’ only provides an approach to discussing the weaponization of increasingly autonomous technologies; it does not provide a solution to the technical, legal, moral and regulatory questions that they pose (Statement of Pakistan, 11/04/2016).

This exemplifies what has already been mentioned before: Human control over target engagement does not automatically imply compliance with legal and ethical principles of armed conflict. The use of armed drones, thus systems under human control, has already led to a major legal and ethical

debate. As the soldier is spatially and temporally separated from the battlefield, a new kind of warfare is introduced that existent legal and ethical frameworks do not capture. The concept of meaningful human control can, thus, only partially address the challenges caused by autonomous weapons systems.

Other points of criticism that are being raised in relation to the concept of meaningful human control refer to the mode of operation between human and machine. In his project on operational risks of autonomous weapons, Scharre emphasised the great complexity of such systems, which could make supervision of the system's functioning opaque and difficult to control (Scharre, 2016:14). Furthermore, the process of human involvement is just not reducible to the final decision of target engagement. Operating these complex systems may involve humans in various different ways as was pointed out by the US:

Because this human/machine relationship extends throughout the development and employment of a system and is not limited to the moment of a decision to engage a target, we consider it more useful to talk about 'appropriate levels of human judgement' (Statement of the US, 11/04/2016).

In addition, as has already been touched upon before, the quality of human control is questionable as it is influenced by the system's performance. Since autonomous weapons systems will process data and information much faster, leading to a short reaction time, the human operator will have to adapt to this and might need to be trained specifically. In this context, some scholars have raised concerns that human operators might rely on the machine-given information and follow the proposed military operation even though it might be wrong (Neslage, 2015:172).

All in all, it becomes clear that the concept of human control is not very mature and still needs some differentiation. While its simple language seems to provide a useful basis for agreeing on and implementing a regulation of LAWS, it fails for the same reason. It does neither provide any significant guidelines for the development of future weapons systems nor does it make autonomy more tangible. Looking at the CCW discussions, however, it becomes apparent that meaningful human control, regardless of its exact meaning, over the critical functions of a weapon became a guiding principle and will constitute the dominant ductus in the discussions to follow. This reflects the dominant instrumentalism of arms control practices, resting on a binary view of technology and society.

6.2. Theoretical Perspectives on the CCW Discussions on LAWS

6.2.1. LAWS – Just another Weapon or a Technological ‘Juggernaut’?

Broadly speaking, two major camps of referring to technology in the various concerns on LAWS raised throughout the CCW discussions can be identified: a deterministic and a constructivist. However, in terms of arms control and regulation mechanisms a structural instrumentalism is prevalent as reflected in the dominant notion of maintaining meaningful human control suggesting that regulating autonomous weapons systems is possible if only wanted. These differing accounts of technology do not only result in differences in the perceptions of the legal, moral and ethical implications, but also in regulatory and policy measures. A constructivist view of autonomous weapons was particularly promoted by the US, which stressed that:

Adherence to ethical and moral norms will depend less on the inherent nature of a technology and more on its potential use by humans. As with any emerging technology, it is important to consider fully the ethical implications of how that technology might be used or misused (Statement of the US, 14/04/2016).

This reflects the conception of technology as a neutral, passive tool determined by human or state agency alone. The legal and ethical consequences of autonomous weapons systems will be the result of political decisions made by societal actors. Depending on the specific interests of these actors, the impact of the technology will change. This suggests that humans are in absolute control over the weapons technology they deploy. If this happens within the legal and moral constraints of IHL, no different implications are to be expected than in comparison to other weapons technology. Technology is a means to an end, and if technology enables improved outcomes it should be developed and deployed.

Others, on the contrary, claimed that it is the inherent nature of autonomous weapons systems that has serious impacts on IHL, human rights and ethics, not merely the “misuse” of such systems, which indicates a deterministic view of technology (Statement by ICRC, 13/05/2014). Calls for a pre-emptive ban of LAWS as a specific weapon category as well as the dominant imperative of meaningful human control reflect the fear of relentless technological dynamics humans are unable to control. It is the fear of an unstoppable technological force, a “juggernaut”, that once brought into motion is hardly to be stopped and would risk destroying everything that stands in its way. It is then the technological evolution that determines society and political-decision making. As the Holy See has exemplified:

The delegation of important powers to machines risks depriving the political authorities of their *raison d’être* and therefore of their capacity to act in a responsible manner. Being-outrun by their machines

and dazzled by their fascinating performance, these decision-makers risk not being able to decide anything, finding themselves in a paradox where the decider decides not to decide anymore! The autonomous combat machines risk, through their speed and their capacity, to dictate important military action policies (Statement of the Holy See, 16/04/2015).

These two accounts of technology are exemplary for the gridlock, in which the discussions on LAWS are risking to head to. As the critical thinking during the nuclear condition has already demonstrated 70 years ago, the relationship between technology and society can not be separated that easily. Instead technology and society influence the outcome of their relationship mutually. Nuclear Realism did not understand weapons as a neutral tool in state hands. It acknowledged that the technology itself has prompted political actors to make certain decisions. At the same time, it did not perceive nuclear weapons as a technological juggernaut beyond any possibility of control. These reflections are essential to consider in the CCW negotiations on LAWS in order to enable an adequate regulation of such weapons systems.

Nonetheless, what connects both views is their underlying instrumentalism with regard to arms control measures. As pointed out above, the requirement of meaningful human control over critical weapons functions is emphasised as starting point for potential regulations. This reflects the dominant rationales in arms control practices that have been scrutinised in the theoretical discussion on technology and society (see chapter 4). For one, the debate is precisely in the process of attributing these weapons a certain meaning which either legitimates or deligitimates them as tools of modern warfare and can be understood under the imperative of enlightenment. On the other, the CCW discussions are clearly missing a debate on what a regulation of such weapons systems is intended to promote at all, which suggests that here, too, arms control is less understood in transformative terms, but as a question of operationalisation or implementation. This evokes the risk of turning potential regulatory measures of LAWS into a meaningless diplomatic agreement.

As the complexity of the whole debate suggests, autonomous weapons systems can not be easily assigned to neither the one nor the other notion of technology, nor can the concept of meaningful human control counter all the legal and ethical implications that these systems might evoke. The correlations and the dynamics between the complexes of society and technology need to be taken into account in order to fully understand and identify the significance and potential consequences of such systems to then explore what a regulation is needed for.

6.2.2. Consequences of How We Kill

Considering Latour's deliberations on how human and technological agency modifies by coming together, it becomes apparent that the current debate on LAWS within the CCW does not recognise

the capacity of technologies to affect human action, decision-making and social relations, which raise a whole new set of moral and societal questions. The problem of ethics can not simply be reduced to justifying war and the killing within it. Neither should complexity be a reason to abandon a broader, philosophical debate on the relationship between technology and society, in particular with regard to the military use of force (Williams, 2015:184).

The lessons that derived from the invention of the atomic bomb and the critical, ethical and moral examination of this weapon as promoted by Nuclear Realism have illustrated that the tools applied for the use of force can strongly determine the form of that force. Attacks that might not have been possible, can be facilitated or fostered by certain weapons. Furthermore, they acknowledged a more balanced conception of the relationship between technology and society, which explored the deeper meaning inherent in the choice of what specific weapon is used for warfare. These choices are influenced by social relations and human decision-making and affect the structure of the societal and cultural system themselves. With regard to the CCW discussions on LAWS, this suggests the need to consider what these systems might enable or result in and which impact they might have on our social relations. Just like nuclear weapons, autonomous weapons systems could turn into weapons of power, dominance, inequality and othering as they are particularly “attractive” to technologically advanced states and would not, in any near future, be deployed in a science-fiction-like scenario of robot war, but most likely in asymmetric conflicts where the opposing side might have nothing to counter (Reaching Critical Will, 2016). As Leveringhaus has stressed “we are using robotic weapons to take out threats. By taking out the people that might constitute a threat to your own security with high precision, you are not building the conditions for peace” (Oxford Martin School, 2014). This questions the usefulness of autonomous weapons in the long run when the most valid good to justify their use, peace, is in danger.

These meta-philosophical considerations suggest the following conclusions. First, the discussions on LAWS and potential regulatory mechanisms need to explore and consider the broader, moral and ethical consequences impacted by the use of autonomous weapons systems for warfare and not just the ends pursued by war. Second, the consequences for war and society of developing such systems and the relationship between technology and society in general need to be taken into account. Third, a comprehensive debate on whether and how autonomous weapons systems contribute to the protection and promotion of core democratic values is required.

7. Conclusion

This thesis has explored contemporary international efforts to develop laws and regulations of autonomous weapons systems within the framework of the CCW. Generally speaking, LAWS as potential future weapons of warfare are subject to a great amount of criticism and scrutiny from states, international organisations, civil rights activists, scholars and researchers. Much of the debate has mainly been focused on capturing the concept of autonomy and discussing the main legal and ethical obstacles and concerns that emerge with regard to these systems. However, the findings of the research indicate that the debate is in danger of getting into a gridlock and neglecting potential consequences as it lacks to account for the broader, societal and political implications that LAWS might evoke and the role of technology and society, in particular in relation to the use of force. The central research question positioned at the core of this thesis therefore explored how we can come to a more comprehensive understanding of the legal and ethical challenges that autonomous weapons systems pose in today's global politics.

The first sub-question guiding this thesis explored the main characteristics that distinguish LAWS from other arms technologies and what implications these have for an international regulation mechanism. It is tightly linked to the second sub-question seeking at identifying the main challenges and gaps in the current CCW discussions on regulating LAWS. The study has highlighted that the debate on LAWS is highly complex and not reducible to technological aspects.

A critical engagement with the notion of autonomy has exemplified that it is not a frameable, static concept which can be defined by a fixed set of characteristics. The meaning and level of a weapon system's autonomy may change in different contexts. Defensive systems that target incoming munition without further human supervision are not perceived as autonomous but rather as automated, whereas offensive computer-controlled processes of targeting humans are understood as an unacceptable level of autonomy. This highlights how context and circumstances are crucial for defining autonomy, implying the need for sufficient flexibility in regulatory mechanisms. Rather than focussing on a categorical distinction between acceptable and unacceptable levels of autonomy, definitional and regulatory debate within the CCW should therefore take contextual factors such as environmental complexity and target type into account.

Considering the ability of fully-autonomous weapons systems to comply with IHL, in particular with the principles of distinction, proportionality and prevention, this study has identified a number of challenges and controversies in the current CCW discussions. The dominant imperative in relation to these concerns is that if LAWS would not meet these legal requirements, they would not be used under applicable law. Special emphasis was put on human agency in armed conflict as the

fulfilment of these legal obligations would require complex, value-based judgement and decision-making that only humans could succeed, suggesting that systems in which a human operator remains in or on-the-loop would comply with IHL. However, it remains questionable to what extent human supervision can prevent non-compliance with IHL as to the limited role of control in systems in which the soldier can only override a machine-induced action. The discussions generally focussed on technological and functional characteristics of LAWS, risking to turn IHL compliance into a design requirement. What, however, evolves from the critical examination in this thesis is the more fundamental question if the principles and requirements of IHL are suitable at all for regulating LAWS. Since the whole set of this legal framework refers to genuinely human decision-making in armed conflict, it is highly questionable whether it can simply be applied one to one to computer-controlled systems. Instead of discussing technological requirements of LAWS in order to secure compliance with IHL, first of all the question should be addressed if current legal agreements and treaties are still keeping pace or if the regulation of LAWS requires laws beyond contemporary legal regulations.

With regard to the ethical and moral concerns raised by LAWS the study has identified the lack of human qualities necessary to make moral decisions, the threat to human rights and human dignity, and the absence of moral agency as the major arguments raised within the CCW negotiations in this context. This is based on the fundamental claim that humans must not be engaged by machines, suggesting that there are no ethical or moral consequences to expect if a human retains control over the decision of life and death. This, however, only reflects one aspect of the ethical dimension surrounding LAWS.

As this thesis has exemplified maintaining meaningful human control over targeting and attack decisions has emerged as the primary point of common ground for regulating LAWS, providing the backbone for much of the debate. It has been introduced as the solution to many of the problems identified in relation to the use of autonomous weapons systems and as the basis for a diplomatic agreement. The practicability of this approach yet remains questionable as all three terms of meaningful human control are contestable themselves. The concept does not provide any significant guidelines for the development and deployment of autonomous weapons systems and does not state what is needed to make human control meaningful. As such, it is not suitable to counter all the legal and ethical implications that these systems might evoke.

In relation to the third sub-question asking what can be learned from these challenges, the main findings of this study illustrate that the current discussion on LAWS within the framework of the CCW is dominated by a binary view of the relation between technology and society which results in different perceptions of the implications of autonomous weapons. On the one hand, a constructivist

account of autonomous weapons was identified, stressing that it is not the inherent nature of the technology but instead its potential (mis-) use by humans that causes legal and ethical concerns. Following this view, LAWS would be no different to other weapons technologies as they are a passive tool subordinated to human decisions. On the other hand, a deterministic view of technology was expressed in the vision of fully-autonomous weapons systems as an unleashed 'killer machine' that humans would no longer be able to control. The requirement of meaningful human control would therefore be the only option to counteract this relentless technological evolution. Both views reflect a dominant instrumentalism of arms control practices, resting on the notion that human agency determines technology. This risks neglecting the transformative potential of arms control as it only strives answering how LAWS could be regulated, but does not address the fundamental question what a regulation is for.

Finally, this thesis has explored how a more balanced conception of the relationship between technology and society would broaden the current discussions on LAWS and its potential consequences. By accounting that technology is influenced by human agency but that human decision-making is affected by technological progress itself, an insight discussed at length within STS and Nuclear Realism but which does not seem to be taken up adequately within IR, this thesis has highlighted ethical and societal implications of the potential use of autonomous weapons systems that so far had only been superficially addressed, if at all. As such, this study has attempted to introduce long-known tools to the field of IR in order to enable an adequate analysis of the relationship between technology and society. Weapons are not just a neutral tool in states' hands but the military is structured around the activities they enable. Regulating LAWS needs to look beyond formal treaties and agreements and at social and political cultures affected by and affecting LAWS. The key question that remains unanswered is how LAWS could prevent suffering and promote peace and justice as this is foundational for human society.

8. References

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