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*“A sword never kills anybody;  
it is a tool in the killer’s hand.”*

*-Seneca*

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## **A. Preface**

In the past many science fiction films used as an intriguing and ‘catchy’ scenario the take-over of robots. Robots would prove to be the main form of intelligence on Earth and gradually and progressively will eradicate humanity and they will dominate the world that is known today. Thankfully, this is only a science fiction scenario. A scenario that is only used to transform a movie into a blockbuster and it does not correspond to reality. Suspicious devices do not exist and technology will not dominate humanity; humanity is capable of controlling technology and using it to satisfy its needs.

A U.N. Report made known that a drone – a military lethal autonomous weapon system or simpler LAW – was deployed in Libya<sup>1</sup>. The weapon was deployed in the fighting that is conducted between the Government of National Accord and the forces deployed by Gen. Khalifa Haftar. Is that an unparalleled change in how the war – as it is known today – is fought? Is the mankind now threatened by suspicious devices that are uncontrolled and they could deploy their attacks against combatants but also civilians? Are those technological advanced devices capable of creating new challenges in the battlefield? Are they capable of changing how the war is fought? And more importantly, are they legal? Who is responsible for their usage?

More or less, these questions constituted a triggering event for this thesis; they constituted a stimulus to research how autonomous weapon systems (AWS) and especially fully autonomous (FAWS) are regulated by international law – if they are at all regulated. The purpose of this research is to satisfy this need; the need to explore if this type of weaponry is regulated by International Law and subsequently who is responsible for their usage when the situation on the battlefield does not go as planned. Battlefield is an unknown place; regardless of how well an operation is prepared, it cannot always be controlled. This position holds true especially in the case of AWS and FAWS; they introduce new dangers on the battlefield, they are unpredictable and they entail risks.

AWS entail many more dangers than those described above. FAWS are from their nature autonomous. We will not see operators controlling them remotely and navigating them in order to deploy their lethal force. They are pre-programmed and they depend on algorithms and Artificial Intelligence (AI). Once they are deployed, nothing seems to exist in order to influence their behaviour and halter an unlawful attack. In such cases, it should be explored who is

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<sup>1</sup> UN SC: S/2021/229, Letter dated 8 March 2021 from the Panel of Experts on Libya established pursuant to resolution 1973 (2011) addressed to the President of the Security Council, 8 March 2021.

responsible for their unlawful conduct. Only the state that is using and deploying this malicious technology or does a possibility exist where also humans could be considered accountable? If the answer to the last question seems apparent; it is not. AWS do not constitute conventional weaponry. Should the soldier or even the military commander be held accountable when the dysfunction of the system or – to put it simpler – their illegal attack was a result of an error, a mistake of the programmers, manufacturers or even roboticists? Should also companies that program and provide malicious defective autonomous technology be held accountable? Or does this scheme of thought go too far?

These questions and concerns thoroughly explain the purpose of the present thesis. If these concerns and fears prove true, humankind will have to confront a major challenge: ‘a third revolution in military affairs.’<sup>2</sup> This thesis will be divided and analysed in the following sections. The first section will try to offer an overview of the variety of definitions of AWS that are provided and the majority of the terms that are used by the international community; states, NGOs, IOs, international lawyers. The second part of the thesis will explore both the arguments and the counterarguments regarding their usage. Many support that a total ban constitutes the most suitable solution towards the dangers that this malicious technology might cause, whereas others have their fair share of rejecting this view; more regulation less banning. The third part of this research will discuss their regulation; if they are regulated, if not and which framework is most suitable to regulate them, what is the international community’s thought on regulation. The fourth part deals with the compatibility of these systems in International Humanitarian Law (IHL). AWS constitute new weapons, which entail new threats and their compatibility with the laws of war should be explored. The fifth part is divided in two sections. The first section analyses state responsibility; it researches whether states are responsible for their usage and how these systems could constitute a breach of international obligation and how this obligation is attributed to the state. The second part of the fifth section deals with individual criminal responsibility; if what is known as ‘the responsibility gap’ indeed exists. The sixth and last part of this thesis offers a final conclusion, an overview of what are the real challenges of these systems and how the obstacles towards holding the state and subsequently individuals that are connected with their usage could be surpassed.

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<sup>2</sup> Future of Life, “Open Letter on Autonomous Weapons”, July 28 2015), available at <<https://futureoflife.org/open-letter-autonomous-weapons/>>, last accessed on October 26 2022.

## B. Introduction

It is undisputed that humanity has been unable to put an end to warfare: it is also undisputed that warfare rather seems like a chameleon.<sup>3</sup> Warfare has kept changing, adapting to new circumstances and even experts face difficulties to easily delineate it and describe the reality that humanity is facing. The replacement of soldiers by device machines, drones, autonomous weapons are only a spectrum of warfare that keeps changing and new challenges are continuously emerging.

The warfare is really difficult to be delimited with regard to the spatial spectrum: the field of activities is everywhere but at the same time nowhere. War is present everywhere but at the same time is present nowhere.<sup>4</sup> It could be described as “*a diffuse and dispersed ‘state of violence’ that replaces the usual configurations of war*”.<sup>5</sup> Warfare can take place at a plane, inside a house, on a street. War has lost its specific cartographic borders and it has “*(..) lost its well-defined contours*”.<sup>6</sup>

Yet this change does not mean that traditional warfare is abandoned and parties to the conflict do not take advantage of traditional weaponry: conventional weaponry, nuclear threats around Europe, surrounded cities in Ukraine, civil wars in Myanmar, human shielding, and many more, continue to be current challenges of a warfare that still have deadly repercussions.

Still because of the metamorphosis of warfare, it is difficult to apply the rules of IHL. Difficulties with regard to the characterization of the actual situation, the legal categories on which the rules of IHL apply to, are challenged. Almost every ancient civilization had had its own laws or norms that regulated the conduct of warfare.<sup>7</sup> Unfortunately now, the well-defined rules of IHL sometimes seem unable to regulate new emerging challenges, which are mainly based in technology and Artificial Intelligence (AI).

Furthermore, the ‘global-war-on terror’ coincided also with an unparalleled emergence of militarised technologies that were remotely controlled and unmanned, such as drone weapons.

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<sup>3</sup> Vincent Bernard, Editor-in-Chief, Editorial, “Tactics, Techniques, Tragedies: A Humanitarian Perspective on the Changing Face of War”, *International Review of the Red Cross*, 97 (900), 2015, p. 959. See also, Carl von Clausewitz, “On War” (originally published in German as *Vom Kriege*, 1832), indexed edition translated and edited by Michael Howard and Peter Paret, Princeton University Press, Princeton, NJ, 1976, p. 89.

<sup>4</sup> *Ibid.*

<sup>5</sup> Derek Gregory, “The Everywhere War”, Published by Wiley on behalf of The Royal Geographical Society (with the Institute of British Geographers *Geographical Journal*), *The Geographical Journal*, September 2011, Vol. 177, No. 3, p. 239.

<sup>6</sup> Münkler Herfried, “The new wars”, (Translated by Patrick Camiller), UK Polity Press, 2005, p. 3.

<sup>7</sup> Sheng Hongsheng, “The Evolution of Law of War”, Published by Oxford University Press, *The Chinese Journal of International Politics*, Winter 2006, Vol. 1, No. 2, p. 271.



From that point on, military commanders and generally combatants have had the opportunity and thus the capability to be absent from the battlefield and to operate the system from a distance. Still, the military commanders and the soldiers were the ones that decided the usage of force.

Nevertheless, technology, as reality, is not static: the advancement of technology offered new opportunities to conflicts. One of these opportunities is to deploy weapon systems on the battlefield that they can on their own, identify, select and engage military targets without any human intervention, namely AWS. These systems will be able to inflict physical harm or even death to their victims, whereas the ones responsible for the deployment will be far away and important decisions, decision on 'life-or-death' will be taken by robots.

These weapon systems – as their predecessors, drones – in simple terms conduct selective targeting of specific group of individuals that fulfil certain characteristics. These specific targetings would not have occurred without the advancement of technology and the proliferation of weapons systems that use satellite data and intelligence, to select and engage targets – even if they are completely innocent. The same is true with AWS: they operate using facial recognition and other data, like religious, ethnic, race, gender, and age information when they select and engage targets. Researches have shown that people of color, Asian, Africans, Latin Americans, women, children and the elderly had more chances to be misidentified than white people in the U.S.<sup>8</sup> Furthermore, as it is mentioned in the Campaign to Stop Killer Robots<sup>9</sup>, new defective technologies most of the times are tested on marginalized groups, because white supremacy develops new weapon technologies. For the above-mentioned reasons, AWS are likely to be biased programmed and considerate fears that would perpetuate patriarchal structures in military operations have legitimately arisen. Rapes and sexual violence have widely been used by states and non-state armed groups as a weapon in a conflict environment, and even AWS are considered unable to commit those crimes, they would offer dissemblance to soldiers who do so and would not disobey any such command from chief superiors.<sup>10</sup>

There are widespread fears encompassing this type of technology: the main one is that eventually mankind will be enslaved by its own creations.<sup>11</sup> But, apart from the fears or the

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<sup>8</sup> Drew Harwell, 'Federal study confirms racial bias of many facial-recognition systems, casts doubt on their expanding use', The Washington Post, December 19 2019, available at <<https://www.washingtonpost.com/technology/racial-bias-recognition-systems/>>, last accessed on October 15 2022.

<sup>9</sup> 'Race and killer robots, Digital dehumanisation and algorithmic bias', in Stop Killer Robots Campaign, available at <<https://www.stopkillerrobots.org/race-and-killer-robots/>> , last accessed on October 15 2022.

<sup>10</sup> 'Gender and killer robots', in Stop Killer Robots Campaign, available at <<https://www.stopkillerrobots.org/gender-and-killer-robots/>>, last accessed on October 15 2022.

<sup>11</sup> Mark A Lemley and Bryan Casey, "You Might Be a Robot", Cornell Law Review 1, 2019, p. 7.

advantages that could be exempted from their usage, the controversy surrounding AWS and especially FAWS, is because of the plethora of terms that are used in order to define them, by the contradicting documents that have been published by States, International Organizations, NGOs and by the fact that not only one field of expertise and knowledge deals with them. Needless to say, little consensus has been achieved regarding their definition, their regulation and thus their ‘legality’, in a way that AWS are weapon systems that are deployed during an armed conflict and in such situations, the laws of war continue to apply.

Another challenge should be added to the one mentioned above: what has been called as ‘the responsibility gap’.<sup>12</sup> There are legitimate concerns that because of their nature, AWS and more importantly FAWS, will be able to use their own intelligence, gather their own data and then transform them in ‘knowledge’. This knowledge will be materialised in engaging and attacking a target without the involvement of any human being. Until now, fully autonomy has not yet been used against human beings, but nothing precludes that such a situation will be the future on the battlefield.

## **C. Autonomous Weapon Systems**

### **1. Setting the scene**

At least the last decade has been characterized by a massive rise of computer systems that do not only affect and change the identity of human beings, but also change many aspects surrounding it. Consequently, computer systems and AI also affect and alter how the war is fought. The traditional perception of how the war is fought has changed in its foundations. The classic notion of combatants being physically present and fighting one another in the battlefield has been lessened: the war has migrated into the cities, most of the times it is remotely controlled and new challenges, like the proliferation and rise of computer systems, have emerged. Nowadays, the war has transformed itself into a spectacle and its projection “*through the media has also become a remote-warfare tactic*».<sup>13</sup>

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<sup>12</sup> Marc Champagne and Ryan Tonkens, “Bridging the Responsibility Gap in Automated Warfare”, *Philosophy & Technology*, 28, 2015, p. 125.

<sup>13</sup> *Supra* note Bernard, “Tactics, Techniques, Tragedies: A Humanitarian Perspective on the Changing Face of War”, p. 965.

The technological advancement of computers and weaponry has been accompanied by the individualization of warfare, especially with ‘new’ non-State armed groups. These ‘new’ groups are no other than transnational terrorist groups, whose presence apparently has also changed how the war is fought and has affected the traditional perception of war and weaponry. More precisely, since almost every time, the members of those terrorist groups are dispersed, states should not have to wait for an armed attack to actually take place but could use lethal force against those individuals, who sooner or later, are about to conduct the attacks<sup>14</sup>. Those particular attacks, are mainly conducted with high levels of precision by drones, since they gather knowledge, they involve intelligence because of surveillance capabilities, offered by unmanned surveillance vehicles (UAVs).<sup>15</sup> As William Arkin points out “*the military (...) able to do only one thing: drill down the individual*”.<sup>16</sup> Therefore it is obvious that drones weaponry operate by tracking, identifying, attacking and eliminating the individual.<sup>17</sup>

Apart from the individualization of the warfare, the humanity has to deal with what it is called the ‘depersonalization’ of the use of force. Drones and other remote-controlled devices select and attack their targets remotely, giving the opportunity to human beings to be absent from the battlefield. Yet, the decisions on who, where, how and when to release force against a target, were taken by humans from a distance. With the proliferation of fully autonomous weapons systems, that ‘system’ is being questioned; will the computer machines take the decisions instead of human beings?

## **2. Delving into Autonomous Weapon Systems**

Someone might be expecting that a yes/ or no answer is adequate to address whether machines will be able to overrule humankind. The technology that surrounds Artificial Intelligence (AI) and the reality it affects, is far more perplexed and cannot be illustrated in one word answer. The US Department of Defense (DoD) defines AWS as ‘*weapons systems that once activated, 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*

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<sup>14</sup> Rebecca Mignot-Mahdavi, “Drone Programs, the Individualization of War and the ad bellum Principle of Proportionality”, in Lieber Series Vol. 4, Claus Kress & Robert Lawless eds., Oxford University Press, 2020, p. 9.

<sup>15</sup> Ibid, p. 9-11.

<sup>16</sup> William Arkin, “Unmanned Drones, Data, and the Illusion of Perfect Warfare”, New York : Little, Brown and Company, 2015, p. 183-184.

<sup>17</sup> Supra note Mignot-Mahdavi, “Drone Programs, the Individualization of War and the ad bellum Principle of Proportionality”, p. 11.

*human input after activation.*<sup>18</sup> It should be clarified at this point, that what is at stake is the decision to deploy force against human beings and not decisions with regard to navigation, landing or force against other robots.<sup>19</sup> Consequently, the importance of AWS does not lie on the specific weapon systems they use, but on the levels of their autonomy: some are able to operate with close human supervision, whereas others are capable after being programmed to act on their own dependence without any human intervention. The latter is what is defined as ‘fully autonomous weapon systems’. Until the time of writing this research, fully autonomous weapons systems have not been used against human beings.

It should also be mentioned that technologically advanced states reiterate that when a lethality decision is about to be made, there will always be a human involvement in that decision. For example, both US’s DoD<sup>20</sup> and UK’s Ministry of Defence<sup>21</sup> statements, support that either they have no intention to develop lethal machines without any human supervision upon them or there will always be human judgment with regard to the jus ad bellum. If these statements give hope to anyone who is sceptical regarding the deployment of AWS, it should also be born in mind, that none of the above-mentioned states have explicitly explained what they mean by ‘human control’ or ‘human judgment’. Regarding autonomous weapons, humans can be involved in different stages: a human can be the researcher, the programmer, the one who presses the button or – hopefully – the one who can intervene and stop a malfunction in their system that it could result in civilian casualties. Consequently, the question that should be asked is what exactly this military technology is and how is it defined by various actors in the international arena.

### **3. Definition of Autonomous Weapon Systems**

A variety of terms has been proposed and used in order to define and describe technology machines that depend on Artificial Intelligence (AI) and once programmed, they can transform and adapt to the actual circumstances ‘on the ground’ and afterwards, identify, select and attack

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<sup>18</sup> US Department of Defense (DoD) Directive 3000.09, “Autonomy in weapon systems”, 21 November 2012, Glossary part II, p.13. See also: Human Rights Watch, “Losing Humanity: The Case against Killer Robots”, 2012, p. 2.

<sup>19</sup> Bhuta, N., Beck, S., Geiß, R., Liu, H., & Kreß, C. (Eds.), “Autonomous Weapons Systems: Law, Ethics, Policy”. Cambridge: Cambridge University Press, 2016, p. 4.

<sup>20</sup> In the first policy US DoD issued with regards to autonomous weapons, they mentioned ‘*Autonomous and semi-autonomous weapons systems shall be designed to allow commanders and operators to exercise appropriate levels of human judgment over the use of force.*’

<sup>21</sup> The UK’s the parliamentary under-secretary of state, Lord Astor of Hever, said: ‘*[T]he MoD [Ministry of Defence] currently has no intention of developing systems that operate without human intervention ... let us be absolutely clear that the operation of weapons systems will always be under human control.*’, 26 March 2013, available at <[http://MoD\\_Lord\\_Astor](http://MoD_Lord_Astor)>, last accessed on October 7 2022.

against specific military targets without the need of human intervention<sup>22</sup>. In this debate, states, academics, AI researchers, international lawyers, international organizations use terms such as ‘lethal autonomous robots<sup>23</sup>’, ‘fully autonomous weapons<sup>24</sup>’, ‘autonomous weapons systems<sup>25</sup>’, ‘lethal autonomous weapon systems<sup>26</sup>’, ‘killer robots<sup>27</sup>’, ‘autonomous military systems<sup>28</sup>’, in order to successfully depict this emerging reality.

For example, one author attempts to define AWS as “*a weapon system that, based on conclusions derived from gathered information and pre-programmed constraints, is capable of independently selecting and engaging targets*”.<sup>29</sup>

The International Committee of Red Cross (ICRC) mainly focuses on the concept of autonomy and construes AWS as weapons which

*“independently select and attack targets, i.e. with autonomy in the 'critical functions' of acquiring, tracking, selecting and attacking targets”*<sup>30</sup>,

whereas NATO considers an autonomous system as

*“a system that decides and acts to accomplish desired goals, within defined parameters, based on acquired knowledge and an evolving situational awareness, following an optimal but potentially unpredictable course of action”*<sup>31</sup>.

Many States also adopt their own definition of AWS which constitutes evidence that defining this evolving and emerging technology is not always an easy task. Apart from that, the different

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<sup>22</sup> Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”. Cambridge: Cambridge University Press, May 2022, p. 9.

<sup>23</sup> Ronald C Arkin, “Governing Lethal Behavior in Autonomous Robots”, (Chapman & Hall Book 2009), p. 37.

<sup>24</sup> Noel Sharkey, “Robot Wars Are a Reality”, The Guardian (Brussels, 18 August 2007), <[www.robots.wars](http://www.robots.wars)>, last accessed on October 4 2022. See also: Human Rights Watch and International Human Rights Clinic, “Losing Humanity: The Case against Killer Robots”, 2012, <[www.hrw.org/losing\\_humanity](http://www.hrw.org/losing_humanity)>, last accessed on October 4 2022.

<sup>25</sup> Peter Asaro, “On Banning Autonomous Weapon Systems: Human Rights, Automation and the Dehumanization of Lethal Decision Making”, International Review of the Red Cross, 94, 2012, p. 687, 690.

<sup>26</sup> Tetayana Krupiy, “Regulating a Game Changer: Using a Distributed Approach to Develop an Accountability Framework for Lethal Autonomous Weapon Systems”, Georgetown Journal of International Law, Vol. 50, 2018, p. 46.

<sup>27</sup> Thompson Chengeta, “Are Autonomous Weapon Systems the Subject of Article 36 of Additional Protocol I to the Geneva Conventions?”, UC Davis Journal of International Law and Policy, Vol. 23, 2016, p. 66, 81.

<sup>28</sup> Tim McFarland, “Factors Shaping the Legal Implications of Increasingly Autonomous Military Systems”, International Review of the Red Cross, Vol. 97, 2015, p. 1313, 1315.

<sup>29</sup> Rebecca Crootof, “The Killer Robots are Here: Legal and Policy Implications”, Cardozo Law Review 1837, 1854, 2015, p. 36.; Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 78.

<sup>30</sup> International Committee of Red Cross (ICRC), “Autonomous Weapons Systems: Technical, Military, Legal and Humanitarian Aspects”, 2014, p. 7.

<sup>31</sup> NATO, AAP-06 Edition 2020: NATO glossary of terms and definitions, p. 16.

legal definitions offered by states make anyone wonder if all these actors are referring precisely to the same technology, a concern that is confirmed by the diversity of the terms used.

For example, Germany focuses in the notion of LAWS, and accordingly they are defined as:

*“lethal autonomous weapons systems (LAWS) are weapon systems that completely exclude the human factor from decisions about their deployment. Emerging technologies in the area of LAWS need to be conceptually distinguished LAWS. Whereas emerging technologies, such as digitalization, artificial intelligence and autonomy are integral elements of LAWS, they can be employed with full compliance to international law”.*<sup>32</sup>

China in its attempt to specify them it provides more details regarding its apprehension on the matter. For China

*“LAWS should include but not be limited to the following 5 basic characteristics. The first is lethality, which means sufficient pay load (charge) and for means to be lethal. The second is autonomy, which means absence of human intervention and control during the entire process of executing a task. Thirdly, impossibility for termination, meaning that once started there is no way to terminate the device. Fourthly indiscriminate effect, meaning that the device will execute the task of killing and maiming regardless of conditions, scenarios and targets. Fifthly evolution, meaning that through interaction with the environment the device can learn autonomously, expand its functions and capabilities in a way exceeding human expectations”*<sup>33</sup>.

Furthermore, some countries like the Netherlands, use alternatively the terms ‘AWS’ and ‘LAWS’, making someone believe that they refer to the same systems and no distinction between both concepts and notions exists.<sup>34</sup>

It is already apparent that the definitions mentioned and many others, offer much in general terms to the conceptualization of what these weapons constitute, but on the other hand they focus on different aspects of AWS and therefore lead to different approaches of their ethical problems.<sup>35</sup> Therefore, the characteristics of those systems, their categories and their differences should be determined. For example, it should be examined whether drones fall into the same

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<sup>32</sup>Federal Foreign Office. 2020, p.1, available at <[https://documents.unoda.org/Germany\\_federal\\_foreign\\_office](https://documents.unoda.org/Germany_federal_foreign_office)>, last accessed on October 7 2022.

<sup>33</sup> Convention on certain conventional weapons: Position paper submitted by China in Geneva, in 2018, p. 1. For more information see <[https://unog.ch/CCW\\_China\\_position\\_paper](https://unog.ch/CCW_China_position_paper)>, last accessed on October 7 2022.

<sup>34</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 68.

<sup>35</sup> Mariarosaria Taddeo, Alexander Blanchard, “A Comparative Analysis of the Definitions of Autonomous Weapons Systems, Science and Engineering Ethics”, August 23 2022, p. 37.

category as the Iron Dome defence system of Israel or even the Stanley Kubrick's invention – HAL from Space Odyssey in 2001, according to which “*I am completely operational and all my circuits are functioning perfectly*”. For those reasons, the question on how we could possibly distinguish those types of weapons arises.

To begin with, the term ‘autonomy’ has different meanings with regard to the field that is used: it could mean other things in robotics, other in philosophy or politics. For some<sup>36</sup> it is more interrelated to the term ‘automatic’. An automatic robot is a machine that operates in a specific way, accomplishing pre-programmed moves in a structured environment, like a robot which paints a car.<sup>37</sup> The problem with autonomous weapons is that they have to operate in an unstructured environment, which is the battlefield. It seems that nobody – researchers, AI experts, international lawyers can precisely predict the challenges that could emerge at a battlefield. AWS – or more precisely the programmers, manufacturers, researchers, since no one could have any expectation from machines – should find a way to make those systems able to adapt to every challenge and in a way re-program again their software, in a case of a non – anticipated development.

It is useful to attempt to define these weapons by analysing and defining its parts: namely, (i) the element of autonomy, (ii) the fact that they constitute weapons, (iii) that they can select and engage a target, (iv) without any human intervention.

#### **4. Putting the pieces together**

##### **i. Defining Autonomy**

Before attempting to classify the different types of AWS, it is vital to determine what the term ‘autonomy’ precisely means. The word derives from the two Greek words ‘autos’ which means ‘self’ and ‘nomos’ which means ‘law’. It is already apparent that the word means someone who is self-governing, someone who is not determined by others. In the legal sphere and especially with regard to the weapon systems, most definitions of the notion of autonomy revolve around

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<sup>36</sup> Gregory P. Noone & Diana C. Noone, “The Debate over Autonomous Weapons Systems”, 47 Case W. Res. J. INT'L L. 25 (2015), p. 27.

<sup>37</sup> Ibid, p. 27-28. See also, Noel Sharkey, “Saying 'No!' to Lethal Autonomous Targeting”, 9 J. MIL. ETHICS, 2010, p. 369, 376.

the fact that this weapon system can select and engage a target without any human supervision or involvement.<sup>38</sup>

For instance, autonomy for George A. Bekey is “*the capacity to operate in the real-world environment without any form of external control, once the machine is activated, and at least in some areas of operation, for extended periods of time*”.<sup>39</sup> Bekey perceives autonomy for AWS as their ability to accomplish a task on their own. On the other hand, Stuart Russell and Peter Norvig conceive autonomy as “*an agent’s capacity to learn what it can to compensate for partial or incorrect prior knowledge*”.<sup>40</sup> In their point of view, autonomy is the ability to adapt to the environment, to gain new knowledge and new skills while the system interacts with it. Other researchers, define autonomy as the capability to determine when exactly to act, the capability to decide to act, a task of “*the capacity to operate without outside intervention*”.<sup>41</sup>

The next question that needs to be addressed is the dimensions of autonomy. The very first is independence. AWS are independent since they have to accomplish on their own the task that they were designed for, without any human control or intervention<sup>42</sup>. These weapons operate in what it is called a ‘socio-technical system’, a system that consists of human, technological and organizational parts.<sup>43</sup> Every part should function on its own, without any effects from other parts. That doesn’t mean that in order for every part to function at the highest level possible and better achieve its goals, it cannot interact with other parts of the system. In order to understand more easily this scheme, Sharkey gives the example of two drones, one of which is exploring a region independently and the other one is exploring another area. These two drones could exchange information with other drones that are exploring other areas and co-share their results.<sup>44</sup>

Moving on, an autonomous system should also have cognitive skills. Cognitive skills are a central element towards the notion of autonomy: a landmine might be independent, but it isn’t capable of exercising any cognitive skills. It doesn’t have the ability to distinguish between the

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<sup>38</sup> Christopher M. Ford, “Autonomous Weapons and International Law”, 69 S. C. L. REV. 413, Bluebook 21st ed., 2017, p. 418.

<sup>39</sup> P. Lin, K. Abney and G. A. Bekey (eds.), “Robot Ethics: The Ethical and Social Implications of Robotics”, (Cambridge, MA: MIT, 2012), p. 18.

<sup>40</sup> S. J. Russell and P. Norvig, “Artificial Intelligence: A Modern Approach” (Upper Saddle River, NJ: Prentice Hall, 2010), p. 39.

<sup>41</sup> O.G. Clark et al., “Mind and Autonomy in Engineered Biosystems”, 12 ENG’G APPLICATIONS OF ARTIFICIAL INTELLIGENCE, 1999, p. 389, 397.

<sup>42</sup> Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 24.

<sup>43</sup> P. Vermaas et al., “A Philosophy of Technology: From Technical Artefacts to Sociotechnical Systems” (San Rafael, CA: Morgan and Claypool, 2011), Ch. 5.; Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p.40.

<sup>44</sup> Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 43.



adversaries that pass over it, it is just capable of recognizing a specific amount of pressure that is exercising over it. That system might be independent, since it doesn't require a human operator or any human control to operate, but it still can't distinguish between possible targets. On the other hand, a missile system that is following other targets and is able to calculate geographical coordinates, until the operator pushes the button, might not be that independent, but has more cognitive skills than the landmine.<sup>45</sup> It is already clear that cognitive skills are interconnected with the notion of autonomy: higher level of cognitive skills entails higher level of autonomy, since the final outcome of the system's action stems from its own abilities and not an exterior factor.

In the aforementioned example of the targeting system, human beings still remain in the loop: they are the ones who will eventually abide by the options that the system is offering them or who will override them. Whether the human will abide or override the system's proposals and, in a way, forecast them, is another indication of the system's capability to achieve its own goals and propose cognitive solutions to the human operators. As it is mentioned<sup>46</sup> when the commissioner hasn't forecasted the exact behaviour of the system, it should be regarded as another aspect of the system's capability to replace human consciousness.

Apart from that, it is proposed that another dimension of autonomy are cognitive-behavioural skills.<sup>47</sup> This category is comprised by adaptiveness, teleology and multi-level autonomy. A system is adaptive when it is capable of interacting with the environment, transforming its operation based on the information and the actual situation it meets on the ground, changing its behaviour in order to better achieve its goals<sup>48</sup>. Therefore, it is obvious why an AWS must be adaptive: if it does not possess the capability of transforming itself in order to gain its goals, then it is doomed to fail and will be destroyed in the battlefield.

In order to define teleology everyone should bear in mind that the system by achieving its goals or by making plans, sharing beliefs, is not under any circumstances attempting to replace the human mind and the human intuition, or the system is operating somewhat similarly to human beings. The belief-desire-intention (BDI) architecture for intelligent agents, is an indication of their autonomy, since they act according to the beliefs, plans or goals they were put in them, they adopt new beliefs because of the changing nature of the environment they operate in or they even

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<sup>45</sup> G. Tononi, "Consciousness as integrated information: a provisional manifesto", *The Biological Bulletin*, 2008, p. 215-216.

<sup>46</sup> *Supra* note Bhuta, N., "Autonomous Weapons Systems: Law, Ethics, Policy", p. 48.

<sup>47</sup> *Supra* note Bhuta, N., "Autonomous Weapons Systems: Law, Ethics, Policy", p. 48.

<sup>48</sup> H. Hexmoor, C. Castelfranchi and R. Falcone (eds.), "Agent Autonomy" (New York: Springer, 2003), p. 103.

change their goals for the sake of their survival. In order to clarify the notion of ‘teleology’ the example of a drone will be used. That machine is operating in an ‘x’ area and is trying to eliminate a target. In order to achieve this goal, the drone should fly in that area in order to find the target, should try to identify it, should try to eliminate it, since this is the actualization of its existence.

The notion of ‘multi-level autonomy’ could more easily be understood by the fact that the different components of the system should not only cooperate between them, but they should also be applied in a hierarchical manner, in order for the system to function more effectively. Van der Hoek and Wooldridge introduce the notion of multi-agent systems (MAS) when attempting to address the various systemic issues of AWS.<sup>49</sup> The various parts and parcels of AWS collaborate, cooperate and communicate with one another in order to achieve their goal that they were designed for.

The three distinct characteristics of autonomy in weapons, are not always present cumulatively, but many times anyone could observe only specific characteristic of them. In the example of landmine, even if it is independent, as it was described above, it cannot be denied that it cannot adapt to the actual circumstances on the ground and it doesn’t have the ability to alter its goals for its survival. Furthermore, a dependent system on a human operator that is fully autonomous could also exist, in a way that it alters its functions and is capable of communicating with another agent. A drone that is providing and exchanging information with a remote pilot could fall into this category.

What should be born in mind is that the dimensions of autonomy are connected with one another. The ability to adapt to current challenges that the machines could face at a certain environment is an indication of their independence and independence also entails the ability to achieve goals, the ability to communicate and collaborate with others, be they human or machine agents. This stance is confirmed by the military domain, which the latter deals with target selection and engagement.

The US 2012 Directive on Autonomy in Weapons Systems<sup>50</sup> makes a distinction between autonomous and semi-autonomous weapons with regard to the role human beings play in targeting. Autonomous weapons are systems that *‘once activated, can select and engage targets without further intervention by a human operator’*, while semi-autonomous weapons systems are

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<sup>49</sup> F. van Harmelen, V. Lifschitz and B. Porter (eds.), “Handbook of Knowledge Representation”, Amsterdam, Elsevier, 2008, 887.

<sup>50</sup> Supra note DoD Directive 3000.09.

*'intended to only engage individual targets or specific target groups that have been selected by a human operator'*. The report goes even further and 'permits' the use of lethal force against humans only in the category of semi-autonomous weapons, where there is human supervision or a human operator, whereas with regards to the autonomous weapons, the force can only be directed against non-human targets.

As it pointed out by Gubrud<sup>51</sup> the distinction between autonomous and semi-autonomous weapons is problematic, because in the latter case we also have a selective targeting process by the weapons. The targeting process by semi-autonomous weapons is composed of humans providing the algorithm, deploying the weapon and specifying the objects in the specific area that should be targeted and afterwards the weapons themselves are those who select the targets that are about to be eliminated in that specific predetermined, by the humans, context. The decision-process that is exercised by the machines when they select the targets based on the information that was provided to them, obviously contains elements of uncertainty<sup>52</sup> and many questions arise.

Many could support that in the case of a weapon, where a human operator 'pushes the button', there is no autonomy, since the machine is entirely dependent by the operator's choice. But this does not hold true. The weapon has the ability to exercise its autonomy through the information and the algorithm that was pre-programmed accordingly: it can 'understand' and analyze the data about the potential targets, their features and their location, the conditions upon which it should operate, it is able to implement the preferred tactic. To that end, the coexistence of human and machine elements in a weapon's decision making does not always entail that any of the components will always or will eventually prevail. As Sharkey points out, *"much depends on whether the machine autonomy is being deployed in order to restrict the need for human deliberation and situational awareness, or rather to expand it (..)"*.<sup>53</sup>

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<sup>51</sup> M. Gubrud, "Semiautonomous and on their own: killer robots in Plato's Cave", Bulletin of the Atomic Scientists Online, April 2015.

<sup>52</sup> Ibid.

<sup>53</sup> Supra note Bhuta, N., "Autonomous Weapons Systems: Law, Ethics, Policy", p. 61.; N. Sharkey, "Towards a principle for the human supervisory control of robot weapons", *Politica e Società*, 3 (2014), p. 305.

## ii. Weapons

Generally, weapons are those devices that intend to kill, damage, injure, destroy human beings or property.<sup>54</sup> Also, Tallinn Manual I defines weapons as “(..) *generally understood as the aspect of the system used to cause damage or destruction to objects or to injure or death to persons*”.<sup>55</sup> For the purpose of this research, no distinction between weapons that have an offensive or defensive function will be made, or between weapons that are intended to kill or injure.

Nevertheless, it should also be born in mind, that the weapons’ functions are not only limited to inflict harm, injury, damage or to the deployment of lethal force against a human target. A weapon function could also be the prevention of harm.<sup>56</sup> A valuable example of that function of weapons, is the Iron Dome Defence System of Israel, when it halted the attack of Hamas’ rockets against Israel, or even the Aegis Combat System.<sup>57</sup> Last but not least, with regards to the ‘weapon system’, as Seixas – Nunes mentions, current military technologies depend on software/hardware to accomplish their goals.<sup>58</sup> Without the usage of software/hardware, the attack cannot be reached and therefore they are considered the necessary part of the attack, they are considered as some ‘means of warfare’.<sup>59</sup> McFarland takes this argument even further by reiterating that the ‘system’ is almost the other side of the coin with regards to ‘means of warfare’, since even if software/hardware are not considered to be weaponry they have a decisive contribution to the warfare.<sup>60</sup>

## iii. Select and Engage a Target

The phrase ‘select a target’ means the capacity to ‘choose a target or among a group of targets’.<sup>61</sup> With regard to the term ‘engage’ in military field, it means to hold someone under fire, to be involved in an attack against someone in the battlefield.<sup>62</sup> In AWS the ‘engage of a target

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<sup>54</sup> Int’l Comm. of the Red Cross Geneva, “A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977”, 88, INT’L REV. RED CROSS, 2006, p. 864, 938.

<sup>55</sup> Int’l Group of Experts, NATO Cooperation Cyber Def., Tallinn Manual on the International Law Applicable to Cyber Warfare, (Michael N. Schmitt ed., 2013), p. 142.

<sup>56</sup> Robert L O’ Connell, “Of Arms and Men: A History of War, Weapons and Aggression”, (Oxford University Press 1989) p. 14.

<sup>57</sup> Lockheed Martin, “Aegis The Shield (and the Spear) of the Fleet”, available at <[https://www.Aegis\\_The\\_Shield](https://www.Aegis_The_Shield)>, last accessed on October 11 2022.

<sup>58</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 84

<sup>59</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective” p. 84.

<sup>60</sup> Supra note McFarland, “Factors Shaping the Legal Implications of Increasingly Autonomous Military Systems”, p. 1315.

<sup>61</sup> Supra note U.S. DoD, Directive 3000.09.

<sup>62</sup> Cambridge Dictionary, definition of ‘engage’ in a military operation.

phase’ could mean three distinct points of time: (i) the moment that the system is activated, (ii) the moment that the system is selecting the targets, (iii) the moment that the system is deployed to kill, injure, destroy its selected target.<sup>63</sup> Most scholars and Manuals when referring to the ‘engagement of the target’, refer to the third phase, when the system is deployed to kill, injure or destroy the target.<sup>64</sup> Therefore, the ‘select and engage a target phase’ is when the machine is deployed and is making a determination on when, where, how and against whom to strike. It is obvious and it was also mentioned above, that this phase is connected to its very name: ‘select and engage a target’. So other functions, such as navigation, that are not connected to this phase are excluded.<sup>65</sup>

The ‘engage and select a target’ phase, might at first sight seem more related to the researchers’ and scientists’ of AI occupation, and less connected to any legal parameter, but a question that those experts should answer is whether these technologies, especially during the ‘engage and select a target’ phase comply with the principles of *jus in bello*. It is supported<sup>66</sup> that the genuine problem is not how AWS could select a target, but rather how they could adapt to the environment and specifically transform when the circumstances on the battlefield demand so and unpredictable events emerge.

#### **iv. Without Human Intervention**

As DoD Directive 3000.09 points out, AWS can select and engage any target without human involvement.<sup>67</sup> This discussion again leads to the aforementioned arguments to somehow ‘measure’ the degree of the human control in this technology and especially the ‘human – in/on/out/near – the – loop’. As Noel Sharkey clarifies<sup>68</sup>, emphasis should be added to the human supervisory control over weapon systems dependent on computer systems. By accepting that classification, five different levels of control could be extracted.<sup>69</sup>

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<sup>63</sup> Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 419.

<sup>64</sup> Supra note DoD Directive 3000.09, p. 14.; Christopher M. Ford, “Autonomous Weapons and International Law”, p.419.; Nathalie Weizmann, “Autonomous Weapon Systems Under International Law Academy”, Briefing No. 8, GENEVA ACAD. OF INT’L HUMANITARIAN LAW AND HUM. RIGHTS (Nov. 2014), p. 6, available at <[https://www.geneva-academy.AWS\\_under\\_IL](https://www.geneva-academy.AWS_under_IL)>, last accessed on October 11 2022.

<sup>65</sup> Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 419.

<sup>66</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 91.; UK Ministry of Defence, “Joint Doctrine Publication 0–30.2 Unmanned Aircraft Systems”, August 2017, available at <<https://unmanned-aircraft-systems>>, last accessed on October 12 2022.

<sup>67</sup> Supra note DoD Directive 3000.09, p. 14.

<sup>68</sup> Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 26.

<sup>69</sup> Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 26.

1. Human engages, selects the target and force is deployed.
2. Program makes suggestions and the human operator chooses.
3. Program selects the target and the human operator is the one who decides whether or not to launch the attack.
4. Program selects the target and the human operator within a limited period of time can halt the attack.
5. Program selects the target, engages with and deploys force, whereas any human operator is absent.<sup>70</sup>

The above-mentioned classification, constitutes more a work in progress rather an established framework of how one could possibly define human control over weapon systems. Still it is obvious that in order to ensure the effectiveness of weapons and the better control upon them, the ideal partnership would be a mixed model of cooperation, since computers are more efficient at certain tasks, whereas humans are more effective in others. Moreover, it is the author's view, that what should be researched and proposed is a partnership between human supervisory control and AWS, in order to ensure that the – lethal (?) – force deployed against a target is not unlawful and does not violate the laws of war.

#### **v. Other basis for distinction**

One other possible way to distinguish AWS, is to examine the exact role humans play while they are performing tasks: in other words, whether there is a human in the loop.<sup>71</sup> The 'loop' refers to the decision-making process, also known as the DOODA loop test (where OODA represents Observation, Orientation, Decision and Action<sup>72</sup>).

1. Human-in-the-loop or semi-autonomous systems: Under this framework, weapons might be considered 'autonomous', but their capabilities and their usage fully depend on the human operator. A valuable example is the US Predator Reaper drone, which was able to fly and land on its own towards a certain location, but it wasn't capable of firing its missiles

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<sup>70</sup> For a detailed analysis of this classification of the human control over weapons, see Bhuta, N., "Autonomous Weapons Systems: Law, Ethics, Policy", p. 27, where Noel Sharkey offers a detailed analysis of the problem and the work in progress towards addressing it.

<sup>71</sup> Jean-François Caron, "Defining semi-autonomous, automated and autonomous weapon systems in order to understand their ethical challenges", Digital War, Springer Nature Limited 2020, p. 173.

<sup>72</sup> Alastair Luft, "The OODA Loop and the Half-Beat", March 17 2020, available at <<https://The OODA Loop>>, last accessed on October 12 2022.

independently and it was dependent on human remote control.<sup>73</sup> In this category, the machine is not able to engage and select a target and accomplish its goal without any human involvement.<sup>74</sup>

2. *Human-on-the loop or human-supervised autonomous systems*: in this category, systems with a lethal or destructive capacity can be observed. These systems can engage and select a target without any human control, but humans are able to intervene and halt an unlawful attack.<sup>75</sup> The difference between these systems and semi-autonomous weapons is the supervisory role of human operator who can intervene in real time.<sup>76</sup> A valuable example of this category is the Iron Dome defence system of Israel. This system is able to identify incoming military rockets, projectiles, bombs and to intercept or even fire at them. In opposition to semi-autonomous weapons, these systems can attack their target without a decisive human control or intervention of a human being. That was exactly the case in May 2022 regarding the escalation of violence between two opposing enemies: Israel and Palestine. The Hamas organization aimed at dysfunctioning Israel's Iron Dome System<sup>77</sup> and as a response Israel Military Defence (IDF) destructed the tower of Al Jalaa in Palestine that housed – among others – Al Jazeera and Associated Press offices.<sup>78</sup> Furthermore, many scholars mistakenly refer to those systems as autonomous,<sup>79</sup> but they misinterpret the notion of autonomy. It should be mentioned that it is highly interconnected with the ability to determine on their own when, how, why to engage a target. The above-mentioned systems, either depend on humans or they are pre-programmed by algorithms.<sup>80</sup>

3. *Human- out- of-the-loop or fully autonomous weapon systems*: these weapon systems are defined by the lack of any human control or any human involvement in their selecting or targeting process. At the moment of writing this research, based on the available information, no such weapons have been used. While it is still unclear whether scientists and researchers will ever have the capability to create this type of technology, where machines will be in a position to make a decision over life or death, it is undeniable that States are willing to research and

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<sup>73</sup> For more information see Roger Connor, “The Predator, a Drone That Transformed Military Combat”, in National Air and Space Museum, March 9 2018, available at <[https://The\\_Predator](https://The_Predator)>, last accessed on October 4 2022.

<sup>74</sup> Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 424.

<sup>75</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 93.

<sup>76</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 93.

<sup>77</sup> “How Israel's Iron Dome missile shield works”, May 17 2021, available at <[https://www.bbc.com/Israel\\_Iron\\_Dome](https://www.bbc.com/Israel_Iron_Dome)>, last accessed on February 28 2022.

<sup>78</sup> “The Impact of the May 2021 Hamas-Israel Confrontation, A Conversation with Shai Feldman”, Brandeis University, October 28 2021, available at <[https://www.brandeis.edu/Hamas\\_Israel\\_Confrontation](https://www.brandeis.edu/Hamas_Israel_Confrontation)>, last accessed on October 4 2022.

<sup>79</sup> Sparrow, “Killer Robots”, Journal of Applied Philosophy 24 (1), 2007, p. 64-67.

<sup>80</sup> Supra note P. Noone, “The Debate over Autonomous Weapons Systems”, p. 174.

potentially deploy. This is apparent due to the amount of money states are devoting to research these machines. For example, China is estimated to have annual expenses for the development of this technology around \$250 billion, whereas by 2021 it has spent around \$4.5 billion on drone technology.<sup>81</sup> In this category, Seixas – Nunes makes an important observation that it will be thoroughly analysed in the next sections. The fact that a human operator cannot intervene in the system, does not entail the lack of any human control over the system. For example, the FAWS could be able to activate a ‘self-destructive mechanism’ or when the algorithm that was inserted in the system, seems to be obsolete, a commander could also deactivate the system.<sup>82</sup>

4. Human – near – the – loop: this category describes a system where the weapon is deployed near the human being and could offer them logistical support.<sup>83</sup> This is a new category with regard to distinguishing AWS according to the ‘autonomy of the loop’. In the ‘human – near – the – loop’ category the system operates autonomously because there is no human involvement ‘on’ or ‘in the loop’. This category provides the possibility to the military commander to intervene if he observes any malfunction of the system in the battlefield. In that scenario, the human from ‘near – the – loop’, is becoming ‘human – in/on – the loop’.<sup>84</sup> It could therefore be described as an intermediate category between the ‘human – in – the – loop’ and ‘human – on – the – loop’.

Nevertheless, as Noel Sharkey points out<sup>85</sup>, whether there is a ‘human in the loop’, does not explain much about how human beings are involved. It could mean someone who designs those machines, manufactures them, programs them, presses the bottom and launches the attack, stops an indiscriminate attack. More importantly, terms such as ‘autonomous’ or ‘semi-autonomous’ do not help clarify the control issue, since the US army has ten different levels of control, whereas the US navy 3 levels<sup>86</sup>. Furthermore, the classification of weapon system as ‘in/on/out/near’ – the – loop’ is overly simplistic<sup>87</sup> and does not describe the precise role humans play in them.

From the aforementioned analysis it is obvious that States and international organizations use indiscriminately the terms ‘fully autonomous weapons’, ‘lethal autonomous weapons’, ‘autonomous weapons systems’ and this practice seems to offer more obscurity than a clear legal

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<sup>81</sup> Justin Haner, Denise Garcia, “The Artificial Intelligence Arms Race: Trends and World Leaders in Autonomous Weapons Development”, *Global Policy* Volume 10, Issue 3, September 2019, p. 332.

<sup>82</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 95.

<sup>83</sup> Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 424.

<sup>84</sup> Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 424.

<sup>85</sup> Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 26.

<sup>86</sup> Supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 26.

<sup>87</sup> William C. Marra & Sonia K. McNeil, “Understanding The Loop Regulating the Next Generation of War Machines”, 36 *FARv. J.L. & PUB. POL’Y*, 2012, p.1139, 1179.



definition. Even scholars many times use alternatively the terms ‘autonomous’ and ‘automated’, distorting more the already complex reality and the efforts for a clear legal definition. Unfortunately, this practice distorts any efforts for classifying autonomous weapons systems and therefore, understanding their implications and their potential – if any – risks. Nevertheless, it seems more apparent than ever that that AWS do not constitute a future technology: they are used by states and the last years there are more efforts than ever to develop and improve the already advanced technology. Therefore, the questions that should be addressed are the reasons for their research and development and consequently if there is any possibility of – not being banned, but – being regulated.

## **D. Exploring the Purpose of the deployment of Autonomous Weapon Systems**

### **1. Discussing their Benefits**

The purpose of this section is not to determine whether states or other non-state actors should or should not deploy AWS and take advantage of their capabilities: rather this chapter symbolises an attempt to understand why states invest so much research and therefore financial resources in the advancement of that particular technology.

One of the main arguments in favour of the deployment of AWS is as a navy officer points out in P.W. Singer’s research, “*when a robot dies, you don’t have to write a letter to its mother*”<sup>88</sup>. In other words, the usage of AWS will diminish combatant casualties and the personnel of the armed forces will not be that easily decimated in dangerous operations.<sup>89</sup> This position is also confirmed by the Pentagon’s Unmanned Systems Roadmap 2007-2032<sup>90</sup>, which mentions that “*robots are better suited than humans for (..) “dangerous” and “dirty” missions.*”<sup>91</sup> The same applies with regard to AWS that can be used in the air: pilots when in attack missions, they suffer from mental distress, exhaustion, depletion because of the manoeuvres and the intense concentration that is required in order to successfully complete the attack. Robot pilots on the other hand, are not affected by any physical or mental confinements that apply to human beings.<sup>92</sup>

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<sup>88</sup> P. W. Singer, “Robots at War: The New Battlefield”, 33 WILSON Q., 2009, p. 30, 31.

<sup>89</sup> Dr. Jai Galliot; Dr. Austin Wyatt, “Risks and Benefits of Autonomous Weapon System, Perceptions among Future Australian Defence Force Officers”, Published in Journal of Indo-Pacific Affairs, Winter 2020, p. 25.

<sup>90</sup> The US Department of Defense, Office of the Secretary of Defense Unmanned Systems Roadmap 2007-2032, December 10 2007, available at <[https://dod-unmanned-systems-roadmap\\_2007-2032.pdf](https://dod-unmanned-systems-roadmap_2007-2032.pdf)>, last accessed on October 3 2022.

<sup>91</sup> Ibid.

<sup>92</sup> DeSon, “Automating the right stuff – the hidden ramifications of ensuring autonomous aerial weapon systems comply with international humanitarian law”, Air Force Law Review 72, J.S. 2015, p. 113.

Dave Grossman also explains the advantages of the distance between the attacker and the victim: the distance cannot only be physical, it should also be emotional, cultural, and social.<sup>93</sup> Obviously, this distance has become one of the core principles of technology warfare and justifies the need for the advancement of AWS technology. The partisans of the usage of AWS in the battlefield, utilise as an example the case of an exhausted pilot who cannot operate so successfully in highly intense operations. Any decision for AWS to engage in an attack will not be controlled by emotions of fear or distress and AWS can be programmed in order to avoid the attitude of a rattled and apprehensive soldier who first engages in any shooting and then questions about his actions.<sup>94</sup> During warfare, a soldier is starting to appear signs of ‘combat-exhaustion’ at around twenty-five days in the battlefield<sup>95</sup>, whereas the same is not true with machine weaponry. Furthermore, apart from the reduction of those soldiers that are exposed to hazardously exhaustive situations and suffer mental distress, AWS also create job opportunities for scientists and researchers of this technology.<sup>96</sup>

In conventional operations in the battlefield, a soldier is able to monitor the function of only one weapon. The same scheme continues to apply to remotely-operated weapons, where one human is able to operate a weapon system.<sup>97</sup> Nevertheless, the proliferation of AWS has the advantage to liberate operators from the one-to-one match relationship and the latter are able to be more productive, since they become capable of controlling and operating simultaneously many destructive systems.<sup>98</sup>

Another spectrum of this argument is that the processing system of AWS is able to recognize and prevent an unlawful attack against a target that was not planned to be executed.<sup>99</sup> As a result of this capability, it could be observed a ‘personalization in targeting’, in a way that more lives will be saved and unnecessary suffering will be more efficiently prevented. Robots, instead of

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<sup>93</sup> Dave Grossman, “On Killing – The Psychological Cost of Learning to Kill in War and Society”, (Open Road Media), 2014, p. 97. Specifically, Grossman mentions *‘there is a direct relation between the empathic and physical proximity of the victim, and the resultant difficulty and trauma to kill’*, in order to support his argument between the emotional trauma and distress soldiers suffer during warfare.

<sup>94</sup> Arkin, R.C., “The case for ethical autonomy in unmanned systems”, *Journal of Military Ethics* 9 (4), 2010, p. 334.

<sup>95</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 19.

<sup>96</sup> Supra note Crootof, ‘The Killer Robots are Here: Legal and Policy Implications’, p. 1866.

<sup>97</sup> Jeffrey S. Thurnher, “No One at the Controls: Legal Implications of Fully Autonomous Targeting”, 67 *JOINT FORCE Q.*, 2012, p. 79.

<sup>98</sup> Gary E. Marchant et al., “International Governance of Autonomous Military Robots”, 12, *COLUM. SCI. & TECH. L. REV.* 2011, p. 275.

<sup>99</sup> B. J. Strawser, “Killing by Remote Control: The Ethics of an Unmanned Military” (Oxford University Press, 2013), p. 17.

civilians, will likely not decide to engage a target earlier or out of fear.<sup>100</sup> This position is also confirmed by the UN Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions for the Office of the High Commissioner for Human Rights, Professor Philip Alston<sup>101</sup>, who mentions that AWS preclude unnecessary suffering and provide precise targeting.

Because of the technology, AWS are capable of reaching areas that were previously inaccessible<sup>102</sup> and are able to process information more quickly against specific targets.<sup>103</sup> This position is reinforced by a former U.S. Air Force Chief Scientist, Werner Dahm, who, back in 2010, supported that *“by 2030 machine capabilities will have increased to the point that humans will have become the weakest component in a wide array of systems and processes”*.<sup>104</sup>

Some authors also point out the financial aspect of using AWS in the battlefield instead of human soldiers: every US soldier in Afghanistan approximately costs the US around \$850.000 per year, without estimating in that amount the health care costs for the veterans. On the other side, the cost for the structure of a small armed robot, like a ‘TALON’, is estimated only to \$230.000.<sup>105</sup>

## **2. Any Counterarguments?**

Many scholars, international lawyers, international organizations, even researchers in the field of Artificial Intelligence have pointed out many of the dangers that AWS pose on human dignity. A sometimes-underestimated argument with regard to AWS that was pointed out<sup>106</sup> by the Special Rapporteur is that when a new technological advancement, which is connected to the lethal use of force, emerges, the potential dangers of that technology are better addressed after it is developed and used in practice. Therefore, the responses towards it, are better formulated after its actual emergence. This point is of high importance and value. Nevertheless, the usage of AWS poses important threats that cannot be disregarded.

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<sup>100</sup> R. C. Arkin, “Lethal autonomous weapons systems and the plight of the non-combatant”, (2014), p. 3.

<sup>101</sup> Philip Alston, “Lethal Robotic Technologies: The Implications for Human Rights and International Humanitarian Law”, *Journal of Law, Information & Science*, 2012, 35.

<sup>102</sup> Amitai Etzioni, “Happiness is the Wrong Metric, A Liberal Communitarian Response to Populism”, *Library of Public Policy and Public Administration*, Volume 11, Springer Open, 2018, p. 253.

<sup>103</sup> *Supra* note Marchant et al., “International governance of autonomous military robots”, p. 280.

<sup>104</sup> *Supra* note Losing Humanity.

<sup>105</sup> Francis, D., “How a new army of robots can cut the defense budget”. *The Fiscal Times*, 2013.

<sup>106</sup> *Ibid*, para. 33.

To begin with, the Report of the Special Rapporteur Heyns, on extrajudicial, summary or arbitrary executions<sup>107</sup> to the Human Rights Council mentions exactly those dangers, since many times killer robots are difficult to comply with the principles of IHL and IHRL. It is questionable and will be analysed thoroughly in forthcoming chapters, whether this weaponry complies with the core principles of IHL, like the principle of proportionality, the principle of humanity, the principle of precautions in attack.

It is widely discussed that AWS violate the principle of distinction, since it would be very complicated for them to distinguish at all times between civilians and combatants: a distinction that sometimes even for humans is challenging. As Noel Sharkey<sup>108</sup> points out, there is not a clear definition of who constitutes a ‘civilian’, since even Additional Protocol I of 1977, describes civilians as those people who do not fall into specific categories.<sup>109</sup> So, it would not be extreme to claim that a certain level of consciousness is required and also an ability to situate the person in the exact environment, in order to determine his exact status and therefore classification under IHL. At the moment, killer robots are equipped with cameras, lasers, temperature identifications, and they are able to distinguish at least between humans or animals, but it is highly questioned whether they are capable of recognizing the exact combat status of a certain person. In other words, during the fog of war, what is required is human consciousness: an ability to understand the exact status of the others, to understand their intentions, their possible behaviour. Machines lack any intuition. They might be capable of recognizing faces or facial expressions, but what about those who situate themselves near the battlefield<sup>110</sup>, but not take direct participation in hostilities?

With regard to the principle of proportionality, AWS are supposed to be unable to determine both the element of ‘excessiveness’ and the ‘military advantage that is about to be gained’.<sup>111</sup> Determinations and calculations of that kind belong, according to many scholars, to human beings and it is actually impossible for a machine to delve into any such determinations. It seems impossible for AWS to determine on their own how many innocent civilians are equal to a

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<sup>107</sup> United Nations General Assembly, Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns, A/HRC/23/47, April 9 2013, available at <[https://www.ohchr.org/Special\\_Rapporteur\\_Heyns](https://www.ohchr.org/Special_Rapporteur_Heyns)>, last accessed on October 4 2022.

<sup>108</sup> Supra note Sharkey, “Saying ‘No!’ to Lethal Autonomous Targeting” p. 378.

<sup>109</sup> “A civilian is any person who does not belong to one of the categories of persons referred to in Article 4 A (1), (2), (3) and (6) of the Third Convention and in Article 43 of this Protocol”.

<sup>110</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 379.

<sup>111</sup> Sharkey, N., “Death Strikes from the Sky: The Calculus of Proportionality”, IEEE Science and Society, Spring Issue, (2009), p. 16-19.

successful mission. Therefore, it is preferable to consider the technology to be as the appropriate tool for assisting the determination of the minimum collateral damage and then to have military commanders make the actual decision whether the civilian damage was proportional to the military advantage gained.<sup>112</sup>

Apart from the dangers AWS regarding the principles of distinction and proportionality pose, another substantial concern relates to the problem of accountability. Killer robots, and especially fully AWS decide on their own without any human intervention and then the question of who is responsible of that malfunction arises. For example, nor the designer nor the user of this technology could be blamed for a fault that could not be foreseen at the designer stage and had not appeared at the deployment stage.<sup>113</sup> For that reason, the element of clarity is missing. Despite of the fault of engineer, the programmer or even a dysfunction of the algorithm, one of the core principles of IHL is that someone must be held accountable for the civilian casualties he causes.<sup>114</sup> Therefore, any weapon or mean of warfare that does not meet the requirements of IHL should not be deployed in warfare.<sup>115</sup>

It is also claimed that a machine, even if it is programmed through a specific algorithm, should not be able to decide to launch or not an attack, since this is contradictory to the right to life and human dignity<sup>116</sup>. This position was confirmed by the “Scientist’s Call to Ban Autonomous Lethal Robots”<sup>117</sup>, which is a statement of AI and robotics experts, scientists, researchers, in which they highlight the dangers killer robots pose, since in the near future, they would be able to identify the target, make assessments with regards to its suitability to launch the attack and the level of force that is required and therefore they could cause collateral damage. They concluded that such decisions should not be made by machines.<sup>118</sup>

Fears also arise with regard to the element of unpredictability. More specifically, AWS are supported to be ‘unpredictable – by – design’.<sup>119</sup> They have the ability to select and engage targets

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<sup>112</sup> Supra note ICRC, “Autonomous Weapons Systems: Technical, Military, Legal and Humanitarian Aspects”, p. 380.

<sup>113</sup> D. G. Johnson, “Technology with no human responsibility?”, *Journal of Business Ethics*, 127 (2015), p. 708, 709. See also supra note Bhuta, N., “Autonomous Weapons Systems: Law, Ethics, Policy”, p. 68, 69.

<sup>114</sup> Rule 151 of Customary IHL Study.

<sup>115</sup> Supra note Ronald C. Arkin, “Governing Lethal Behavior in Autonomous Robots”, p. 257.

<sup>116</sup> PAX, Brochure: “10 Reasons to Ban Killer Robots”.

<sup>117</sup> ICRAAC (International Committee for Robot Arms Control), “Scientists’ Call to Ban Autonomous Lethal Robots”, 2013, available at <[https://Scientists\\_Call\\_to\\_ban\\_Killer\\_Robots](https://Scientists_Call_to_ban_Killer_Robots)>, last accessed on October 4 2022.

<sup>118</sup> Ibid.

<sup>119</sup> V. Boulanin, et al., “Limits on Autonomy in Weapon Systems, Identifying Practical Elements of Human Control, Stockholm International Peace Research Institute”, ICRC, June 2020, p. 3, 7, 10, 12.

on their own – especially with regard to FAWS –, they are designed to function in unpredictable and continuously changing environments and they must always be ‘one step ahead of their enemies’. This situation rationally creates constraints on how they could react on certain occasions and who could be their possible targets.

Research conducted in 2020 by RAND Corporation concluded that “*the speed of autonomous systems did lead to inadvertent escalation in the wargame*”.<sup>120</sup> The same conclusion was reached by the United Nations Institute for Disarmament Research (UNIDIR) that pointed out the fears of ‘unintended escalation’ in a warzone.<sup>121</sup> The escalation of conflict that can be caused because of AWS is also due to the fact that they can cause more harm than soldiers, even if they are the same at quantity. More precisely, the amount of harm that can be caused to combatants, civilians, objects is only dependent on the quantity of weapon systems a state, an army possesses. More importantly, as it was mentioned above, the effects of these weapons do not depend on the amount of people that are ‘behind’ them and they operate them, because of their ‘autonomy’. From the moment that they are activated they can act on their capacity. Therefore, some have attempted to classify AWS and especially LAWS as weapons of mass destruction<sup>122</sup>, because they can have extremely fatal consequences, especially in the hands of those who would like to cause chaos and destabilisation.<sup>123</sup>

### **E. Control over the unknown**

The next important question that should be addressed is whether these systems are regulated and if not, what could be, the appropriate measures that the international community should adopt, in order to urge more the discussion of their (il)legality. Moreover, it is not quite clear if the laws of war can be applied to these systems and if the paradigm of the former international conventions and their drafting could set a good example for the regulation of AWS and especially FAWS and pave the way forward.

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<sup>120</sup> Wong, Yuna Huh, et al., “Deterrence in the Age of Thinking Machines”. Santa Monica, CA: RAND Corporation, 2020, p. 11, available at <<https://Deterrence in the Age of Thinking Machines>>, last accessed on October 15 2020.

<sup>121</sup> UNIDIR, “Safety, Unintentional Risk and Accidents in the Weaponization of Increasingly Autonomous Technologies”, UNIDIR Resources, No5, 2016, p. 9.

<sup>122</sup> Zachary Kallenborn, “Swarms of Mass Destruction: The Case for Declaring Armed and Fully Autonomous Drone Swarms as WMD”, Modern War Institute at War, May 28 2020, available at <<https://Swarms of mass destruction> , last accessed on October 15 2022.

<sup>123</sup> “The Risks of Lethal Autonomous Weapons, in Lethal Autonomous Weapons Systems”, available at <<https://autonomousweapons.org/the-risks/>>, last accessed on October 15 2022.

## 1. A short summary of Weapons' Law Codification

It is obviously beyond the scope of this paper to analyse the origins of the laws of war. Yet, the main codification of the laws regulating warfare can be chronically situated from the middle of the 19<sup>th</sup> century. The Declaration of Paris in 1856<sup>124</sup>, the Declaration of St. Petersburg in 1869<sup>125</sup>, the Hague Peace Conferences of 1899<sup>126</sup> and 1907<sup>127</sup>, the Geneva Protocol of 1925<sup>128</sup>, the Geneva Convention of 1929<sup>129</sup>, the Four Geneva Conventions of 1949<sup>130</sup> and the two Additional Protocols of 1977<sup>131,132</sup>, are the most vivid examples of how the laws of war have been developed and gradually crystallized in what constitutes today and what can be characterized as 'international humanitarian law'.

Moreover, an evolution of the codification of laws could also be seen with regards to the weapons law. Weapons law is part of the laws of war, but some important information should be provided in order to evaluate whether the current existent framework is adequate to deal with new challenges that have emerged. The first attempt to codify the laws of war goes back to 1861 when Dr. Francis Lieber of Columbia University prepared a document of the already existing laws of land warfare.<sup>133</sup> The Lieber Code<sup>134</sup>, the St. Petersburg Declaration in 1868<sup>135</sup> and the Brussels Declaration in 1874<sup>136</sup>, contributed to the codification of the weaponry law. In 1880, the

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<sup>124</sup> Declaration Respecting Maritime Law. Paris, 16 April 1856.

<sup>125</sup> Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg, 29 November / 11 December 1868.

<sup>126</sup> Convention (II) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 29 July 1899.

<sup>127</sup> Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 18 October 1907.

<sup>128</sup> Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. Geneva, 17 June 1925.

<sup>129</sup> Convention relative to the Treatment of Prisoners of War. Geneva, 27 July 1929.

<sup>130</sup> Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Geneva, 12 August 1949; Convention (II) for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Geneva, 12 August 1949; Convention (III) relative to the Treatment of Prisoners of War, Geneva, 12 August 1949; Convention (IV) relative to the Protection of Civilian Persons in Time of War. Geneva, 12 August 1949.

<sup>131</sup> Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977.

<sup>132</sup> Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II), 8 June 1977.

<sup>133</sup> William H. Boothby, "Weapons and the Law of Armed Conflict" (2nd Edition), United Kingdom: Oxford University Press, 2016, in Chapter 2 'The Evolution of the Law of Weaponry', p. 9.

<sup>134</sup> Instructions for the Government of Armies of the United States in the Field (Lieber Code). 24 April 1863.

<sup>135</sup> *Supra* note Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight.

<sup>136</sup> Project of an International Declaration concerning the Laws and Customs of War, Brussels, 27 August 1874 (Brussels Declaration).



Oxford Manual<sup>137</sup>, constituted a codification of the accepted ideas of that age and was supposed to provide useful assistance to the military.

The difficulty in codifying the emerging technologies is also depicted in military aviation. The Declaration 1 at the 1899 Hague Peace Conference prohibited any launching of projectiles and incendiaries from balloons and other methods of similar nature<sup>138</sup>. It was replaced by Hague Declaration XIV 1907<sup>139</sup> and after the massive use of asphyxiating gases during World War I, it was obvious that the Hague Declaration 2 of 1899<sup>140</sup>, that referred to some gas weapons, and also Article 171<sup>141</sup> of the 1919 Treaty of Versailles, were inadequate to address the prohibition of gases during war. Therefore, the League of Nations held an International Conference with regard to the Control of the International Trade in Arms, Munitions and Implements of War in 1925, the Geneva Gas Protocol.<sup>142</sup> The next important step came in 1972 with the adoption of the Biological Weapons Convention (BWC).<sup>143</sup>

On October 10 1980, 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 (CCW)<sup>144</sup> and the annexed Protocols I, II and III were adopted.<sup>145</sup> The aim<sup>146</sup> of the Convention is to prohibit or to control the use of specific types of weapons that cause unnecessary suffering to combatants or uncritically affect the civilian population. The structure of the Convention serves this purpose, since it intriguingly attempts to deal with new

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<sup>137</sup> “The Laws of War on Land”. Oxford, 9 September 1880.

<sup>138</sup> Supra note William H. Boothby, “Weapons and the Law of Armed Conflict”, p. 16.

<sup>139</sup> Declaration (XIV) Prohibiting the Discharge of Projectiles and Explosives from Balloons. The Hague, 18 October 1907.

<sup>140</sup> Supra note Hague Convention II 1899.

<sup>141</sup> “*The use of asphyxiating, poisonous or other gases and all analogous liquids, materials or devices being prohibited, their manufacture and importation are strictly forbidden in Germany. The same applies to materials specially intended for the manufacture, storage and use of the said products or devices. The manufacture and the importation into Germany of armoured cars, tanks and all similar constructions suitable for use in war are also prohibited*”.

<sup>142</sup> Supra note Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare.

<sup>143</sup> Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, Geneva, 10 April 1972.

<sup>144</sup> It is also known as the Inhumane Weapons Convention.

<sup>145</sup> The Convention was amended in December 21 2001. Now, the scope of the Convention also covers “*situations referred to in Article 3 common to the Geneva Conventions of 12 August 1949. This Convention and its annexed Protocols shall not apply to situations of internal disturbances and tensions, such as riots, isolated and sporadic acts of violence, and other acts of a similar nature, as not being armed conflicts*”. The United States had proposed an amendment of the treaty, in order its scope to be extended. For more information and for the text of the amended Convention, see <<https://amended-cww-convention>>.

<sup>146</sup> The scope of the Convention was extended after the amendment of Article 1 by the Second Review Conference, which now encompasses also situations of non – international armed conflicts. For more information see International Committee of the Red Cross, International Humanitarian Law: Answers to Your Questions (Geneva: International Committee of the Red Cross, 2002), p. 21.



developments in weaponry and in armed conflicts. The main core of the Convention includes general rules on the conduct of weaponry. In that section, traditional principles of international humanitarian law can be found like the prohibition of ‘indiscriminate attacks’, the prohibition of ‘superfluous injury or unnecessary suffering’ and the right of the parties to the conflict to choose means and methods of warfare is not unlimited<sup>147</sup>. Protocols to the Convention contain the prohibitions and limitations on certain weaponry. The issue of whether the Convention can address the use of lethal autonomous weapons systems is still unresolved and as Boothby artfully pointed out, it remains to be seen whether the Convention “*will become the victim of its own success*”.<sup>148</sup>

The Chemical Weapons Convention (CWC)<sup>149</sup>, which provisions constitute customary law, was adopted in 1993 and according to its drafters the purpose of it was to eliminate and prohibit all types of weapons of mass destruction.<sup>150</sup> The void of the CCW Convention to address the prohibition in the use of anti-personnel landmines, was eventually adopted in 1997 by the adoption of the Ottawa Convention.<sup>151</sup>

The dispute regarding the use of nuclear weapons after the controversial<sup>152</sup> and according to ICRC bizarre<sup>153</sup> Advisory Opinion delivered by ICJ was somehow resolved almost two decades later. In 2012 the United Nations General Assembly adopted resolution 67/56 entitled “*Taking forward multilateral nuclear disarmament negotiations*<sup>154</sup>”, in which it emphasized the catastrophic humanitarian effects of a possible use of nuclear weapons. In July 2017 the Treaty on Prohibition of Nuclear Weapons (TPNW) was adopted and was entered into force in 2021.

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<sup>147</sup> Supra note William H. Boothby, “Weapons and the Law of Armed Conflict”, p. 94.

<sup>148</sup> Supra note William H. Boothby, “Weapons and the Law of Armed Conflict”, p. 100.

<sup>149</sup> Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Paris, 13 January 1993.

<sup>150</sup> Ibid, First Paragraph of the Preamble.

<sup>151</sup> Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, September 18 1997, Ottawa, Canada. It is also known as the “Mine Ban Treaty”.

<sup>152</sup> A. Roberts and R. Guelff, “Documents on the Laws of War”, 3rd edn (2000), Oxford University Press, p. 639.

<sup>153</sup> More specifically, on this issue the ICRC pointed out that it is “*difficult to envisage how a use of nuclear weapons could be compatible with the rules of international humanitarian law*”. For more see (1997) 316 IRRC 118, 119.

<sup>154</sup> United Nations General Assembly, A/RES/67/56, December 3 2012.

## 2. A Conventional/Customary Framework for the Regulation of Autonomous Weapon Systems?

Before assessing the current legal framework for regulating AWS, it is valuable to mention that after vivid discussions that began in 2013, CCW was considered to be the most appropriate framework to deal with the challenge of autonomous weapons. More specifically, in 2013 organizations, and afterwards, scientists, researchers,<sup>155</sup> activists<sup>156</sup>, from all over the world launched the ‘Campaign to Stop Killer Robots<sup>157</sup>’, which was an attempt to call for a ban on FAWS.<sup>158,159</sup> One year later, in 2014, the UN CCW met to debate whether a ban on FAWS was needed and justified<sup>160</sup>, and after three informal Meetings of Experts in 2014, 2015 and 2016, the High Contracting Parties of CCW, decided to establish a Governmental Group of Experts with the purpose of assessing the legal implication posed by LAWS, in which they concluded that the framework of CCW was the most adequate one to address the challenges posed by this technology, whereas they reiterated that the laws of war continued to apply to these weaponry and states should be held responsible for violations of IH.<sup>161</sup> In 2019, the GGE recommended and adopted 11 guiding principles that set the basic prerequisites regarding their use, which field of international law applies and also raises the issue of accountability gap.<sup>162</sup>

As it was mentioned above, the CCW Conventions consists of the ‘framework Convention’ and the Protocols annexed to it, which eliminate certain use of weaponry.<sup>163</sup> The Protocols of the Convention, at the moment, regulate the mines, booby-traps and other devices, blinding lasers

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<sup>155</sup> Noel Sharkey, “Computing Experts from 37 Countries Call for Ban on Killer Robots”, Int’l Comm. For Robot Arms Control, October 15 2013, available at <<http://experts-from-37-countries-call-for-ban-on-killer-robots>>, last accessed on October 15 2022.

<sup>156</sup> Charli Carpenter, “Beware the Killer Robots: Inside the Debate over Autonomous Weapons”, Foreign Aff., July 3, 2013, available at <<http://beware-the-killer-robots>>, last accessed on October 15 2022.

<sup>157</sup> The Problem, Campaign to Stop Killer Robots, available at <<http://www.stopkillerrobots.org/the-problem>>, last accessed on October 15 2022.

<sup>158</sup> Supra note Losing humanity.

<sup>159</sup> As it was mentioned above there are no information available until the time of writing this research that these kind of weaponry has ever been used.

<sup>160</sup> UN Meeting Targets ‘Killer Robots’, UN News Centre, May 14, 2014, available at <<http://www.un.org/apps/news/story.asp?NewsID=47794>>, last accessed on October 15 2022.

<sup>161</sup> Group of Governmental Experts of the High Contracting Parties to 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, CCW/GGE.1/2017/CRP.1, November 20 2017, available at <[https://CWWMeeting\\_of\\_High\\_Contracting\\_Parties\\_\(2017\)](https://CWWMeeting_of_High_Contracting_Parties_(2017))>, last accessed on October 15 2022.

<sup>162</sup> Meeting of the High Contracting Parties to 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, CCW/MSP/2019/9, December 13 2019, available at <<https://documents-dds-ny.un.org/CCW>>, last accessed on October 15 2022.

<sup>163</sup> United Nations Office for Disarmament Affairs, The Convention on Certain Conventional Weapons, available at <<https://www.un.org/disarmament/the-convention-on-certain-conventional-weapons/>>, last accessed on October 15 2022.

and explosive remnants of war.<sup>164</sup> Therefore, the majority of the international community and – in order to be precise – those who support a regulation framework, tend to consider that AWS could be potentially regulated as an Additional Protocol to the CCW Convention.

The issue of the regulation of AWS has not yet been fully settled, since no international convention regulating their usage has been adopted. At the Sixth Review Conference of UN’s CCW Convention that was held in Geneva 2021, the international community had many hopes that this was the best opportunity to negotiate a binding legal instrument to regulate LAWS.<sup>165</sup> ICRC also made multiple suggestions anticipating a binding treaty after that Conference and made comments that, that was the best opportunity for states to conclude a binding document.<sup>166</sup>

Human Rights Watch has multiple times supported that an International Treaty, as a new Convention or even as a Protocol to the CCW Convention is the only possible way to regulate this emerging technology, since the field of IHL cannot fully regulate this weaponry<sup>167</sup>. The four Geneva Conventions of 1949 and the Additional Protocols of 1977 annexed to it, have envisaged that the laws of war apply only to human beings and not machinery. Therefore, it is not yet clear how exactly IHL applies in this field.<sup>168</sup>

During the Conference the issues of accountability, their compatibility with the principles of IHL and most importantly how could ‘autonomy’ and subsequently ‘meaningful human control’ be defined, due to the lack of international consensus for those concepts. The provision of ‘maintaining meaningful human control over the use of force’ could be formulated as a positive

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<sup>164</sup> For the full text of the Convention, See <<https://unoda-web.s3-accelerate.amazonaws.com/wp-content/uploads/assets/publications/more/ccw/ccw-booklet.pdf>>.

<sup>165</sup> See also: Views and Recommendations for the Sixth Review Conference of the Convention on Certain Conventional Weapons Working paper submitted by the International Committee of the Red Cross, 8 November 2021, p. 8.

<sup>166</sup> Statement of the International Committee of the Red Cross delivered at the Convention on Certain Conventional Weapons (CCW) before the Group of Governmental Experts on Lethal Autonomous Weapons Systems - 3–13 August 2021, Geneva.

<sup>167</sup> Bonnie Docherty, “The Need for and Elements of a New Treaty on Fully Autonomous Weapons”, June 1 2020, available at <<https://www.hrw.org/need-and-elements-new-treaty-fully-autonomous-weapons>>, last accessed on October 15 2022.

<sup>168</sup> The applicability of international humanitarian law to lethal autonomous weapons systems is the first of 11 guiding principles adopted by CCW states parties, “Report of the 2018 Session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems,” CCW/GGE.1/2018/3, para. 26(a), October 23, 2018, available at <[https://www.unog.ch/CCW\\_GGE\\_2018](https://www.unog.ch/CCW_GGE_2018)> last accessed on October 15 2022.

obligation of the anticipated treaty, whereas other provisions could be included in order to avoid discriminatory practices during the ‘selecting and engaging a target’ phase.<sup>169</sup>

By the end of the conference not such consensus had been achieved and the Conference was concluded with an ambiguous proposal to “...*consider proposals and elaborate, by consensus, possible measures, including taking into account the example of existing protocols within the convention, and other options related to the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems...*”.<sup>170</sup>

In attempting to explain and evaluate this bizarre statement, it should be born in mind that the CCW Convention functions on a consensus-based system: any adjustment or a new proposal should be accepted by all member states. While the majority of the contracting parties was willing to agree on binding regulations, highly militarized states, like Israel, India and the U.S., considered such a proposal for a binding instrument ‘premature’.<sup>171</sup> The outcome of the Conference was criticised,<sup>172</sup> and as it is pointed out “*there could be catastrophic consequences if we liberate militaries from political constraints preventing them from going to war*”<sup>173</sup>. Unfortunately, but not unexpectedly not many things changed during the two 2022 GGE Meetings with regard to the regulation of AWS.<sup>174</sup>

### 3. Towards Banning than Regulation?

When a new technological capability emerges or more simply a new weapon is being researched and developed, the discussions surrounding it revolve around the idea of banning it than regulating it. It cannot be denied that there are legitimate and rational fears surrounding AWS, since there is no consensus even when attempting to define them and especially the

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<sup>169</sup> Article 36, “Targeting People: Key Issues in the Regulation of Autonomous Weapons Systems,” November 2019, available at <<http://www.article36.org/wp-content/uploads/2019/11/targeting-people.pdf>>, last accessed on October 16 2022.

<sup>170</sup> Report of the 2021 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, CCW/GGE.1/2021/3, February 22 2022.

<sup>171</sup> Emma Laumann, The Road Ahead for the Regulation of Autonomous Weapons, June 28 2022, available at <<https://intimacies-of-remote-warfare.nl/perspectives/the-road-ahead-for-the-regulation-of-autonomous-weapons/>>, last accessed on October 15 2022.

<sup>172</sup> Ibid. See also, “Campaign to Stop Killer Robot, Historic opportunity to regulate killer robots fails as a handful of states block the majority”. available at <<https://www.stopkillerrobots.org/news/historic-opportunity-to-regulate-killer-robots-fails-as-a-handful-of-states-block-the-majority/>>, last accessed on October 15 2022.

<sup>173</sup> Matthew Anzarouth, “Robots that Kill: The Case for Banning Lethal Autonomous Weapon Systems”, Harvard Political Review, December 2 2021, available at <<https://harvardpolitics.com/robots-that-kill-the-case-for-banning-lethal-autonomous-weapon-systems/>>, last accessed on October 15 2022.

<sup>174</sup> For a detailed analysis See “Report of the 2022 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems”, CCW/GGE.1/2022/CRP.1/Rev.1, July 29 2022, available at <<https://documents.unoda.org/CCW-GGE-2022>>, last accessed on October 15 2022.

concept of ‘meaningful human control’. Moreover, the scenario that if they are used by guerrilla groups and especially terrorist organizations, the humankind will see an unprecedented escalation of violence. The same is also true with regard to states, since history has shown that the most obnoxious atrocities were committed by states in the name of ‘religion’ or more recently in the name of combating ‘terrorism’.

Amnesty International has stated that “*a total ban on the development, deployment and use of ‘killer robots’ is the only real solution*”.<sup>175</sup> It might seem that their total ban, especially when they use lethal force against human beings, would be the best suitable solution and would eliminate any concerns. But how suitable is a ban when the highly militarized states invest millions of dollars in their development? And even if it is assumed that a total ban is indeed suitable and international law should not be affected by the politicised will of states, how achievable is a ban when states are unwilling to ban them? The answer is profound.

Moreover, scholars like Crootof<sup>176</sup> who merely supports that a total ban on this technology would solve many problems and uses as an example to intensify her arguments the Mine Ban Convention or the Chemical Convention, seems to accept that if states who develop and use the technology of AWS have not signed or ratified any convention which bans them, it is obvious that the ban cannot be successful. As a result, no customary norm can also be extracted if only a minority of states accede to the treaty.

Supposedly, if a ban was enacted, because of the nature of this weaponry, it would be difficult to determine whether the ban was violated. States that would have taken advantage of this technology, could claim that the weaponry that was deployed was not a fully autonomous one – rather it was a semi-autonomous or even automated. Moreover, it would be difficult for ‘an-all-inclusive-ban’ to come into reality, because of the lack of the consensus towards their definition and because some AWS are clearly used for defence purposes.<sup>177</sup> There is also the argument that a total ban would offer nothing new, since the quality of harm that is caused by a bullet shot by a soldier is exact the same with the harm caused by shot of an AWS.<sup>178</sup>

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<sup>175</sup> Amnesty International, “UN: States should commit to pathway towards global ban on ‘killer robots’”, December 16 2016, available at <<https://www.amnesty.org/states-should-commit-to-pathway-towards-global-ban-on-killer-robots/>>, last accessed on October 15 2022.

<sup>176</sup> Supra note Rebecca Crootof, “The Killer Robots are Here: Legal and Policy Implications” p. 1883-1890.

<sup>177</sup> Michael C. Horowitz & Paul Scharre, “Do Killer Robots Save Lives?”, POLITICO (Nov. 19, 2014), available at <[http://www.politico.com/magazine/story/2014/11/killer-robots-save-lives-113010\\_full.html?print#.VICWzWds2dx](http://www.politico.com/magazine/story/2014/11/killer-robots-save-lives-113010_full.html?print#.VICWzWds2dx)>, last accessed on October 15 2022.

<sup>178</sup> George R. Lucas, Jr., “Automated Warfare”, 25 STAN. L. & POL’Y REV., 2014, p. 317, 330.

The aim of IHL is to minimize harm suffered by human beings: either civilians or combatants.<sup>179</sup> By attempting to establish a regulatory framework that minimizes harm and also sets the human beings in the centre of the accountability of fully autonomous weapon systems, the obstacles of a total ban seem more easily surpassed<sup>180</sup>. In order to be more precise, human beings can still remain in the centre of the accountability assessment, since even for the deployment of this weaponry, a human being is needed: weapons can be autonomous in the targeting phase or even when selecting targets, but still, humans are those who set the basic parameters. If a similar approach is adopted, AWS are not totally unlawful. Therefore, the weight should not be on a total ban, but rather on how they could be used lawfully, how human beings that are connected to their usage or deployment could be held accountable: in a few words on their regulation.

All states are equal, but some states are more equal than others. The creation of a regulatory framework than a total ban seems to offer more advantages. More specifically, it will be easier to evaluate what conduct is allowed, what practices should be stigmatized and will also shed light to uncertain aspects of weapons' autonomy. Ban advocates might support that it is more efficient to ban this technology once and for all, but do not consider the chances of a total ban, when some states like the U.S. have not yet ratified the API and don't consider it customary law.

Unlike from what could be expected, it is the author's view that a regulatory framework is more suitable and preferable than a total ban, but not achievable at the moment. Some scholars<sup>181</sup> consider that a comprehensive convention like the Chemical Weapons Convention, which apart from banning the development, acquisition, use of specific weapons, also has enforcement mechanisms, is a good example and shows the way forward for the regulation of AWS. Other points the similarities between AWS and landmines.<sup>182</sup> However, with regard to chemical weapons, it was clear to everyone what the dangers of those weaponry were and they were not subject to interpretative abuse by states and regarding landmines, apart from any similarities they do have significant differences.

The negotiations for an additional protocol to the CCW Convention might have failed, but that does not entail that international law does not offer any alternative solutions: non-binding

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<sup>179</sup> Michael N. Schmitt, "21st Century Conflict: Can the Law Survive?", 8 MELB. J. INT'L L., 2007, p. 443, 445.

<sup>180</sup> John Lewis, "The Case for Regulating Fully Autonomous Weapons", The Yale Law Journal, Vol. 124, No 4, Jan-Feb 2015, p. 1313-1314.

<sup>181</sup> Supra note Supra note Rebecca Crotoof, "The Killer Robots are Here: Legal and Policy Implications", p. 1883-1892.

<sup>182</sup> See e.g. John Lewis, "The Case for Regulating Fully Autonomous Weapons", , p. 1319 – 1325.

resolutions, codes of conduct, society reports, declarations, soft-law paradigms, professional guidelines. It is not the first time that the international community has to deal with emerging technologies. The Tallinn Manual on the International Law Applicable to Cyber Warfare<sup>183</sup> and the International Committee of the Red Cross's interpretive guidance with regards to the status of civilians that directly participate in hostilities,<sup>184</sup> are two valuable examples of how experts and subsequently the international community dealt with issues that were not fully addressed by the laws of war. Therefore, it is important to explore alternative ways and paths to regulate states' conduct: otherwise states will uninterruptedly continue to develop and deploy AWS without any barriers.

#### **F. Compatibility with Principles of International Humanitarian Law**

The proponents of a total ban of AWS support that this technology is unable to comply with the principles of IHL. Machines, even if they are programmed and thus being able to act without any human intervention, are unable to distinguish between civilians and combatants and especially are unable to determine when civilians actively participate in the hostilities and when they give up arms. Also, it is impossible for weapon robots to make assessments with regard to the proportionality principle and determine whether the harm that is about to be caused was excessive to the military advantage anticipated. Furthermore, they highly question whether AWS can comply with dictates of humanity and public conscience: the Martens Clause principle.

IHL's rules are not black nor white: a 'yes or no answer' cannot be provided when dealing with complex principles that in conventional warfare also raise many issues. Technology is not neutral: it is created by human beings; it is deployed by them and it is also used to fulfil their ambitions and goals. The purpose of the laws of war, are to reconcile between two opponents, as Schmitt points out,<sup>185</sup> the principle of humanity and the principle of military necessity. Any assessment of AWS's legality with IHL is therefore an assessment of their compatibility with the well-known and established principles of the laws of war.

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<sup>183</sup> INT'L GRP. OF EXPERTS, NATO COOP. CYBER DEFENCE CTR. OF EXCELLENCE, TALLINN MANUAL ON THE INTERNATIONAL LAW APPLICABLE TO CYBER WARFARE (Michael N. Schmitt ed., 2013).

<sup>184</sup> INT'L COMM. OF THE RED CROSS, INTERPRETIVE GUIDANCE ON THE NOTION OF DIRECT PARTICIPATION IN HOSTILITIES UNDER INTERNATIONAL HUMANITARIAN LAW (Nils Melzer ed., 2009), available at <[https://www.icrc.org/interpretive\\_guidance](https://www.icrc.org/interpretive_guidance)>, last accessed on October 16 2022.

<sup>185</sup> Michael N Schmitt, "Military Necessity and Humanity in International Humanitarian Law: Preserving the Delicate Balance", Virginia Journal of International Law 50, 2010, p. 798.

## 1. Precautions in Attack

Scholars like Crootof, consider AWS as ‘inherently unlawful systems’<sup>186</sup> and their nature as unpredictable weaponry, raises many concerns whether they could apply precautions in attack, as it is enshrined in article 57 of API. In the same reasoning, the International Law Association Study Group on the Conduct of Hostilities in the 21st Century, reiterate that unlike the principles of proportionality or humanity, the principle of precautions in attack is not that easy to be addressed and determined, since it is underdeveloped.<sup>187</sup> Nevertheless, the way article 57 is formed is what makes any legal assessment a thorny issue.<sup>188</sup> The Precautionary Principle as embodied in article 57, constitutes customary international law,<sup>189</sup> applicable both in IACs and NIACs.<sup>190</sup>

According to Article 57:

*1. In the conduct of military operations, constant care shall be taken to spare the civilian population, civilians and civilian objects.*

*2. With respect to attacks, the following precautions shall be taken:*

*(a) Those who plan or decide upon an attack shall: (i) do everything feasible to verify that the objectives to be attacked are neither civilians nor civilian objects and are not subject to special protection but are military objectives within the meaning of Paragraph 2 of Article 52 and that it is not prohibited by the provisions of this Protocol to attack them; (ii) take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimising, incidental loss of civilian life, injury to civilians and damage to civilian objects; (iii) refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;*

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<sup>186</sup> Supra note Rebecca Crootof, “The Killer Robots are Here: Legal and Policy Implications”, p. 1885.

<sup>187</sup> International Law Association Study Group on the Conduct of Hostilities in the 21st Century, “The Conduct of Hostilities and International Humanitarian Law: Challenges of 21<sup>st</sup> Century Warfare”, International Law Studies, 93, 2017, p. 322, 372.

<sup>188</sup> Elena Carpanelli and Nicole Lazzerini (eds), “Use and Misuse of New Technologies: Contemporary Challenges in International and European Law”, Springer, 2019, p. 80–81.

<sup>189</sup> In addition, ICJ in *The Legality in The Threat or Use of Nuclear Weapons*, has referred to this rule as a customary rule of international law (paras 42-43, 79).

<sup>190</sup> Supra note International Law Association Study Group, p. 372-373.



*(b) An attack shall be cancelled or suspended if it becomes apparent that the objective is not a military one or is subject to special protection or that the attack may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;*

*(c) Effective advance warning shall be given of attacks which may affect the civilian population, unless circumstances do not permit.*

*3. When a choice is possible between several military objectives for obtaining a similar military advantage, the objective to be selected shall be that the attack on which may be expected to cause the least danger to civilian lives and to civilian objects.*

*4. In the conduct of military operations at sea or in the air, each party to the conflict shall, in conformity with its rights and duties under the rules of International Law applicable in armed conflict, take all reasonable precautions to avoid losses of civilian lives and damage to civilian objects.*

*5. No provision of this article may be construed as authorizing any attacks against the civilian population, civilians or civilian objects.*

The first paragraph of the aforementioned article; reveals not only the balance between the goals expected to be achieved in military operations and the constant care of the civilian population,<sup>191</sup> but also the whole purpose of the laws of war: regulation of conduct in order to protect those who do not participate in warfare.

AWS can comply with the precautionary principle, because it is the military commanders who have an obligation to abide by these provisions. More specifically, AWS are indeed systems that once activated, they engage and select targets without any further human intervention, but the precautionary principle can be applied ‘ex ante’ and ‘ex post’. ‘Ex ante’, when the weaponry is designed and developed and it is equipped with the algorithm that will contain all the necessary information and ‘ex post’, when the weaponry will be provided with a ‘self-destructive’ option or the military commander will be able to deactivate it,<sup>192</sup> if the actual circumstances on the ground change and require such an action. Therefore, it can be supported that precautions in

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<sup>191</sup> International Committee of the Red Cross, “Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949”, para 2189.

<sup>192</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 167.

attack have to be taken from the very first moment of the activation or better the moment the algorithm is incorporated to the system till the moment of the engagement of the target.<sup>193</sup>

Some comments should be made with regards to ‘feasibility criterion’ of the second paragraph. The Study Group has supported that the commanders are under an obligation not to violate the rules of IHL based on the available information they had before or at least during the attack.<sup>194</sup> But with regards to the ‘during the attack’ phase, the precautionary principle can hardly be applied. It is not always easy to determine whether a human operator is able to intervene and halt the attack when the ordnance is released from the machine.<sup>195</sup>

It was mentioned above that the precautionary principle can be applied ‘ex post’ in two scenarios: when the military commander intervenes and deactivates the system and when the system has a self-destructive capability. In conventional weaponry, it is much easier for the military commander to intervene and deactivate the system, since in AWS the commander might not have the necessary time to do so.<sup>196</sup> Otherwise, as Seixas - Nunes<sup>197</sup> points out, if the commander intervenes to halt the effects of the attack, then this action can also be seen as abiding by article 58 (c) of API.

A ‘self-destructive’ mechanism is not a new concept for scientists or researchers. In Article 2 (9) of the Convention for Cluster Munitions (hereinafter CCM), such mechanism is provided and the purpose is the destruction of the munition that is attached to<sup>198</sup>. In the AWS, a ‘self-destructive’ mechanism could be incorporated to the system through their algorithm<sup>199</sup> and could be activated whenever it was possible that the weaponry could not adapt to the new circumstances that faces on the ground. This scheme might sound full of promise, but no one could exclude the possibility, that such a mechanism could indeed not be activated because of a malfunction. In

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<sup>193</sup> Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 450.; BOTHE ET AL., “NEW RULES FOR VICTIMS OF ARMED CONFLICTS”, 1982, p. 363.

<sup>194</sup> Study Group International Law, p. 375.

<sup>195</sup> Contrary to LT Colonel Alexander Bolt’s argument that everything depends on whether the intervention can take place in ‘*the time lag between the release of the weapon and when it will cause its effects is acceptable*’, because many times is uncertain whether such interventions are actually possible. See Lt Col Alexander Bolt, “The Use of Autonomous Weapons and the Role of the Legal Adviser” in Dan Saxon (ed), “International Humanitarian Law and the Changing technology of War”, vol 41 (Martinus Nijhoff 2013), p. 147-150.

<sup>196</sup> Supra note Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 169.

<sup>197</sup> Supra note Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 169.

<sup>198</sup> ICRC, “Convention on Cluster Munitions”, January 8 2010, <[www.icrc.org/ecluster\\_munitions](http://www.icrc.org/ecluster_munitions)>, last accessed on October 16 2022.

<sup>199</sup> Gro Nystuen and Stuart Casey-Maslen (eds), “The Convention on Cluster Munitions: A Commentary”, Oxford University Press, 2010, p. 231–232.

that case, the only possible solution could come through the intervention of a commander, who should be able to activate the malfunctioning ‘self-destructive system’.

To understand better how AWS could abide by the precautionary principle, the scheme<sup>200</sup> that is proposed by Seixas – Nunes will be used. First and foremost, military commanders are responsible to take all the necessary precautions before the attack, because they are the ones who will deploy the AWS and according to their directions and the legal advisor’s knowledge the algorithm will be incorporated to the machinery. If the weapon is deployed and unexpected circumstances prevail, then either the system should be able to adjust itself to the new environment, or if it is unable, it should choose its ‘self-destructive’ mechanism. Last but not least, if the ordnance is released by the system, the whole concept of precautions during an attack is collapsing. Only if the munition is not released, the commander can intervene and halt the attack. Furthermore, if it is obvious to the military commander that the system, because of new circumstances in the environment it operates, will violate the principles of IHL, he should be able to intervene and deactivate the system, in acceptable time, according to Article 57 (2) (b) of API.

## **2. Principle of Distinction**

The Principle of Distinction is considered to be one of the core rules of IHL<sup>201</sup>. It is codified in Article 48 of API as

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

This core principle is considered to be one of the greatest obstacles of AWS, when attempting to research whether they comply with IHL. Unfortunately, it does not come with much clarity. More specifically, both in IACs and NIACs civilians are defined in the negative<sup>202</sup> (as those who are not combatants – article 50 API) and they do not participate directly in hostilities.<sup>203</sup>

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<sup>200</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 170-171.

<sup>201</sup> The ICJ has referred to the principle of distinction as one of the core principles of IHL, See *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion*, 1996 I.C.J. para. 78.; Supra note Christopher M. Ford, “Autonomous Weapons and International Law”, p. 433.

<sup>202</sup> In IACs civilians are those who are not parties to the conflict, they are not members of any armed forces or they are not members levée en masse. In NIACs civilians are those who are not parties to the conflict, they are not members of the armed forces of a state and they are not members of a non-state armed group.

<sup>203</sup> With the exception of levée en masse.

According to the ICRC Interpretative Guidance on the Notion of Direct Participation in Hostilities under International Humanitarian Law<sup>204</sup> (2009), there should be three cumulative criteria in order to determine whether a civilian is participating directly in hostilities: the threshold of harm, the direct causal link between the act and the harm that is about to be caused and the belligerent nexus.<sup>205</sup>

Any evaluation of who constitutes a civilian, who a combatant, what is considered as a civilian or as a military objective, should be made according to all information available and any uncertainty should deter the commanders from engaging the target.<sup>206</sup> Thus, the commander when deciding to deploy the weapon, should be in good – faith that it will not violate the principle of distinction.<sup>207</sup>

In contemporary warfare most of the times, is extremely difficult to distinguish between civilians and combatants because the latter do not wear specific uniforms, they do not have specific signs to be distinguished, they do not carry their arms openly: on the contrary they prefer to blend in the civilian population<sup>208</sup> and can only be distinguished by them when they directly participate in hostilities.<sup>209</sup> Moreover, civilians who directly participate in hostilities, sometimes are attempting to conceal their status.<sup>210</sup> In those situations the principle of distinction is challenging not only for weaponry but also for soldiers.

AWS will not always be in a position to determine, whether the entity that could potentially be targeted is a civilian or combatant, especially when there isn't any sign, in order to make such determination. Furthermore, non-state armed groups could also deceive these systems and present themselves as 'innocent civilians'.<sup>211</sup> It quite seems unlikely that these systems will be capable of understanding and analysing humans' intentions. Many times, a determination of the intentions of the human being should be made in order to assess properly whether he constitutes – or not – a target. This argument is also supported by Noel Sharkey, who highlights that

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<sup>204</sup> Nils Melzer, "Interpretative Guidance on the Notion of Direct Participation in Hostilities", ICRC, 2009, p. 46, available at <[www.icrc.org/interpretive\\_guidance](http://www.icrc.org/interpretive_guidance)>, last accessed on October 16 2022.

<sup>205</sup> Ibid.

<sup>206</sup> Supra note, International Committee of the Red Cross, "Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949", para. 2195.

<sup>207</sup> Ian Henderson, "The Contemporary Law of Targeting: Military Objectives, Proportionality and Precautions in Attack under Additional Protocol I", Martinus Nijhoff, 2009, p. 165.

<sup>208</sup> Elliot Winter, "The Compatibility of Autonomous Weapons with the Principles of International Humanitarian Law", Journal of Conflict & Security Law VC Oxford University Press 2022, p. 14.

<sup>209</sup> Supra note Losing Humanity, p. 30.

<sup>210</sup> Supra note Christopher M. Ford, "Autonomous Weapons and International Law", p. 436.

<sup>211</sup> Krishnan, A.. "Killer Robots: Legality and Ethicality of Autonomous Weapons", Routledge, London, 2009, p. 99.

*“humans understand one another in a way that machines cannot”*.<sup>212</sup> Thus, it seems that human beings are better-equipped to make determinations on complex issues.<sup>213</sup>

Apart from an assessment of the intentions or the possibility of terrorist groups deceiving AWS, there are many more ‘gray areas’, such as ‘hors de combat’ or (in)voluntary human shields. It might be sometimes easy for those systems to distinguish between civilian or military objectives but the question remains in more complex environment, where well-trained soldiers find any determination challenging. For example, a civilian that is located near the battlefield and carries weaponry, because he is a part of the transfer chain should not be targeted, because other transits are interposed, whereas a civilian that is armed because of his direct participation is a legitimate target. Another determination that could prove far from easy for AWS is how they could assess whether a destruction of a military objective makes an effective contribution to the military action and offers a ‘definite military advantage’.<sup>214</sup> Or, how AWS could make similar assessments with regards to dual use objects.<sup>215</sup> It is uncertain if these systems, will be able for example to classify a bridge as a civilian object when civilians are using it to transfer goods and as a military one when combatants are taking advantage of it.

Therefore, there is a proposal that could be regarded as compatible with the principle of distinction if they have the same capabilities with conventional/ non – autonomous weaponry.<sup>216</sup> For Seixas – Nunes<sup>217</sup> the technological development at stake seems unable to incorporate all the complexities of the rules of distinction into algorithms, especially when they have to distinguish between civilians and combatants. It is doubtful whether AWS will be capable of distinguishing between a combat, who could be legitimately attacked and another combatant who is injured, and any attack against him must be considered unlawful. Other authors<sup>218</sup> raise the argument that AWS can only be deployed only versus another military equipment and especially other weapons or they can only be deployed when it is safeguarded that other civilians are not in the area of their deployment.

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<sup>212</sup> Sharkey, “Killing Made Easy,” in Lin, Abney, and Bekey, eds., “Robot Ethics”, p. 118.

<sup>213</sup> Jeroen Van Den Boogaard, Proportionality and Autonomous Weapons Systems, 6 J. INT’L HUMAN. LEGAL Stud. 247 (2015), p. 262.

<sup>214</sup> Supra Note IL Association Study Group, p. 344-345.

<sup>215</sup> Supra Note an Henderson, “The Contemporary Law of Targeting: Military Objectives, Proportionality and Precautions in Attack under Additional Protocol I”, p. 58-59.

<sup>216</sup> Supra note Rebecca Crootof, “The Killer Robots are Here: Legal and Policy Implications”, p. 1874.

<sup>217</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 178.

<sup>218</sup> Kenneth Anderson and Mathew C Waxman, “Law and Ethics for Autonomous Weapon Systems: Why a Ban Won’t Work and How the Laws of War Can” (2013) American University WCL Research Paper 2013-11, Columbia Public Law Research Paper, p. 6, 11.

The concerns surrounding the compatibility of AWS with the principle of distinction do not entail that a pre-emptive ban is the most suitable solution. Michael Schmitt raises a not so logical argument: a system might not be able to distinguish legitimate and unlawful target, but yet it can be deployed in such environments if it is undisputed that it will not act indiscriminately, meaning it will not engage against human beings, since it lacks such capability.<sup>219</sup> Such a system was for him the Iraqi SCUD missiles that were used during the Gulf-War in 1990-1991.<sup>220</sup>

The answer to the question of how and when AWS will comply with the principle of distinction, will likely come from the roboticists as they will develop and research further those systems.<sup>221</sup> It can't be denied that at present, there are weapon systems that can comply with the requirements of distinction, based on what they can detect, recognize and distinct. One such example is the Harpy system of Israel,<sup>222</sup> which detect and targets radars. Furthermore, AWS are already employed in steady environments, like the sea and they can target incoming missiles. It is obvious that the problems with their compatibility arise when they operate in complex, unsteady environments.

It can thus be concluded that because of the nature of AWS as unpredictable systems, most of the times it is almost impossible to comply with the requirements of the principle of distinction. AWS should only be deployed only when it is confirmed that they will not violate this principle, meaning when in the area that are deployed, no human beings are located. There is also the suggestion that they could comply with the principle of distinction if they are equipped with a 'self-destructive' mechanism.<sup>223</sup>

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<sup>219</sup> Michael N. Schmitt, "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", HARV. NAT'L SECURITY J. FEATURES 4-5, 2013, p. 11, 13, available at <[http://harvardnsj.org/A\\_reply\\_to\\_the\\_critics](http://harvardnsj.org/A_reply_to_the_critics)>, last accessed on October 17 2022.

<sup>220</sup> Ibid, p. 10.

<sup>221</sup> Kellenberger supports that the compatibility of AWS with the principles of IHL depend on "*variety and quality of the sensors and programming employed within the system*". For more information see J. Kellenberger, President of the ICRC, "Keynote Address, International Humanitarian Law and New Weapon Technologies, 341h San Remo Round Table 8-1o September 2011", 94 (886) IRRC 809 (2012), p. 812.

<sup>222</sup> Stefano D' Urso, "Let's Talk About The Israel Air Industries Loitering Munitions And What They're Capable Of", in the Aviationist, January 7 2022, available at <<https://theaviationist.com/Israel-air-industries>>, last accessed on October 17 2022.

<sup>223</sup> Supra note Seixas-Nunes, A. "The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective", p. 180.

### 3. Principle of Proportionality

The customary principle of Proportionality, applicable both in IACs and NIACs<sup>224</sup> constitutes one of the most complex rules in IHL. More specifically, as it is enshrined in Article 51(5)(b) of API

*“[a]n attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.”*

Principle of proportionality is one of the cornerstones in IHL. It is generally accepted among military commanders and is also widely used to justify the (il)legality of a particular act.<sup>225</sup> First and foremost, it is prohibited to launch an attack when the civilian harm caused, exceeds the direct military advantage anticipated from the attack. Therefore, since direct attacks against civilians and civilian objects are prohibited, proportionality comes into play when attacks are directed against lawful targets<sup>226</sup>. Yet, there is much controversy surrounding proportionality, due to its subjective nature. Its exact meaning is vague, since there is no objective way to compare the military advantage and civilian harm, the “excessiveness” of an attack;<sup>227</sup> the comparison is taking place between different “quantities and values”.<sup>228</sup> The issue is much more perplexed with regard to dual use objects.<sup>229</sup>

Once a lawful target has been identified, this doesn't mean that military commanders are free to continue the targeting process. The targeting of an object should be accompanied by the consideration of the harm that is anticipated to be caused in civilians or civilian objects. This rule is codified in API and requires an assessment between anticipated military advantage and

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<sup>224</sup> *Kupreškić et al.*, [2000], ICTY Trial Chamber (IT-95-16), para. 524.

<sup>225</sup> *Prosecutor v. Ljube Boškoski and Johan Tarčulovski* ICTY, , Trial Chamber II, July 10 2008, para.357.

<sup>226</sup> Nils Melzer coordinated by Etienne Kuster, “International humanitarian Law, A Comprehensive Introduction, ICRC”, November 2019, p.101.

<sup>227</sup> F. Kalshoven and L. Zegveld, “Constraints on the Waging of War: An Introduction to International Humanitarian Law, 3<sup>rd</sup> ed.”, ICRC, Geneva, 2001, p.46.

<sup>228</sup> ICTY, Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, June 13 2000, para.48.

<sup>229</sup> Objects that at the same time constitute a military objective and serve a civilian purpose, in U.S. Naval War College in International Law Studies, “The Conduct of Hostilities and International Humanitarian Law: Challenges of 21<sup>st</sup> Century Warfare, International Law Association Study Group on the Conduct of Hostilities in the 21<sup>st</sup> Century, Volume 93”, 2017, p.356.

anticipated civilian harm<sup>230</sup>. Therefore, in order for an attack to be lawful, the military advantage from it, should not be disproportionate to the collateral damage caused to the civilians<sup>231</sup>.

There are two main views regarding the effects of the attack that should be assessed' the one takes into account only direct effects and the other addresses the need to include into consideration and indirect effects. The last view seems the most coherent, since the law would have included the term "direct"<sup>232</sup> and it seems bizarre to demand from military commanders to consider only direct effects, whereas many times indirect effects reflect the most serious ones<sup>233</sup>, even if they constitute long-term consequences. A typical example of this situation is the destruction of military headquarters, which at the same time damage water installation of clean water for civilians<sup>234</sup>. But how far can a commander go when considering indirect effects? Should he take into account all possible results of an attack even if they extend in time and space? ICRC proposes that the most suitable criterion is foreseeability. Therefore, indirect effects should only be taken into account, only when they are foreseeable. Results that are not expected, are not considered in the proportionality assessment.

Proportionality in IHL is not related to cumulative numbers or military losses, is only relevant to two types of incidental harms' the one caused to civilians and the one caused to civilian objects. Civilians are defined in the negative as those who are not combatants in IACs<sup>235</sup> and those who do not assume a 'continuous combat function' in NIACs.<sup>236</sup> Therefore, it does not include those who directly participate in hostilities, but it does include persons hors de combat, military medical personnel<sup>237</sup> and 'human shields'.

The wording of article 51(5)(b)API is not limited only to physical damage and could also include mental injury, a position that is also confirmed by Tallinn Manual on Cyber Warfare<sup>238</sup> which includes in the assessment of proportionality severe mental injury. Unfortunately, this

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<sup>230</sup> Ben Clarke, "Proportionality in Armed Conflicts: A Principle in Need of Clarification?", in Martinus NIJHOFF Publishers, *International Humanitarian Legal Studies* 3, 2012, p.76-77.

<sup>231</sup> *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons*, [1996] ICJ, Dissenting Opinion of Judge R. Higgins.

<sup>232</sup> Objects that at the same time constitute a military objective and serve a civilian purpose, in Supra note U.S. Naval War College in *International Law Studies*, "The Conduct of Hostilities and International Humanitarian Law: Challenges of 21st Century Warfare", p.352.

<sup>233</sup> UK Manual of the Law of Armed Conflict, 2004, para.5.33.4, p.86.

<sup>234</sup> Ian Henderson & Kate Reece, "Proportionality under International Humanitarian Law: The Reasonable Military Commander Standard and Reverberating Effects", 51 *VAND. J. Transnat'l L.* 835 (2018), p.847-849.

<sup>235</sup> Article 50(1)API.

<sup>236</sup> ICRC (2009), *ICRC Interpretive Guidance on Direct Participation in Hostilities*, Sections II and VII.

<sup>237</sup> This position is accepted in various military manuals.

<sup>238</sup> Tallinn Manual 2.0, Commentary on rule 92, para. 8, p.417.



position has not been approved by many experts, justifying that drafters of API had not in mind this interpretation of ‘health’, this approach goes also beyond the will of states and is related to a hypothetical consequence applied to different individuals. This interpretation is narrow and problematic for multiple reasons. ICTY in *Galic*, accepted that notion of crime constituted of elements of trauma and psychological damage,<sup>239</sup> UNGA, NGOs, human rights experts, include ‘mental injury’ to the notion of health, since it is a dynamic interpretation of it, treaties in order to stay alive need to be interpreted<sup>240</sup> according to present day conditions<sup>241</sup> and this thesis is also confirmed by IHL<sup>242</sup> which prohibits acts that intend to cause terror among the civilian population.<sup>243</sup>

The other type of harm that is identified in Article 51(5)(b)API is damage to ‘civilian objects’, which are again defined in the negative.<sup>244</sup> The situation is more perplexed with regard to ‘dual-use’ objects and the fact that what counts as ‘military objective’ affects proportionality. The difficulty in assessing proportionality in a multi-story building that only a few parts of it are used for military purposes, is whether the specific apartment or the whole building is a military objective and consequently whether damage to the civilian part of it should be taken into account. From a legal perspective, it is supported that an object is either military or civilian and this intermediate category should be rejected. Thus, any harm to the civilian part of the object should not be considered. This approach is problematic because a minor military use of any object, transforms the whole object into a military objective and remaining civilian use of it—regardless its importance – is deemed to destruction. Moreover, it insinuates that IHL cannot protect civilians that are located in or near a military objective and therefore their presence does not affect launching an attack.

Thankfully, the ICRC espouses a different interpretation of the dual-use objects, since it considers the whole object as a military one, but any damage to the civilian part of it should be balanced against the military advantage that is supposed to be accomplished.<sup>245</sup> Damage to the civilian part of dual-use object is considered as ‘internal proportionality’, whereas damage to civilians and civilian object is deemed as ‘external proportionality’. With regards to the former,

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<sup>239</sup> ICTY, *Prosecutor v. Galic, Appeal Judgement*, November 30 2006, para.102.

<sup>240</sup> United Nations Vienna Convention on the Law of Treaties, 1969, article 31.

<sup>241</sup> Linos–Alexander Sicilianos, “Evolutive Interpretation of the ECHR and Beyond: Recent Developments in the Case – Law of the European Court of Human Rights”, *Human Rights Law Journal*, December 31 2020, p.2,

<sup>242</sup> Article 51(2)API, 13(2)APII, ICRC Customary IHL rule 2.

<sup>243</sup> ICRC, “International Expert Meeting Report: The Principle of Proportionality in the Rules Governing the Conduct of Hostilities Under IHL”, ICRC 2016, p.33-37.

<sup>244</sup> Article 52(1)API.

<sup>245</sup> ICTY, *Prosecutor v. Prlic et al.*, Judgement (Trial Chamber), May 29 2013, vol.3, para.1582-1584.

it is interconnected with what experts consider as ‘military objective’ many regard the whole building a military objective. Even if many<sup>246</sup> rightfully support that damage to the remaining civilian part of the building should be taken into account,<sup>247</sup> the approach is problematic when considering the whole building as a military objective. Even if its use or purpose could make an effective contribution to the military action, this logic and justification could be widely used for states that participate in asymmetrical warfare, in order to justify possible attacks in buildings, bridges, infrastructures. Furthermore, States which have the capability in identifying military uses of dual-use objects, most of the times they also have the capability to destruct only the military part.

Proportionality is a subjective principle but it is the author’s view that the law provides objective elements’ the advantage that justifies the attack should be of a military nature and concrete one. With regards to the first element, advantages that are expected to be only financial, have to do with morale of the occupants or other strategic policies should not be considered as military. The second element is that the advantage has to be direct, not hypothetical, with no other incident intervening between.<sup>248</sup> Thus, the threshold of military advantage in the proportionality principle is higher than in qualifying an object as a military one, demanding two cumulative elements, ‘concrete and direct’.<sup>249</sup>

From the aforementioned analysis, it is obvious that the military commanders are the responsible ones for deploying AWS in a certain operation, only if they knew from the information, they had prior to the attack that the civilian casualties would be excessive. This field is extremely challenging in FAWS, because of the gap that exists between their activation and the engagement of the target. During this time, the military advantage can change. Sassoli, who correctly identifies that danger, considers this issue as the most serious one and supports that FAWS should not be deployed, unless they are constantly updated and adapted.<sup>250</sup>

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<sup>246</sup> Marco Sassòli, “Legitimate Targets of Attacks under IHL”, International Humanitarian Law Research Initiative, June 2003, p7.

<sup>247</sup> Supra note ICRC, ‘International Expert Meeting Report: The Principle of Proportionality in the Rules Governing the Conduct of Hostilities Under IHL’, ICRC 2016, p.37-40.

<sup>248</sup> Objects that at the same time constitute a military objective and serve a civilian purpose, in Supra note U.S. Naval War College in International Law Studies, “The Conduct of Hostilities and International Humanitarian Law: Challenges of 21st Century Warfare”, p.364.

<sup>249</sup> Objects that at the same time constitute a military objective and serve a civilian purpose, in Supra note U.S. Naval War College in International Law Studies, “The Conduct of Hostilities and International Humanitarian Law: Challenges of 21st Century Warfare”, , p.365.

<sup>250</sup> Marco Sassoli, “Autonomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to be Clarified”, 90 INT’L L. STUD., 2014, p. 332.

Another difficulty regarding proportionality is that the assessment depends on circumstances of each specific case and this approach is confirmed by the clue of ‘excessiveness’. To begin with, any incidental damage caused to civilians is anticipated and compatible with proportionality.<sup>251</sup> What counts as excessive is determined prior to the attack from what information holds the military commander and is influenced by the outcome of it. A common example of the expected incidental loss to the anticipation of military advantage is the damage to a bridge while a civilian train crosses it, meaning the expected for a commander’s perspective harm to civilians towards the anticipated military advantage gained by that attack. In other words, the comparison between the harm to civilian population and the advantage that was gained by that attack, should not be excessive, so as to be compatible with proportionality.<sup>252</sup> Thus, the excessiveness is determined from a ‘reasonable military commander’s’ perspective with the assistance of legal advisers. But all military commanders do not share the same perspective’ the whole process of evaluation contains elements of subjectivity since the comparison between military advantage and civilian harm is not just an arithmetical calculation, belligerent do not share the same values and more importantly proportionality is characterized by possibilities.<sup>253</sup>

What was mentioned above when trying to determine whether AWS comply with the principle of distinction, also applies to the principle of proportionality. If it is foreseeable that AWS will not comply with that principle, they should not be deployed. This obvious answer is not always easy to be determined and applied when AWS select and engage targets. Apparently AWS will use algorithms, statistics analytics in order to estimate if any civilian casualty will be excessive to the advantage they opt for,<sup>254</sup> but some questions remain unanswered: could they select and engage targets of opportunity? Could a military commander be replaced entirely by a computer algorithm?

According to Schmitt<sup>255</sup>, attacks against traditional targets take place according to a pre-planned scheme: weapons are deployed in a certain area in order to fulfil the goals they were designed for. Targets of opportunity, on the other hand, constitute those targets that an attack against them is not pre-planned, is not anticipated, but it is a target that is identified at that

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<sup>251</sup> Yoram Dinstein, “The Conduct of Hostilities Under the Law of International Armed Conflict” (Cambridge: Cambridge University Press, 3rd ed, 2016), p.155-156.

<sup>252</sup> Supra note Yoram Dinstein, “The Conduct of Hostilities Under the Law of International Armed Conflict”, p.157.

<sup>253</sup> Supra note Yoram Dinstein, “The Conduct of Hostilities Under the Law of International Armed Conflict”, p.158-159.

<sup>254</sup> Ronald C Arkin, “Governing Lethal Behavior in Autonomous Robots”, (Chapman & Hall Book 2009), p. 186-187.

<sup>255</sup> Michael N Schmitt, “Targeting and Humanitarian Law: Current Issues”, (2006) 80 International Law Studies, p. 152.

moment, like a missile that is recognized during the heat of the battle and is about to destruct the system, and the system is ‘in front of a dilemma’, whether it should focus its operation against the unplanned target or should not be distracted by it and continue pursuing its initial goals.

In situations like the above mentioned, a human operator could easily synchronize both operations.<sup>256</sup> AWS in order to be in a position to act accordingly to a military commander should be able to adapt fast to arising circumstances and should also be able to assess not only the direct but also the indirect effects of their actions.<sup>257</sup> A helping hand, for many countries, in assessing the effects of proportionality is the CDEM (Collateral Damage Estimate Methodology) System, which is an analytical system, able to assess military commanders whether a forthcoming attack has excessive collateral damage.<sup>258</sup>

It is important to note that regardless of how hopeful a system like CDEM might seem, it is not capable and suitable of replacing human behaviour and legal advisors’ or commanders’ assessments.<sup>259</sup> As the Study Group<sup>260</sup> mentions “*a quasi-mathematical assessment [of proportionality] may sometimes be possible*”, but there are some guarantees it is unable to provide and human consciousness is essential.

Only time will tell if AWS will ever be capable of making similar assessments as military commanders, with regards to principle of proportionality. Also, only time will tell, if AWS will ever be better-suited and replace military commanders or legal advisors in the ‘excessive civilian harm’ assessment. As for now, AWS, which cannot discriminate between lawful and unlawful targets, which cannot make assessments of ‘the military advantage anticipated’, cannot be lawfully deployed in uncertain environments without constant human intervention.

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<sup>256</sup> Supra note Ian Henderson & Kate Reece, “Proportionality under International Humanitarian Law: The Reasonable Military Commander Standard and Reverberating Effects”, p. 126-127.

<sup>257</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 186.

<sup>258</sup> Chairman of the Joint Chiefs of Staff Instruction, “No-Strike and the Collateral Damage Estimation Methodology”(13 February 2009) D-2, available at <[www.aclu.org/no\\_strike](http://www.aclu.org/no_strike)>, last accessed on October 18 2022.

<sup>259</sup> Markus Wagner, “The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems”, (2014) 47 Vanderbilt Journal of Transnational Law, p. 1398.

<sup>260</sup> Supra note, International Law Association Study Group on the Conduct of Hostilities in the 21st Century, p. 369.

#### 4. The Martens Clause

Another important pillar of IHL<sup>261</sup>, which also constitutes a customary rule of international law is the Martens Clause or otherwise, the principle of humanity and it is embodied in the very first. According to it

*“In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of the public conscience.”*<sup>262</sup>

The meaning of the principle of humanity is that in the absence of any treaty or customary rule of international law, protection to human beings can be addressed through the principles of humanity, the principles of public conscience.<sup>263</sup>

Ban advocates support that AWS are totally incompatible with such a principle, since they should not be given the permission to deploy lethal force against human beings,<sup>264</sup> since they do not experience feelings of condolence or compassion. Others<sup>265</sup> claim that these systems are compatible with Martens Clause when they do not violate the principle of humanity or the dictates of public conscience. These arguments might seem more ethical or emotional than legal, since they do not provide a strong legal basis as to why these systems should not be deployed. Some could argue that if an algorithm can be constructed in such a way that it could show signs of emotions or sympathy, wouldn't that system be 'more compatible' with Martens Clause than a bloody-minded soldier or even a military commander? In the same vein, a study that was conducted by Arkin and sought people's thoughts about technology and especially if AWS were an acceptable scenario, showed that people were far from willing to accept a weapon that is not controlled by humans.<sup>266</sup> As the survey concluded *“[t]aking life by an autonomous robot in both open warfare and covert operations is unacceptable to more than half of the participants.”*

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<sup>261</sup> The term 'pillar' rather than 'principle' is used because of Winter's justification. For a detailed analysis see Supra note Elliot Winter, "The Compatibility of Autonomous Weapons with the Principles of International Humanitarian Law", p. 12.

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<sup>263</sup> Tyler D. Evans, Note, "At War with the Robots: Autonomous Weapon Systems and the Martens Clause", 41 HOFSTRA L. REV., 2013, p. 697, 713-719.

<sup>264</sup> Supra note Losing Humanity, p. 35.

<sup>265</sup> HUMAN RIGHTS WATCH & INT'L HUMAN RIGHTS CLINIC, HARVARD LAW SCH., ADVANCING THE DEBATE ON KILLER ROBOTS: "12 KEY ARGUMENTS FOR A PREEMPTIVE BAN ON FULLY AUTONOMOUS WEAPONS", (2014), available at <[http://www.hrw.org/killer\\_robots\\_debate](http://www.hrw.org/killer_robots_debate)>, last accessed on October 17 2022.

<sup>266</sup> Supra note Arkin, "Governing Lethal Behavior in Autonomous Robots", p. 49 – 55.

These arguments do not seem so strong, since the principle come into play in the absence of any treaty or customary provisions: it seems therefore that the principle comes to fill the *lacunae*, the gaps of the law.<sup>267</sup> Moreover, irrespective of how important are surveys that depict the fears and constrains of the society, including scientists or researchers, AWS are many times defined as those weapons that cannot be controlled, cannot be restrained and there is no alternate mechanism. Many have the idea for AWS as those who overrule humanity and conquer mankind.

Rather what should be asked, when constructing and afterwards when evaluating those systems, is whether a gap exists that indicates that AWS are not governed by customary or conventional IHL or other customary or treaty obligations<sup>268</sup>. Furthermore, Crootof<sup>269</sup> also raises the argument that the AWS in use today have not been accused of violating the principle of humanity. But the question remains regarding FAWS: could compassion be articulated into an algorithm? Could a FAWS have restrain mechanisms or any 'self-destructive' capability? The answer remains to be provided by the roboticists. As long as such a clear indication does not exist, the balance leans to the incompatibility.

### **G. Responsibility and Accountability**

FAWS are systems that as was analysed above, are able to engage and attack a target without any human intervention after their deployment. FAWS can be considered unique in a way that can be re-programmed and can adapt to the continuously changing and unsteady environment they operate. Yet, this unique function does not entail that violations of provisions of IHL can be entirely excluded. When conventional weaponry is used and the rules of IHL are violated, there do not seem to be many difficulties in examining state responsibility and criminal liability. These situations could lead to prosecutions, to compensations, satisfaction, restitution in integrum.<sup>270</sup> However, in the case of FAWS that fail to operate properly due to a malfunction, questions of responsibility and accountability arise. This happens because in traditional weaponry states and afterwards humans are to be blamed for the unlawful behaviour. In contrast, FAWS operate according to their nature: autonomously. They can take decisions on their own, many times acting

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<sup>267</sup> Michael N. Schmitt & Jeffrey S. Thurnher, "Out of the Loop: Autonomous Weapon Systems and the Law of Armed Conflict", 4 HARV. NAT'L SECURITY J., 2013, p. 275.

<sup>268</sup> Supra note Robert Sparrow, "Killer Robots", p. 62.

<sup>269</sup> Supra note Rebecca Crootof, "The Killer Robots are Here: Legal and Policy Implications", p. 1881.

<sup>270</sup> ICRC, EXPERT MEETING AUTONOMOUS WEAPON SYSTEMS TECHNICAL, MILITARY, LEGAL AND HUMANITARIAN ASPECTS GENEVA, SWITZERLAND, 26-28 MARCH 2014, p. 45.

in an unpredictable way. But a machine cannot be punished for its illicit behaviour and actions.<sup>271</sup> Therefore, the questions of responsibility and accountability arises.

## 1. State Responsibility

International law is state-centric: it was first developed to address the rights and the obligations of one state towards another. The law of state responsibility is one of its most vital regimes. State is responsible to offer reparation for the injury that one of its entities is causing<sup>272</sup>, regardless to whom this injury is imputed. The obligations that state accept can stem from customary international law or treaty law. Thus, states are subject to not violate many obligations under IHL: states must respect themselves and ensure the respect of others for the Geneva Conventions,<sup>273</sup> they should conduct legal reviews for the new weaponry,<sup>274</sup> they should either prosecute and extradite those who commit violations of IHL.<sup>275</sup> In order to abide more effectively to those – and many more – obligations, state have adopted national legislation in order to prosecute war crimes. Therefore, the ICRC in its Rule 158 has recognised as a rule of customary law, states' obligation to investigate and prosecute war crimes.<sup>276</sup> Furthermore, states are responsible for all the war crimes their armed forces commit<sup>277</sup> and sometimes are also responsible for the conduct of non-state actors.<sup>278</sup>

Despite this reality, some scholars consider the concept of state responsibility in case of malfunction or error of AWS not to be an adequate concept to conceptualise the level of the harm they cause<sup>279</sup>, while others like Hammond consider that states carry the 'moral' burden of the usage of AWS, since the companies who produce them correspond to a need of states and the

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<sup>271</sup> Caron E Gentry and Amy E Eckert, "From Smart to Autonomous Systems: Confounding Territoriality and Moral Agency, The Future of Just War: New Critical Essays", University of Georgia Press, 2014, p. 98.

<sup>272</sup> *Factory at Chorzów* (Ger. v. Pol.), Claim for Indemnity, 1928 P.C.I.J., where the Court mentioned that "*it is a principle of international law, and even a general conception of law, that any breach of an engagement involves an obligation to make reparation.*"

<sup>273</sup> Common Article 1 of the Geneva Conventions of 1949.

<sup>274</sup> Article 36 of API of 1977.

<sup>275</sup> Article 49 of GC1 of 1949.

<sup>276</sup> Article 158, Prosecution of War Crimes, INT'L COMMITTEE RED CROSS CUSTOMARY INT'L HUMANITARIAN L. DATABASE, available at <<https://www.icrc.org/customary-ihl/eng/docs/rule158>>, last accessed on October 29 2022.

<sup>277</sup> Rule 149, Responsibility for Violations of International Humanitarian Law, INT'L COMMITTEE RED CROSS CUSTOMARY INT'L DATABASE, available at <<https://www.icrc.org/customaryihl/eng/docs/rule149>>, last accessed on October 29 2022.

<sup>278</sup> Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries, Int'l Law Comm'n, Rep. on the Work of Its Fifty-Third Session, U.N. Doc. A/56/10, (2001), art. 5, 8, 11.

<sup>279</sup> Kelly Cass, "Autonomous Weapons and Accountability: Seeking Solutions in the Law of War", 2015, 48, *Loyola of Los Angeles Law Review*, p. 1053-1054.

soldiers or the commanders who employ them, perform a state policy.<sup>280</sup> Crootof considers states to be better-suited to address whether AWS are designed and employed in accordance to IHL principles and the concept of state responsibility might offer a good opportunity to overcome ‘accountability gaps’.<sup>281</sup> In contrast, another scholar supports the concept of ‘administrative accountability’<sup>282</sup>, that not an international, but rather a domestic mechanism is better-equipped to deal with these challenges.<sup>283</sup>

According to Article 1 of ARSIWA<sup>284</sup> an international wrongful act of a state entails its international responsibility. The concept of ‘*an international wrongful act*’ constitutes of two elements: when the act or omission is attributable to the state and when that act or omission is also a breach of an international obligation that the State has undertaken.<sup>285</sup> Article 4 of the ARSIWA is considered to be the necessary link, the required provision in order to hold the State accountable for the acts of its organs, whatever position they hold, even when they act in excess to the authority that has been given to them, or when they follow the instructions ordered. ICJ in *the Armed Activities on the Territory of Congo*<sup>286</sup> confirmed that it is irrelevant for the existence of the international responsibility of a state, if its organs circumvent the orders that have been assigned to them. Therefore, the wrongful acts of designing, programming, deploying, not halting an attack of an AWS of the armed forces of a state constitute its international responsibility.

AWS do not constitute the organs of a state. It is properly argued that the conduct of AWS cannot be directly attributed to the state, since Articles 4 and 5 of ARSIWA mention only ‘persons’ and ‘entities’.<sup>287</sup> Therefore, a link must be sought through the human operator. So, AWS are systems that are deployed and thus activated by organs of the state. In this case, the

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<sup>280</sup> Daniel N Hammond, “Autonomous Weapons and the Problem of State Accountability” (2015) 15 Chicago Journal of International Law, p. 652, 670.

<sup>281</sup> Rebecca Crootof, “War Torts: Accountability for Autonomous Weapons”, University of Pennsylvania Law Review, Vol. 164, No. 6, May 2016, p. 1390.

<sup>282</sup> Laura A. Dickinson, “Lethal Autonomous Weapons Systems: The Overlooked Importance of Administrative Accountability” in Eric Talbot and Ronald Alcalá (eds), “The Impact of Emerging Technologies on the Law of Armed Conflict”, vol 2, Oxford University Press, 2019.

<sup>283</sup> It is important to mention that the author recognizes the weakness of her proposal, since most of the times states will be unwilling to cooperate and comply.

<sup>284</sup> International Law Commission, Responsibility of States for Internationally Wrongful Acts, 2001.

<sup>285</sup> International Law Commission, Responsibility of States for Internationally Wrongful Acts, 2001, Article 2.

<sup>286</sup> *Case Concerning Armed Activities on the Territory of the Congo (Democratic Republic of Congo v Uganda)*, ICJ, Judgement of 2005, para. 214, 243.

<sup>287</sup> Yannick Zerbe, “Autonomous Weapons Systems and International Law: Aspects of International Humanitarian Law, Individual Accountability and State Responsibility”, 29 Swiss. REV. INT’L & EUR. L. 581, Bluebook 21st ed, 2019, p. 600.



attribution of the conduct of AWS will be enacted through Article 4 of ARSIWA and article 91 of API.

However, malfunctions and unpredictable actions by them can happen, regardless of how cautiously they were designed or programmed. The programmer or the human operator could have given precise orders and instructions and the system itself could have disregarded them. In such cases, for Seixas - Nunes<sup>288</sup> these acts do not trigger any form of accountability of the operators or the programmers, but could trigger compensation *ex gratia*, as happened in the Iran Flight 655 Case.<sup>289</sup> The Iran Flight 655 case illustrates vividly the unwillingness of states to be held responsible for their own acts, regardless of the type of weapons used – Iran Flight 655 involved a semi-autonomous system. Crootof<sup>290</sup> raises an interesting argument regarding why states are reluctant in such situations to admit their responsibility. As an example she uses again the Iran Flight 655, which illustrates that the unwillingness of US to admit its responsibility, was also an unwillingness to accept a moral blame: a moral blame which was not linked to compensate the victims' families, but rather a blame that the downing of the aircraft was 'a criminal act', 'a massacre'.<sup>291</sup>

Regardless of states' intentions to admit their responsibility, states while deploying FAWS, know their intentions: they do not opt for 'human-on-the-loop'. FAWS will operate according to a given algorithm and they will try to adapt their action to the continuously changing environment. In such circumstances, it cannot be precluded that they could cause unlawful action. It could be argued that, in case of 'errors'<sup>292</sup>, as the one mentioned here, the element of 'foreseeability' forces states to accept that they could be held responsible also for indirect damage.<sup>293</sup> The textual interpretation of Article 31 of ARSIWA might not offer such conclusion,

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<sup>288</sup> Supra note Seixas-Nunes, A. "The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective", p. 250.

<sup>289</sup> David K Linnan, "Iran Air Flight 655 and Beyond: Free Passage, Mistaken Self-Defense, and State Responsibility", Yale Journal of International Law, Volume 16, Number 2, Summer 1991, p. 249; Harold G. Maier, "Ex Gratia Payments and the Iranian Airline Tragedy", The American Journal of International Law, Apr., 1989, Vol. 83, No. 2 (Apr., 1989), pp. 325-332.

<sup>290</sup> Supra note Rebecca Crootof, "War torts: Accountability for Autonomous Weapons", p. 1392.

<sup>291</sup> See for instance, 'Statement by Assistant to the President for Press Relations Fitzwater on United States Policy Regarding the Accidental Attack on an Iranian Jetliner over the Persian Gulf, 2 PUB. PAPERS, p. 934-935, July 11 1988.; Fox Butterfield, "Iran Falls Short in Drive at U.N. to Condemn U.S. in Airbus Case", N.Y. TIMES (July 15, 1988), available at <<http://iran-falls-short-in-drive-at-un-tocondemn-us-in-airbus-case.html>>, last accessed on October 19 2022.

<sup>292</sup> It goes beyond the scope of this research to examine and analyse the difference between 'malfunctions' and 'errors', but it should be clarified that 'errors' are able to trigger the responsibility of a state and even if they do not constitute war crimes, they are still considered violations of IHL.

<sup>293</sup> Emmanuela-Chiara Gillard, "Some Reflections on the "Incidental Harm" Side of Proportionality Assessments", 51, Vanderbilt Journal of Transnational Law, 2018, p. 827-833.

but ILC commentary confirms the point of view that is adopted here: sometimes the element of causality is not adequate and then ‘foreseeability’ comes into play. Such vivid example is the Arms Trade Treaty that holds states responsible if they do not effectively regulate conventional arms’ trade and if they do not make the appropriate assessments.<sup>294</sup>

Furthermore, a set of 2010 NATO non-binding Guidelines for Compensations for Civilian Casualties in Afghanistan<sup>295</sup>, reaffirms the position that states are held accountable in cases of ‘malfunctions’ of the weapons their nationals or their armed forces use. Therefore, the state is under an obligation to investigate such violations. This is also considered to be a customary rule of IHL, according to Rule 158 of ICRC Study.<sup>296</sup> Even if AWS are not explicitly mentioned in this article, this does not entail that the state is not under an obligation to investigate violations of IHL committed by the weapons its organs use. Another framework for state’s responsibility for unpredictable action of its systems is the ‘Convention on International Liability for Damage Caused by Space Objects<sup>297</sup>’ and especially Article 2, according to which a state should pay compensation for damage caused by its space objects. Thus, it can be argued that following the paradigm of the aforementioned Conventions, state responsibility could be triggered by unlawful acts of AWS.

Another point that should be mentioned is the situation that the commander knows that the system that is about to be used is not in compliance with IHL provisions and decides to disregard this information and facts and indeed uses and employs the weapon. Apart from breaching the principle of precaution and any commander’s individual liability, such situations entail the responsibility of the state, since the state should cease the wrongful act and offer guarantees of non-repetition, because the time that the violation remains and does not cease state disregards its international obligations.<sup>298</sup>

Thus, it could be argued that there are specific ways through which states can be held responsible for the acts of AWS while being deployed. According to Chengeta<sup>299</sup> (i) when state

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<sup>294</sup> United Nations, The Arms Trade Treaty (ATT), and especially Article 7.

<sup>295</sup> ‘NATO Nations Approve Civilian Casualty Guidelines’, available at <[www.nato.int/](http://www.nato.int/)>, last accessed on October 19 2022.

<sup>296</sup> ICRC, ‘Rule 158: Prosecution of War Crimes’ (IHL Database Customary IHL, 2005), available at <[https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1\\_rul\\_rule158](https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule158)>, last accessed on October 19 2022.

<sup>297</sup> ‘Convention on International Liability for Damage Caused by Space Objects’ (1972) <[www.unoosa.org/oosa/](http://www.unoosa.org/oosa/)>, last accessed on October 19 2022.

<sup>298</sup> Supra note ARSIWA, Article 14, para.2 and Article 30.; Crawford, “The International Law Commission’s Articles on State Responsibility: Introduction, Text and Commentaries” (Cambridge University Press 2003), p. 196–197.

<sup>299</sup> Thompson Chengeta, “Accountability Gap: Autonomous Weapon Systems and Modes of Responsibility in International Law”, 45 DENV. J. INT’L L. & POL’y 1, Bluebook 21<sup>st</sup> ed., (2016), p. 47.

agents use AWS which violate international obligations, the conduct of the organ is attributable to the state, (ii) state is also responsible when non-state actors acquire or are authorized to use AWS by state-agents, and (iii) state is held responsible when a third party corporation, which produced AWS, but not according to a specific standard and therefore, specific rights are violated.

With regards to the first two options, the principle of international law that a state should offer reparation for its injuries<sup>300</sup> also applies to IHL<sup>301</sup> and the state should apply due diligence to protect those under its jurisdiction and others, by unlawful acts of private parties<sup>302</sup> and thus prosecute insurgents or corporations which commit unlawful acts.<sup>303</sup>

#### **i. In Absence of Legal Weapon Review?**

The purpose of this section is to research if states that do not review the legality of the weapons they develop, disregarding the provisions of API, trigger their international responsibility. According to Article 36 of API:

*In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this protocol or by any other rule of International Law applicable to the High Contracting Party.*

This Article is also applicable to new weaponry, since it constitutes a technology that is used on the battlefield. But, AWS do not constitute ordinary weapons. Therefore, the legal review, apart from lawyers or international law experts, should also include roboticists, engineers and military commanders. The outcome of the review would not only prove if the weapon is unlawful,<sup>304</sup> but it would also have a firm position on the future of AWS, meaning that it would prove if it abides with international obligations, and if not, what are the dangers and therefore what guidelines could be established for its potential compliance. And, as it was mentioned in

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<sup>300</sup> *Case Concerning the Factory at Chorzów (Germany v Poland) Judgment*, (1927), Permanent Court of International Justice, which mentions that “reparation is the indispensable complement of a failure to apply a convention”.

<sup>301</sup> Art. 91 of Additional Protocol I to the Geneva Conventions. See also Rule 149 of the ICRC Customary International Humanitarian Law Study (2005).

<sup>302</sup> General Comment Number 31, CCPR/C/21/Rev.1 Add. 13, para. 8.

<sup>303</sup> MS Soluman, “The international Criminal Court and rebel groups”, 5 (2012).

<sup>304</sup> ISupra note international Committee of the Red Cross, A Guide to the Legal Review of New Weapons, Means and Methods of Warfare. Measures to Implement Article 36 of the Additional Protocol I of 1977.

another section of this research, it is important for AWS to comply with IHL provisions through the embodiment into them of the provisions of this branch of law.

Unfortunately, only a few states have adopted a review process for the deployment of AWS.<sup>305</sup> regardless of this reality, state agents or entities employed by states are those who conduct these reviews. Therefore, violations of provisions of IHL or less, any inactions concerning the legal review of AWS, entail that the conduct of these systems is attributed to those agents and therefore to the state itself. This position is also affirmed by the experts of ICRC's meeting on AWS.<sup>306</sup>

## ii. Due Diligence Obligations?

Article 1 of API requires from state parties to “respect and ensure respect” in all circumstances for the provisions that this Protocol contains. It is supported that from this provision, a ‘*due diligence*’ obligation for the usage could be extracted, in a way that states should always control the usage of AWS every time, even when they are used by non-state actors.<sup>307</sup> This argument also stems from the *Bosnian Genocide Case*, where ICJ reiterated that states should take all available measures in order to prevent violations of IHL.<sup>308</sup> For the above mentioned reasons, it is supported that when a state fails to display the adequate care, it violates its obligation of due diligence and thus it is internationally responsible for its omission.<sup>309</sup>

## 2. Individual Responsibility

Generally, state responsibility is not capable to encapsulate the notion of a wrongdoing act. To be clearer, states are not always the only one that should be blamed. Individuals after the 1<sup>st</sup> World War have been engaged in mass atrocities and they have committed grave breaches of international law war crimes. This reality confirms the emergence of another field of

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<sup>305</sup> JAMES FARRANT & CHRISTOPHER M. FORD, “Autonomous Weapons and Weapon Reviews: The UK Second International Weapon Review Forum”, 93 *International Law Studies: US Naval War College* (2017), p. 391.

<sup>306</sup> ICRC, ‘Report of the ICRC Expert Meeting on Autonomous Weapons Systems: technical, military, legal and humanitarian aspects’, 26-28 March 2014, available at <[icrc meeting](#)>, last accessed on October 19 2022.

<sup>307</sup> Robin Geiss, “The International-Law Dimension of Autonomous Weapons Systems”, 2015, p. 17-18.

<sup>308</sup> *Application of the Convention on the Prevention and Punishment of the Crime of Genocide, (Bosnia-Herzegovina v. Serbia and Montenegro)*, Judgement, ICJ Report 2007, para. 430.

<sup>309</sup> Sandra Brindli (ed.), “Mensch und Maschine: Symbiose oder Parasitismus?”, Bern 2015, p. 117; Supra note Yannick Zerbe, “Autonomous Weapons Systems and International Law: Aspects of International Humanitarian Law, Individual Accountability and State Responsibility”, p. 602.

international law· international criminal law.<sup>310</sup> According to its name, international criminal law prosecutes war crimes and “(..) *recognizable war crimes, (..) must be recognizable criminals*”.<sup>311</sup>

AWS pose a significant problem and even question the concept of international criminal law· they operate in absence of wilful human action.<sup>312</sup> In this case, no one acts intentionally or recklessly, neither the programmer, the manufacturer, the roboticist, nor the commander and the soldier. Certainly, when all the above-mentioned people acted with intent and knowledge, when they programmed the system to commit a serious breach of IHL, when they deployed the system intentionally and knew that it was unable to distinct between civilians and combatants, could be easily prosecuted. But, in the absence of any intent or knowledge, difficulties arise. The question that immediately arises is who will be the person that the prosecutor will prosecute since no one seemed to have acted intentionally or recklessly.<sup>313</sup> If indeed an ‘accountability gap’ exists, then Article 30 of Rome Statute that requires for the prosecution of war crimes, the criminal to have acted with intent and knowledge would become null and void.<sup>314</sup>

For the above-mentioned reasons, other paths should be explored in order to hold the manufacturers and the programmers accountable for a dysfunction of the system. One of those ‘alternative’ ways is the concept of ‘command responsibility’, according to which, superior is responsible for the misconduct and the crimes of his/her inferiors, if he/she controls them effectively, if he/she arguably believes that the inferiors are involved in crimes and eventually he/she disregards that evidence and decides not to take any precautionary measures and to prevent the unlawful act and afterwards punish them.<sup>315</sup>

For Crootof<sup>316</sup> this doctrine is hardly applicable to AWS, since AWS do not act intentionally or recklessly because they lack any human intuition or emotions and the concept of ‘effective control’ creates more problems than offers solutions. She questions that in the case of AWS it could have many meanings and uses as an example a military commander· he/she is still in charge and therefore he/she remains liable if he/she does not take any precautions, if he/she does not

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<sup>310</sup> Christian Tomuschat, “The Legacy of Nuremberg, 4 J. INT’L CRIM. JUST.”, 2006, p. 830, 840.

<sup>311</sup> Michael Walzer, “Just and Unjust Wars: A Moral Argument with Historical Illustrations”, (2d ed. 1992), 287.

<sup>312</sup> Supra note Rebecca Crootof, “War torts: Accountability for Autonomous Weapons”, p. 1390.

<sup>313</sup> Jens David Ohlin, “The Combatant’s Stance: Autonomous Weapons on the Battlefield”, 92 INT’L L. STUD. 1, 2016, p. 24-27.

<sup>314</sup> Rome Statute of the International Criminal Court, July 17, 1998, art. 30(1).

<sup>315</sup> Updated Statute of the International Criminal Tribunal for the Former Yugoslavia art. 7(3), May 25, 1993; *Prosecutor v. Delalić, Case No. IT-96-21-T, Trial Chamber Judgment*, (Int’l Crim. Trib. for the Former Yugoslavia Nov. 16, 1998), para. 346.

<sup>316</sup> Supra note Rebecca Crootof, “War Torts: Accountability for Autonomous Weapons”, p. 1379.

halter an unlawful act, a crime of his/her subordinate, if he/she decides not to prosecute and punish his/her subordinate.<sup>317</sup>

It is already apparent that the problems FAWS pose is due to the fact that many people are involved in their ‘designing-and-programming-phase’ and also in their ‘deployment-phase’. Moreover, the wrongdoings of roboticists or technicians and especially the dysfunctions in the system will also affect the decisions AWS take on the battlefield. Yet, on the outside it would seem that the disproportionate attack of the system, the excessive collateral damage it caused, is the fault of the commander – or even the soldier that was ordered by the commander. Therefore, – if not almost always – at least most of the times, it is very difficult to distinguish the contribution of each individual to a crime committed by an AWS and especially a FAWS one.

In the forth-coming sections, attempts will be made in order to research and discuss possible solutions in order to overcome the ‘accountability gap’, the gap that could be described simply as “*people want to see someone held accountable*”.<sup>318</sup> At first, the liability of those involved in the production phase will be discussed and afterwards this thesis will also attempt to explore the liability of the military commanders.

#### **i. Liability of Those Involved in the Production Phase**

Before examining the individual criminal liability of the technicians’, the roboticists’, the manufacturers’, some points should be raised. In the forthcoming section, specific attention will be given to (a) the theory of causation, (b) the different types of dysfunctions AWS might perform, (c) what does mens rea mean and how it is connected with AWS and finally (d) how those who are involved in the designing and programming phase, could be held accountable.

##### **a. The Theory of Causation**

The theory of causation is important to be examined, in order to understand what acts constitute criminal acts. It is the very first examination that it will prove the exact relationship between the behaviour of humans and their legal consequences.<sup>319</sup> The theory of causation can

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<sup>317</sup> Supra note Rebecca Crootof, “War Torts: Accountability for Autonomous Weapons”, p. 1379.

<sup>318</sup> Supra note Losing Humanity, p. 42; Supra note Daniel N. Hammond, “Autonomous Weapons and the Problem of State Accountability”, p. 662.

<sup>319</sup> L. Castellanos-Jankiewicz, “Causation and International State Responsibility”, Amsterdam Center for International Law, University of Amsterdam, 2012, p. 8.

be applied and distinguish two different categories. The first category is war crimes, which constitute grave breaches of IHL, committed either in IACs or NIACs<sup>320</sup>. In order for a war crime to be committed, certain criteria should be established: the person must be culpable for the conduct and must bear a degree of intention, being it *dolus* or negligence<sup>321</sup>. Even if manufacturers, designers or programmers have a degree of culpability, if they fail to satisfy the requirement of *mens rea*, meaning if they don't have some degree of intention, they cannot be held liable.<sup>322</sup>

The second category is when violations of IHL occur, but they cannot be attributed to someone, because of the unpredictability of the outcomes. In such circumstances, many will support that we are in front of a 'responsibility gap', since, as it was above explained, it is not possible to establish a chain of causation for the unexpected outcome. But, as it was discussed, when states are held responsible for any international wrongful act and the element of causation is not always necessary.

This discussion should also be centred to the exact dysfunctioning FAWS could appear while operating on the battlefield. The type of mistakes they can cause – if they are considered '*malfunctions*' or '*errors*' is of vital importance in the discussion of accountability. Not every "defection" should be confronted in the same way, since different situations demand different answers.

### **b. Differentiation of 'Malfunctions', 'Accidents' and 'Errors'**

As it is pointed out, '*malfunctions*' can occur in any case of weaponry on the battlefield and they are not only common in AWS.<sup>323</sup> They constitute those failures that happen regardless of any human intervention, because the system fails to operate according to the instructions given to it. For that reason, malfunctions cannot always be easily attributed to any human fault. Malfunctions are interconnected to any dysfunction in the hardware of the system, which understands and interprets the environment that they operate.<sup>324</sup> Thus, '*malfunctions*' should be

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<sup>320</sup> "Perspectives on the ICRC Study on Customary International Humanitarian Law", Cambridge University Press, 2007, p. 378.

<sup>321</sup> Robert Cryer et al., "An Introduction to International Criminal Law and Procedure", Cambridge University Press, 2nd edn, 2010, p. 384.

<sup>322</sup> Max Liljefors, Gregor Noll and Daniel Steuer (eds), "War and Algorithm", Rowman & Littlefield, 2019, p. 91.

<sup>323</sup> Jens David Ohlin (ed.) "Remote and Autonomous Warfare Systems: Precautions in Attack and Individual Accountability", Research Handbook on Remote Warfare (Edward Elgar Press 2016), p. 361.

<sup>324</sup> Jurgen Altmann, "Military Nanotechnology: Potential Applications and Preventive Arms Control" (Routledge 2006), p. 75–78.

considered as an unforeseeable dysfunction of the system, which regardless of any testing or assessment that took place during experiments, cannot be predicted.

‘*Accidents*’ according to Seixas – Nunes<sup>325</sup> happen because of lack of negligence in the design or the programming phase. So, the difference between ‘*malfunctions*’ and ‘*accidents*’ is that the first ones can happen regardless of any human fault, whereas ‘*accidents*’ are caused because of a mistake of a human: be it a programmer, a designer, a technician and it is not because of an abnormal functioning of the system.

From analysing different types of dysfunctions of machine weaponry it is obvious that many times, a possible dysfunction of an AWS and especially a FAWS one, is imputed not only to people who deploy them, but also to people who seem to be behind those using them on the battlefield. These people can be the manufacturers, the designers, the technicians or even the roboticists. This point of view was also confirmed in the *William Holbrook v. Prodomax Automation Ltd* Case. The case was brought before the Western District Court of Michigan by Mr. Holdbrook on behalf of his deceased wife, ‘Wanda’, who was a technician at ‘Ventra’ company and died by an unexpected attack against her from a robot, which entered the area she was working. The claims of Mr. Holdbrook were based on the liability of the systems and specifically their deficiency in the design and manufacturing process and the lack of any precautions before the attack, that altogether pointed out the lack of due diligence that the company failed to exercise. The Court found that all defendants were responsible for not conducting risk assessment and inspection of unpredictable behaviour.<sup>326</sup> The same reasoning is important to be adopted in international law, since many times a reasoning of ‘*responsibility gap*’ is adopted.

‘*Errors*’ are considered to be part of the designing process: systems that are dependent on algorithms, use error as part of the learning process.<sup>327</sup> An AWS, for instance, on the battlefield can have a dysfunction amounting to an ‘*error*’ if it does not operate according to the instructions and data embed into it, if for example causes more harm than it should, or is unable to adapt to the circumstances on the battlefield, because it confronts new data as ‘a foreign algorithm’ and not as an adaptive process. Therefore, errors are interconnected with dysfunctions in the software,

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<sup>325</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 210.

<sup>326</sup> *William Holbrook v Prodomax Automation Ltd* [2017] US District Court for the Western District of Michigan Case No 17-00219.

<sup>327</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 210; Andreas Matthias, “The Responsibility Gap: Ascribing Responsibility for the Actions of Learning Automata”, 6, *Ethics and Information Technology*, 2004, p. 183.



which should be considered that exact part which enables the system decide on its own.<sup>328</sup> Errors might seem unforeseeable but they are not through testing their potential mistakes can be predicted and accordingly fixed and predicted.<sup>329</sup> The UNIDIR Report Algorithmic Bias and the Weaponization of Increasingly Autonomous Technologies also confirms that in specific circumstances the wrongdoing conduct of a weapon machinery is because of an ‘error’, a dysfunction in the system itself.<sup>330</sup> For Chengeta<sup>331</sup> in situations like these, it is difficult to attribute the wrongdoing conduct to a human.

According to Article 49 of API, an attack is an act of violence, either offensive or defensive. If an AWS and especially a FAWS does not act according to the instructions inserted to it, it would be unfair to support that everyone in the designing or manufacturing process was the responsible one for its act of violence. Moreover, any claim that the attack should be attributed to the weapon system itself is also invalid, since any such assumption would qualify machines as human beings. For those reasons and especially because a valid link of causation cannot be established between the human beings in designing/manufacturing phase and the illegal act, the state should be considered the responsible one for any unpredictable attacks of these systems, since by using and deploying them on the battlefield, it accepts any dangers deriving from their usage.

### **c. Mens Rea and Individual Responsibility**

It is a foundational principle of criminal law that anyone should be held accountable only for those crimes that he/she has committed, or participated or even contributed to them.<sup>332</sup> This basic principle was also confirmed in Tadic Case, where the ICTY clearly illustrated the relationship between criminal responsibility and personal culpability.<sup>333</sup> In order for individual liability to be established, two elements must be present: the material elements or ‘*actus reus*’ and the mental element or ‘*mens rea*’. The ‘*actus reus*’ or how the ICTY defined it, the ‘*objective element*’, is the external feature of an act: how an action or omission materializes into an illegal act. On the

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<sup>328</sup> Supra note Jurgen Altmann, “Military Nanotechnology: Potential Applications and Preventive Arms Control”, p. 75-78.

<sup>329</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 211.

<sup>330</sup> UNIDIR, “Algorithmic Bias and the Weaponization of Increasingly Autonomous Technologies” (UNIDIR 2018).

<sup>331</sup> Supra Thompson Chengeta, “Accountability Gap: Autonomous Weapon Systems and Modes of Responsibility in International Law”, p. 24.

<sup>332</sup> Antonio Cassese, “International Criminal Law”, Oxford University Press, 2003, p. 136.

<sup>333</sup> *Prosecutor v Dusko Tadic, Judgement* [1999] ICTY - Appeals Chamber IT-94-1-A, para 186.

other hand, the ‘mens rea’ or the ‘*subjective element*’, is the psychological connection between the act and the person who committed it.<sup>334</sup>

Article 30 of ICC Statute defines the necessary parameters of the ‘mental element’, that in general terms requires the person who commits a crime to have intent for his action and to know the possible consequences of it. Therefore, any human being that participated in the designing, programming and manufacturing process of FAWS, without having any intent for unforeseeable consequences, should not be considered criminally liable for those results.

Before proceeding, it should be examined if the above mentioned people, in order to be held accountable should have intent to commit a crime, should in other words be aware and pursue the illegal result<sup>335</sup>, or even when they act negligently and do not realise what they are doing, they appear to have ignorance of their behaviour<sup>336</sup>, is adequate to establish their liability. The textual interpretation does not cover the second category; therefore when trying to hold them accountable while acting negligently, Article 28 of ICC Statute comes into play, where it will be examined if they ‘*knew*’ or ‘*should have known*’ or they ‘*consciously disregarded information*’.

#### **d. Holding Those in the Designing, Manufacturing, Programming-Phase Accountable**

Some authors like A. Matthias support the view that designers, programmers, roboticists cannot be held accountable in cases of unpredictable, in unforeseeable consequences of FAWS, because the outcome of these systems’ conduct was not because of their intent.<sup>337</sup> This ‘*responsibility gap*’ though does not hold true for a variety of reasons.

As it was addressed before, FAWS and generally AWS are from their nature unpredictable. This element also gives rise to one of the core arguments that is proposed against their usage,

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<sup>334</sup> Supra note Antonio Cassese, “International Criminal Law”, p. 136.

<sup>335</sup> It should be mentioned that *dolus eventualis* of Article 30 of ICC Statute is also relevant to AWS, since all those who are involved in the designing/manufacturing process are aware of the inherent risks of using such a weapon in the battlefield, not only because of their professional status, but also because of the risk assessment they conduct before the deployment of the weapon. If in the case of AWS *dolus eventualis* would be excluded from the criminal liability assessment, serious violations of IHL would remain unpunished. This position was indirectly confirmed in the Lubanga Case, where the Trial Chamber accepted that the concept of *dolus eventualis* is interrelated to probabilities that as it was explained in this research, probabilities and possibilities are inherent to notions such as ‘risk’. For more information, See *Situation in the Democratic Republic of the Congo in the Case of the Prosecutor v Thomas Lubango Dyilo* [2012] ICC- Trial Chamber I ICC-01/04-01/06-2842 para 1012.

<sup>336</sup> Antonio Cassese et al., “The Rome Statute of the International Criminal Court: A Commentary”, vol 1, Oxford University Press, 2002, p. 42.

<sup>337</sup> Supra note Andreas Matthias, “The Responsibility Gap: Ascribing Responsibility for the Actions of Learning Automata”, p. 180.

since they cannot be easily regulated, they insert new risks on the battlefield and subsequently new challenges arise. Moreover, Article 91 of API holds states responsible for the acts their armed forces commit. However, it is supported that programmers and generally roboticists do not constitute the armed forces of a state and therefore cannot be held accountable by international rules, but only by domestic ones<sup>338</sup>, according to their internal regulations. Both arguments hold true. Generally, AWS are unpredictable systems from their nature and they can be considered synonymous to ‘dangers’ and ‘risks’. Also, some manufacturers and roboticists are commissioned by a certain government to research and afterwards deploy those systems in the battlefield. These technicians are obviously under the control of the state and they are subject to domestic and international law.

Nevertheless, some roboticists are not hired by a state. They could be hired by multiple states in an interstate mission or by private corporations. In this scenario, the answer shall be provided by the principle of complementarity of international criminal law, as enshrined in Article 1 of ICC Statute. According to this principle, when the international judicial order is unable to exercise its jurisdiction over a specific person and determine his/her liability, the domestic legal order is applicable and according to its provisions, those who act illegal are held liable.<sup>339</sup> If the state, that is taking advantage of the capabilities of this technology, is unable or unwilling to carry out the investigations or the prosecution, then the ICC considers the case in question admissible.<sup>340</sup>

Crootof, on the other hand, rejects the idea that negligence could be considered a behaviour that once connected with AWS, could give rise to criminal liability. She supports that negligent behavior should not be considered capable of holding roboticists of AWS liable, since *“overcriminalization will undermine all of international criminal law (...) if everyone is criminal, no one is”*.<sup>341</sup> She supports that it is better to introduce the idea of war torts, instead of the international criminal law somehow qualifying war crimes to injuries. Regardless of any contribution to understanding how criminal liability should be applied in AWS, this thought seem to have its flaws. First of all, there should be a mechanism that is able to hold all those involved in the manufacturing, designing, programming phase accountable and more importantly, as Seixas – Nunes points out, the standard that is applied to those persons is not that one of

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<sup>338</sup> Supra note Kelly Cass, “Autonomous Weapons and Accountability: Seeking Solutions in the Law of War”, p. 1049.

<sup>339</sup> William A Schabas, “The International Criminal Court: A Commentary on the Rome Statute”, Oxford University Press, 2010, p. 57–62.

<sup>340</sup> Article 17(1)(a) of ICC Statute.

<sup>341</sup> Supra note Rebecca Crootof, “War Torts: Accountability for Autonomous Weapons”, p. 1384.

negligence, because no such mention is made in Article 30 of ICC, but that of “*dolus eventualis*”.<sup>342</sup>

The concept of negligent behaviour and generally ‘*mens rea*’ is not always easy to be examined in international criminal law. Any answers are not so easily provided and the jurisprudence of international courts seem fragmented. ICJ in the *Bosnia Genocide Case* provided a ‘simplistic interpretation’<sup>343</sup>, whereas the *Lubanga Case* considered ‘*dolus eventualis*’ as a concept that could entail the individual criminal liability.<sup>344</sup> This case also provides another point for the sake of this research’s argument. Indeed, if ‘*dolus eventualis*’ was not taken into account, a ‘*responsibility gap*’ would indeed exist, because many cases will not be covered by any framework. Nevertheless, much controversy surrounds ‘*dolus eventualis*’.<sup>345</sup> In the *Lubanga Case* the Court decided that when the superior knows that a violation of IHL is about to be committed and decides to disregard this possibility and halter the violation, should be held accountable because of the profound evidence.

This reasoning of the court leads us to the following question: if the superior does not acknowledge the possibilities and the risk of the imminent violation should he/she be held accountable? Helen Nissenbaum states, “*instead of identifying a single individual whose faulty actions have caused the injuries, we find that we must systematically unravel a messy web of interrelated causes and decisions*”.<sup>346</sup> The position of Nissenbaum holds true: many people are involved in the process of programming, manufacturing or even deploying the system. Nevertheless, the superior’s liability is not an ‘umbrella-liability’, able to ‘squeeze’ inside it everyone’s fault.<sup>347</sup> Some dysfunctions of the systems are because of a dysfunction of the algorithm, which could not be predicted in advance and could only be eliminated by the procedure of tests and evaluations.

The commander might be in charge of the mission but not always he is capable to re-adapt to program or to maintain the system. Therefore, as it is clearly illustrated in the *Lubanga Case*, in such circumstances the concept of ‘*dolus eventualis*’ is a vital one. It should be used by the

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<sup>342</sup> Supra note Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 224.

<sup>343</sup> ICJ, *Case Concerning Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v Serbia and Montenegro)*, para. 187–188.

<sup>344</sup> *Lubanga Case, The Prosecutor v. Thomas Lubanga Dyilo*, ICC-01/04-01/06.

<sup>345</sup> Mark A Summers, “The Problem of Risk in International Criminal Law”, *Washington University Global Studies Law Review*, 13, 2014, p. 680-681.

<sup>346</sup> Helen Nissenbaum, “Accountability in a Computerized Society”, *Science and Engineering Ethics*, 2, 1996, p. 30.

<sup>347</sup> Christopher Toscano, “Friend of Humans: An Argument for Developing Autonomous Weapons Systems”, *Journal of National Security Law & Policy* 189, 8, 2015, p. 224.

international community. Also, through this concept it should be clarified that the commander's liability is not a 'wide-umbrella-liability'. It does not entail that he/she is also responsible for every conduct of those, who should normally be responsible for the proper-functioning of the system, especially in cases that he is not expected to have any such knowledge.

## **ii. Liability of Military Commanders**

Article 28 of ICC Statute introduces the doctrine of command responsibility either for military commanders or other superiors. A first question that should be addressed is whether roboticists and manufacturers are to be considered under the authority or control of the military commanders. If they are considered to be a part of the armed forces, then the military commanders are responsible for their conduct and generally for any crime they have caused. But, more importantly, military commanders in this regard are responsible for omitting to supervise the conduct of their superiors, and if it was unlawful, for omitting to prevent the criminal outcome, meaning the violation of IHL provisions.<sup>348</sup>

Moreover, through this analysis another aspect of commanders' responsibility emerges: that of their personal criminal responsibility for omitting to take all necessary precautions not only before the deployment of the weapon, but also during the manufacturing and the programming process.<sup>349</sup> The military commanders are the ones who provide all the necessary information for how the system would like to operate in a specific mission and the roboticists, manufacturers, programmers act accordingly.

### **a. For Crimes Committed by the Subordinates**

The concept of command responsibility was extensively analysed in the *Celebici Case*.<sup>350</sup> Before that case, the military commander could be charged only if he had actively participated in a commission of a crime. The ICTY's Trial Chamber introduced two criteria for the command responsibility as it is known today in the international criminal law: the first one is the relationship between a commander and its subordinates and subsequently his/her lack of preventive measures for the commission of the crime and the second is that the commander *knew*

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<sup>348</sup> Supra note Antonio Cassese et. Al., "The Rome Statute of the International Criminal Court: A Commentary", vol 3, Oxford University Press, 2002, p. 851.

<sup>349</sup> Article 57 of API, Articles 25 and 30 of ICC Statute.

<sup>350</sup> *Prosecutor v Mucic' et al (Celebici Case)* [1998] ICTY (Trial Chamber) IT-96-21-A para 346.

or *should have known* that his/her subordinate would commit the crime. Afterwards, the *Oric Case* introduced the element that the subordinates must commit also a crime themselves<sup>351</sup>, which crime is the outcome of the commander's negligence to exercise control over his/her subordinates.

Thus, the commander cannot be held accountable firstly for crimes not committed by his/her superiors, since they do not fall under his/her control and more importantly he/she is liable only for dysfunctions of the systems that can be attributed to a human, meaning the category of '*accidents*'. As it was analysed above, in the case of '*malfunctions*' no human could be held liable and in the case of '*errors*' the responsible one is the state who accepts the dangers inherent to AWS and decides to deploy them.

Some clarifications are necessary here in order to avoid holding military commanders accountable for every dysfunctioning of the system. First of all it was mentioned that military commanders should be held accountable for '*accidents*', because they appear a mistake of human error. Apart from the liability of those who are involved in the designing/manufacturing process, from the aforementioned military commanders analysis are also responsible for the wrongdoings of their subordinates. The question that emerges is if they are always responsible? Military commanders obviously cannot be held accountable if they have no information of a malfunction of the system and they have taken all the necessary measures to be informed, but not such information was provided. Otherwise, it would be absurd to demand from military commanders to overcome their role and at the same time be in the shoes of roboticists/manufacturers/programmers.

In addition to, the exact relationship of all the people involved must be examined. The nature of this exact relationship is not accompanied with much controversy in literature. More precisely, there is a suggestion to extend the commander's duty for supervision to the AWS which operate '*under their direct command and control*'.<sup>352</sup> For Seixas - Nunes<sup>353</sup>, some clarifications should be made in order to fully understand this link and to comprehend how it connects commanders with these systems. For him, control can be accepted only if the commander himself was involved and was part while designing the algorithm of the mission or intervening to halter and deactivate

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<sup>351</sup> *Prosecutor v Naser Oric* [2006] ICTY IT-03-68-T, para. 294.

<sup>352</sup> Nikolas Sturchler and Nicholas Siegrist, "A "Compliance-Based" Approach to Autonomous Weapon Systems" (EJIL: Talk!, 1 December 2017) <[www.ejiltalk.org/a-compliance-basedapproach-to-autonomous-weapon-systems](http://www.ejiltalk.org/a-compliance-basedapproach-to-autonomous-weapon-systems)>, last accessed on October 29 2022.

<sup>353</sup> *Supra* note Seixas-Nunes, A. "The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective", p. 223.

the system. In this case the applicable framework for his liability is provided under Articles 25 and 30 of ICC Statute, and not Article 28 of ICC Statute which delves into his/her command responsibility.

Furthermore, commanders should have a relationship of ‘superior-subordinate’ with all those involved in the programming, manufacturing, designing phase. This relationship though is not always confirmed by the very reality. AWS are autonomous agents; if they were considered to be mere machines fully and always independent in a ‘subordinate-relationship’, they would not be considered autonomous at all. Lastly the analogy that is proposed insinuates that commanders should – according to the information available to them – at all times be in a position to direct and control the system. Commanders in FAWS and generally in autonomous military technology could intervene and deactivate the system or trigger a ‘self-destruction’ mechanism, but they are not always capable of controlling and directing the system. Otherwise, the system could be a conventional weaponry or even an automated one, but not autonomous.

As it is pointed out<sup>354</sup> AWS do not allow human intervention, but some forms of control over them and more importantly they are supposed to adapt of the environment; they are ‘the-products-of-AI’. AWS are more effective than any human operator or any soldier in that sense. Therefore, as Ohlin argues<sup>355</sup> in situations that the military commander has acted recklessly, has not exercised control as he should have, he is accountable for the crimes that are caused under Article 25(1) of ICC Statute and not under Article 28. He also supports that Article 25(3) of ICC Statute, which introduces the concept of ‘*indirect perpetrator*’ is applicable. Following his argument, the military commander would stand as an indirect perpetrator and AWS will stand as a direct perpetrator, because the system will execute the crime.<sup>356</sup> It is the author’s view that this argument has some problems; to establish a framework where a human being is “*used as an instrument to commit a crime is not relevant*”.<sup>357</sup>

Article 28(a)(ii) of ICC Statute offers also another framework, under which military commanders can be held accountable. This can happen when they do not submit the crime to the responsible authorities and they do not mention the crime. This was also the case in *Bemba*

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<sup>354</sup> Simon Chignard and Soizic Penicaud, “‘With Great Power Comes Great Responsibility’: Keeping Public Sector Algorithms Accountable’ (Le blog d’Etalab, 11 June 2019). 2, available at <[www.academia.edu/39576180/ With\\_great\\_power\\_comes\\_great\\_responsibility\\_keeping\\_public\\_sector\\_algorithms\\_accountable?email\\_work\\_card=title](http://www.academia.edu/39576180/With_great_power_comes_great_responsibility_keeping_public_sector_algorithms_accountable?email_work_card=title)>, last accessed on October 29 2022.

<sup>355</sup> Supra note Jens David Ohlin, “The Combatant’s Stance: Autonomous Weapons on the Battlefield”, p.4.

<sup>356</sup> Supra note Jens David Ohlin, “The Combatant’s Stance: Autonomous Weapons on the Battlefield”, p.16-20.

<sup>357</sup> Seixas-Nunes, A. “The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, p. 235.

*Gombo Case*<sup>358</sup>, where the military commanders did not proceed and did not sanction their forces. By analogy in the case of FAWS, a military commander should immediately inform the competent authorities when he observes that the system is not operating appropriately.

Generally, military commanders should at all times be held accountable when they directly and control the acts of their subordinates – whoever they might be, including manufacturers, designers, roboticists – and they disregard the evidence that these people are acting with the necessary ‘mens rea’ and yet they do not stop them or they do not refer them to the appropriate authorities.

#### **b. For not taking all precautionary measures**

Commanders have the duty of care; the duty to take all precautionary measures before deploying the system. In cases that they haven’t acted accordingly and they act recklessly, the system’s malfunction is embodied as what was described earlier as ‘*accidents*’. Commanders’ responsibility to take all precautionary measures is more apparent in the case of AWS. In these systems there is a greater need to distinguish between those malfunctions that happen because a lack of care – ‘*accidents*’ – and those malfunctions that happen because the system did not act according to the way it was programmed and the commander and generally those in charge took all necessary measures.<sup>359</sup>

Also, the fact that humans might not be able to intervene, when, for example the system falsely selects a target, this does not mean that any form of direct human control is excluded. For example, self-destructive mechanism will ensure the ‘back-up-option-mechanism’ not only in cases of unlawful attacks, but also in cases that other parties are capable of using the FAWS for their own aims<sup>360</sup>. Moreover, military commanders are the ones who are responsible to deactivate the system in unforeseeable events on the battlefield. More precisely, according to the laws of war, military commanders must take all the necessary precautions before, during and after an attack. Therefore, they fall under the obligation to halt an unlawful attack, meaning they are

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<sup>358</sup> *Situation in the Central African Republic in the Case of the Prosecutor v Jean-Pierre Bemba Gombo* [2009] ICC ICC-01/05-01/08, para. 362–363.

<sup>359</sup> Helen Nissenbaum, “Accountability in a Computarized Society”, p. 37.

<sup>360</sup> Mike Elgan, “Welcome to the Era of Self-Destructing Gadgets, From Phones to Drones” (Fast Company, 23 February 2018), <[era-self-destructing](#)>, last accessed on October 29 2022; Craig Smith, “DARPA Looking at Self-Destructive Drone Technology”, (U.S Patriot, 21 October 2015) <[DARPA](#)>.



obliged to deactivate the system. This interpretation of precautionary measures is able to include the category of '*accidents*' and held commanders liable when they deploy the system.

## H. Conclusion

It is already apparent that the future of warfare is interrelated and interconnected to technology and AI. Regardless of how anyone could possibly conceive what this future might be, at present this future is interdependent to the intentions and the research of the roboticists, the manufacturers and the programmers. Right now, the international community and more specifically, all those who argue about their (il)legality can only speculate the future of these systems. This position is also confirmed by the very reality; different interpretations of a lethal autonomous technology and subsequently much uncertainty and controversies.

However, what is clear is that autonomous weapon systems and especially fully autonomous weapon systems are weapon systems that are able to operate without human supervision. They are manufactured and programmed by human beings, but they do not allow for human intervention. They are able to ‘learn’ from the algorithm inputted into them and afterwards they are capable of adapting, of transforming to the various circumstances on the battlefield. In that sense, the arguments, of those who are in favor of this weaponry, are right; they operate more effectively and more precisely on the battlefield than human combatants. They are more suitable for dangerous and difficult missions. What many ban advocates and scholars tend to forget is that constant human supervision or intervention is not required in the case of FAWS, since the system has the capability to re-program on its own and adapt to the various circumstances on the battlefield.

Moreover, the ‘autonomy’ of the system should be perceived in a way that it will have the capacity and more importantly the ‘intelligence’ to operate on its own and to understand and interpret its surroundings. This capacity is owed to the algorithm of the mission; this algorithm enables the system to interpret its surroundings, to be deployed and engage the target according to the original plan and finally to engage the target.

With regards to the question of their compatibility with IHL principles, many scholars advocate their incompatibility with them. It is the author’s view that most of the times, these arguments stem from the plurality of the definitions provided and from the absence of any legal framework regulating them. If the ‘*algorithm of the mission*’ does not prove to be defective, FAWS would be compatible with the core pillars of the laws of war. Yet, at the moment it seems apparent that military commanders will be the ones who will have to take all precautions in attack; they are those who will be responsible to answer one vital question; whether the system is operating according to the ‘*algorithm of the mission*’.

Regardless of how well the ‘*algorithm of the mission*’ is programmed nothing can preclude that violations of IHL will actually occur. Battlefield is an unknown and unpredictable space. When FAWS violate the principles of IHL because of ‘*accidents*’, because of defections traceable to a human fault, the majority of literature and jurisprudence does not accept *dolus eventualis* as an acceptable category for holding individuals accountable. This position does not hold true, as it was analysed above, because those who program and manufacture the system cannot be considered negligent and because of the fact that human intervention is impossible during ‘*algorithm of the mission*’.

In addition, with regards to ‘*malfunctions*’ it was already mentioned that they can occur in any case of weaponry on the battlefield and they are not only common in AWS; they constitute those failures that happen regardless of any human intervention, because the system fails to operate according to the instructions given to it. Therefore, ‘*malfunctions*’ in autonomous weaponry should be dealt accordingly to the conventional weaponry.

‘*Errors*’ as it was shown are dysfunctions in the software; they might seem unforeseeable but they are not: through testing their potential mistakes can be predicted and accordingly fixed. Therefore, the state should be considered the responsible one for any unpredictable attacks of these systems, since by using and deploying them on the battlefield, it accepts any dangers deriving from their usage.

What is true is that AI has not reached a point where it is capable to predict and therefore say when the system is acting with intent or recklessly. If this feature appears in the future, it cannot be answered through this thesis; what could be argued is that much depends on the AI’s experts. AI’s advancement might be able to advocate more clearly that an ‘*accountability gap*’ does not exist. In the future it might be more apparent that humans can get involved in the self-destructive process of the system. However, it is the author’s view that it does not correspond either to reality or to the intentions of the states to support that in the absence of any autonomous weapon systems, the issues of the compatibility with IHL principles, state responsibility and individual criminal responsibility, will be much easier. An international lawyer’s aim is to be capable to address current international challenges. Answers to fictional scenarios belong to other professions.

## I. Bibliography

### *Articles*

“Accountability Gap: Autonomous Weapon Systems and Modes of Responsibility in International Law”, Thompson Chengeta, 45 DENV. J. INT’L L. & POL’Y 1, Bluebook 21<sup>st</sup> ed., (2016).

“Accountability in a Computerized Society”, Helen Nissenbaum, *Science and Engineering Ethics*, 2, 1996.

“A Comparative Analysis of the Definitions of Autonomous Weapons Systems, *Science and Engineering Ethics*”, Mariarosaria Taddeo, Alexander Blanchard, August 23 2022.

“A “Compliance-Based” Approach to Autonomous Weapon Systems”, Nikolas Sturchler and Nicholas Siegrist, (EJIL: Talk!, December 2017).

“Are Autonomous Weapon Systems the Subject of Article 36 of Additional Protocol I to the Geneva Conventions?”, Thompson Chengeta, *UC Davis Journal of International Law and Policy*, Vol. 23, 2016.

“Artificial Intelligence: A Modern Approach”, S. J. Russell and P. Norvig, (Upper Saddle River, NJ: Prentice Hall, 2010).

“At War with the Robots: Autonomous Weapon Systems and the Martens Clause”, Tyler D. Evans, Note, 41 HOFSTRA L. REV., 2013.

“Automated Warfare”, George R. Lucas, Jr., 25 STAN. L. & POL’Y REV., 2014.

“Automating the right stuff – the hidden ramifications of ensuring autonomous aerial weapon systems comply with international humanitarian law”, DeSon, *Air Force Law Review* 72, J.S. 2015.

“Autonomous Weapons and Accountability: Seeking Solutions in the Law of War”, Kelly Cass, 2015, 48, *Loyola of Los Angeles Law Review*.

“Autonomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to be Clarified”, Marco Sassoli, 90 INT’L L. STUD., 2014.

“Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics”, Michael N. Schmitt, *HARV. NAT’L SECURITY J. FEATURES* 4–5, 2013.

“Autonomous Weapons and International Law”, Christopher M. Ford, 69 S. C. L. REV. 413, Bluebook 21st ed., 2017.

“Autonomous Weapons Systems and International Law: Aspects of International Humanitarian Law, Individual Accountability and State Responsibility”, Yannick Zerbe, 29 Swiss. REV. INT'L & EUR. L. 581, Bluebook 21st ed, 2019.

“Autonomous Weapons and the Problem of State Accountability” Daniel N Hammond, (2015) 15 Chicago Journal of International Law.

“Autonomous Weapons and Weapon Reviews: The UK Second International Weapon Review Forum”, JAMES FARRANT & CHRISTOPHER M. FORD 93 International Law Studies: US Naval War College (2017).

“Autonomous Weapon Systems Under International Law Academy”, Nathalie Weizmann, Briefing No. 8, GENEVA ACAD. OF INT'L HUMANITARIAN LAW AND HUM. RIGHTS (Nov. 2014).

“Beware the Killer Robots: Inside the Debate over Autonomous Weapons”, Charli Carpenter, Foreign Affairs.

“Bridging the Responsibility Gap in Automated Warfare”, Champagne M. and Tonkens R., Philosophy & Technology, 28, 2015.

“Causation and International State Responsibility”, L. Castellanos-Jankiewicz, Amsterdam Center for International Law, University of Amsterdam, 2012.

“Computing Experts from 37 Countries Call for Ban on Killer Robots”, Noel Sharkey, Int'l Comm. For Robot Arms Control, 2013.

“Consciousness as integrated information: a provisional manifesto”, G. Tononi, The Biological Bulletin, 2008.

“DARPA Looking at Self-Destructive Drone Technology”, Craig Smith, US Patriot, October 2015.

“Death Strikes from the Sky: The Calculus of Proportionality”, Sharkey, N., IEEE Science and Society, Spring Issue, (2009).

“Defining semi-autonomous, automated and autonomous weapon systems in order to understand their ethical challenges”, Jean-François Caron, Digital War, Springer Nature Limited 2020.

“Deterrence in the Age of Thinking Machines”, Wong, Yuna Huh, et al., Santa Monica, CA: RAND Corporation, 2020.

“Do Killer Robots Save Lives?”, Michael C. Horowitz & Paul Scharre, POLITICO, November 2014.

“Drone Programs, the Individualization of War and the ad bellum Principle of Proportionality”, Mignot-Mahdavi Rebecca, in Lieber Series Vol. 4, Claus Kress & Robert Lawless eds., Oxford University Press, 2020.

“Evolutive Interpretation of the ECHR and Beyond: Recent Developments in the Case – Law of the European Court of Human Rights”, Linos–Alexander Sicilianos, Human Rights Law Journal, December 2020.

“Ex Gratia Payments and the Iranian Airline Tragedy”, Harold G. Maier, The American Journal of International Law , Apr., 1989, Vol. 83, No. 2 (Apr., 1989).

“Factors Shaping the Legal Implications of Increasingly Autonomous Military Systems”, Tim McFarland, International Review of the Red Cross, Vol. 97, 2015.

“Friend of Humans: An Argument for Developing Autonomous Weapons Systems”, Christopher Toscano, Journal of National Security Law & Policy 189, 8, 2015.

“Governing Lethal Behavior in Autonomous Robots”, Ronald C Arkin, (Chapman & Hall Book 2009).

“From Smart to Autonomous Systems: Confounding Territoriality and Moral Agency, The Future of Just War: New Critical Essays”, Caron E Gentry and Amy E Eckert, University of Georgia Press, 2014.

“How a new army of robots can cut the defense budget”, Francis, D., The Fiscal Times, 2013.

“International Governance of Autonomous Military Robots”, Gary E. Marchant et al., 12, COLUM. SCI. & TECH. L. REV. 2011.

“Iran Air Flight 655 and Beyond: Free Passage, Mistaken Self-Defense, and State Responsibility”, David K Linnan, Yale Journal of International Law, Volume 16, Number 2, Summer 1991.

“Iran Falls Short in Drive at U.N. to Condemn U.S. in Airbus Case”, Fox Butterfield, N.Y. TIMES, July 1988.

“Killer Robots”, Sparrow, *Journal of Applied Philosophy* 24 (1), 2007.

“Happiness is the Wrong Metric, A Liberal Communitarian Response to Populism”, Amitai Etzioni, *Library of Public Policy and Public Administration*, Volume 11, Springer Open, 2018.

“Law and Ethics for Autonomous Weapon Systems: Why a Ban Won’t Work and How the Laws of War Can” Kenneth Anderson and Mathew C Waxman, (2013) American University WCL Research Paper 2013-11, Columbia Public Law Research Paper.

“Legitimate Targets of Attacks under IHL”, Marco Sassòli, International Humanitarian Law Research Initiative, June 2003.

“Lethal autonomous weapons systems and the plight of the non-combatant”, R. C. Arkin, (2014).

“Lethal Robotic Technologies: The Implications for Human Rights and International Humanitarian Law”, Philip Alston, *Journal of Law, 21, Information & Science*, 2012.

“Let’s Talk About The Israel Air Industries Loitering Munitions And What They’re Capable Of”, Stefano D’ Urso, in the *Aviationist*, January 7 2022.

“Limits on Autonomy in Weapon Systems, Identifying Practical Elements of Human Control, Stockholm International Peace Research Institute”, V. Boulanin, et al., ICRC, June 2020.

“Military Necessity and Humanity in International Humanitarian Law: Preserving the Delicate Balance”, Michael N Schmitt *Virginia Journal of International Law* 50, 2010.

“Mind and Autonomy in Engineered Biosystems”, O.G. Clark et al., 12 *ENG’G APPLICATIONS OF ARTIFICIAL INTELLIGENCE*, 1999.

“NEW RULES FOR VICTIMS OF ARMED CONFLICTS”, BOTHE ET AL.,1982.

“No One at the Controls: Legal Implications of Fully Autonomous Targeting”, Jeffrey S. Thurnher, 67 *JOINT FORCE Q.*, 2012.

“On Banning Autonomous Weapon Systems: Human Rights, Automation and the Dehumanization of Lethal Decision Making”, Peter Asaro, *International Review of the Red Cross*, 94, 2012.

“On Killing – The Psychological Cost of Learning to Kill in War and Society”, Dave Grossman, (Open Road Media), 2014.

“On War”, Carl von Clausewitz, Princeton University Press, Princeton, NJ, 1976.

“Out of the Loop: Autonomous Weapon Systems and the Law of Armed Conflict”, Michael N. Schmitt & Jeffrey S. Thurnher, 4 HARV. NAT’L SECURITY J., 2013.

“Proportionality in Armed Conflicts: A Principle in Need of Clarification?”, Ben Clarke, in Martinus NIJHOFF Publishers, International Humanitarian Legal Studies 3, 2012.

“Proportionality under International Humanitarian Law: The Reasonable Military Commander Standard and Reverberating Effects”, Ian Henderson & Kate Reece,, 51 VAND. J. Transnat’l L. 835 (2018).

“Regulating a Game Changer: Using a Distributed Approach to Develop an Accountability Framework for Lethal Autonomous Weapon Systems”, Tetayana Krupiy, Georgetown Journal of International Law, Vol. 50, 2018.

“Risks and Benefits of Autonomous Weapon Systems Perceptions among Future Australian Defence Force Officers”, Dr. Jai Galliot, Dr. Austin Wyatt, Published in Journal of Indo-Pacific Affairs, Winter 2020.

“Robots at War: The New Battlefield”, P. W. Singer, 33 WILSON Q., 2009.

“Robots that Kill: The Case for Banning Lethal Autonomous Weapon Systems”, Matthew Anzarouth, Harvard Political Review, December 2021.

“Saying 'No!' to Lethal Autonomous Targeting”, Noel Sharkey, 9 J. MIL. ETHICS, 2010.

“Semiautonomous and on their own: killer robots in Plato’s Cave”, M. Gubrud, Bulletin of the Atomic Scientists Online, April 2015.

“Some Reflections on the “Incidental Harm” Side of Proportionality Assessments”, Emmanuela-Chiara Gillard, 51, Vanderbilt Journal of Transnational Law, 2018.

“Swarms of Mass Destruction: The Case for Declaring Armed and Fully Autonomous Drone Swarms as WMD”, Zachary Kallenborn, Modern War Institute at War.

“Tactics, Techniques, Tragedies: A Humanitarian Perspective on the Changing Face of War”, Bernard Vincent, International Review of the Red Cross, 97 (900), 2015.

“Targeting and Humanitarian Law: Current Issues”, Michael N Schmitt, (2006) 80 International Law Studies.

“Technology with no human responsibility?”, D. G. Johnson, Journal of Business Ethics, 127 (2015).



“The Artificial Intelligence Arms Race: Trends and World Leaders in Autonomous Weapons Development”, Justin Haner, Denise Garcia, *Global Policy* Volume 10, Issue 3, September 2019.

“The case for ethical autonomy in unmanned systems”, Arkin, R.C., *Journal of Military Ethics* 9 (4), 2010.

“The Case for Regulating Fully Autonomous Weapons”, John Lewis, *The Yale Law Journal*, Vol. 124, No 4, Jan-Feb 2015.

“The Combatant’s Stance: Autonomous Weapons on the Battlefield”, Jens David Ohlin, 92 *INT’L L. STUD.* 1, 2016.

“The Compatibility of Autonomous Weapons with the Principles of International Humanitarian Law”, Elliot Winter, *Journal of Conflict & Security Law* VC Oxford University Press 2022.

“The Contemporary Law of Targeting: Military Objectives, Proportionality and Precautions in Attack under Additional Protocol I”, Ian Henderson, Martinus Nijhoff, 2009.

“The Convention on Cluster Munitions: A Commentary”, Gro Nystuen and Stuart Casey-Maslen (eds), Oxford University Press, 2010.

“The Debate over Autonomous Weapons Systems”, Gregory P. Noone & Diana C. Noone, 47 *Case W. Res. J. INT’L L.* 25 (2015).

“The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems”, Markus Wagner, (2014) 47 *Vanderbilt Journal of Transnational Law*.

“The Everywhere War”, Gregory Derek, *The Geographical Journal*, September 2011, Vol. 177, No. 3.

“The Evolution of Law of War”, Hongsheng Sheng, Published by Oxford University Press, *The Chinese Journal of International Politics* , Winter 2006, Vol. 1, No. 2.

“The international Criminal Court and rebel groups”, MS Soluman,5 (2012).

“The International-Law Dimension of Autonomous Weapons Systems”, Robin Geiss,2015.

“The Killer Robots are Here: Legal and Policy Implications”, Rebecca Crootof, *Cardozo Law Review* 1837, 1854, 2015.

“The Need for and Elements of a New Treaty on Fully Autonomous Weapons”, Bonnie Docherty, *Human Rights Watch*, June 2020.

- “The Legacy of Nuremberg, Christian Tomuschat 4 J. INT’L CRIM. JUST.”, 2006.
- “The new wars”, Herfried Münkler, UK Polity Press, 2005.
- “The Problem of Risk in International Criminal Law”, Mark A Summers, Washington University Global Studies Law Review, 13, 2014.
- “The Responsibility Gap: Ascribing Responsibility for the Actions of Learning Automata”, Andreas Matthias, 6, Ethics and Information Technology, 2004.
- “Towards a principle for the human supervisory control of robot weapons”, N. Sharkey, *Politica e Società*, 3 (2014).
- “Understanding The Loop Regulating the Next Generation of War Machines”, William C. Marra & Sonia K. McNeil, 36 *FARv. J.L. & PUB. POL’Y*, 2012.
- “Unmanned Drones, Data, and the Illusion of Perfect Warfare”, William Arkin, New York : Little, Brown and Company, 2015.
- “War Torts: Accountability for Autonomous Weapons”, Rebecca Crootof, *University of Pennsylvania Law Review*, Vol. 164, No. 6, May 2016.
- “Welcome to the Era of Self-Destructing Gadgets, From Phones to Drones”, Mike Elgan, (Fast Company).
- “You Might Be a Robot”, Lemley M. and Casey B., *Cornell Law Review* 1, 2019.
- “21st Century Conflict: Can the Law Survive?”, Michael N. Schmitt, 8 *MELB. J. INT’L L.*, 2007.

### ***Books***

- “Agent Autonomy”, H. Hexmoor, C. Castelfranchi and R. Falcone (eds.), (New York: Springer, 2003).
- “An Introduction to International Criminal Law and Procedure”, Robert Cryer et al., Cambridge University Press, 2nd edn, 2010.
- “Autonomous Weapons Systems: Law, Ethics, Policy”, Bhuta, N., Beck, S., Geiß, R., Liu, H., & Kreß, C. (Eds.), Cambridge: Cambridge University Press, 2016.
- “Constraints on the Waging of War: An Introduction to International Humanitarian Law, 3<sup>rd</sup> ed.”, F. Kalshoven and L. Zegveld, ICRC, Geneva, 2001.
- “Documents on the Laws of War”, A. Roberts and R. Guelff, 3rd edn (2000), Oxford University Press.

“Governing Lethal Behavior in Autonomous Robots”, Ronald C Arkin, (Chapman & Hall Book 2009).

“Handbook of Knowledge Representation”, F. van Harmelen, V. Lifschitz and B. Porter (eds.), Amsterdam, Elsevier, 2008.

Instructions for the Government of Armies of the United States in the Field (Lieber Code). 24 April 1863.

“International Criminal Law”, Antonio Cassese, Oxford University Press, 2003.

“International Humanitarian Law and the Changing technology of War”, Dan Saxon (ed),vol 41 (Martinus Nijhoff 2013).

“International humanitarian Law, A Comprehensive Introduction, ICRC” Nils Melzer coordinated by Etienne Kuster.

“Interpretative Guidance on the Notion of Direct Participation in Hostilities”, Nils Melzer, ICRC, 2009.

“Just and Unjust Wars: A Moral Argument with Historical Illustrations”, Michael Walzer, (2d ed. 1992).

“Killer Robots: Legality and Ethicality of Autonomous Weapons”, Krishnan, A..Routledge, London, 2009.

“Killing by Remote Control: The Ethics of an Unmanned Military”, B. J. Strawser, (Oxford University Press, 2013).

“Mensch und Maschine: Symbiose oder Parasitismus?”, Sandra Brindli (ed.),Bern 2015.

“Military Nanotechnology: Potential Applications and Preventive Arms Control” Jurgen Altmann, (Routledge 2006).

“Of Arms and Men: A History of War, Weapons and Aggression”, Robert L O’Connell, (Oxford University Press 1989).

“Perspectives on the ICRC Study on Customary International Humanitarian Law”, Cambridge University Press, 2007.

“Remote and Autonomous Warfare Systems: Precautions in Attack and Individual Accountability”, Jens David Ohlin (ed.), Research Handbook on Remote Warfare (Edward Elgar Press 2016).

“Robot Ethics: The Ethical and Social Implications of Robotics”, P. Lin, K. Abney and G. A. Bekey (eds.), (Cambridge, MA: MIT, 2012).

“The International Criminal Court: A Commentary on the Rome Statute”, William A Schabas, Oxford University Press, 2010.

“The International Law Commission’s Articles on State Responsibility: Introduction, Text and Commentaries” Crawford, (Cambridge University Press 2003).

“The Conduct of Hostilities Under the Law of International Armed Conflict”, Yoram Dinstein, (Cambridge: Cambridge University Press, 3rd ed, 2016).

“The Impact of Emerging Technologies on the Law of Armed Conflict”, Eric Talbot and Ronald Alcalá (eds), vol 2, Oxford University Press, 2019.

“The Legality and Accountability of Autonomous Weapon Systems: A Humanitarian Law Perspective”, Seixas-Nunes, A. (2022). Cambridge: Cambridge University Press.

“The Rome Statute of the International Criminal Court: A Commentary”, Antonio Cassese et al., vol 1, Oxford University Press, 2002.

“Use and Misuse of New Technologies: Contemporary Challenges in International and European Law”, Elena Carpanelli and Nicole Lazzarini (eds), Springer, 2019.

“War and Algorithm”, Max Liljefors, Gregor Noll and Daniel Steuer (eds), Rowman & Littlefield, 2019.

“Weapons and the Law of Armed Conflict” William H. Boothby, (2nd Edition), United Kingdom: Oxford University Press, 2016.

### ***Brochures***

PAX, Brochure: “10 Reasons to Ban Killer Robots”.

### ***Commentaries***

International Committee of the Red Cross, “Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949”.

### *Conventions*

Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Geneva, 12 August 1949.

Convention (II) for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Geneva, 12 August 1949.

Convention on certain conventional weapons: Position paper submitted by China in Geneva, in 2018, p. 1. For more information see [https://unog.ch/80256EDD006B8954/\(httpAssets\)/E42AE83BDB3525D0C125826C0040B262/\\$file/CCW\\_GGE.1\\_2018\\_WP.7.pdf](https://unog.ch/80256EDD006B8954/(httpAssets)/E42AE83BDB3525D0C125826C0040B262/$file/CCW_GGE.1_2018_WP.7.pdf)

Convention on Cluster Munitions, January 8 2010.

Convention on International Liability for Damage Caused by Space Objects, 1972.

Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Paris, 13 January 1993.

Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, Geneva, 10 April 1972.

Convention (III) relative to the Treatment of Prisoners of War, Geneva, 12 August 1949.

Convention (IV) relative to the Protection of Civilian Persons in Time of War. Geneva, 12 August 1949.

Convention relative to the Treatment of Prisoners of War. Geneva, 27 July 1929.

Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 18 October 1907.

Convention (II) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 29 July 1899.

Project of an International Declaration concerning the Laws and Customs of War, Brussels, 27 August 1874 (Brussels Declaration).

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977.

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II), 8 June 1977.

Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. Geneva, 17 June 1925.

United Nations Vienna Convention on the Law of Treaties, 1969

United Nations Office for Disarmament Affairs, The Convention on Certain Conventional Weapons.

United Nations, The Arms Trade Treaty (ATT)

### *Databases*

INT'L COMMITTEE RED CROSS CUSTOMARY INT'L HUMANITARIAN L. DATABASE.

### *Declarations*

Declaration (XIV) Prohibiting the Discharge of Projectiles and Explosives from Balloons. The Hague, 18 October 1907.

Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg.

Declaration Respecting Maritime Law. Paris, 16 April 1856.

### *Directives*

NATO, AAP-06 Edition 2020: NATO glossary of terms and definitions.

Ministry of Defence. (2018a). Unmanned aircraft systems (JDP 0–30.2).

The US Department of Defense, Office of the Secretary of Defense Unmanned Systems Roadmap 2007-2032, December 10 2007.

US Department of Defense (DoD) Directive 3000.09, “Autonomy in weapon systems”.

UK Ministry of Defence, “Joint Doctrine Publication 0–30.2 Unmanned Aircraft Systems”, August 2017.

### *Documents*

Federal Foreign Office. 2020, p.1, available at <<https://documents.unoda.org/wp-content/uploads/2020/07/20200626-Germany.pdf>>.

UN CCW/GGE.1/2018/3, “Report of the 2018 Session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems”.

### *General Comments*

General Comment Number 31, CCPR/C/21/Rev.1 Add. 13.

### *Jurisprudence*

“Application of the Convention on the Prevention and Punishment of the Crime of Genocide” (Bosnia-Herzegovina v. Serbia and Montenegro), Judgement, ICJ Report 2007.

Case Concerning Armed Activities on the Territory of the Congo (Democratic Republic of Congo v Uganda), ICJ, Judgement of 2005.

Case Concerning the Factory at Chorzów (Germany v Poland) Judgment, (1927), Permanent Court of International Justice.

ICTY, Prosecutor v. Galic, Appeal Judgement, November 30 2006.

ICTY, Prosecutor v. Prlic et al., Judgement (Trial Chamber), May 29 2013.

Kupreškić et al, [2000], ICTY Trial Chamber (IT-95-16), para. 524.

Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J.

Lubanga Case, The Prosecutor v. Thomas Lubanga Dyilo, ICC-01/04-01/06.

Prosecutor v. Delalić, Case No. IT-96-21-T, Trial Chamber Judgment, (Int’l Crim. Trib. for the Former Yugoslavia Nov. 16, 1998).

Prosecutor v Dusko Tadic, Judgement [1999] ICTY - Appeals Chamber IT-94-1-A

Prosecutor v. Ljube Boškoski and Johan Tarčulovski ICTY, , Trial Chamber II, July 10 2008.

Prosecutor v Mucic´ et al (Celebici Case) [1998] ICTY (Trial Chamber) IT-96-21-A.

Prosecutor v Naser Oric [2006] ICTY IT-03-68-T, para. 294.

Situation in the Central African Republic in the Case of the Prosecutor v Jean-Pierre Bemba Gombo [2009] ICC ICC-01/05-01/08.

Situation in the Democratic Republic of the Congo in the Case of the Prosecutor v Thomas Lubanga Dyilo [2012] ICC- Trial Chamber I ICC-01/04-01/06-2842.

William Holbrook v Prodomax Automation Ltd [2017] US District Court for the Western District of Michigan Case No 17-00219.

### *Manuals*

Int'l Group of Experts, NATO Cooperation Cyber Def., Tallinn Manual on the International Law Applicable to Cyber Warfare, (Michael N. Schmitt ed., 2013).

“The Laws of War on Land”. Oxford, 9 September 1880.

UK Manual of the Law of Armed Conflict, 2004.

Schmitt, M. (2017). Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations (2nd ed.). Cambridge: Cambridge University Press.

### *Meetings*

ICRC, EXPERT MEETING AUTONOMOUS WEAPON SYSTEMS TECHNICAL, MILITARY, LEGAL AND HUMANITARIAN ASPECTS GENEVA, SWITZERLAND, 26-28 MARCH 2014.

Meeting of the High Contracting Parties to 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.

### *Reports*

Chairman of the Joint Chiefs of Staff Instruction, “No-Strike and the Collateral Damage Estimation Methodology”.

Draft Articles on Responsibility of States for Internationally Wrongful Acts, with commentaries, Int'l Law Comm'n, Rep. on the Work of Its Fifty-Third Session, U.N. Doc. A/56/10, (2001).

Human Rights Watch, “Losing Humanity: The Case against Killer Robots”, 2012.

HUMAN RIGHTS WATCH & INT'L HUMAN RIGHTS CLINIC, HARVARD LAW SCH., ADVANCING THE DEBATE ON KILLER ROBOTS: “12 KEY ARGUMENTS FOR A PREEMPTIVE BAN ON FULLY AUTONOMOUS WEAPONS”, (2014).

ICRC, “International Expert Meeting Report: The Principle of Proportionality in the Rules Governing the Conduct of Hostilities Under IHL”, ICRC 2016.

ICRC, ‘Report of the ICRC Expert Meeting on Autonomous Weapons Systems: technical, military, legal and humanitarian aspects’, 26-28 March 2014.



ICTY, Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, June 13 2000.

INT'L COMM. OF THE RED CROSS, INTERPRETIVE GUIDANCE ON THE NOTION OF DIRECT PARTICIPATION IN HOSTILITIES UNDER INTERNATIONAL HUMANITARIAN LAW (Nils Melzer ed., 2009).

International Committee for Robot Arms Control (ICRAC), Scientists' Call to Ban Autonomous Lethal Robots, 2013.

Int'l Comm. of the Red Cross Geneva, "A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977", 88, INT'L REV. RED CROSS, 2006.

International Committee of the Red Cross, International Humanitarian Law: Answers to Your Questions (Geneva: International Committee of the Red Cross, 2002).

International Committee of Red Cross (ICRC), "Autonomous Weapons Systems: Technical, Military, Legal and Humanitarian Aspects", 2014.

International Committee for Robot Arms Control (ICRAC), Scientists' Call to Ban Autonomous Lethal Robots, 2013.

International Law Association Study Group on the Conduct of Hostilities in the 21st Century, "The Conduct of Hostilities and International Humanitarian Law: Challenges of 21<sup>st</sup> Century Warfare", International Law Studies, 93, 2017.

"Interpretative Guidance on the Notion of Direct Participation in Hostilities", Nils Melzer, ICRC, 2009.

NATO Nations Approve Civilian Casualty Guidelines'.

"Report of the 2022 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems", CCW/GGE.1/2022/CRP.1/Rev.1, July 29 2022.

UNIDIR, "Algorithmic Bias and the Weaponization of Increasingly Autonomous Technologies" (UNIDIR 2018).

UNIDIR, "Safety, Unintentional Risk and Accidents in the Weaponization of Increasingly Autonomous Technologies", UNIDIR Resources, No5, 2016.

United Nations General Assembly, Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns, A/HRC/23/47, April 9 2013.

United Nations Security Council, Letter dated 8 March 2021 from the Panel of Experts on Libya established pursuant to resolution 1973 (2011) addressed to the President of the Security Council. S/2021/229, 8 March 2021.

U.S. Naval War College in International Law Studies, “The Conduct of Hostilities and International Humanitarian Law: Challenges of 21<sup>st</sup> Century Warfare, International Law Association Study Group on the Conduct of Hostilities in the 21<sup>st</sup> Century, Volume 93”, 2017.

### ***Resolutions***

United Nations General Assembly, A/RES/49/75k, January 9 1995.

United Nations General Assembly, A/RES/67/56, December 3 2012.

### ***Statutes***

Rome Statute of the International Criminal Court, July 17, 1998

Updated Statute of the International Criminal Tribunal for the Former Yugoslavia, May 25, 1993

### ***Synthesis of Lectures***

“A Philosophy of Technology: From Technical Artefacts to Sociotechnical Systems”, P. Vermaas et al., (San Rafael, CA: Morgan and Claypool, 2011).

### ***Statements***

Amnesty International, “UN: States should commit to pathway towards global ban on ‘killer robots’”, December 2016.

J. Kellenberger, President of the ICRC, “Keynote Address, International Humanitarian Law and New Weapon Technologies, 341h San Remo Round Table 8-1o September 2011”, 94 (886) IRRC 809 (2012).

‘Statement by Assistant to the President for Press Relations Fitzwater on United States Policy Regarding the Accidental Attack on an Iranian Jetliner over the Persian Gulf, 2 PUB. PAPERS, July 11 1988.

Statement of the International Committee of the Red Cross delivered at the Convention on Certain Conventional Weapons (CCW) before the Group of Governmental Experts on Lethal Autonomous Weapons Systems - 3–13 August 2021, Geneva.

Views and Recommendations for the Sixth Review Conference of the Convention on Certain Conventional Weapons Working paper submitted by the International Committee of the Red Cross, November 2021.

### *Websites*

“Aegis The Shield (and the Spear) of the Fleet”, Lockheed Martin, available at <<https://www.lockheedmartin.com/en-us/products/aegis-combat-system.html>>.

“How Israel's Iron Dome missile shield works”, May 17 2021, available at <<https://www.bbc.com/news/world-middle-east-20385306>>.

“Federal study confirms racial bias of many facial-recognition systems, casts doubt on their expanding use”, Drew Harwell, The Washing Post, December 19 2019, available at <<https://www.washingtonpost.com/technology/2019/12/19/federal-study-confirms-racial-bias-many-facial-recognition-systems-casts-doubt-their-expanding-use/>>.

Future of Life, “Open Letter on Autonomous Weapons”, July 28 2015), available at <<https://futureoflife.org/open-letter-autonomous-weapons/>>.

“Gender and killer robots”, in Stop Killer Robots Campaign, available at <<https://www.stopkillerrobots.org/gender-and-killer-robots/>>.

Noel Sharkey, “Robot Wars Are a Reality”, The Guardian (Brussels, 18 August 2007), <[www.theguardian.com/commentisfree/2007/aug/18/comment.military](http://www.theguardian.com/commentisfree/2007/aug/18/comment.military)>.

“Race and killer robots, Digital dehumanisation and algorithmic bias”, in Stop Killer Robots Campaign, available at <<https://www.stopkillerrobots.org/race-and-killer-robots/>>.

“The Impact of the May 2021 Hamas-Israel Confrontation, A Conversation with Shai Feldman”, Brandeis University, October 28 2021, available at <<https://www.brandeis.edu/crown/publications/crown-conversations/cc-10.html>>.

“The OODA Loop and the Half-Beat”, Alastair Luft, March 17 2020, available at <<https://thestrategybridge.org/the-bridge/2020/3/17/the-ooda-loop-and-the-half-beat>>.

“The Predator, a Drone That Transformed Military Combat”, Roger Connor, in National Air and Space Museum, March 9 2018, available at <<https://airandspace.si.edu/stories/editorial/predator-drone-transformed-military-combat>>.

“The Risks of Lethal Autonomous Weapons, in Lethal Autonomous Weapons Systems”,  
available at <<https://autonomousweapons.org/the-risks/>>.