The Lethal Autonomous Weapons Systems: A concrete example of AI's presence in the military environment
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Abstract: *Comprehending and analysing Artificial Intelligence (AI) is fundamental to embrace the next challenges of the future, specifically for the defence sector. Developments in this sector will involve both arms and operations. The debate is linked to the risks that automation could bring into the battlefield, specifically for the Lethal Autonomous Weapons Systems (LAWS). While AI could bring many advantages in risk detection, protection and preparation capabilities, it may bring also several risks on the battlefield and break the basic principles of International Law. Indeed, having the human operator "out of the loop", could lead to unprecedented challenges and issues. Such weapons may also strengthen terroristic groups, allowing them to plan mass attacks or specific assassinations with no human sacrifice.*
The article, divided into three parts, aims to analyse the LAWS and its related issue. The first one introduces the LAWS and is applications worldwide. The second one summarizes the problems concerning International Humanitarian Law. Eventually, the last part is focused on the research for a proper regulation and the EU position on the topic.
Keywords: Artificial Intelligence – Lethal Autonomous Weapons Systems – OODA Loop – International Humanitarian Law – Killer robots

1. Introduction
The great concern connected to the use of Artificial Intelligence (AI) in the military environment is specifically related to the Lethal Autonomous Weapons Systems (LAWS), commonly known as drones. There are several discussions on the definition, the legislation and the possibility of a ban over them. The issues that characterised the debate over the LAWS are three. The first one is related to the lack of agreement or *consensus* on the definition, leaving uncertainty on such matter. Countries are indeed in a different technological stage and they have different interpretations on how to behave. The second one is related to the fast development that technologies are having nowadays: having a proper regulation that would not be old before time is indeed complex. The last one is political: nations worldwide are looking at their own security interests when speaking of the development of LAWS.

Several discussions on the definition of LAWS, as happened with AI, are succeeding, and many actors, as International Organisations, States and Non-Governmental Organisations (NGOs), are investigating to find the correct definition of LAWS.

The first one is given by the International Committee of the Red Cross (ICRC), which defines the LAWS as "*any weapon system with autonomy in its critical functions. That is, a weapon system that can select (i.e. search for or detect, identify, track, select) and attack (i.e. use force against, neutralize, damage or destroy) targets without human intervention*".[1]

The second one, more a categorisation than a real definition, was made by the Human Rights Watch, which has classified the weapons into three different categories: Semiautonomous Weapons, where the human operator has complete control, he/she chooses the target among a specific group and the weapon attack it; Supervised Autonomous Weapons, where the human operator supervises and, if necessary, intervenes; Fully Autonomous Weapons, where the system is autonomous and could select targets and act on its own. The latter is considered the definitive one: the human decides to launch the weapon without knowing which targets should be attacked. It is indeed the machine itself that identifies and engage the target.[2]

The third one that should be mentioned is the one given by the US Department of Defense (DOD), which defines the LAWS as *"a weapon system 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 human input after activation"*.[3]

The search for a common definition has been started also by experts and academics: while some of them, as Paul Scharre shown in his book "*Army of None: Autonomous Weapons and the Future of War*", agreed on the "Loop" division,[4] others are trying to find a new way to define the LAWS. By way of illustration, Jean-Marc Rickli, Head of Global Risk & Resilience at the Geneva Centre for Security Policy, defined an autonomous weapons system as a weapon that should have three main tasks: searching the objective, deciding to engage, and engaging the target.[5] Indeed, through its algorithms, the LAWS can select, recognise, classify, track and engage targets, detect objects or additional menaces, and give recommendations on the engagement of additional targets.[6]

The more the machines become sophisticated, the less predictable will be their actions. Indeed, the concept of autonomy is various: it could affect both the decision and the subsequent process. The three different levels of autonomy may find their explanation in the OODA loop: it is a scheme based on four different actions, Observe, Orient, Decide,

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[1] United Nations Office for Disarmament Affairs, *Perspectives on Lethal Autonomous Weapons Systems*, UNODA Occasional Papers n. 30, November 2017, p. 5.

[2] See https://www.hrw.org/report/2012/11/19/losing-humanity/case-against-killer-robots (accessed, 28 February 2021).

[3] Department of Defense, Directive n. 3000.09 of 21 November 2012, Incorporating Change 1, 8 May 2017, p. 13.

[4] See P. Scharre, *Army of None: Autonomous Weapons and the Future of War*, cit., pp. 27-31.

[5] *"A weapon [which] should fulfil at least three core functions of its engagement cycle autonomously: the search of the objective, the decision to engage and the engagement of the target. Such a weapon should be able to move independently through its environment to arbitrary locations; select and fire upon targets in their environment and create and or modify its goals, incorporating observation of its environment and communication with other agents"*, see J.M. Rickli, *The Economic, Security and Military Implications of Artificial Intelligence for the Arab Gulf Countries,* cit., p. 6.

[6] See also https://bit.ly/3q6RwqJ (accessed, 28 February 2021).

and Act, developed by US Air Force Colonel John Boyd to explain the structure of the decision-making process in the battlefield. Concerning the LAWS, the OODA loop is related to the position of the human operator in the loop and the grade of autonomy of the machine (in-the-loop, on-the-loop, out-of-the-loop).

Starting from the OODA loop, Paul Scharre gives an interesting point of view concerning the LAWS and its operations. As a matter of fact, the three categories are:

– Human-in-the-Loop operations, in which the machine must wait for human intervention to complete the task. It can understand the environment where it is and foresee a specific operation, but it cannot act on its own;

– Human-on-the-Loop operations, in which the system can search, detect, engage, and act autonomously, but the human operator has the possibility to intervene;

– Human-out-of-the-Loop operations, in which the machine has complete control over its actions, there is no communication between the human and the system, with the consequent lack of human intervention.[7]

This had also raised concerns on the ethics of LAWS. Indeed, while LAWS could represent a step ahead in ethics during war: the lack of human emotions could prevent exaggerated violence (sexual one included), reducing civilian harm. At the same time, the same lack of emotion or empathy may have unethical consequences, as the loss of human dignity and moral responsibility in the battleground.

2. LAWS and International humanitarian law

Are the LAWS complying with the basic principles of International humanitarian law (IHL)? One of the core principles that drive the *ius in bello*, a branch of International law linked to arms, civilians and soldiers, is stated in Article 35 of the Protocol 1 Additional to the Geneva Conventions:[8] the limitation in using methods or means of warfare. Since the 17th century, controlling arms was considered at the centre of the Laws of war, as Hugo Grotius showed in *De jure bello ac pacis*.[9] The IHL principles that could be affected by the use and implementation of autonomous weapons during war are the principle of distinction, the principle of proportion (or proportionality), and the principle of avoiding unnecessary suffering.

The principle of distinction is indeed the most problematic: when developing an autonomous weapon, it is essential not only to create algorithms that can distinguish between civilian and military targets, but also to give it the option to stop its action if needed. How could it be possible for the machine to understand whether it has confused a military target for a civilian one without human intervention? New AI technologies are good in identify and detect images through Machine Learning, yet human intervention is

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[7] See P. Scharre, *Army of None: Autonomous Weapons and the Future of War*, cit., pp. 27-31.

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

[9] See A. Iaria, *Da autonomi a completamente autonomi: l'applicazione dell'Intelligenza Artificiale nei sistemi d'arma autonomi (LAWS)*, in *Rassegna della Giustizia Militare*, 2018, n. 6, p. 28.

often necessary to avoid unforgivable mistakes, as Cold War's episode of Lieutenant Colonel Petrov has shown.[10]

The principle of proportion relates to the rule that, during an armed conflict, violence is not unlimited and should not cause additional or superfluous suffering. Among some experts, the proportionality principle is often linked with the concept of asymmetry: only a few states have the capability and the technological power to develop, produce and use the LAWS. Nevertheless, asymmetry is not classified as a rule of IHL: despite the country that uses LAWS complies with IHL rules and principles, there still may be asymmetry in battle. Due to this principle, several conventions have been approved to avoid specific weapons, such as chemical ones or antipersonnel mines.[11]

Besides the principles enounced in Article 35, other rules and principles of customary IHL should be taken into account: the principle of responsibility, the rule of precautions in the attack, and the *hors de combat* (i.e. out of the fight) rule.

Regarding the responsibility principle, it sure to say that LAWS have no responsibility during conflicts. To better comprehend the relation between the principle of responsibility and the LAWS, it may be useful to mention the interpretation given by the 2016 DOD's Law of War Manual: *"The law of war rules on conducting attacks (such as the rules relating to discrimination and proportionality) impose obligations on persons. These rules do not impose obligations on the weapons themselves; of course, an inanimate object could not assume an "obligation" in any event. […] Rather, it is persons who must comply with the law of war".*[12]

Therefore, humans are the only ones responsible for the use of any category of weapons on the battlefield. Needless to say, the State is also responsible for allowing the usages of such weapons. Consequently, even the most complicated weapon should be considered just as a machine, instead of a legal entity. Diplomats and experts strongly believed that humans could be appointed responsible during the wargame.[13] Yet, some questions are debated among experts: who should be the person accountable for the use of autonomous weapons on the battlefield? What will be the responsibility of the human operator that launched the attack through the LAWS? Should be considered responsible also the manufacturer and the creator of the algorithm? And if so, the accountability is individual or collective?[14]

The rule of precautions in attack is foreseen in Rule 15 of the Customary IHL of the ICRC: *"In the conduct of military operations, constant care must be taken to spare the*

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[10] On 26 September 1983, a nuclear strike from the Soviet Union to the US was avoided thanks to Petrov's intervention. Petrov was enough intelligent to understand that the early-warning system of the Soviets predicting a launch of five missiles from US bases was wrong. His intervention avoided the escalation of a disruptive nuclear war.

[11] For the complete texts, see https://www.opcw.org/chemical-weapons-convention (accessed, 28 February 2021) and https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVI-5&chapter=26&clang=_en (accessed, 28 February 2021).

[12] General Counsel of the Department of Defense, *Department of Defense Law of War Manual,* December 2016, p. 353.

[13] See A. Iaria, *Da autonomi a completamente autonomi: l'applicazione dell'Intelligenza Artificiale nei sistemi d'arma autonomi (LAWS)*, cit., p. 29.

[14] See N. Ronzitti, "Uso e sviluppo delle armi autonome. Prospettive per un controllo a livello internazionale", *Osservatorio di Politica Internazionale*, n.81, March 2018, pp.4-5.

civilian population, civilians and civilian objects. All feasible precautions must be taken to avoid, and in any event to minimize, incidental loss of civilian life, injury to civilians and damage to civilian objects".[15]

The problem here is connected to the word "feasible", which could be misunderstood as "freedom" by military chiefs: if the LAWS are the only armaments available, improper use of those weapons would be legitimate. Besides, to be fully aware of weapons used during conflicts, militaries must comply with the legal review foreseen in Article 36 of the above-mentioned Protocol.[16]

The final principle menaced by the LAWS is the rule of *hors de combat,* which requires to not harm soldiers who surrender or are unable to fight. A combatant is considered outside the fight if he/she is taken, express the will to surrender or is unconscious, sick or not in the position of defending himself, as defined in Article 3 of the Geneva Convention.[17] Despite humans in history have been using many signals, surrender is a matter of intention. How can a machine recognize an intention?[18]

All these issues linked to the threats of the LAWS are still debated among IHL's experts and academics, and the solution to them is still far. However, not everyone considered the use of Unmanned Aerial Vehicle (UAV) in warfare as a threat. In an article published on Foreign Policy, Erik Lin-Greenberg, fellow at Stanford University's Centre for International Security and Cooperation, gave a different opinion. Referring to recent tensions between the US and Iran on the shutdown of a drone in the middle of the Strait of Hormuz in 2019, he said that using drones and similar technologies may help to control escalation in crisis among states. Firstly, because it could save human lives: attacking drones will have significantly fewer casualties than military sites. Shooting down drones may indeed represent a sort of warning from a country to another one on specific military actions, without harming humans. Secondly, the loss of autonomous weapons would not lead to a strong reaction from the harmed state. In addition, decision-makers will not experience emotional reactions related to the loss of lives. Therefore, the choice of alternative ways to respond to the attack will probably be higher.[19]

3. LAWS' development worldwide

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[15] J.M. Henckaerts, L. Doswald-Beck, *Customary International humanitarian law*, Cambridge University Press, 2005, p. 51.

[16] "*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.",* see Art. 36 of the Additional Protocol (I) to the Geneva Convention.

[17] "*In the case of armed conflict not of an international character occurring in the territory of one of the High Contracting Parties, each Party to the conflict shall be bound to apply, as a minimum, the following provisions: Persons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed ' hors de combat ' by sickness, wounds, detention, or any other cause, shall in all circumstances be treated humanely, without any adverse distinction founded on race, colour, religion or faith, sex, birth or wealth, or any other similar criteria.",* see Art. 3, par. 1 of the Geneva Convention (1949).

[18] For a complete overview of the relation between LAWS and IHL principles, see P. SCHARRE, *Army of None: Autonomous Weapons and the Future of War*, cit., pp. 251-270.

[19] E. Lin-Greenberg, "Trump Is Playing Iran's Game of Drones", *Foreign Policy*, 20 June 2019.

Not all countries in the world have the capabilities to craft and develop LAWS. Despite several countries, such as China, Iran, Iraq, Israel, Jordan, Kazakhstan, Myanmar, Russia, Saudi Arabia, the UK and the US[20] are developing autonomous drones, there was no official statement nor regulation by any country. The LAWS' race has already started with different levels of transparency. While the US and the UK have public records that show the state of the art, Russia, on the contrary, has not a public and transparent policy on it.

Although common thoughts have always considered the US as the global leader in military technology, other countries are developing LAWS: a brief presentation of different projects initiated by some countries as the US, South Korea, the UK and Russia will follow.

Several projects, both national and private, are currently evolving in the US. One of them is the Long-Range Anti-Ship Missile (LRASM): designed by the DARPA and the Navy Air Force, this AI missile can strike enemy targets at long distances, up to 500 nautical miles. Even if at the beginning there was confusion on the classification of such weapon,[21] it could be classified as a semiautonomous one. As said by its producer, Lockheed Martin, "*LRASM employs precision routing and guidance [...]. This advanced guidance operation means the weapon can use gross target cueing data to find and destroy its pre-defined target in denied environments*".[22] The debate was indeed on the concept of predefined, which could mean that the target was chosen earlier by the human operator, or that the machine itself might choose the target among a specific group. The company later confirmed through a test that a human operator is needed during the entire operation, avoiding the risk of an excessive machine's independence. It is not the weapon that decides which target to destroy.[23] Another important project that has been developing during recent years is the Collaborative Operation in Denied Environments, aka CODE. The project consists of a collaborative group of UAVs that can be guided together by a single human operator. However, the supervisor is a guarantee of having human-in-the-loop operations: the main aim is not to build LAWS, but to create a collaborative autonomy in order to simplify target recognition.[24]

Before describing some projects realised by the UK, it is useful to describe in a nutshell which is the British doctrine on the LAWS. At the beginning, the UK government seemed to not believe that an autonomous weapon would never be created.[25] This doctrine has

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[20] For a list of a global state of play of the development of UAVs, see https://bit.ly/3e72fzt (accessed, 28 February 2021).

[21] See J. Markoff, "Fearing Bombs That Can Pick Whom to Kill", *The New York Times*, 11 November 2014.

[22] See https://www.lockheedmartin.com/en-us/products/long-range-anti-ship-missile.html (accessed, 28 February 2021).

[23] See *ibidem*.

[24] See P. Scharre, *Army of None: Autonomous Weapons and the Future of War*, cit., pp. 62-76.

[25] See https://modmedia.blog.gov.uk/2016/06/10/defence-in-the-media-10-june-2016/ (accessed, 28 February 2021), and UK Ministry of Defence, *Joint Doctrine Note 2/11: The UK approach to Unmanned Aircraft Systems,* 30 March 2011.

changed through the years, as showed in the Joint Concept Note 1/18, where it is defined as the difference between an autonomous and automated system.[26]

The most famous projects carried out by the UK are the Brimstone Missile, similar to the American LRASM, and the Taranis drone. The Brimstone Missile has two different modes that can aid the human operator to select and detect targets: the Single Mode, which allows the machine to act following an indication provided through a laser by the human operator; and the Dual Mode, which unifies the laser guidance with a radar which helps the weapon to move faster and detect target easier. Both have the human-in-the-loop system, so we are referring to a Semiautonomous weapon. The Taranis drone is also considered a semiautonomous weapon: in an imaginary situation, it would reach a specific area and target the enemy. However, the fire command would start from the human being and all operations would be under the control of a trained team.[27]

Respecting its tradition of being a military superpower, Russia is currently developing various warfare robots, designed specifically for ground environments, both for defence and attack purposes: the Platform-M, the Uran-9 and the T-14[28] are just some examples of what Russia could achieve in this field. Furthermore, the Russian army is already working to craft a Fully Autonomous Weapon, which will have the ability to identify and make decisions to engage targets.

4.1 Looking for a regulation

Generally speaking, one of the first rules on autonomous weapons was the Martens Clause, which firstly appeared in the preamble of the Hague Convention of 1899. The Clause was born to substitute a specific regulation emerging in case of a lack of consensus: which is the current status related to the LAWS' issue.[29]

First concerns were raised at the international level in 2012 with the Stop Killer Robots campaign[30] and by the United Nations (UN) through of Group of Governmental Experts (GGE) in the framework of 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). The CCW, first drafted in 1981, is composed of a Convention and five different protocols and, since 2016, several conferences led by experts' groups have pursued to find a proper regulation on LAWS. Though years, countries have been showing different positions on the concept of autonomy in warfare: while France, Germany, and the EU have proposed a political binding solution, the US and Russia opposed any sort of regulation, claiming that principles and rules of International law are enough. Many issues were studied through the meetings, such as:

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[26] See UK Ministry of Defence, *Joint Concept Note 1/18: Human-Machine Teaming,* May 2018.

[27] See P. Scharre, *Army of None: Autonomous Weapons and the Future of War*, cit., pp. 105-111.

[28] For specific information on the developments of such Russian weapons, see *ivi*, pp. 11-117.

[29] *"Until a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between civilized nations, from the laws of humanity and the requirements of the public conscience"*, see R. Ticehurst, "The Martens Clause and the Laws Of Armed Conflict", *International Review of the Red Cross*, No. 317, 30 April 1997.

[30] See https://www.stopkillerrobots.org/ (accessed, 28 February 2021).

the necessity to conform to all weapons, to the IHL standards; state's accountability while using LAWS; the need to consider all technological developments concerning LAWS, but without any sort of limitation for civilian purposes; the interaction between human and machine as an additional guarantee in developing trustworthy technologies; the concept of meaningful human control, its meaning and its operational implementations.[31]

To concretely understand how the CCW is currently solving these issues, it is relevant to briefly analyse the conclusions of the last meetings held in Geneva on 25-29 March and 20-21 August 2019, in which they provided a set of rule known as "11 Guiding Principles".[32] One of the first conclusion drawn by the group was on the Human-machine interaction in LAWS' operations, which should always comply with rules and principles of IHL: distinction, proportionality, precautions in attack and good faith. Human judgement and control, indeed, is fundamental to guarantee the respect of IHL. The GGE also stated that States are not only responsible for using LAWS, but have to ensure that "*individual responsibility for the employment of means or methods of warfare involving the potential use of weapons systems in accordance with their obligations under IHL*".[33] States are considered meaningful actors also for studying and foreseeing potential effects on the use of LAWS on the battlefield: the GGE strongly suggested to countries to carry out legal reviews, considered as useful tools to improve research and understanding on LAWS. According to the Group, there is still much uncertainty among countries both on the theoretical and the practical side of LAWS.[34] In addition, the current pandemic crisis will hardly slow the debate within CCW on LAWS. The next review of the CCW will be held on December 2021, but while for Izumi Nakamitsu, UN high representative for disarmament affairs, this period will be sufficient for the GGE to succeed in finding a solution, according to Mary Wareham, coordinator of the Stop Killer Robots Campaign, the achievements reached by the International Community are not impressive.[35]

In a nutshell, which are the current options proposed for proper regulation? The research of laws for robotics has brought several instruments, such as legal bans on LAWS, political declarations, and legal reviews. As said above, many obstacles have arisen through years and a common regulation is difficult to find. There are indeed political issues, as the disagreement on definitions of LAWS and meaningful human control, as well as practical issues, as lightning-fast technological developments, the domestic

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[31] See N. Ronzitti, "Uso e sviluppo delle armi autonome. Prospettive per un controllo a livello internazionale", *Osservatorio di Politica Internazionale*, n.81, March 2018, pp. 6-8.

[32] See https://bit.ly/3eeyi0i (accessed, 8 March 2021).

[33] 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, Draft Report of the 2019 session of the group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, CCW/GGE.1/CRP.1/Rev.2, 21 August 2019, p. 4.

[34] *"[There is uncertainty on] how constraints and capabilities could reduce the likelihood of causing civilian casualties or damage to civilian objects and thereby assist with implementation of IHL by parties to an armed conflict. [...] identifying and reaching a common understanding among High Contracting Parties on the concepts and characteristics of lethal autonomous weapons systems could aid further consideration of the aspects related to emerging technologies in the area of LAWS."*, see *ivi*, p. 5.

[35] See J. Delcker, A. Gray, "Top UN official: It's not too late to curb AI-powered weapons", *POLITICO Europe*, 11 February 2020.

proliferation of technology, uncertainty and doubts about future capabilities, national and strategic interests, and lack of will and resources. All of them could be solved only with an improvement in the understanding of LAWS and a shared consensus on them.[36] International Organisations, such as the UN and its related bodies, seem weak and not prepared to find common solutions among countries.

Nevertheless, today's solutions on the table for a proper regulation on LAWS are few and not so convincing. The first one is a complete ban on Autonomous Weapons. This option is supported firstly by NGOs (as the Stop Killer Robots campaign showed), secondly by international institutions as the EP and the Organisation for Security and Co-operation in Europe (OSCE), and by some countries that are not really into the debate, such as Algeria, China, El Salvador, State of Palestine, the Holy See, and others.[37] What do these nations have in common? Most of them, excluding China and the Holy See for the opposite reasons, are not military superpowers. Their support for a complete ban is for protecting themselves from developed states and from a technology that they do not own, rather than defence for civilians or human rights. This attitude would indeed obtain the opposite: a strong resistance to limit the use of the LAWS. Due to the lack of clarity and consensus on what is the LAWS among military superpowers, the ban option is less liked to be adopted. The second option is a ban on antipersonnel LAWS, a specific type of weapon that target people. It may be considered an optimal alternative solution. First and foremost, because is clear what an antipersonnel LAWS is. Secondly, because the military utility is low: these weapons are used mainly for targeting people rather than objects, and the hazard increases. Thirdly, there is the concept of terribleness perceived by the public. Weapons that have as objective humans are indeed considered as an enormous threat by people, and public fear would be a relevant factor in the decisions of policymakers. The third one is political non-binding rules. Technology is indeed changing and growing rapidly and having an updated regulation is almost impossible: different issues require different answers. The aim here is to create a set of rules that, following the IHL's principles, would reduce the risks of unintentional harm for humans. Eventually, another option could be the creation of a new principle of International Law specifically related to human involvement. All the solutions proposed above have one thing in common: they include technology as the starting point. However, technology is in continuous evolution and preview which will be its changes is (almost) impossible. The solution may be to designing a sort of Martens Clause specific for war regulation. To carry on the attack and make responsible decisions during war, the human operator should follow some strict instructions, such as: to follow the principles of IHL and consider the lawfulness of the operation; to have specific information on targets, weapons, environment and framework, and to show possible consequences of a malfunction. This new principle, may leave poor space for interpretation and, on the opposite, obtain more respect of International Law itself.[38] This principle is related to the concept of

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[36] See https://bit.ly/3uI6hnq (accessed, 28 February 2021).
[37] See https://www.stopkillerrobots.org/endorsers/ (accessed, 28 February 2021).
[38] See *ivi*, pp. 353-359.

"Meaningful Human Control", which has three components: information on weapons, conscious decisions, and preparation of personnel.[39]

4.2 The European position on LAWS

Despite the EU cannot be considered truly as a relevant geopolitical actor, it tried to address the issue for a proper regulation on LAWS. The EU position is strong and could be explained following these key points: all weapons systems should comply with International law and its branches; human control must be guaranteed, remaining responsible for decisions over life and death; the CCW should represent the proper frame to discuss, define and find rules and principles on such weapons; limitations on LAWS should not affect civilian research on AI.[40]

Such points were raised in the EP Resolution on Autonomous Weapons dated 12 September 2018, passed with 566 votes in favour, 47 against, and 73 abstentions, in which the Members of the European Parliament (MEPs) asks the EU to take an active and leading role in the global military AI framework. Starting from considerations on the Martens Clause, the main principles of IHL and the position of the CCW, the EP's position on LAWS is quite negative. Given that LAWS are a system that has no "*meaningful human control over the critical functions of selecting and attacking individual targets*",[41] the resolution stresses the necessity of human command on LAWS, relying on human accountability on life and death's decisions, and on the defensive role of these weapons. The text asks the EU According to the EP, such weapons should be crafted only to protect platforms, forces and people against highly dynamic threats such as hostile missiles, munitions and aircraft,[42] as also stated in the Meeting of the High Contracting Parties to the CCW on 21-23 November 2018.[43] This approach was later confirmed and recalled in a report adopted on 20 January 2021, in which the EP demands to structure an EU legal framework on AI, specifically based on ethical and human-centred principles.[44] As expressed by its Rapporteur Gilles Lebreton: *"Faced with the*

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[39] *"Human operators are making informed, conscious decisions about the use of weapons; human operators have sufficient information to ensure the lawfulness of the action they are taking, given what they know about the target, the weapon, and the context for action; and the weapon is designed and tested, and human operators are properly trained, to ensure effective control over the use of the weapon.",* see P. Scharre, M. Horowitz, *Meaningful Human Control in Weapon Systems: A Primer,* Center for a New American Security, March 2015, p. 4.

[40] See https://bit.ly/3bQ3z6X (accessed, 28 February 2021).

[41] European Parliament resolution of 12 September 2018, *on Autonomous weapon systems*, 2018/2752(RSP).

[42] See *Ibidem.*

[43] *"We agree that technical attributes alone are inadequate to agree on a working definition on LAWS, given the fast-paced evolution of emerging technologies, including in the civilian sector that are applicable to weapons systems with increasingly autonomous functions. [...] We firmly believe that humans must make the decisions with regard to the use of lethal force, exert control over lethal weapons systems they use, and remain accountable for decisions over life and death",* see EU Statement: Meeting of the High Contracting Parties to the Convention on Certain Conventional Weapons (CCW) Agenda Item 8 (Geneva, 21-23 November 2018); see also https://www.stopkillerrobots.org/2018/09/europeanparliament-2/ (accessed, 28 February 2021).

[44] European Parliament resolution of 20 January 2021, *on artificial intelligence: questions of interpretation and application of international law in so far as the EU is affected in the areas of civil and military uses and of state authority outside the scope of criminal justice,* 2020/2013(INI).

multiple challenges posed by the development of AI, we need legal responses. [...] AI must always remain a tool used only to assist decision-making or help when taking action. It must never replace or relieve humans of their responsibility".[45]

5. Conclusions

Despite an agreement for an international ban is difficult to reach, it is duty of advanced countries to show the way, as it was done by Canada for the Anti-Personnel Mine Ban Convention.[46] Technology is developing faster in all areas, and having a proper regulation on AI in warfare would avoid massive and improper uses by violent and non-state actors, as they are already doing, specifically related to surveillance.[47] Indeed, there are various open source programmes, such as TensorFlow, that allow to build easily algorithms and neural networks.[48] This is just another reason that should force international community to make clear rules for autonomy in defence, going beyond the ordinary principles of IHL and forcing the regional power to take their political responsibility.

The use of LAWS is not optimal for our imperfect world, yet they are a reality, and a shared solution is essential.

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[45] European Parliament, *Guidelines for military and non-military use of Artificial Intelligence,* 20 January 2021, available at https://bit.ly/3chkb7X (accessed, 8 March 2021).

[46] See https://www.thecanadianencyclopedia.ca/en/article/land-mines (accessed, 14 March 2021).

[47] For a concrete example, see P. Chovil, "Air superiority under 2000 feet: lessons from waging drone against ISIL", *War on the rocks*, 11 May 2018.

[48] See https://www.tensorflow.org/ (accessed, 15 March 2021).