

INTERNATIONAL JOURNAL OF LAW
MANAGEMENT & HUMANITIES

[ISSN 2581-5369]

Volume 5 | Issue 3

2022

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International Humanitarian Law and Autonomous Weapons Challenges and Implications

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ABSTRACT

Technological advancement has brought a revolution in weapon systems to the extent that the requirement of human intervention and control is gradually fading. As the extent of machine autonomy is increasing, it becomes pertinent to assess the compatibility of such weapons with rules of International Humanitarian Law (hereinafter IHL). Granting complete autonomy to weapons would mean allowing them to make crucial decisions of life and death. Although machines are well equipped to make data analysis and perform mathematical calculations, making a distinction between civilians and combatants can be a challenging task for them in some situations. This distinction is inevitable for the compliance of two fundamental principles of IHL i.e. principle of distinction and proportionality.

The present article assesses if autonomous weapons can be made compliant to the above-mentioned principles and what would be the challenges imposed by the use of such weapons. It provides some suggestions for rule making and finally concludes that at present it is important to keep a human being in loop and that complete autonomy to weapon systems can lead to catastrophic results.

Keywords: *International Humanitarian Law, autonomous weapons, distinction, proportionality, armed conflict.*

I. INTRODUCTION

An autonomous weapon can be defined as one which exercises autonomy when making critical decisions such as to search, detect and identify a target and attack such target without any human intervention². The human intervention is limited to the initial stage of assimilation of such weapon and its launch. Once this has been done, the autonomous weapon itself using its sensors, programming software and weaponry executes the action to be performed. They are

¹ Author is an Assistant Professor at VIPS, GGSIP University, India.

² International Committee of the Red Cross (ICRC), *Views of the ICRC on Autonomous Weapon Systems*, paper submitted to the Convention on Certain Conventional Weapons Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS), 11 April 2016, Available at: <https://www.icrc.org/en/document/views-icrc-autonomous-weapon-system> (last visited May 13, 2022).

being rightly referred to as the third revolution in warfare, after gun powder and nuclear weapons.

Although at this point in time, there are no fully autonomous weapons being used but considering the pace of technology, it seems that the day is not far when such weapons would be involved in a conflict independent of human intervention. While their use has some distinct benefits over human soldiers yet there remains some ambiguity with regard to their consonance with principles of International Humanitarian Law (hereinafter IHL) especially the principle of distinction and proportionality. None of the international treaties at present, explicitly mention the use and regulation of such weapons but their adherence to norms of IHL is inevitable. Therefore, those who plan an attack or operate such weapons, must ensure that when put to use, these weapons must preserve their ability to make necessary legal judgements for compliance with rules of IHL.

The Martens Clause provides for cases not covered under existing treaties to be governed by customary IHL, the principles of humanity and dictates of public conscience.³ The principle of humanity acts as a common reference point for all emerging means of warfare thereby preventing the assumption that all which is not explicitly prohibited, is permitted. However, the pace of progress in this field has been profound such that the distance between the target and the aggressor has been consistently increasing and critical decisions of life and death seem to be ceded to machines. It is thus, important to assess the legality of such weapons and determine if it is possible for them to follow the rules of IHL.

The present article, while distinguishing between automatic and autonomous weapons assess the compatibility of fully autonomous weapons with some vital rules of IHL. It analyzes how the rules of distinction and proportionality become difficult to follow by autonomous weapons in some situations. However, this does not imply that their use must be completely banned rather what is suggested is to keep a human in loop and determine the upper limit for which autonomy can be granted to a weapon. To this effect some rule making suggestions have also been incorporated in the article.

II. DIFFERENTIATING AUTOMATIC WEAPONS FROM AUTONOMOUS WEAPONS

At the outset, it is important to know the difference between automatic and autonomous weapons for even though there are plenty of automatic weapons being used, fully autonomous

³ The “principles of humanity and the dictates of public conscience” are mentioned notably in article 1(2) of Additional Protocol I and in the preamble of Additional Protocol II to the Geneva Conventions, referred to as the Martens Clause.

weapons have not yet been deployed. Precursors with varying degree of autonomy though have been used by many countries while research in the field of autonomous weapons is still ongoing especially when it comes to equipping these weapons with full autonomy.

Historically, weapons were crafted for hand to hand combat or those that had a limited range. Overtime, a leap had been made in this regard as the range of weapons has been increased to the extent that combat has become less of an exchange between opposing warriors and more of an exchange between weapons. Contemporary armed forces are now equipped with weapons that are capable of targeting and striking at an enemy from a distance. The use of unmanned aerial vehicles to drop bombs and robots for a number of military tasks has brought a revolution in armed conflict. This development not only seems irreversible but also continuously evolving towards advancement. It is here that we find the use of autonomous weapons in future wherein such weapons would be able to identify their target and neutralize them without human interference.⁴ Consequently, a possibility in the times to come would be wars by and among machines.⁵

The term 'autonomous' when used for a weapon puts forth the idea that the weapon is capable of making decisions without human intervention. For this purpose, it includes both hardware and software components needed to make autonomous decisions. The extent of autonomy may vary and it may depend on certain factors such as (i) its frequency of interaction with a human (ii) its tolerance for uncertainty of environment (iii) its discretion to change its decision as per the situation (iv) its capability to learn from its actions and adding new courses of actions to its system.⁶

Artificial Intelligence is what enables these weapons to respond differently to different situations thereby expanding their possibilities using both quantitative and qualitative assessment of the information that they are confronted with.⁷ Sensors, algorithmic mechanisms and other software inputs enable them to work independently. Having addressed what comprises of autonomous weapons, it also important to distinguish them from automatic weapons which also includes certain drones and robots. The main difference between the autonomous weapons systems and other weapons is the use of artificial intelligence to select a

⁴ N.E. Sharkey, *The Evitability of Autonomous Robot Warfare*, 94 INT. REV. RED CROSS 787, 788 (2012)

⁵ Jereon van den Boogard, *Proportionality and Autonomous Weapon Systems*, 6, J. INT. HUMANIT. LEG. STUD. 1,4 (2016)

⁶ W.C. Marra and S.K. McNeil, *Understanding 'The Loop': Regulating the Next Generation of War Machines*, 36(3) HARV. J.L. & PUB. POL'Y. 1139, 1152 (2013)

⁷ A. Backstrom and I. Henderson, *New Capabilities in Warfare: An Overview of Contemporary Technological Developments and the Associated Legal and Engineering Issues in Article 36 Weapons Reviews*, New Capabilities in Warfare: an Overview of Contemporary Technological Developments and the Associated Legal and Engineering Issues in Article 36 Weapons Reviews, 94 INT. REV. RED CROSS 483, 490 (2012)

target and engage it without human interference. This may even cause an autonomous weapon to act in unpredictable ways. What primarily distinguishes an autonomous weapon from an automatic one is the ability of the former to decide whether to attack or not even after the military target has emerged. Automated weapons are designed to operate automatically at a target in a predetermined environment. In other words, once the configurations are made, the results are predictable.⁸ Examples of automated weapons include mines, sentry guns, missiles etc. The main characteristic of automated weapons is that after being deployed, there is no separate moment of active decision-making to attack. Thus, while automated weapons fire upon detecting a target autonomous weapons select their targets.

Automated weapons always have a human being in loop who is responsible for making the important decisions but fully autonomous weapons take all crucial decisions of reasonability and practicality by themselves. They use artificial intelligence for this purpose and once programmed in a certain way they independently perform their tasks. It is their independent decision making ability that needs to be analysed in order to assess whether or not they can be made compliant to principles of IHL. For the purposes of the present article, the term ‘autonomous weapons’ means those weapons that are work autonomously without human intervention and use artificial intelligence to take any decision related to the attack.

Assessing Legality of Autonomous Weapons

While reviewing the lawfulness of any weapon, it is obligatory to know of its specific characteristics and whether such weapons when intended to be used would be able to follow the fundamentals of IHL in all situations and for all times to come. It would also need an interrogation into the treaties and customary practice with regard to the use of certain weapons as well as general rules pertaining to all means and methods of warfare. A verification and testing of the weapon in advance, to understand its capabilities and to foresee its effects is a prerequisite for its lawful use. For unlike a weapon under direct human control, autonomous weapons must provide the confidence that when put to use, they would abide by requirements of IHL in all circumstances.

As far as the legal framework is concerned, autonomous weapons can more or less be treated like any other means of warfare. For even though they exercise autonomy in terms of deciding an attack, nevertheless at some point the whole process is initiated by human beings. Therefore, it may be said that the rules of IHL apply with equal force to autonomous weapons as well.

⁸ W.H. BOOTHBY, AUTONOMOUS ATTACK- OPPORTUNITY OR SPECTRE?, in T.D. Gill ET. AL., (eds.), Yearbook of International Humanitarian Law 73 (2014)

What only remains to be discerned is whether or not such weapons need some additional restraints as well?

Presently, there is no multilateral treaty that completely bans the use of autonomous weapons. To analyze the legality of such weapons it is important to determine whether a new weapon would be prohibited by IHL rules under any circumstances.⁹ This obligation is based on the notion that parties to a conflict do not have the unlimited right to choose their means of warfare. The restrictions imposed on use of weapons are outlined in customary IHL and a number of treaty provisions. In the present article three important obligations to be observed by States during an armed conflict are discussed *vis-à-vis* autonomous weapons. These are the prohibition to cause superfluous injury and respecting the principle of distinction and proportionality during an armed conflict.

Autonomous Weapons and Superfluous Injury

The first general obligation under IHL is to refrain from using weapons that cause superfluous injury or unnecessary suffering.¹⁰ Although this obligation cannot be defined in exact terms, it in general means to weigh the military advantage of a weapon with the harm it does to the fighters of the parties to the conflict.¹¹ An example of this kind of weapon that was outlawed due to the superfluous injury it caused, is the bullet that explodes or expands upon contact with human body. The kind of harm that these bullets cause is usually aggravated leaving no chance for the soldier to survive.¹²

The primary reason to prohibit weapons that cause superfluous injury or unnecessary suffering is the effect that the weapon is designed to inflict. This implies that the focus is not so much on the weapon system but rather on the impact that such a weapon creates. It must be noted that the prohibition must be assessed by the effect the weapon is designed to have on fighters of the parties to the conflict, and not necessarily of its impact on civilians, provided they are not directly participating in the hostilities. For instance, antipersonnel landmines were designed to cause severe wounds to the limbs of the affected soldiers. These wounds often caused the soldiers to lose (parts of) their limbs. Consequently, some militaries agreed to completely ban

⁹ Article 36 of Additional Protocol I to the 1949 Geneva Conventions of 1977 (hereinafter API) provides that “[i]n 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 Parties.”

¹⁰ See Article 35(2) API and Rule 70 of the ICRC Customary International Humanitarian Law Study.

¹¹ See generally H. Meyrowitz, *The Principle of Superfluous Injury or Unnecessary Suffering*, 34(299) INT. REV. RED CROSS 98, 122 (1994)

¹² The St. Petersburg Declaration of 1868 states that the purpose of war is to weaken the military forces of the enemy by disabling the greatest possible number of men, and that this object would be exceeded by the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable.

antipersonnel landmines in those States. The impact of anti-personnel landmines on the civilian population was an additional, but separate, motivation for States to agree on banning their use, production, stockpiling, and transfer¹³.

As far as autonomous weapons are concerned, the fact that they select and attack targets without human interference has no relation to them causing unnecessary suffering or superfluous injury. The impact of the munitions used by them can be put to restraint and regulations similar to those put on any other weapon of contemporary use can be implemented. Therefore, in this regard autonomous weapons would operate in the same manner as existing weapons do.

Principle of Distinction and Autonomous Weapons

The principle of distinction as first set out in the St. Petersburg Declaration, states that war is to be waged against the enemy's forces and not against civilians. It has been qualified as the cardinal and intransgressible principle of IHL¹⁴. What it basically enforces is that even during an armed conflict the only acceptable action is to weaken the military potential of the enemy. In other words, there is an encumbrance on the combatants to distinguish themselves from the civilians the latter of whom, may not be attacked nor participate in the hostilities. Further, this principle mandates the exclusion of inherently indiscriminate weapons i.e. those which by their very nature cannot be targeted towards a particular group of people.¹⁵ Examples of it will include the V2 and Scud missiles used by Nazi Germany and Saddam Hussein's government respectively.

While fighting on the battlefield, this distinction is most obvious to make however with the use and deployment of autonomous weapons, maintaining this distinction may at times become difficult. To implement this distinction in the true sense advanced observation and recognition abilities along with the capability to exercise judgment as per the situation, is a must.¹⁶ While the observation and recognition abilities of machines far surpasses that of humans however an area where it still lags behind is the exercise of judgment. This judgment is pertinent in order to act differently under different circumstances.

For instance, it is pertinent for an autonomous weapon to distinguish between a regular and active combatant and one who is *hors de combat*. Likewise a distinction also needs to be made

¹³ ADAM ROBERTS & RICHARD GUELFF, DOCUMENTS ON THE LAWS OF WAR, 648 (Oxford University Press 2003)

¹⁴ Yoram Dinstein, *Distinction and Loss of Civilian Protection in International Armed Conflicts*, 38 IYHR 1,3 (2008)

¹⁵ Article 51(4)(b) API

¹⁶ Elliot Winter, *The Comparability of Autonomous Weapons with the Principle of Distinction in the Law of Armed Conflict*, 71, INTERNATIONAL AND COMPARATIVE LAW QUATERLY 845,847 (2020)

for a member of military medical service who may be carrying a weapon for personal protection or an armoured vehicle bearing the Red Cross emblem and being used as an ambulance. All these require the application of reason and judgment on the part of weapon. Furthermore, it can be a challenging task for autonomous weapon system to be able to refrain from attacking a person who has clearly expressed the intention to surrender, because this would need multiple qualitative assessments.¹⁷

Hence as regards the principle of distinction, autonomous weapons do not become illegal at the outset yet like in the case of any other weapon, autonomous weapons also need to be thoroughly tested before being put to use to ensure that they fulfil the requirements of law. It is important to mention here that testing autonomous weapons poses a number of challenges which are both methodological and practical in nature.¹⁸

Autonomous Weapons and Proportionality

The rule of proportionality is not only a rule of customary international humanitarian law but also is codified under article 51(5)(b) API. It requires a military commander to cancel or postpone an attack if the direct military advantage anticipated is less than the expected loss or damage to civilian life. The principle of proportionality is the last check required to be done by a military commander before an attack is conducted. The military commander is also required to continue keeping this check and cancel or suspend the attack, if possible, in case it does not fulfil the requirements of the principle of proportionality any time later¹⁹.

For this purpose many factors have to be considered such as how the concept of military advantage, military objective, civilian and civilian objects are to be defined and the gravity to be attributed to each one of them. In a proportionality analysis, much also depends on the type of adversary one is engaging and the type of operation that is being conducted.²⁰ Such an analysis however is subjective and prone to varying interpretations.

Necessity to make distinction

The principle of proportionality and distinction are interrelated to the extent that in order to calculate the military advantage before executing a planned attack, it is important that the

¹⁷ Article 41 of API. Also see W.H. BOOTHBY, *THE LAW OF TARGETING* 286 (Oxford University Press 2012)

¹⁸ See the Report of International Committee of Red Cross (ICRC) on Autonomous Weapons for meeting held on 24-26 March 2014 available at: <https://www.icrc.org/en/document/report-icrc-meeting-autonomous-weapon-systems-26-28-march-2014> (last visited on May 4, 2022)

¹⁹ Article 57(2)(b) API

²⁰ Jereon van den Boogard, *Proportionality and Autonomous Weapon Systems*, 6, J. INT. HUMANIT. LEG. STUD. 1,14 (2016)

autonomous weapon is able to make a distinction between hostile forces and civilians. Researchers have different opinions on this ability of autonomous weapons as some consider that algorithms for target killing are promising while others have their doubts on the same.²¹

Nevertheless, this distinction has no importance in a place which is unpopulated, or in an air to air combat or between warships in high seas. What remains unsettled is whether autonomous weapons would be able to make a combined analysis of all factors to determine whether an individual is protected IHL or not and this analysis is integral to calculate a military advantage as required by the principle of proportionality. The human mind definitely seems superior in this aspect as it is able to assimilate a lot of data and differentiate without much trouble. The apple-tomato example used by Singer, is a clear example of this superiority. According to it, a computer might find it difficult to distinguish between an apple and a tomato considering the similarity in size and colour, but the same could be easily done by a three year old.²² In similar vein, for an autonomous weapon it might become difficult to distinguish between civilians and combatants in urban areas where both are constantly moving around.

Limitation of Autonomous Weapons to calculate military advantage

For the purposes of proportionality principle, the military advantage to be calculated should be concrete, direct and military in nature. Rule 1(w) of the Air and Missile Warfare Manual gives an appropriate definition of it, according to which a military advantage means “those benefits of a military nature that result from an attack. They relate to the attack considered as a whole and not merely to isolated and particular parts of attack.”²³ Although the term military advantage is broad in its application yet some concrete examples of it may include destruction of enemy stronghold, barracks or headquarters. It is comprised of a notion of wide range of tactical gains and military considerations that need not necessarily derive by destroying a particular object under attack but may require a cumulative analysis.²⁴

However, in spite of having a clear understanding of the expected military advantage and collateral damage in case of a planned attack, the decision whether the former exceeds the latter

²¹ See generally, D.R. Jacques, ‘Search, Classification and Attack Decisions for Cooperative Wide Area Search Munition’ in BUTENKO et al. (eds.) 1 COOPERATIVE CONTROL: MODELS, APPLICATIONS AND ALGORITHMS COOPERATIVE SYSTEMS (2003) and J.D. Herbach, *Into the Caves of Steel: Precaution, Cognition and Robotic Weapon Systems under the International Law of Armed Conflict*, 4 *Into the Caves of Steel: Precaution, Cognition and Robotic Weapon Systems Under the International Law of Armed Conflict*, ALF 19 (2012)

²² P.W. SINGER, *WIRED FOR WAR*, 76 (Penguin Press 2009)

²³ Useful definitions are provided by the Expert Group that drafted the HPCR Manual on International Law Applicable to Air and Missile Warfare (AMW Manual).

²⁴ R. Geiss, *The Principle of Proportionality: Force Protection as a Military Advantage*, 45 *ISR LAW REV.* 77, 91 (2012)

would require judgment by a reasonable military commander which in turn is a subjective analysis²⁵. As far as the algorithm is concerned, it's calculations are restricted to limited number of situations, even if that number is high. An autonomous weapon can make a judgment either based on what has been fed into it or what it has already encountered on previous missions. What is required of an autonomous weapon is but to learn from previous situations and take a new course of action as per the environment, if needed. This is where the human rationality and qualitative judgment surpasses an autonomous weapon and the need to keep a human in loop is felt.²⁶

The question therefore is, whether it is at all possible to design an autonomous weapon that can act reasonably making a cumulative assessment in all situations and within the boundaries of IHL? This certainly depends upon the kind of sensors and programming employed within a system²⁷. For sometimes a situation may require a simple mathematical assessment such as when a planned attack would kill hundred enemy combatants but only four civilians. But, at other times the assessment may not be as simple such as when the destruction of a vital civilian infrastructure would require to be compared with one enemy tank and four enemy soldiers. It is in such situations that the decision making ability of an autonomous weapon would be questionable.²⁸

Nevertheless, with the right kind of programming it may in future be expected that autonomous weapons would be able to make the kind of assessments required to make a distinction and adhere to the principle of proportionality. While that might take some time, there are at present some clear and apparent benefits that autonomous weapons offer to mankind.

III. SOME APPARENT BENEFITS OF AUTONOMOUS WEAPONS

It cannot be contested that development and use of autonomous weapons will pose some challenges and implications for law and regulation however, the same is true for any technologically advanced weapon system. For instance, machine malfunctioning, operational issues, unpredictable results etc. have plagued all forms of weapons that use technology and is not limited to autonomous weapons *per se*.²⁹ On the other hand, the benefits that these weapons

²⁵ See generally *Prosecutor v. Stanislav Galic*, Trial Chamber Judgment, Case No. IT-98-29-T, (2003)

²⁶ A. Backstrom and I. Henderson, *New Capabilities in Warfare: An Overview of Contemporary Technological Developments and the Associated Legal and Engineering Issues in Article 36 Weapons Reviews*, 94 INT. REV. RED CROSS 483, 493 (2012)

²⁷ J. Kellenberger, *Keynote Address, International Humanitarian Law and New Weapon Technology*, 94 INT. REV. RED CROSS 809, 812 (2012)

²⁸ See generally, L.K. McPherson, *Excessive Force in War: A golden Rule Test*, 7 THEORITICAL ENQUIRIES IN LAW 81, 94 (2006)

²⁹ Ryan Calo, *Robotics and the New Cyberlaw*, 103 CAL. L. REV. 101, 125-26 (2015)

offer are not only military efficient but also humanitarian in nature. For instance, most autonomous weapon systems can operate without directly exposing military personnel to an enemy attack or defense mechanism. Also, the risk to civilians is reduced by their use as it makes targeting more precise and firing decisions more controlled and unaffected by emotions of panic, vengeance and fright. A robot for example is bereft of emotions exacerbated by loss of fellow soldier or personal interest and so is able to act with consistent amount of diligence and accuracy even in the most critical times. Machines are also not driven by instinct of self-preservation.³⁰ Consequently, misidentification of targets is reduced, collateral damage is better calculated or detected and, in some cases, a smaller quantum of force is used in comparison to human decision-making.³¹

Also, tasks that are repetitive in nature and not as complex, machines can do better in them as unlike humans they do not bored or feel sleepy or need a break as their concentration begins to fade. Further, machines are immune to extreme environments such as the deep sea or places contaminated by biological or chemical weapons which may retard the performing capacity of humans. The quick learning ability of machines by merely updating their software ensures that all machines are equally able and competent to perform a task without worrying about the need that few student soldiers may not be attentive or may be slow learners.

Do the Shortcomings of Control and Lack of Knowledge make Autonomous Weapons Less Beneficial?

One prime concern with the development of autonomous weapons has been that most of the times human beings are not able to determine how and why autonomous systems make decisions. This may at times be due to the complexity of the system making it impossible to predict in advance how the system would behave or at a later stage reconstruct how it did actually behave. At other times, the programming in itself may be probabilistic which makes it difficult to know with certainty what the decision of the machine would be.³² For these reasons can autonomous weapons be called ‘game changers’ in terms of loss of human control in the battlefield?

As a matter of fact, they are not, for even today those who operate highly automated military equipment seldom are acquainted with the exact technology they are using internally in the electronic systems. This aspect however, does not deter one from using such military

³⁰ C. Grut, *The Challenge of Autonomous Lethal Robotics to International Humanitarian Law*, 18 J. CONFL. SECUR. LAW 5, 11 (2013)

³¹ Shane Reeves and William Johnson, *Autonomous Weapons: Are you Sure These are Killer Robots? Can we Talk About It?* 1 THE ARMY LAWYER, 24,25 (April 2014)

³² Ryan Calo, *Robotics and the New Cyber Law*, 103 CAL. L. REV 101, 126 (2015)

equipment. On the contrary, those using them have broad and basic understanding of the manner in which the equipment operates and also its limitations. For the purposes of law and to determine the legality of autonomous weapons what needs to be ensured is that the weapon is not inherently unlawful and the person using it must do so within the parameters of the law of warfare. This would also include ensuring that the weapon is not deployed in a situation for which it is not designed or one that would lead to unnecessary harm and destruction.³³

IV. REGULATION OF AUTONOMOUS WEAPONS-SUGGESTIONS FOR RULE MAKING

Considering the pace at which autonomous weapons are being developed and the challenges that their use might offer, there is an urgent need of a mechanism that would regulate the same. The amplitude of their use is so diverse that it may require a regulation at different levels. For this purpose, a three-tiered approach seems appropriate to ensure that all aspects of such weapons are covered.

At the top it is suggested that there needs to be an international agreement that lays down some common rules of application for all countries to follow. This must not in the first instance impose a blanket ban on the use of autonomous weapons nor keep the use of such weapons a matter of discretion for countries. It must outline the specific instances when the use of such weapons would be appropriate and the extent to which autonomy to a weapon can be granted. A set of guidelines demarcating the amount of human control in such weapons are also essential. There can be a requirement of human intervention or authentication of action before final deployment of such weapon. In similar vein, guidelines for development of such weapons should also be mentioned so that there is uniformity amongst nations in creation of such weapons. It is also pertinent to keep in mind the rapid change in technology and so some flexibility in the convention must be allowed considering the evolvement of technology. Thus, what is required is to establish some core minimum standards that need to be adhered to.

The second tier of regulation would be at the national or domestic level, where each nation formulates a legislation for the use and deployment of autonomous weapons complying with the international standards as mentioned above. Although it would not be possible for any nation to make public all rules and policies related to such weapons yet nations must be encouraged to share general rules and best practices. A step in this regard has been taken by the U.S. Defense Department by developing and publishing a policy directive regulating automatic and autonomous weapon systems that lays down the procedural requirements with

³³ Noel Sharkey, America's Mindless Killer Robots Must be Stopped, THE GUARDIAN, December 3, 2012. Available at: <https://www.theguardian.com/commentisfree/2012/dec/03/mindless-killer-robots> (last visited April 24, 2022).

regard to research, development and deployment of autonomous weapons.³⁴

The third tier of guidelines would be required by those who are involved in developing such weapons as well as its potential users. While the former will need clear set rules to determine what can and cannot be developed, the latter require clear limitations for methodology to be used, operational procedures and engagement rules. Having set the three tiers for which regulations are required, it is important to bear in mind that the three need to work in collaboration for a set of consolidated and mutually agreeable rules. Also, it is important that these rules take into consideration not only the present technology but also future advancements in the field.³⁵

Further by no means a total ban of the weapons must be propagated. Rather a better way to approach at the outset is to set a maximum limit to machine autonomy and to prohibit any weapon that exceeds the stipulated limit. A flipside to this could also be to set a minimum standard for human intervention and authentication before a decision is taken by a machine. This would help reduce the harmful effects of machine autonomy while at the same time allow using it for the benefit of mankind.

V. CONCLUSION

Presently, the technology in weapon systems has not moved to a stage that completely autonomous weapons can be used in armed conflicts. Human beings are required to be in loop, making the crucial decisions for deployment of partially autonomous and automatic weapons. Considering the benefits that autonomous weapons have to offer, one may conclude that it would be irrational to completely ban their use. Rather what is suggested is to include them in teams and squads of human soldiers in order to have the best of two worlds.

Distinction and proportionality as assessed and complied by humans still is a far-fetched dream for machines as it requires a comprehensive analysis of a situation which is both qualitative and subjective in nature. Moreover, it is difficult to assess as to how a machine would respond to a completely new situation. Yet it cannot be ignored that there are some clear benefits of autonomous weapons when put to use and so the best course of action would be to create a hybrid model. This would require as a mandate a human to take some critical decisions while an autonomous weapon could be required to perform a task in which it is superior to humans. For instance, performing tasks that require complex mathematical analysis or collecting

³⁴ U.S. Department of Defense, DoD Directive 3000.09, *Autonomy in Weapon Systems* 13 (2012)

³⁵ Kenneth Anderson, Daniel Reisner & Matthew Waxman, *Adapting the Law of Armed Conflict to Autonomous Weapon Systems*, 90 INT'L L. STUD. SER. US Naval War Col. 386,410 (2014)

information from war zones and relaying it to their human counterparts could be done by machines while decision making could be left to a human military commander.

No matter how big or small a role autonomous weapons play in an armed conflict, it is important to have a legal framework that clearly defines its limits. There are no guidelines presently but a framework is needed that would regulate autonomous weapons at the international, national as well at the developer's stage. This would filter the disadvantages of such weapons but allow them to offer some key benefits. Without such a regulation, different countries would have weapons with varying degrees of autonomy.
