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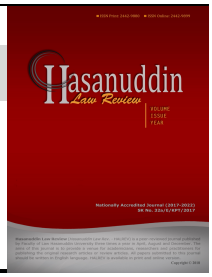

A New Treaty for Fully Autonomous Weapons: A Need or a Want?

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ABSTRACT

Autonomous Weapon System (AWS) is still discussed and is considered to the principle of International Humanitarian Law (IHL) particular the principle of distinction and proportionality. In line with moral and ethical issues, some experts and global citizens agree that AWS will likely to distract moral and ethical on a battlefield and are never able to replace human's feeling. Human beings are responsible over AWS because there is no such a fully autonomous weapons exist. It is always a human commander behind the actions. To bridge the situation on discussion of AWS, a new treaty should be created in order to anticipate further violation.

1. Introduction

In the last decades, the proliferation of weapons has increased rapidly. Some of these weapons are banned, such as anti-personnel landmines, and biological and chemical weapons. Some are just strictly used such as booby-traps. The latest and most controversial is Autonomous Weapon System (AWS). Military and robotic experts have a prediction that "killer robots" or fully autonomous weapons that can operate without human intervention are likely to have been developed within 20-30 years.[1] Some states that AWS is cost savings. Gordon Johnson argues that 'they do not get hungry'. They are

[1] Human Rights Watch, *Losing Humanity. The Case Against Killer Robots* (19 November 2012) <*https://www.hrw.org/report/2012/11/19/losing-humanity/case-against-killer-robots*>.

not afraid. They do not forget orders. They do not care if the guy next to them has just been shot. Will they do a better job than humans? Yes.[2]

> *Humans have limited tolerance of the physical extremes of acceleration, temperature, and radiation, are vulnerable to biological and chemical weapons and require rest, food, breathable air, and drinkable water. Machines are expendable; their loss does not cause emotional pain or political backlash. Humans are expensive, and their placement by robots is expected to yield cost savings.*[3]

AWS is considered as cheaper than human-operated weapons. Moreover, it has the capability to work continuously with a long performance without taking a rest as long as their batteries sustain them.[4] Those who propose the idea of AWS contend that someday they may be compatible with IHL at some point.[5]In fact, AWS may have better capability to comply the principles of IHL than human soldiers.[6]

There is a possibility that they may act more conservatively due to the lack of self-preservation.[7] Because of lack of emotions, they will be better in making battlefield observations. Moreover, 'they will be immune to the psychological problem of scenario fulfilment.'[8] In contrast, Human Rights Watch and Harvard Law School's International Human Rights Clinic (IHRC) argue that such development of fully autonomous weapons would not be compatible with International Humanitarian Law (IHL) and is likely to raise the number of injury and dead civilians during armed conflict. Therefore, certain issues are going to be addressed in this essay. Firstly, whether the existing principles of IHL apply to the use of AWS. These cutting-edge weapons such as drones, the principle of targeting strategies and tactics have been countering significant changes.[9]

This might be the first time in the history of the development of weapons as the most appropriate development with the old proverb "technology is a double-edged sword."[10] Some even suggest that autonomous weapons should not be classified as weapons.[11] Robots are unlike humans, they have no feeling, and the capability to distinguish between the civilian and combatant is doubtful. Thus, this can be an advantage or disadvantage in war. Pursuant to the Martens Clause, a new weapon could be illegal under international law if the principles of humanity or the order of the public conscience were infringed.[12]

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2 Weiner, T. 'GI Robot's Rolls Toward the Battlefield', *New York Times* (online), 1 February 2005 <http://www.nytimes.com> cited in Foy, J. (2014) 'Autonomous Weapons Systems', *Dalhousie Journal of Legal Studies* 47, p.52.

3 Gubrud, M. (2014) 'Stopping Killer Robots', *Bulletin of the Atomic Scientists* 32, p. 38.

4 Krishnan, A. (2009) *Killer Robots: Legality and Ethicality of Autonomous Weapons* Ashgate Publishing Limited, cited in Weiner, above 2.

5 Noel Sharkey, *Staying in the Loop: Human Supervisory Control of Weapons* in Bhuta, N., *et al.* (eds), (2016), *Autonomous Weapons Systems*, Cambridge University Press, pp.23- 24.

6 Marchant, G.E., *et al.*,'International Governance of Autonomous Military Robots' (2012) 12, *Colum Science and Technology Law Review* 272 cited in Weiner above 2.

7 Weiner, above 2.

8 Weiner, above 2.

9 Solis, G.D. (2016) *The Law of Armed Conflict* 2nd ed, Cambridge University Press, p. 535.

10 Chengeta, T. (2016). 'Accountability Gap: Autonomous Weapon Systems and Modes of Responsibility in International Law', 45, *Denver Journal of International Law and Policy* 1, p. 2.

11 Solis, above 9.

12 Human Rights Watch, above n 1.

The second concern that needed to be highlighted is the responsibility. Even though until today *fully* autonomous weapons have not existed yet,[13] Debates in regards the responsibility of fully autonomous weapons have occurred. Marco Sassóli denies the idea of incompatibility of IHL in regulating autonomous weapons. It does not matter how state of the art the technology is; there is always a human being at the starting point.[14] A human who orders a command through the program system might be accountable for individual responsibility. Furthermore, developers of the AWS can also be responsible for the violation. This will be elaborated further in this essay. Last, ethical concerns regarding fully autonomous weapons also become a significant problem.

The United Nations Special Rapporteur on extrajudicial killings recommends that all nations should declare moratorium immediately of the development of lethal autonomous robotics.[15] Thus, this essay will argue that to anticipate violations in armed conflicts; a new law is necessary to regulate ultimate fully autonomous weapons. This is why national and new international law need to pre-emptively ban the development, production, and use of fully AWS. As we know, AWS is not able to replicate the weapon that has meaningful human control.

2. Definitions of Autonomous Weapon Systems (AWS)

The definition of AWS is so various. According to ICRC, AWS is defined 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.' Similarly, Peter Asaro defines an autonomous weapon system as 'any system that is capable of targeting and initiating the use of potentially lethal force without direct human supervision and direct human involvement in lethal decision-making.'[16]

There has been a misunderstanding in regards to the definition of the word "autonomous". Generally, people would imagine a robot that is able to find out an enemy, decide when to shoot, and initiatively kill selected target.[17]Moreover, some might have an imagination of drones or Unmanned Aerial Vehicles (UAV).[18] Nevertheless, either the use of drones or UAV does not meet the definition of autonomous weapon systems by ICRC[19], which asserts:

> *A genuinely autonomous system would have artificial intelligence that would have to be capable of implementing IHL. While there are considerable interest and funding for research in this area, such systems have not yet been weaponised. The deployment of*

[13] Schmitt, M.N., and Thurner, J.S. (2013). "Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict, 4, *Harvard National Security Journal*, pp. 231- 234 cited in *ibid*, 699.

[14] Sassóli, M. (2014). 'Autonomous Weapons and International Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified' (90), *U.S Naval War College's International Law Studies* 308, pp. 310-311 cited in Solis, above 3, 544.

[15] C. Heyns, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions,* United Nations Document A/HRC/23/47 (April 9, 2013) <www.hrw.org/ reports/2012/11/19/losing-humanity-0>.

[16] Asaro, P. (2012). 'On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-Making', 94, *International Review of the Red Cross,* pp. 687-690.

[17] Solis, above n 9, p. 536.

[18] Kua, C. 'Autonomous Weapon Systems, International Law and Meaningful Human Control' (8) 1, *Australian Army Journal,* pp. 21-23.

[19] *Ibid.*

> *such systems would reflect a paradigm shift and a major qualitative change in the conduct of hostilities.*[20]

Thus, U.S Department of Defense (DOD) clarifies that 'all autonomous systems are supervised by human operators at some level, and autonomous systems' software embodies the designed limits on the actions and decisions delegated to the computer.'[21] One of the examples of current autonomous weapons is drones or missiles that can hunt their targets by using their on-board sensors and computers.[22] Sometimes, it is said that there are four levels of autonomous weapon systems: human operated, human delegated, human-supervised, and fully autonomous.[23] In general, Schmitt and Thurner state:

> *'Of course, a fully autonomous system is never entirely human-free. Either the system designer or an operator would at least have to program it to function under specified parameters, and an operator would have to decide to employ it in a particular battle space.*[24]

For instance, South Korea and Israel have used automated sentry guns which have the capability to select a target and send an alarm to a human operator who then will decide whether to fire or not.[25]

Likewise, Captain Cindy Kua argues that indeed, autonomous weapons systems with the specific autonomic capability to select target and attack have been used. However, fully autonomous systems that are capable to independently decide their actions and make complex decisions according to the environment do not exist. Kua also seems doubtful that these fully autonomous weapons are unlikely to be developed shortly.[26] However, Benjamin Kastan contends that recently, "dumb" systems, which can operate autonomously, exist.[27] Similarly, Gubrud provides the Israeli Iron Dome and the U.S Patriot and Aegis missile defence systems as fully autonomous systems, which are used to employ incoming missiles and artillery rounds.[28]

After all, most experts point out that from a technical point of view, there is no clear distinction in regards to the definition of AWS and both the main legal and ethical questions stay the same.[29]

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20 Kellenberger, J. 'Keynote Address International Humanitarian Law and New Weapon Technologies' (Speech delivered at the 34th Round Table on Current Issues of International Humanitarian Law, San Remo, Italy, 8-10 September 2011) 5-6 <*http://www.iihl.org/iihl/Documents/JKBSan%20Remo%20Speech.Pdf*>.

21 Department of Defense, Defense of Science Board, *Task Force Report: The Role of Autonomy in DoD Systems* (2012) 1 ('*Task Force Report*') cited in Solis, above n 9, p. 536.

22 Gubrud, above n 3, p. 33.

23 Galdorisi, G. (2015). 'Keeping Humans in the Loop' (2015), *U.S. Naval Institute Proceeding* 36, 38 cited in Solis, above n 9, p. 537.

24 Schmitt and Thurner, above n 13, p. 235.

25 Lewis, J. (2015). 'The Case for Regulating Fully Autonomous Weapons' 124, *The Yale Law Journal,* pp. 1309-1311.

26 *Autonomous Weapon Systems: Technical, Military, Legal and Humanitarian Aspects*, Expert Meeting, Geneva, Switzerland (26-28 March 2014) cited in Kua, above 18, p. 22.

27 Kastan, B. (2013). 'Autonomous Weapons Systems: A Coming Legal "Singularity"? *Journal of Law, Technology and Policy* 45, p. 50.

28 Gubrud, above n 3, p.38.

29 ICRC, *Views of the International Committee of the Red Cross (ICRC) on Autonomous Weapon System,* Convention on Certain Conventional Weapons (CCW), Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS), Geneva (11-15 April 2016), p. 1.

3. Principles of International Humanitarian Law and Autonomous Weapon Systems

Autonomous weapon systems, as well as other weapons, are bound by principles of International Humanitarian Law: distinction, proportionality, military necessity, and unnecessary suffering. The current debates concerned whether AWS can be compatible with the principles of IHL or not because there is no current treaty or convention that regulates AWS.

3.1. Distinction

The distinction means the state must distinguish between combatants and military objectives, non-combatants and civilian objects, and only attack the target directly against the former.[30] The principle of distinction is also a customary of international law, therefore, whether a state has ratified a treaty or not, it is still bound to this principle. The base presumption of IHL is 'an individual who is not a combatant is a civilian.'[31] In fact, applying this principle is challenging because it often targets is not merely civilian in nature, but also they tend to have a military purpose. To illustrate, an Afghani farmer openly wearing an AK-47 across his shoulders who is just shepherding his cattle and an insurgent Afghani Taliban wearing almost the same clothes and openly carrying weapons.[32] Due to the complexity, inability to predict their act in complicated operational situations, unpredictable and ambiguous circumstances, a further difficulty is likely to occur. Moreover, because the law of armed conflict (LOAC) does not exclude 'artificially intelligent autonomy', like other weapons of war, AWS is the subject of the same test.[33] As it is required in Article 36 of AP I, how can these new weapons be tested and verified to fulfil the requirement of IHL[34] Therefore, certain types of weapons would violate the principle of distinction as well as proportionality, which will be elaborated further in the following section, because they fail to minimize the civilian casualties and distinguish between civilians and combatants.[35] Gubrud states that 'weapons not capable of being so directed are considered to be indiscriminate and therefore prohibited'.[36] This type of work is doubtful can be performed by fully autonomous weapons.

On the contrary, some believe that AWS should only use in less complex situations. Furthermore, proponents of AWS note that at a certain point the complex command will be possible and preferable. How can it be constructed into a machine? It all depends on the structure of the program.[37]

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30 O'Connell, M.E. 'Historical Development and Legal Basis' in Fleck, D. (ed), (2013). *The Handbook of International Humanitarian Law*. Oxford University Press, 3rd ed., p. 36.

31 Wagner, M. (2014). 'The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems' 47, *Vanderbilt Journal of Transnational Law* 1371, p.1388.

32 Roff, H.M. (2014). 'The Strategic Robot Problem: Lethal Autonomous Weapons in War' (13, *Journal of Military Ethics*, pp. 211-213.

33 Young, K.D. (2017). *The Militarization of Artificial Intelligence: A Systematic Inquiry Into the Reliability, Vulnerability, and Responsibility of Autonomous Weapons Systems*. A Capstone Project, Utica College, p. 37.

34 Asaro, above n 16, 687, 692-693.

35 McNab, M., and Matthews, M. (2011). 'Clarifying the Law Relating to Unmanned Drones and the Use of Force: The Relationships Between Human Rights, Self-Defense, Armed Conflict, and International Humanitarian Law', 39, *Denver Journal of International Law and Policy* 661, p. 690.

36 Gubrud, above 3, p. 35.

37 Roff, above 32,

3.2. Proportionality

Proportionality is explained in Article 51 (5)(b) of AP I. It states that "*Launching an 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 about the concrete and direct military advantage anticipated, is prohibited*". Then, a disproportionate attack is described in Article 51(5)(b): 'an 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.' This article then comes with Article 57(2)(a)(iii) of AP I:

> *Those who plan or decide upon an attack shall refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive concerning the concrete and direct military advantage anticipated.*

What is more, states are required to take all feasible steps to reduce damage to civilian life and objects even if the targets are lawful.[38] Feasibility requires a person who launches an attack takes appropriate measures to identify the target and reduce civilian casualties as far as possible.[39]As proportionality is one of the most complex rules of IHL, it requires a human judgment that a fully autonomous weapon could not do.[40]There is a military advantage that should be targeted, on the other hand, incidental loss or injury to civilian as well as the damage to civilian objects should be minimized.[41] The US Air Force mentions that 'proportionality in attack is an inherently subjective determination that will be resolved on a case-by-case basis'.[42]

Currently, a system to measure the level of collateral damage has existed. For instance, Collateral Damage Estimate Methodology (CDEM) of the U.S allows a commander to make a decision of a pre-attack judgment by taking the precision of the weapon to be employed into consideration, attack tactics that have been planned, the possibility of the presence of civilians in buildings near the target, and the composition of the structure, in order to estimate civilian casualties.[43] Besides CDEM, there are also mean to reduce collateral damage.

> *By constraining loiter or search times, the period when collateral risks would be minimized can be selected. … These human judgments at the mission planning stage may, in certain circumstances, ensure that an autonomous attack only takes place when the collateral damage that is expected would be clearly outweighed by the military advantage in attacking the sorts of a target to which the algorithms relate… There is, however, currently no known software capable of mechanising qualitative decision-making. The process that is implicit in the application of the proportionality test is one that only a human brain can adequately undertake. At first glance, that would appear conclusively to exclude any idea that autonomous (weapon systems)can be used in*

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38 Duffy, H. (2015). *The War on Terror and the Framework of International Law.* Cambridge University Press, 2nd ed, 2015, p. 231-235 cited in McNab and Matthews, above 35.

39 Claude Pilloud, *Commentary to the Additional Protocols* § 2198 (1987).

40 Human Right Watch, Losing Humanity 1.

41 Wagner, above n 31, 1395.

42 Air Force Judge Advocate General's Department, 'Air Force Operations and the Law: A Guide for Air and Space Forces' (1st edition, 2002) <*http://web.law.und.edu/Class/militarylaw/web_assets/pdf/AF%20Ops%20&%20Law.pdf*>.

43 Solis, above n 3, p. 540.

> *attack… There may nevertheless be… circumstances in which the use of such systems would be legitimate… In short, a man need not be 'in the loop' in all conditions.*[44]

Nevertheless, there are no existing means that allow AWS to meet the requirement of proportionality.[45] There is a technical issue that robots could not differentiate accurately between civilians and combatants, in particular in irregular warfare, thus it could not fulfil the criterion to judge proportionality.[46] Asaro asserts that:

> *Those who plan or decide military attacks are assumed to be human, and that proportionality, in particular, is inherently subjective and represents not just an algorithmic criterion but a moral burden upon commanders to give due consideration to the human costs in judging whether a lethal action is justified.*[47]

3.3. Military Necessity

Military necessity does not mean that everything is allowed to win a war instead, 'nothing is allowed that is not justified by military necessity'. Therefore, vicious violence and abusing civilians are highly prohibited.[48] This was also explained in Article 14 of Lieber Code 1863. The application of military necessity, in the context of belligerent occupation, is explained in *United States v List and others*.[49] Belligerents as the subject of the LOA may apply any means to enforce the complete target of the enemy. Destruction of life of armed opponents and others who got incidentally unavoidable destructions is permissible. Capturing combatants and other peculiar dangers are allowable however killing innocents for a reprisal or killing satisfaction is highly prohibited. The connection between the destruction of property and the overcoming of the enemy forces must be reasonable. Destruction of public facilities such as railways or lines of communication is lawful as long as these facilities are being utilized by the enemy or for military purposes.[50]

To determine whether AWS could follow the command of military necessity, it should be asked whether it can recognise military targets and then assessed whether they damage of the target "offers a definite military advantage."[51] Even though someday AWS could really distinguish between a civilian and a combatant, it still needs to be under control of a human commander.[52]

3.4. Unnecessary Suffering

This principle is also called the principle of humanity, which minimise the capacity of combatants to follow particular "means of injuring the enemy."[53] This is an ancient approach to the law of war. Any suffering, injury, or damage which not necessary for

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44 Sassóli, above n 14, 332 cited in ibid 541.
45 Solis, above n 3, p. 541.
46 Gubrud, above 3, p. 35.
47 Gubrud, above 3, p. 40.
48 Clapham, A., *et al.* (eds). (2015). *Oxford Public International Law*. Oxford University Press, p. 92.
49 *United States v List and Others* (1980) 8 WCR 34.
50 See more *United States v List, and Others* cited in The Joint Doctrine and Concepts Centre (JDCC), *The Joint Service Manual of the Law of Armed Conflict*, (Joint Warfare Publications 383, 2004) , p.22.
51 U.S Air Force, *Air Force Doctrine Document 2-19:Targeting 6-17* (2006) 140 cited in Kastan, above n 27, p. 58.
52 Tony Gillespie & Robin West, 'Requirements for Autonomous Unmanned Air Systems Set by Legal Issues (2010) 4, *International C2J* 1, 9-10 cited in ibid.
53 Bovarnick, J., *et al., Law of War Deskbook* (2011), U.S. Army 157 cited in Kastan, above n 19, p. 56.

the accomplishment of legitimate military purposes is prohibited.[54] This can be found in Rule 70 of the ICRC Study.[55]

This principle is divided into three parts: first, the prohibition of the use of "arms that are per se calculated to cause unnecessary suffering; second, the prohibition of the use "otherwise lawful arms in a manner that causes unnecessary suffering"; and the third one is all of those prohibitions are only applicable when the unlawful effect is particularly planned.[56]

The essential idea of this principle is a sight of shared humanity should not be lost even in conflict.[57] Allowing technology to determine the fate of human lives, 'whether through individual targeting decision or through a conflagration initiated by the unexpected interactions of machines' will be considered as heartless.[58]

According to a scientific poll in the U.S, the opponents of AWS outnumbered the proponents of AWS two to one. Moreover, the rest of the world massively against the drone strikes. Therefore, it is likely that global opinion will also against AWS based on humanitarian grounds and the worry of the dangers of a new arms race.[59] As it is explained in Marten Clause in regards to pre-emptive ban, AWS is a threat to global peace because they are in contrast to established custom, the principle of humanity, and dictates of public conscience. Thus, it is a matter of concern under the UN Charter.[60]

However, William Boothby argues that the compatibility of AWS with this principle is not relevant in the recent context because the 'the legality of the weaponry that autonomous and remote weapons systems deploy is independently reviewed.[61] If the AWS does not inflict superfluous injury or unnecessary suffering, this is right. While, some exceptions might occur, for instance, where the AWS is itself the weapon (such as the Switchblade of the US),[62] therefore, it is not likely that AWS will challenge this principle.

4. Ethical and Moral Concerns

Nonetheless, AWS is considered to have an ability to overcome main obstacles faced by soldiers: 'fear of being killed and resistance to killing.'[63] A human rights investigator of the United Nations recommends that *'the international community urgently… address the legal, political, ethical and moral implications of the development of lethal robotic technologies.'*[64] Anderson and Waxman state that the important moral objection to AWS is 'deciding to kill away from a human and giving it to machines. Even a flawed human being is more

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54 *Ibid*, p. 10.

55 J.M. Henckaerts and L. Doswald-Beck, *Customary International Humanitarian Law, Volume I: Rules* (ICRC and Cambridge University Press, 2005) 237-244 cited in Hin-Yan Liu, 'Categorization and Legality of Autonomous and Remote Weapons Systems' (94) 886, *International Review of the Red Cross* 627, p. 640.

56 *Ibid*.

57 Gubrud, above 3, p. 40.

58 *Ibid*.

59 *Ibid*.

60 *Ibid*.

61 Boothby, W. (2009). *Weapons and the Law of Armed Conflict*. Oxford University Press, p. 55-58 cited in Liu, above 55.

62 Spencer Ackerman, 'US Troops Will Soon Get Tiny Kamikaze Drone', the *Wired Magazine* (online) 18 October 2011 <*http://www.wired.com/dangerroom/2011/10/tiny-kamikaze-drone/*> cited in Liu, ibid p.641.

63 Sharkey, N. (2011). 'Automating Warfare: Lessons Learned from the Drones', 21, *Journal of Law* 140, 145 cited in Foy, above 2, p. 62

64 Patrick Worsnip, 'UN Official Calls for Study of Ethics, Legality of Unmanned Weapons', *The Washington Post* (online) 24 October 2010 <*http://www.washingtonpost.com*>.

capable of moral action than a robot without a conscience.[65]Moreover, AWS disturb the existing norms of IHL and LOA by minimising radically and illegitimately combat risk to the parties that employ them.[66] 'A challenge that it is unfair, dishonorable, cowardly, or not sporting to attack from a safe distance, whether with aircraft, submarines, or, today, a cruise missile, drone, or conceivably an autonomous weapon operating on its own.'[67]

It is claimed that generally, a machine will never achieve the fundamental ethical and legal principles.[68] The opponents of AWS believe that there is no a programming machine will ever be able to take over the core elements of human emotion and influence. Therefore, this makes 'human beings irreplaceable in making lethal decisions on the battlefield-compassion, empathy, and sympathy for other human beings'.[69]

5. Human Responsibility of Autonomous Weapon System

In the Nuremberg International Military Tribunal 1946, individual criminal responsibility for breaches of the law of war is affirmed. 'Crimes against international law are committed by men, not by abstract entities, and only by punishing individuals who commit such crimes can the provisions of international law be enforced.[70] Robert Sparrow illustrates:

> *Imagine that an airborne AWS [Autonomous Weapon System], directed by a sophisticated artificial intelligence, deliberately bombs a column of enemy soldiers who have clearly indicated their desire to surrender. The AWS had reasons for what it did…[but] they were not the sort to morally justify the action. Had a human being committed the act, they would immediately be charged with a war crime. Who should we try for a war crime in such a case?*[71]

The most debatable over AWS is who should be responsible for the use of this weapon. IHL clearly mentions the responsibility of the parties to an armed conflict is to respect the rule of international humanitarian law and they will be accountable for any violations. These cannot be transferred to robots.[72] Thus, as it has been illustrated above, Sparrow argues that no one is responsible for autonomous robot's behaviour.[73] Equally, the developers or the military commanders should not be blamed for AWS' actions.[74] Sparrow also proposes three main issues of the human responsibility based on autonomously designed systems. First, the designer should not be accountable and responsible. Robotics engineers only build systems that will be able to learn from experience and adjust with future behaviour, which has never been scripted. The success

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65 Anderson, K., and Waxman, M. (2012). 'Law and Ethics for Robot Soldiers' 176, *Policy Review* 35, 42 cited in Foy, above 2, 61.

66 Anderson, K., and Waxman, M. (2013). 'Law and Ethics for Robot Soldiers'. Research Paper No 2013-11, American University Washington College of Law, p. 8.

67 *Ibid*.

68 'Unmanned Aerial Warfare: Flight of the Drones: Why the Future of Air Power Belongs to Unmanned Systems', *The Economist* (8 October 2011) cited in Anderson and Waxman, above 66, p. 14.

69 Anderson and Waxman, ibid.

70 International Military Tribunal for the Trial of German Major War Criminals (Nuremberg, Sept 30-Oct 1, 1946) 41 cited in Solis, above 9, p.544.

71 Robert Sparrow, 'Killer Robots' (24) 1, *Journal of Applied Philosophy* 62, 66-67 cited in Simpson, T.W., and Müller, V.C. (2016). 'Just War and Robots' Killings' 66, *The Philosophical* Quarterly, pp.302-304.

72 ICRC, above n 29, p. 3.

73 Robert Sparrow, 'Killer Robots' (24) 1, *Journal of Applied Philosophy* 62, 77 cited in Schulzke, M. (2013). 'Autonomous Weapons and Distributed Responsibility' 26, *Philosophy and Technology*. pp.203-204.

74 *Ibid*.

of the system causes the results will no be longer controllable and predictable by the designer, therefore, they have no responsibilities anymore.[75] Second, the Military commander does not have the responsibility as well. This is the distinction between long-range area weapons such as artillery and killer robots.[76] The responsibility relation for such commander is usually occurring between the commander and his subordinates. The previous issues merely regulate the result of compliance with which the commander is responsible for; nonetheless, the commander is not for non-compliance of his subordinates.[77] Last, the machine also cannot be responsible.

> *Responsibility is appropriate only if the subject is an appropriate target of praise and blame, punishment, and reward. Robots cannot be punished, at least not until they have the internal complexity sufficient for the frustration of desires and suffering. But at the point when they are capable of this, they will likely possess the autonomy constitutive of full moral agents.*[78]

Andreas Matthias then called these three issues as a 'responsibility gap', in which no human has responsibility for the actions of a system.[79] In contrast, Marcus Schulzke contends that the developers or the commanders can hold responsible for the actions of AWS.[80] Criminal responsibility might occur when the degree of control over the regulated action exercised by the system itself-and by extension by its developers – has increased to the point where it is not reasonable to say that a human operator alone exercises effective control' that is, the individual who would normally decide to "pull the trigger" is no longer solely responsible for that decision.

However, to proof, whether a developer is accountable for an attack by AWS, is a bit problematic.[81] Gubrud evaluates that any use of violent force, whether it is lethal or non-lethal, there must be a human who makes the decision in another word; this must always be under the control of a human.[82] "Developers",… refer broadly to people who play some significant role in defining the behaviour of an autonomous weapon system, as opposed to "operators", which refer to those responsible for utilizing the system in some situation during armed conflict.'[83] A weapons system is a dead object; any harm resulted from it, is a result of its developers.[84] In that case, a highly autonomous weapon is potentially partly or fully replaces combat personnel from their duty which occupied traditionally, so that accountability for specific acts committed through such systems is not likely easily ascribed to the personnel or the commander.[85] Conversely, developers will bring bigger influence to control over. The particular actions that are performed by the weapon system, in fact, will perform after being deployed. Consequently, the accountability of a developer becomes pertinent.[86] Criminal responsibility of a developer

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75 Simpson and Müller, above 54.
76 Ibid.
77 Ibid.
78 Ibid.
79 Ibid.
80 Schulzke, above 56.
81 Solis, above 9, p.544.
82 Gubrud, above 3, p.37.
83 Tim McFarland and Tim McCormack, 'Mind the Gap: Can Developers of Autonomous Weapons Systems Be Liable for War Crimes (90), *Naval War College's International Studies*, pp. 361-363 cited in Solis, above 9, 544.
84 Ibid.
85 Ibid.
86 Ibid. p. 366.

can occur anytime the AWS operation relates to a performance subject to legal regulation, for instance, crossing an international border.[87]

What is more, commitment in the course of an international and non-international of armed conflict is the first requirement for the prosecution of a war crime.[88] However, it seems that the developers will have finished and completed their unlawful contribution to the AWS before the armed conflict itself started. Thus, their unlawful act should be defeated.[89] In addition, the coding operations often consist of team members. In this case, even if the unlawful act of writing a code was finished while the armed conflicts are ongoing, and even if 'the unlawful code could be discovered and isolated for identification after its unlawful work was done,' this can be a challenge for prosecutor to identify the deceive code writers among the innocent code writers.[90]

Aside from the designer, it is evident that a human commander is responsible and accountable for making the decision. If the commander's act is performed by another person who operates a weapon system, this person will be responsible and accountable for maintaining control of the system.[91] The responsibility refers to moral and legal obligation and the accountability refers to a formal system that accounts for actions.[92]

There is a formal policy that concerns of the development and employment of semi-autonomous and fully autonomous systems. This policy is named the Department of Defense Policy Directive 3000.09, which explains that 'the design and programming of an AWS must permit humans to exercise appropriate levels of control and judgement over the use of force.' Moreover, this policy emphasises and set responsibility to individuals allowing the use of AWS.[93]

6. Challenges of Future International Treaties

After examining whether AWS is appropriate with the main principles of IHL and LOA and discussing the human responsibility of AWS, there are several challenges for international treaties in the future. First, there should be a precise legal definition of AWS. The definition would make AWS will not be complicated to define and regulate. The definition should explain comprehensively whether fully autonomous weapons are weapons or combatants, therefore legal responsibility could be identified and controlled. Second, there should be a particular legal treaty that governs AWS. It seems possible to adopt the regulation of AWS into a framework convention.[94] Some suggest that a treaty might be in a regulatory form which confines acceptable use. This could be done by following the pattern of the past regulatory weapon treaties.[95]

Previously, several multilateral conventions have successfully regulated some conventional weapons. For instance, the Biological Weapons Convention, Chemical Weapons Convention, and Blinding Laser Weapons, which is governed by Protocol IV. They are successfully regulated due to the use that in contrast with the principles of IHL.[96] However, this cannot be done for AWS because the capability of AWS to adhere

87 Solis, above 9, p.545.
88 *Prosecutor v Haradinaj, et al.,* IT-04-84-T (3 April 2008), para 36 cited in Solis, above 9, p. 545.
89 McFarland and McCormack, above 83, p. 374.
90 Solis, above 9, p. 545.
91 Gubrud, above 3, p. 37.
92 Ibid.
93 Young, above 28, p.34.
94 Human Rights Watch, above 1, p.313.
95 Anderson and Waxman, above 63, p. 20.
96 Foy, above 2, p.66.

to the principles of IHL is debatable.[97] A multilateral treaty that has been suggested to ban or limit the practical use of AWS seems impractical. Therefore, the consensus is not likely to be possible to achieve, and compliance seems not be guaranteed.[98] James Foy suggests that:

> *Further development of AWS is necessary before a multilateral convention would be a viable option to regulate their use. However, waiting until the technology exists before implementing standards is not desirable. Guidelines and dialogue are essential during the development stage to ensure that AWS is engineered in a way that complies with IHL standards.*[99]

7. Conclusion

Taking everything into consideration, currently, the definition of AWS is still debatable. Moreover, are considered is compatible with the principle of IHL, in particular, the principle of distinction and proportionality. Second, in regards to moral and ethical issues, research has found that more experts and global citizens agree that AWS will likely to distract moral and ethical on a battlefield and never be able to replace human's feeling. A human still holds responsibility over AWS because so far there is no such a fully autonomous weapons exist, there is always a human commander behind the actions. However, whether the designer of fully autonomous weapon systems will be countable and responsible is still in extensive debate. Thus, to anticipate further violation, a new treaty should be created in order to have legally binding instruments of AWS. It is a challenge for the states around the word to commence negotiating process of the treaty.

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97 Ibid.
98 Anderson and Waxman, above 62, 45 cited in ibid.
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