LETHAL AUTONOMOUS WEAPON SYSTEMS: LEGAL AND ETHICAL PERSPECTIVES*

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Abstract

Much of the focus in reshaping the law of armed conflict is fixated on the vision of humanizing war, thus the term "humanitarian". But when self-governing, soulless, and machines are introduced into the scheme, does it project betrayal towards this objective? This article attempts to provide insight in answering the question through three sections. *First,* we will venture into the current and expected future progress of utilizing autonomous weapons systems in armed conflicts. *Second*, it will thoroughly observe the relevance of substituting human beings with robots in the battlefield with the cardinal concept of "just war" from the viewpoint of both jus ad bellum and jus *in bello*. This is mainly dedicated to overview and reconcile the pessimistic stance upon the issue against the vulnerable ethics in combat. *Third,* the article discusses the potential candidates who should be prepared to bear the legal cost of using insentient objects astride the frontier of warfare.

Intisari

Sebagian besar fokus dari pengembangan hukum konflik bersenjata terpaku pada visi untuk memanusiakan perang, oleh karena itu istilah 'humaniter' digunakan. Namun apabila mesin berotonomi dan tidak berjiwa diperkenalkan dalam skema yang ada, apakah hal tersebut menunjukkan perlawanan terhadap tujuan di atas? Artikel ini mencoba untuk menyediakan ide dalam menjawab pertanyaan tersebut melalui tiga bagian. Pertama, kita akan mendalami progres saat ini dan di masa depan dalam konteks penggunaan sistem persenjataan otonom dalam konflik bersenjata. Di bagian kedua, kita akan mendiskusikan secara menyeluruh hubungan antara mengganti manusia dengan robot di medan perang dengan konsep penting 'just war' dari sudut pandang jus ad bellum dan jus in bello. Aspek ini utamanya didedikasian untuk meninjau dan merekonsiliasi sikap pesimis terhadap isu yang ada jika disandingkan dengan etika pertempuran yang rapuh. Bagian terakhir mendiskusikan kandidat yang mungkin harus bersiap untuk menanggung konsekuensi hukum dari penggunaan objek tak bernyawa dalam batasan terdepan perang.

Keywords: autonomous weapons, robots, international humanitarian law, *jus ad bellum*, *jus in bello*, armed conflict, ethics

Kata Kunci: *senjata otonom, robot, hukum humaniter internasional, jus ad bellum, jus in bello, konflik bersenjata, etika*

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A. Introduction

Similar to its other controversial companions such as blinding laser weapons (dazzlers) and cluster munitions, lethal autonomous weapons systems ("**LAWs**") have been around for longer than depicted in today's coverage. The most archaic and rudimentary version of this weapon system can be traced back to the 1960s, during the escalation of the Cold War and when research in artificial intelligence surged as both the Eastern and Western Blocs competed in an endless attempt to augment their respective armaments. Prototypes of LAWs go even way further back to Leonardo da Vinci's design of possibly the first ever automaton: a sketch of a knight equipped with complex mechanics as to simulate human movements (McCormick, 2014).

However, the relevance of LAWs in modern warfare debates only arose within the past three decades; whilst détente among warring nations was in sight, the use of unmanned military systems gained its popularity, prompting the regime of armed conflict to respond. The ICRC released its first official report on the legal and ethical issues of LAWs in 2011. Although there is no agreed definition of what can be considered as LAWs, the ICRC recognizes them as "a weapon system that can independently select and attack targets".

The report departs from the understanding that LAWs can hardly bear the decision-making capacity of human beings in carrying out its functions, marking only one serious problem under the customary principles of international humanitarian law ("**IHL**") out of many. Another important aspect in the legal assessment of LAWs is what the ICRC names as the "accountability gap"; when violations of IHL occur due to the use of LAWs in the battlefield, current legal regime would be in eclipse, unable to establish a proper and just culpability (ICRC, 2011).

Discussions among experts as of currently on the deployment of killer robots, [20] including those engaging the States Parties to the Convention on Certain Conventional Weapons ["CCW"], mainly focus on the somewhat double-edged question of what the law should be aimed at: prohibiting LAWs or accommodating their use and other prospective technological advancements in the methods of warfare?

Several States, however, argue that any negotiations intended to outlaw LAWs at this point in time would be premature, since the weapon system has not been empirically utilized with operational force in the battlefield. Indeed, the rising uproar against LAWs under international law is mainly motivated by the potential of their production and proliferation as opposed to their actual use by military forces. Even so, the ICRC remains adamant that taking preventive steps to counter the use of weapons with foreseeable destructive effects is necessary to protect humanity (Iaria, 2017).

B. LAWs in Practice

1. Current Technology

Although resembling one another in nature, LAWs are different from unmanned military systems such as UAVs or UMSs.[21] LAWs are built with partial or total autonomy specifically to detect, select, and attack targets. They are weaponized, thus imposing a certain degree of lethality with

[20] 'Killer robots' is the most commonly used terminology to refer to LAWs. Others may use terms such as 'Lethal Autonomous Robotics' or LARs.

[21] Unmanned aerial vehicles and unmanned maritime systems, otherwise known as 'drones' are military technologies developed to serve more versatile purposes (inclusive of commercial applications). They are generally ground-controlled and supported with direct communication links to their bases.

minimum to no human supervision. The core intention of LAWs developers is for them to undertake the tasks of human soldiers. Within this understanding, LAWs are more prone to unpredictability and surpassing the existing humanitarian bounds (ICRC, 2014).

There is no evidence of robots with full lethality or autonomy currently being used. But the fact remains that their development is underway in a number of States with the wherewithal to improve their defense systems and see it as an investment. Based on a report by the HRC Special Rapporteur Christof Heyns in 2013, semi-autonomous robots are presently in use, the list includes (Heyns, 2013):

a. The US Counter Rocket, Artillery and Mortar (C-RAM) system, an automatic destroyer of incoming rockets, artillery and mortar rounds;
b. Sentry guns, including the Samsung Techwin surveillance and security guard robots positioned in the demilitarized zone between North and South Korea, can be set to an automatic mode;
c. IAI Harpy ('Self-Sacrificing Drones'), developed by Israel to detect and attack radar emitters. Classified as a loitering munition.

These States were among those who expressed the opinion that there is no pressing and imminent need for any legal framework to be designed in this respect as there is no ongoing plan to create and/or utilize fully autonomous lethal robotics.[22]

[22] See Report of the 2014, 2015, and 2016 Informal Meetings of Experts on Lethal Autonomous Weapons Systems (LAWS) convened by the UN CCW, UN Docs. CCW/MSP/2014/3 para. 17, CCW/MSP/2015/3 para. 14, CCW/CONF.V/2 para. 13.

2. The Human Oversight: In v Out of the Loop

Apart from their purported functions, the differentiation between unmanned military systems and LAWs also rests on their human control engagement scheme. The 'human in the loop' system or HITL, applied to most unmanned military systems, allows for human operators to directly intervene in the deployment and commission.[23] In the 'human out of the loop' (HOTL) system, contrarily, the operators are in charge only when autonomous robotics diverge from their assigned mission or if any other malfunctions are found during their performance of duties (Geiss, 2015). This translates to the machines' ability to wholly rely on its preprogrammed algorithms, inclusive of determining their own methods of mission accomplishment (Dinstein, 2018).

Early prophecies suggest that even if today's HOTL system is understood to allow authoritative human superintendence, HOTL in the future would take humans completely out of the loop, leaving the actors in field to rely solely on their computing processes and built-in programming (Warren, Hillas, 2017). Subsequently, the newest proposition introduced by the HRC is the 'human on the loop' narrative, in which human beings may conduct supervised autonomy, letting LAWs function through their program, but with the cardinal decision of activating or deactivating them when necessary (Heyns, 2013).

3. The Futuristic Outlook

On the flip side, the now well-functioning and operational autonomous technologies are mostly used as means of preserving States' peace and security.

[23] Some experts still venture into the acceptable threshold of the HITL system, (Arkin, 2009, p. 7) opines that arguments can be made as regards the specific time-frame in which the human intervention can take place and the scale of mission in question.

When the first diplomatic talks concerning LAWs were held by the High Contracting Parties to CCW in 2014, several delegations refuted the belief that technologies such as this will only open more possibilities of humanitarian violations (CCW, 2014). Instead, they had earlier asserted that with sufficient design enhancement efforts backed by nascent legal readiness, autonomous robotics could very well contribute to reducing the "political cost" of war (Espada, Hortal, 2013).

The United States and United Kingdom have been particularly vocal in maintaining their stance. The case for consolidating the beneficial existence of LAWs surrounds the following aspects (UK Ministry of Defense, 2017):

a. Risk removal: autonomous systems suppress the expense of military crew or combatants compared to manned operations;
b. Time-efficiency: suitability with time-sensitive targets, swift response;
c. 'Domesticable' LAWs: with better technology, it is expected that autonomous systems can alternatively paralyze its military objectives through immobilization or disarmament rather than by killings[24] (Kahn, 2013).
d. Force multiplication: armed robots allow for fewer military resources to do and achieve more. Due to their hardwearing makeup, the machines may also be assigned to do dirty, dull, and dangerous work (Marchant, 2011).

[24] See the US Opening Statement at the CCW Meeting of 2017 at https://geneva.usmission.gov/2017/11/15/u-s-opening-statement-at-ccw-meeting-of-group-of-governmental-experts-on-lethal-autonomous-weapons-systems/

C. Relevance with the 'Just War' Doctrine

1. (In)ability to Distinguish

As the yardstick of the moral philosophy of armed conflict, the modern 'just war' doctrine dictates that a war should be based on a just cause, adhere to the indispensable humanitarian considerations, and waged upon the intention to avoid evil (Dinstein, 2012). The methods by which a belligerent may engage targets in an armed conflict are not without limit.

The prevailing regime of the law of war, the Geneva Conventions of 1949 and its Additional Protocols of 1977 embody the customary safeguards to be respected in military operations. One of the most long-standing principles is that of distinction. As stipulated by Articles 51 and 52 of Additional Protocol I, every belligerent taking part in armed hostilities must distinguish combatants and civilians. Acts of violence must not be directed at the latter at all times (Henckaerts, Doswald-Beck, 2009).

In the debate, it has been repeatedly noted that by having LAWs at States' disposal, IHL is at the risk of being dehumanized (Warren, Hillas, 2017). The robots, although designed on the sense-think-act paradigm, are doubted to be able to match human judgment in the context-dependent and complicated decision-making process concerning life and death in armed conflicts (Heyns, 2013).

The proponents of LAWs, on the other end, believe that there is a high chance for the more developed LAWs of the future to increase precision in combat. Once the robots are preset with adequate strategic and tactical calibrations, they are much more reliable to aim at targets accurately, with the possibility of human error mitigated (Arkin, 2011). Others,

moreover, go beyond the discussion of noncombatants and entertain the issue of technicalities, e.g. software, instruments, trajectories (Anderson, Waxman, 2012; Schmitt, 2013).

Roff sets forth a hypothetical case whereby an Afghani famer wearing civilian attire whilst openly carrying an AK-47 on countryside is hardly distinguishable from a Taliban insurgent wearing the exact same clothing and visibly carrying arms, too. In this instance, proximity for the determination of a lawful military target can only be measured by complex human discernment (Roff, 2014).

However, the Author argues that the deployment of LAWs in the battlefield is a gradual and deliberate process. Although concession can be made on the lack of technological capacity that LAWs pose currently, delegating combat duty to LAWs is not tantamount to an automaton apocalypse. [25] So long as today's technology can ensure that LAWs are being used responsibly (to exemplify, through strategic placement in accordance with the environment, location and military necessity as an initial step), there will eventually be a point where human ingenuity may endow the machines with more precision and advanced mechanics, allowing them to learn from combat experience, whilst policy-makers may adapt to the evolution and create a fitting legal framework.

[25] Many imply the negative connotation that the operation of LAWs in armed conflicts as marking a dramatic alteration in the dynamics of the law of war is an onset of technological doom. See examples: Ball, P. *We can't ban killer robots – it's already too late* at https://www.theguardian.com/commentisfree/2017/aug/22/killer-robots-international-arms-traders and Elon Musk's call for the ban of LAWs at https://www.deccanchronicle.com/science/science/161117/killer-robots-leading-ai-scientist-warns-of-an-apocalypse.html

2. The Ethical Dimension

In terms of humanitarian protection, the law can sometimes be overly normative and rigid. The ethical aspect of the use of LAWs no longer deals with the notion that we could, but whether or not we should. The 'just war' doctrine may have gone through the vicissitudes of history, but ethical considerations are always there, with ever-changing standpoints (Patterson, 2009). Additional Protocol I, as also affirmed by the International Court of Justice in 1996 (Legality of the Threat or Use of Nuclear Weapons, ICJ 1996), has crystallized the 'Martens Clause' which states:

> "In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from **the principles of humanity and from the dictates of public conscience.**" (Protocol I, Art. 1)

One shared opinion is that using robots with autonomy as surrogate for human soldiers would erode the 'interpersonal relationship' in the battlefield, as coined by Sparrow, between the attacker and the target, which naturally gives leeway for humanity appeals; it consequently shows utmost affront towards human dignity (Sparrow, 2007; Alston, 2010). Unfortunately, this claim is fallible for three reasons: first, the LAWs may think for themselves, but they are not entirely detached from control. Further, the psychology of war is established upon the idea that while killing is bad, when done in battle the only influential factors are motivation and purpose.

Thus, from the viewpoint of the most fundamentally deontological assessment, conducts of autonomous machines is just as ethically sound. Be it a human person or not, the presence of justifiable grounds to commit an attack is enough to satisfy the moral reasoning, as it has always been.

Second, the claim implies denial of how far the evolution of armed conflicts has come. Reconnaissance combat hardware and improvised explosive devices are solid examples of how remote-control warfare has gained notoriety not only since LAWs became a trend (Hickie, Abbott, Zaffran, 2014). In response, the attitude of contemporary IHL has been quite categorical: the development does not incapacitate the law; it reinforces change.[26]

Finally, even by acknowledging that self-governing robots lack the morality and conscientiousness to determine life and death, the qualitative underpinnings of human dignity will always be inalienable from the fluidity of general ethos. This entails the willingness to accept that the acts influence the ethical basis, and not the other way around. Fortifying this, some behavioral studies even go on to show that looking at the susceptibility of human judgment to both internal and external driving forces, which can lead to poor decisions, autonomous robots may hold a promising future for warfare (UNIDIR, 2015).

3. The Lopsided Argument of the Right to Go to War

A further scrutiny brings some to argue that the use of LAWs would affect political decisions and its interlink with *jus ad bellum* or the right to go to war. It follows that restraints to resort to force is mainly due to the consideration of minimizing the loss of life. When States are not dealt with the existential risk of falling victim to the ramifications of war, there would be no hesitation to start one (Heyns, 2013). Although the Author does not object to the bearing technological advancements have on the paradigm of armed conflicts, one must not overlook its in-depth analysis.

There are two conceivable extremes. First, what would happen if LAWs were easily accessible to all States? War is contingent upon circumstances; it is not a crass tool to solve problems. If the political constraints are removed, States are aware that by abusing their right to self-defense, in light of the economic, social and security considerations would cost them more than they do benefit. If anything, the emergence of state of the art methods in warfare bolsters the desire to achieve multilateralism and diplomacy, mitigating the likelihood of hasty decisions.

Second, what if the situation was asymmetrical and LAWs were at the disposal of several States only? Setting aside the more ambitious odds of a systematic international cooperation in the placement and utilization of LAWs for the greater good, asymmetric war is not an unfamiliar theory (Paulus, Vashakmadze, 2009). There are two counters to this prediction.

First, we look at the codependent relationship between asymmetry in military capacity and asymmetry in political footing, as put forward by Arreguín-Toft. Principally, asymmetric conflicts **could** benefit the weak because the wider the disparity between military powers is, the less politically vulnerable and the more resolute the weak becomes, and vice versa (Arreguín-Toft, 2001). This theory, albeit

[26] The Hague Regulations of 1899 and 1907, as a start, lost their prevalence due to their incompatibility with developments of modern arms (Kunz, 1951; Alexander, 2015). Read further (Liivoja, 2015) on how technology has opened the doors for legal transformations in this respect over the years.

inherently strategic and highly predictive, revisits the structure of conflict and is well-suited to the relativity of a futuristic combat.

Another reason that frequently surfaces is what Joerden refers to as the lack of "knightliness" caused by the usage of remote-controlled machines—namely when one's soldiers can freely operate outside the dangerous periphery of warzone against the enemies (Joerden, 2018). The way to see this is by drawing the analogy of using military vehicles to maneuver estimated distance between one's soldiers and the enemies—inevitably this would result in the same tactical intention of sparing as many ground forces as possible from falling victim to counter-attacks.

In addition to the notion of 'clean killings' (waging war without shouldering the moral cost of human suffering) by virtue of technology consequently jeopardizes one's proportionality calculations. Roff makes a compelling case here by providing evidence of how the usage of unmanned systems by the USA in fighting Al-Qaeda generated hatred among as it was seen as disrespectful. This, in turn, pushed the success rate in recruiting people for terrorist organizations, directly going against the former's military purpose (Roff, 2015). Quite rationally, the mere capacity of a State to deploy LAWs does not entirely drive its intention to go to war, at least to the extent that long-term consequences are accounted for.

IV. Attempts to Diminish the Accountability Gap

1. Individual Responsibility

The attempt to incorporate the use of LAWs in the applicable regime of armed conflict has been largely impeded by the issue of legal responsibility (Beard, 2014). This problem is approachable through two perspectives, each with its own setbacks. On one end, individual responsibility may rely on criminal culpability or civil liability (Asaro, 2012) – both of which are unlikely to be extended to LAWs as a matter of punishment without establishing their legal personhood.[27] Hence, this section would isolate the discussion to potential entities to bear the responsibility.

First, the Rome Statute of the International Criminal Court ["ICC"], and the *ad hoc* International Criminal Tribunals for the Former Yugoslavia and Rwanda ["ICTY" and "ICTR"] Statutes stipulate that any person who "orders, solicits, or induces …" and "[facilitates] the commission of [the] crime …" may be held as individually responsible (Rome Statute, Art. 25; ICTY Statute, Art. 7.1; ICTR Statute, Art. 6.1). It seems that the concept of vicarious responsibility can bind any person who is an accessory in the production and/or operation of LAWs (McFarland, McCormack, 2014). Post WW II trials used to impose criminal responsibility to corporate executives who manufactured and distributed the apparatus used in the Nazi genocide (Beard, 2014), so it is plausible to be applied in the current scenario.

The same goes to the traditional command responsibility whereby LAWs are considered as subordinates in the military ranks (Heyns, 2013). This logic, however, is met with the elements of *actus reus* and *mens rea*. Even if *actus reus* is independent from intent (Van der Vyer, 2005), the chain of responsibility from the manufacturers to the conduct of LAWs in field is broken

[27] Constitutions of international judicial bodies strictly states that they have jurisdiction over natural persons only (Rome Statute, Statutes of ICTY & ICTR), coupled with the requirement of moral agencies (Asaro, 2012). Whereas the conceptual understanding of civil liability of non-state actors under international law is extendable insofar as corporates are involved and is interlinked with the obligation to repair (Mongelard, 2006).

when there is no "practical assistance, encouragement, or moral support which has a substantial effect on the perpetration of the crime" (Furundzija, ICTY, 1998).

Moreover, Additional Protocol I describes the requirement of intent as when he/she know or should have known of the committed breach of the Protocol but did not prevent it nor punish it following the act (Protocol I, Arts. 86(2), 87). Thus, for a commander to be liable, it must be proven that he/she acknowledges the risk of LAWs to violate its mandate, understand how their program works, and readily admit the possibility of malfunction (Hammond, 2015).

Another proposed solution is in the form of product liability. Proponents suggest that strict liability is suitable to hold manufacturing and/or developing companies in incurring defective operational LAWs responsible, which is analogous to cases of environmental hazard and torts. (Beard, 2014). If successful, this argument overrides the notion of corporate negligence where the omission of the company in question is deemed as a breach of duty which conjures the obligation of reparation (Weston, 1963). However, it is also problematic due to several reasons: in terms of military equipment and weapons, companies are seldom held accountable for defects, let alone when violations of IHL occur (HRW, 2012).

Assuming that this was a viable option, in the contrary, would result in another problem where it is possible for the producers to increase their sales price in an attempt at shifting the liability to consumer States who are willing to assume the risks caused by utilizing LAWs (Hammond, 2015). Some also maintain that bringing civil lawsuits against companies on this ground would disadvantage victims of war who are most likely at a loss in gaining access to redress (HRW, 2012).

2. State Responsibility

On the other end, State responsibility and the attribution of internationally unlawful acts seem more reliable appertaining to both armed conflicts of an international or non-international character. The ILC Articles on State Responsibility stipulates that any acts committed by the organs of a State, directed, empowered, or otherwise contravening the instructions given by a State are attributable to that State (ARSIWA, Arts. 4, 7, 8). If the parties are States, then the preferable forum is the ICJ.[28]

In a different narrative where the nationals of a State suffer from injury caused by the negligence of the armed forces of his/her State, the claim then can be inquired into by the International Humanitarian Fact-Finding Commission, although this might be rather weak considering that the Commission's competence is based on the parties' consent (ICRC, 2010).

V. Conclusion

The pursuit of discovery is intrinsic to the processes of human civilization. In his essay titled "*Contemporary Governance Architecture Regarding Robotics Technology: An Assessment*", Richard O'Meara wrote:

"Even a cursory review of the contemporary governance architecture regarding military

[28] As the primary judicial organ of the UN, the ICJ may adjudicate over international contentious cases between the States who have expressed their consent towards its jurisdiction. This scheme would also help individual victims who seek remedy as a result of grave breaches committed by the armed forces of a foreign State, given the prerequisite assumption of *locus standi* is fulfilled by the State of nationality. See also *acta jure imperii* which debars individuals from claiming against a State's sovereign acts before a foreign domestic court (Jurisdictional Immunities, ICJ, 2012).

technological innovation generally reveals a disturbing lack of consensus regarding the necessity for governance and the methodologies to be utilized to achieve it."

And it is true: when technology becomes a watershed in the revolution of the legal order, it is not so much about anticipation as it is motivated by experience.

This article pivots on how foreseeable designs of uprising military technology can fit into the grand picture of the law of armed conflict and those granted with protection under it. This is largely driven by the Author's wish of paying due regard to what *may* be the case, instead of the *status quo,* which is a more fitting rationale to draw a line of parallel to a forthcoming object.

Amidst the controversies, one thing that all key actors can seem to agree on is that the law is continuously evolving, much to the natural apprehension of everyone involved. War comes at a steep, inevitable price. The answer to whether or not new weapon systems can play a role in it relies solely on the unified vision of creating clearer safeguards and rules to protect those who are exposed to its threats.

BIBLIOGRAPHY

Books and Journals

Warren, A. & Hillas, A. (2017). Lethal Autonomous Weapons Systems: Adapting to the Future of Unmanned Warfare and Unaccountable Robots. *Yale Journal of International Affairs, 12,* 71-85.

Arkin, R. (2009). *Governing Lethal Behavior in Autonomous Robots*. Boca Raton, FL: Taylor & Francis Group.

Espada, C. & Hortal, M. (2013). Autonomous Weapons Systems, Drones and International Law. *Revista del Instituto Español de Estudios Estratégicos, 2,* 1-30.

Kahn, P. (2013). Imagining Warfare. *European Journal of International Law, 24(1),* 199-226.

Marchant, G., Allenby B., Arkin, R., Barrett, E., Borenstein, J., Gaudet, L., Kittrie, O., Lin, P., Lucas, G., O'Meara, R. & Silberman, J. (2011). International Governance of Autonomous Military Robots. *Columbia Science and Technology Law Review, 12,* 272-315.

Dinstein, Y. (2012). *War, Aggression and Self-Defence*. Cambridge, United Kingdom: Cambridge University Press.

Dinstein, Y. (2018). Autonomous Weapons and International Humanitarian Law in *Dehumanization of Warfare: Legal Implications of New Weapon Technologies*. Springer International Publishing.

Joerden, J. (2018). Dehumanization: The Ethical Perspective in *Dehumanization of Warfare: Legal Implications of New Weapon Technologies*. Springer International Publishing.

Asaro, P. (2012). A Body to Kick, But Still No Soul to Damn: Legal Perspectives on Robotics in *Robot Ethics: The Ethical and Social Implications of Robotics*. Cambridge, MA: The MIT Press.

Henckaerts, J. & Doswald-Beck, L. (2009). *Customary International Humanitarian Law: Volume I*. Cambridge, United Kingdom: Cambridge University Press.

Roff, H. (2015). Lethal Autonomous Weapons and Jus Ad Bellum Proportionality. *Case Western Reserve Journal of International Law, 47(1),* 37-52.

Beard, J. (2014). Autonomous Weapons and Human Responsibilities. *Georgetown Journal of International Law, 45,* 618-681.

Arkin, R. (2011). The Case for Ethical Autonomy in Unmanned Systems. *Journal of Military Ethics, 9(4),* 332-341.

McFarland, T. & McCormack, T. (2014). Mind the Gap: Can Developers of Autonomous Weapons Systems be Liable for War Crimes? *US Naval War College International Law Studies, 90,* 361-385.

Arreguín-Toft, I. (2001). How the Weak Win Wars: A Theory of Asymmetric Conflict. *International Security, 26(1),* 93-128.

Paulus, A. & Vashakmande, M. (2009). Asymmetrical war and the notion of armed conflict – a tentative conceptualization. *International Review of the Red Cross, 91(873),* 95-125.

Anderson, K. & Waxman, M. (2012). Law and Ethics for Robot Soldiers. *Policy Review, 76*.

Schmitt, M. (2013). Autonomous Weapons Systems and International Humanitarian Law: A Reply to the Critics. *Harvard National Security Journal Features*.

Roff, H. (2014). The Strategic Robot Problem: Lethal Autonomous Weapons in War. *Journal of Military Ethics, 13(3),* 211-227.

Patterson, E. (2009). Just War Theory and Explosive Remnants of War. *Journal of*

Conventional Weapons Destruction, 13(1), Article 2.

Liivoja, R. (2015). Technological change and the evolution of the law of war. *International Review of the Red Cross, 97(900),* 1157-1177.

Alexander, A. (2015). A Short History of International Humanitarian Law. *European Journal of International Law, 26(1),* 109-138.

Kunz, J. (1951). The Chaotic Status of the Laws of War and the Urgent Necessity for Their Revision. *American Journal of International Law, 45(1),* 37-61.

Sparrow, R. (2007). Killer Robots. *Journal of Applied Philosophy, 24(1),* 62-77.

Hammond, D. (2015). Autonomous Weapons and the Problem of State Responsibility. *Chicago Journal of International Law, 15(2),* 652-687.

Mongelard, E. (2006). Corporate civil liability for violations of international humanitarian law. *International Review of the Red Cross, 88(863),* 665-691.
Van der Vyer, J. (2004). The International Criminal Court and The Concept of Mens Rea in International Criminal Law. *University of Miami International and Comparative Law Review, 12(1),* 57-149.

Weston, S. (1963). Contributory Negligence in Product Liability. *Cleveland State Law Review, 12,* 424-436.

UN Documents and Reports

ICRC. (2011). *International Humanitarian Law and the challenges of contemporary armed conflicts.* (32IC/15/11). Geneva, Switzerland: 31st International Conference of the Red Cross and Red Crescent.

ICRC. (2014). *Autonomous Weapons Systems: Technical, Military, Legal and Humanitarian Aspects.* Geneva, Switzerland: Expert meeting of the Red Cross and Red Crescent.

UN Human Rights Council, *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns,* 9 April 2013, UN Doc. A/HRC/23/47.

Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, *Report of the 2014 informal Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS),* 11 June 2014, UN Doc. CCW/MSP/2014/3.

Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, *Report of the 2015 informal Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS),* 2 June 2015, UN Doc. CCW/MSP/2015/3.

Fifth Review Conference 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, *Report of the 2016 informal Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS),* 10 June 2016, UN Doc. CCW/CONF.V/2.

Geiss, R. (2015). *The International-Law Dimension of Autonomous Weapons Systems.* (Study). Berlin, Germany: Friedrich-Ebert-Stiftung.

UNIDIR. (2015). *The Weaponization of Increasingly Autonomous Technologies: Considering Ethics and Social Values.* (Resources No. 3).

HRW. (2012). *Losing Humanity: The Case Against Killer Robots.* Retrieved from: https://www.hrw.org/report/2012/11/19/losing-humanity/case-against-killer-robots

UN Human Rights Council, *Report of the Special Rapporteur on extrajudicial,*

summary or arbitrary executions, Philip Alston, 28 May 2010, UN Doc. A/HRC/14/24/Add.6

Cases

Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, ICJ Reports 1996, p. 226.

Prosecutor v. Anto Furundzija (Trial Judgment), Case No. IT-95-17/1-T, ICTY, 10 December 1998.

Jurisdictional Immunities of the State (Germany v. Italy: Greece intervening), Judgment, ICJ Reports 2012, p. 99.

Treaties

UN General Assembly, *Rome Statute of the International Criminal Court (last amended 2010),* 17 July 1998.

UN Security Council, *Statute of the International Criminal Tribunal for the Former Yugoslavia (as amended on 17 May 2002),* 25 May 1993.

UN Security Council, *Statute of the International Criminal Tribunal for Rwanda (last amended on 13 October 2006),* 8 November 1994.

International Law Commission, *Articles on Responsibility of States for Internationally Wrongful Acts,* November 2001, Supplement No. 10 (A/56/10), chp. IV.E.1.

Miscellaneous

Ty McCormick (2014). How killer robots became more than just scary science fiction. Retrieved from http://foreignpolicy.com/2014/01/24/lethal-autonomy-a-short-history/

Adriano Iaria (2017). Lethal Autonomous Weapon Systems and the Future of Warfare. Retrieved from http://www.iai.it/sites/default/files/iaicom1730.pdf

UK Ministry of Defence. (2017). Unmanned Aircraft Systems. (Joint Doctrine Publication). Wiltshire, United Kingdom.

Scott Hickie, Chris Abbott & Raphaēl Zaffran. (2014). Trends in Remote Control Warfare in New Ways of War: Is Remote Control Warfare Effective? *The Remote Control Digest.* Retrieved from: http://oxfordresearchgroup.org.uk/sites/default/files/Remote%20Control%20Digest.pdf

US Mission to the UN. (2017). US Opening Statement at CCW Meeting of Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS). Retrieved from: https://geneva.usmission.gov/2017/11/15/u-s-opening-statement-at-ccw-meeting-of-group-of-governmental-experts-on-lethal-autonomous-we