Autonomous Weapon Systems, Human Dignity and International Law

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Chapter Five

Autonomous Weapon Systems and International Humanitarian Law

I. Introduction

During armed conflict, soldiers must conduct combat according to norms entrenched in both international and domestic law, so that military activity does not take place in a normative void.[1] Although '[v]iolence is appropriate to war,'[2] for many generations writers have advocated that 'it is worthy of civilized nations … "to restrain the destructive force of war, while recognizing its inexorable necessities."'[3] Lord Wright, who edited The Law Reports of Trials of War Criminals following the Second World War, observed that the laws of war attempt 'to diminish the evils of war so far as military requirements permit.'[4] Thus, law cannot serve as a substitute for war.[5] It can, however, constrain the conduct of hostilities to reduce the suffering that occurs during armed conflict.

The efforts of international humanitarian law[6] (as well as international human rights law) to promote the 'humanization of war' intuitively presuppose that war's protagonists and decision-makers – soldiers, military commanders, civilian superiors and insurgents – are human. This assumption is reinforced by relevant treaties and other instruments that frequently use personal pronouns and/or refer to human beings. For example, Article 57 of the 1863 Lieber Code provided that when 'a *man* is armed by a sovereign government and takes the soldier's oath of fidelity, *he* is a belligerent; *his* killing, wounding, or other warlike

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[1] *The Public Committee Against Torture in Israel v. The Government of Israel*, Separate Opinion of President D. Beinisch, HCJ 769/02, December 11, 2005.
[2] L White, Jr. *Medieval Technology and Social Change* (Oxford: The Clarendon Press, 1962), p. 103.
[3] Preface, *The Laws of War on Land*, Institute of International Law, Oxford, 9 September 1880, citing Baron de Jomini, <https://www.icrc.org/applic/ihl/ihl.nsf/ART/140-80005?OpenDocument>.
[4] Foreword, Vol. 15, Digest of Laws and Cases, *Law Reports of Trials of War Criminals*, London, United Nations War Crimes Commission, 1949, xiii, <http://www.loc.gov/rr/frd/Military_Law/pdf/Law-Reports_Vol-15.pdf>.
[5] H Lauterpacht, *The Function of Law in the International Community* (Oxford: Clarendon Press, 1933), p. 437.
[6] In this dissertation, I use the phrases 'international humanitarian law,' 'the law of armed conflict' and 'the law of war' synonymously.

acts are not individual crimes or offenses.'[7] Article 13 of the 1949 Geneva Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field ('Geneva Convention') applies to members of militias and organized resistance movements that are 'commanded by a *person* responsible for *his* subordinates.'[8] Article 87 (3) of Protocol I Additional to the Geneva Conventions of 12 August 1949 ('API') requires 'any commander who is aware that subordinates or *other persons under his control* are going to commit or have committed breaches' of the Geneva Conventions or API, to initiate steps to prevent and/or punish the perpetrators.[9]

Concurrently, however, the growing use of technology by armed forces has driven the development of the laws of war.[10] As we saw in chapter two, increasingly, war is and will be fought by machines – and virtual networks linking machines - which, to varying degrees, are controlled by humans. In chapter four, I demonstrated how the delegation to machines of the responsibility for important, value-based thought and reasoning damages human dignity. Respect for human dignity is 'the very raison d'etre'[11] of the entire body of international law, including the law of armed conflict. Indeed, the preservation and restoration of human

[7] *General Orders No. 100, Instructions for the Government of Armies of the United States in the Field* (emphasis added), <http://avalon.law.yale.edu/19th_century/lieber.asp#art1>. Article 72 provided that 'all officers, when captured, must surrender *their* side arms to the captor. They may be restored to the prisoner in marked cases, by the commander, to signalize admiration of *his* distinguished bravery or approbation of *his* humane treatment of prisoners before *his* capture. In the 1868 Declaration Renouncing the Use, in Time of War, of Certain Explosive Projectiles, the state signatories agreed that, for the purpose of weakening the military forces of the enemy, 'it is sufficient to disable the greatest number of *men*' (emphasis added). <https://www.icrc.org/ihl/INTRO/130?OpenDocument>.

[8] (Emphasis added).

[9] Furthermore, according to Article 44 (2) of Additional Protocol I of 1977 ('API'), violations of international humanitarian law 'shall not deprive a combatant of *his* right to be a combatant or, if *he* falls into the power of an adverse Party, of *his* right to be a prisoner of war….' (emphasis added).

[10] Centuries ago, advances in technology 'ended the face-to-face combats and the "individualism of combat" between medieval warriors,' and 'ultimately generated the need for international rules of war to humanize the conduct of hostilities ….' T Meron, *Bloody Constraint: War and Chivalry in Shakespeare* (Oxford University Press: 1998), p. 12.

[11] *Prosecutor v. Anto Furundžija, Judgment*, IT-95-17/1-T, 10 December 1998, para. 183.

dignity is the essence of the work of the International Committee of the Red Cross, which received its mandate from the 1949 Geneva Conventions and the 1977 Additional Protocols.[12]

Therefore, in this chapter, I describe the development of international humanitarian law, its basic principles and the rules of targeting, which are particularly relevant to the design and employment of lethal autonomous weapon systems. I identify the kinds of values-based decisions concerning the exercise of lethal force in international humanitarian law that demand the inclusion and direction of human reasoning. I argue that 1) the principles of humanity and military necessity in international humanitarian law are intrinsically linked to the concept of human dignity, 2) humans should make decisions in situations where these principles are in tension, 3) human involvement is not necessary in military decisions that require more automatic and instinctive behaviour, such as close-quarters combat, or during processes of information gathering and fusion, and 4) the duties to protect human dignity and to employ the guiding concept of dignity limits armed forces and organized armed groups to the use of autonomous weapon systems with a co-active design that permits collaborative autonomy for complex, values-based decisions.

II. The Development and Applicable Principles and Rules of Modern International Humanitarian Law

A. The Development of Modern International Humanitarian Law

More than two thousand years ago, Marcus Tullius Cicero, the Roman philosopher, politician and orator famously declared that '[i]n times of war, the law falls silent.'[13] By the medieval era, however (if not before), rules constraining behaviour during armed conflict

[12] 'Memorandum: The ICRC's Privilege of Non-Disclosure of Confidential Information,' 895 *International Review of the Red Cross* (October 2015), p. 2; Arts. 3 (2), 9, 10, 11, 56, 72, 75, 79, 123, 125 and 126, Geneva Convention III; Arts. 5, 17, 33, 38, 78 and 81, API.

[13] 'Silent enim leges inter arma;…' The literal translation is '[f]or laws are silent when arms are raised.' M Cicero, 'Oration for Titus Annius Milo,' The Society for Ancient Languages, section IV, <http://www.uah.edu/student_life/organizations/SAL/texts/latin/classical/cicero/promilone1e.html#celeven>. For a general description of 'codes of conduct' for warfare implemented by ancient cultures, see C Greenwood, 'Historical Development and Legal Basis,' D Fleck (ed.) *The Handbook of International Humanitarian Law* (2nd ed.) (Oxford University Press: 2009), pp. 15 – 16.

were more common.[14] This process accelerated during the last few centuries and today a comprehensive body of customary and treaty-based international humanitarian law has developed that regulates the conduct of hostilities and protects persons who are vulnerable to the violence and suffering of war.

Dutch jurist Hugo Grotius, writing in the seventeenth century, was a catalyst for new thinking about the importance of law during armed conflict. Grotius introduced the principle that the lawful exercise of force during warfare is not unlimited.[15] He argued that 'the power of the sword must be *restrained* from inflicting promiscuous death.'[16] Grotius linked this notion of restraint with the importance of 'moderation and humanity' in the conduct of war and foreshadowed how commanders might be held accountable should they fail to adhere to these principles.[17] Similarly, a century later, Emerich de Vattel contended that the right to use violence during armed conflict 'goes hand in hand *with necessity* and the exigency of the case, but never exceeds them.'[18] This connection between the exercise of force and necessity, de Vattel claimed, is part of Natural Law.[19] Thus, hostile acts by armed forces that are necessary to overpower the enemy's resistance and attain the end of a lawful war are lawful under international law.[20]

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[14] For example, the *Qur'ān* prohibits attacks against non-combatants such as women, children, the aged, the blind, the sick and incapacitated persons. M Badar, 'Jus in Bello Under Islamic International Law,' 13 *International Criminal Law Review* (2013), 593, p. 606; For an analysis of the rules of Chivalry, see Meron, Bloody Constraint: War and Chivalry in Shakespeare.

[15] Grotius explained that his subject was to decide 'how far the power of lawfully destroying an enemy, and all that belongs to him, extends.' *On the Law of War and Peac*e (1625), Translated by A.C. Campbell (Kitchener: Batoche Books, 2001, p. 286, available online at http://socserv2.socsci.mcmaster.ca/econ/ugcm/3ll3/grotius/Law2.pdf.

[16] *Ibid* (emphasis added).

[17] *Ibid*, pp. 319 – 324. Grotius' description of the importance of moderation resembles the modern principle of 'military necessity discussed below:' '[b]y way of conclusion to this subject it may be observed, that all actions no way conducive to obtain a contested right, or to bring the war to a termination, but calculated merely to display the strength of either side are totally repugnant to the duties of a Christian and to the principles of humanity.' *Ibid*, para. XIX.

[18] *The Law of Nations* (1758) (Philadelphia: T. & J. W. Johnson, Law Booksellers, 1844), section 137, <http://www.loc.gov/rr/frd/Military_Law/Lieber_Collection/pdf/DeVattel_LawOfNations.pdf>.

[19] *Ibid*, sections 137 – 138.

[20] *Ibid*, section 137.

Just a few years after Vattel's treatise, Jean-Jacque Rousseau advanced the same nexus between necessity and lawful conduct: '[w]ar gives no right which is not necessary to the gaining of its object.'[21] Rousseau also drew a distinction between the treatment of persons taking part in hostilities and those who did not, arguing that once persons lay down their arms, they should not be subject to attack.[22]

These Enlightenment doctrines eventually developed into the proscriptive and empowering rules of modern international humanitarian law, which is divided generally into two categories: 'Hague Law' and 'Geneva Law.' Hague Law[23] generally encompasses rules for the conduct of hostilities whilst Geneva Law[24] addresses the protections due to civilians who are not directly participating in hostilities as well as combatants who find themselves hors de combat.[25]

Several nineteenth century foundational documents for these branches of international humanitarian law deserve mention. With respect to 'Hague Law,' the so-called 'Lieber Code,' drafted by Professor Francis Lieber at the request of U.S. President Abraham Lincoln

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[21] *The Social Contract* (1762), translated by G.D.H. Cole, p. 8, <http://www.ucc.ie/archive/hdsp/Rousseau_contrat-social.pdf>.
[22] *Ibid.*
[23] Sources of Hague Law include, inter alia, The Lieber Code, the 1868 Saint Petersburg Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight, the 1874 Brussels Project of an International Declaration Concerning the Laws and Customs of War, the 1880 Oxford Manual on the Laws of War on Land, the 1899 Hague Convention (II) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land, the 1907 Convention (IV) Respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land, 18 October 1907 and related Declarations, the Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, Geneva, 17 June 1925, and the 1980 Convention on Prohibitions on the Use of Certain Chemical Weapons.
[24] Sources of Geneva Law include, inter alia, the Convention for the Amelioration of the Condition of the Wounded in Armies in the Field, Geneva, 22 August 1864, Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Geneva, 12 August 1949, Convention (II) for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Geneva, 12 August 1949, Convention (III) Relative to the Treatment of Prisoners of War, Geneva, 12 August 1949, and Convention IV Relative to the Protection of Civilian Persons in Time of War, Geneva, 12 August 1949. The 1977 Additional Protocols to the Geneva Conventions of 1949 ('API' and 'APII') effectively combine Hague and Geneva Law, as they extend the protections of the Conventions as well as develop the rules concerning the conduct of hostilities.
[25] 'Introduction to the Commentary on the Additional Protocols I and II of 8 June 1977,' ICRC, <https://www.icrc.org/ihl/INTRO/470>.

during the increasingly vicious American civil war, constituted the first single set of instructions for soldiers and officers in the field pertaining to the laws and customs of war. Lieber was a realist, a tough humanitarian who believed that war should be waged vigorously.[26] 'Blood,' he once wrote to the General-in-Chief of the Union armies, 'is occasionally the rich dew of history.'[27] Thus, although the Lieber Code proscribes acts of inhumanity ('[m]ilitary necessity does not admit of cruelty, that is, the infliction of suffering for the sake of suffering or for revenge, ….'),[28] it does so pragmatically to facilitate the return to peace.[29] Moreover, the Code sanctions and provides a framework for 'all direct destruction of life or limb of armed enemies' and other persons who suffer incidental but unavoidable injury as a consequence of war.[30]

In addition to the Lieber Code's regulation of the conduct of hostilities, the 1868 Declaration of St. Petersburg was the first formal international agreement that prohibited the use of certain weapons. The Declaration prohibited the use of bullets that explode on impact and reiterated the principle suggested by Grotius, Vattel and Rousseau that 'the only legitimate object which States should endeavor to accomplish during war is to weaken the military forces of the enemy.'[31] Accordingly, the Declaration banned the use of weapons that would needlessly aggravate the sufferings of persons, or render their death inevitable, a rule that is now part of customary international humanitarian law, as well as treaty law.[32]

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[26] J Witt, *Lincoln's Code: The Laws of War in American History* (New York: Free Press, 2012), p. 196; 'The more vigorously wars are pursued, the better it is for humanity. Sharp wars are brief.' Art. 29, The Lieber Code.
[27] Witt, p. 196 and notes 177 and 196.
[28] Art. 16, The Lieber Code.
[29] *Ibid*.
[30] *Ibid*, art. 15.
[31] Declaration Renouncing the Use, in Time of War, of Certain Explosive Projectiles. Saint Petersburg, 29 November/11 December 1868, <https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=568842C2B90F4A29C12563CD0051547C>.
[32] Rule 70, 'Weapons of a Nature to Cause Superfluous Injury of Unnecessary Suffering,' *ICRC Customary International Humanitarian Law Study*, <https://www.icrc.org/customary-ihl/eng/docs/v1_cha_chapter20_rule70>; Art. 35, API.

A number of the tenets expressed in the Lieber Code and the Declaration of St. Petersburg became part of the 1899 Regulations Concerning the Laws and Customs of War on Land and the 1907 Regulations Concerning the Laws and Customs of War on Land (the '1899 and/or 1907 Hague Regulations').[33] For example, articles 22 and 23 of both the 1899 and 1907 Regulations echo the Lieber Code's admonition that there are limits to the lawful exercise of violence during armed conflict. The comprehensive rules codified in the Regulations address important areas of the conduct of hostilities including 1) the qualifications of lawful combatants, 2) the treatment of prisoners of war, 3) legal and illegal means and methods of warfare, 4) the status and treatment of spies during armed conflict, 5) flags of truce, capitulations and armistices and 6) military occupation of enemy territory.[34]

In addition, the preamble to the 1899 Regulations contains the 'Martens Clause:'

> 'Until a more complete code of the laws of war is issued, the High Contracting Parties … declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law as they result from the usages established between civilized nations, from the laws of humanity and the requirements of the public conscience.'

The 1977 Additional Protocols to the Geneva Conventions of 1949 partly affirmed and developed the principles and rules embodied in the 1899 and 1907 Hague Conventions.[35] For example, API, applicable to international armed conflicts,[36] contains, in addition to a modified

[33] The influence of the Lieber Code and the St. Petersburg Declaration also can be seen in the unratified International Declaration Concerning the Laws and Customs of War ('Brussels Declaration') of 1874 and the 1880 Oxford Manual of the Laws and Customs of War ('Oxford Manual'). For example, like the Lieber Code, the Brussels Declaration affirms that prisoners of war must be humanely treated (compare arts. 72 – 76 of the Lieber Code with art. 23 of the Brussels Declaration). Similarly, art. 9 (a) of the Oxford Manual, which prohibits the use of weapons calculated to cause superfluous suffering or aggravated wounds, specifically refers to the St. Petersburg Declaration.

[34] See 'History and Sources of the Law of Armed Conflict,' in G Corn et. al, (eds.), *The Law of Armed Conflict: An Operational Approach* (New York: Wolters Kluwer, 2012), pp. 40 – 43.

[35] 'General Commentary to 1899 Regulations,' ICRC, <https://www.icrc.org/ihl/INTRO/150?OpenDocument>. Similarly, whilst the 1899 Declaration 2 Concerning Asphyxiating Gases banned the used of projectiles intended to diffuse asphyxiating or deleterious gases, the 1925 Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare extended this ban to include the use of bacteriological methods of warfare. A Roberts & R Guelff, *Documents on the Law of War*, 3rd ed. (Oxford University Press: 2000), pp. 155 – 159.

[36] Art. 1 (3).

version of the Martens Clause,[37] a detailed framework that articulates conduct (including acts and omissions) necessary for compliance with the basic principles of international humanitarian law.[38]

The development of 'Geneva Law' began after Henry Dunant's experience tending to the wounded and dying survivors of the battle of Solferino.[39] Dunant's proposals for reducing the kinds of suffering that he had witnessed led to the drafting of the Geneva Convention for the Amelioration of the Condition of the Wounded in Armies in the Field and, gradually, the development of the International Committee of the Red Cross.[40] A Second (more comprehensive) Convention for the Amelioration of the Condition of the Wounded in Armies in the Field was promulgated in 1906.[41] In 1929, a diplomatic conference drafted the Third Geneva Convention Relative to the Treatment of Prisoners of War.[42]

The disastrous events of the Second World War revealed significant gaps in 'Geneva Law.' In many areas, the law was vague.[43] Furthermore, even with respect to provisions that were relatively clear and precise, breaches of the law demonstrated the need for more effective rules to monitor compliance and hold violators accountable. Consequently, a diplomatic conference produced the four 1949 Geneva Conventions (the '1949 Conventions'). The First, Second and Third 1949 Conventions significantly broadened the protections due to wounded and sick combatants as well as prisoners of war. Perhaps most importantly, 1949

[37] Art. 1 (2), '[i]n 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.'

[38] For example, see Art. 57, API, 'Precautions in Attack,' discussed below.
[39] H Dunant, *A Memory of Solferino* (1862) (Geneva: International Committee of the Red Cross, 1986), pp. 13 - 128.
[40] *Ibid*, Afterword by H Haug, pp. 129 – 131.
[41] <https://www.icrc.org/ihl/INTRO/180?OpenDocument>.
[42] <https://www.icrc.org/ihl/INTRO/305?OpenDocument>.
[43] Roberts and Guelff, Documents on the Law of War, p. 194.

Geneva Convention IV Relative to the Protection of Civilian Persons in Time of War was the first treaty devoted exclusively to the protection of civilians during armed conflict.[44]

The 1949 Geneva Conventions share several common articles pertaining to the scope of the treaties. Common Article 2 provides that the Conventions apply to any armed conflict (whether formally declared or not) between two or more state parties. Thus, the four Conventions apply to international armed conflicts. Common Article 2 also invokes the power of the Conventions over situations of partial or total occupation of the territory of a state party, even when the occupation meets with no armed resistance. Common Article 3 compels parties to a non-international armed conflict occurring in the territory of a state party to treat persons taking no active part in hostilities humanely.

Additional gaps in Geneva Law (in particular concerning the protection of civilians and the status and treatment of prisoners war) were identified during the post-World War II conflicts of decolonization as well as the Korean and Vietnam Wars.[45] Hence, in 1977, another diplomatic conference promulgated two Additional Protocols to the four 1949 Geneva Conventions.[46] As noted above, in addition to filling gaps in Geneva Law and obliging state parties to review the legality of new means and methods of warfare,[47] API includes more precise rules regarding the conduct of hostilities, including provisions that codify the rules of targeting.[48] Importantly for chapter seven, 'Autonomous Weapon Systems and International Criminal Law,' API also obliges state parties to hold accountable persons who commit grave

[44] *Ibid*, p. 299.
[45] *Ibid*, p. 244.
[46] < https://www.icrc.org/ihl/INTRO/470> and <https://www.icrc.org/ihl.nsf/INTRO/475?OpenDocument>.
[47] *Ibid*, art. 36.
[48] *Ibid*, arts. 48 – 59.

breaches of the 1949 Conventions and API, as well as commanders who fail to prevent or punish subordinates for violations of the laws of war.[49]

Many of the provisions of Hague Law and Geneva Law embody rules of customary international humanitarian law[50] and thus, also bind states that are not parties to the treaties and conventions.[51] Indeed, the International Court of Justice has concluded that the fundamental rules expressed within the Hague Regulations and Geneva Conventions 'constitute *intransgressible* principles of international customary law.'[52] While the Geneva Conventions have achieved almost universal application,[53] the same cannot be said for the Additional Protocols.[54] Nevertheless, many rules of customary international humanitarian law apply in both international and non-international armed conflicts.[55] Importantly, the application of customary international humanitarian law to non-international armed conflicts serves to fill gaps in APII's limited regulation of the conduct of hostilities and the general provisions of common Article 3.[56] Furthermore, customary rules of international

[49] *Ibid*, arts. 85 – 87.
[50] As explained in chapter three, the creation of customary international law requires a combination of state practice and opinio juris. *North Sea Continental Shelf*, Judgment, I.C.J. Reports 1969, paras. 77 – 78. In the context of international humanitarian law, where multiple treaties codify legal obligations during armed conflict, the primary significance of a norm's customary character is that the norm binds states that are not parties to the instrument that restates the norm. T Meron, *Human Rights and Humanitarian Norms as Customary Law* (Oxford: Clarendon Press, 1989), p. 3.
[51] ICRC Introduction to *Convention (II) with Respect to the Laws and Customs of War on Land and its Annex: Regulations Concerning the Laws and Customs of War on Land*, The Hague, 29 July 1899, available online at https://www.icrc.org/ihl/INTRO/150?OpenDocument; Greenwood, 'Historical Development and Legal Basis,' p. 11; J Kellenberger, to J Henckaerts & L Doswald-Beck (eds.) *Customary International Humanitarian Law*: Volume I: Rules,' (Also referred to below as the 'ICRC Customary International Humanitarian Law Study'*)*, p. x.
[52] Legality of the Threat or Use of Nuclear Weapons, para. 79 (emphasis added).
[53] Most provisions of the Geneva Conventions are considered to be declaratory of customary international humanitarian law. *Prosecutor v Blagoje Simić et. al*, Decision on the Prosecution Motion Under Rule 73 for a Ruling Concerning the Testimony of a Witness, IT-95-9, 27 July 1999, para. 48.
[54] Kellenberger, 'Foreword' p. x.
[55] 'Introduction' to Customary International Humanitarian Law: Volume I, p. xxix.
[56] *Ibid*, pp. xxviii – xxix.

humanitarian law are reflected in other international treaties such as the Rome Statute of the International Criminal Court.[57]

B. Basic Principles and Rules of Modern International Humanitarian Law

The application of modern international humanitarian law is an attempt to achieve an equitable balance between humanitarian requirements and the demands of armed conflict,[58] e.g. between the principles of humanity and military necessity.[59] The principle of 'humanity' – the heart of international humanitarian law[60] - prohibits the infliction of suffering, injury or destruction not actually necessary for the accomplishment of a legitimate military purpose.[61] 'These considerations are based upon the rights of the individual, and his [human] dignity.'[62]

Francis Lieber defined 'military necessity' as 'the necessity of those measures which are indispensable for securing the ends of the war, and which are lawful according to the modern law and usages of war.'[63] The U.K. armed forces use a more nuanced definition that mirrors the principle of humanity:

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[57] Roberts & Guelff, Documents on the Law of War, pp. 60 and 157. For example, art. 8 (2) (b) (xviii) reflects the customary rule banning the use of 'asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices.' Similarly, Art. 6 (b) of the Charter of the International Military Tribunal at Nuremberg reflected the laws and customs of war first codified in the 1907 Regulations. *Judgment*, The Trial of German Major War Criminals, Proceedings of the International Military Tribunal Sitting at Nuremberg, Germany, 1 October 1946, p. 467.

[58] L May & M Newton, *Proportionality in International Law* (New York: Oxford University Press, 2014), pp. 171 and 177; *ICRC Commentary to Art. 57*, API, para. 2206, <https://www.icrc.org/ihl/INTRO/470>.

[59] ICRC Commentary to Art. 57, API, para. 2206, https://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=D80D14D84BF36B92C12563CD00434FBD.

[60] Legality of the Threat or Use of Nuclear Weapons, para. 95, <http://www.icj-cij.org/docket/files/95/7495.pdf>.

[61] This principle is based on the concept that once a military purpose has been achieved, the further infliction of suffering is unnecessary. JSP 383, *The Joint Service Manual of the Law of Armed Conflict*, (2004 ed.) Joint Doctrine and Training Centre, U.K. Ministry of Defence, paras. 2.4 and 2.4.1, <https://www.gov.uk/government/publications/jsp-383-the-joint-service-manual-of-the-law-of-armed-conflict-2004-edition>.

[62] *The Public Committee Against Torture in Israel v. The Government of Israel*, Opinion of President (Emeritus) A Barak, HCJ 769/02, December 11, 2005, para. 22. For example, when civilians are present in a combat zone, their human dignity must be protected during military operations. *Judgment*, *Physicians for Human Rights v. IDF Commanders*, Opinion of President A. Barak, HCJ 4764/04, [2004] IsrLR 200, paras. 11 – 12.

[63] Art. 14, The Lieber Code.

> '[m]ilitary necessity is now defined as 'the principle whereby a belligerent has the right to apply any measures which are required to bring about the successful conclusion of a military operation and which are not forbidden by the laws of war. Put another way a state engaged in an armed conflict may use that degree and kind of force, not otherwise prohibited by the law of armed conflict, that is required in order to achieve the legitimate purpose of the conflict, namely the complete or partial submission of the enemy at the earliest possible moment with the minimum expenditure of life and resources.'[64]

Evident in both of these legal principles is the presence and influence of the concept of human dignity. Humanity's goal to reduce the suffering caused by war demands the (feasible) respect for human rights during armed conflict. In parallel, military necessity's limits on permissible use of force demands the same regard for human rights. Accordingly, humanity and military necessity are an expression of the interplay of human dignity and human rights within international humanitarian law.[65]

In addition to humanity and military necessity, two other 'crucial'[66] principles determine the effectiveness of modern international humanitarian law. First, the principle of distinction establishes that belligerents must always distinguish between enemy combatants and civilians and never intentionally target civilians or civilian objects.[67] Consequently, indiscriminate attacks, i.e. those that are of a nature to strike military objectives and civilians

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[64] *JSP 383, Joint Services Publication 383 -- The Manual of the Law of Armed Conflict Amendment 3* (September 2010), (22), para. 2.2.

[65] The term 'international humanitarian law' itself emerged from the influence of human rights doctrine on the law of armed conflict. Prosecutor v. Duško Tadić a/k/a 'Dule,' Decision on Defence Motion for Interlocutory Appeal on Jurisdiction, No. IT-94-1, 2 October 1995, para. 87. Like human rights law, the rules of international humanitarian law rest on 'the principle of respect for human personality,' i.e. human dignity. ICRC Commentary to Common Art. 4 of 1949 Geneva Conventions.

[66] The Legality of Nuclear Weapons, paras. 77 and 78, citing Art. 23 (e) of *1907 Convention (IV) Respecting the Laws and Customs of War on Land and Its Annex: Regulations Concerning the Laws and Customs of War on Land*, which prohibits the use of arms, projectile or material calculated to cause unnecessary suffering. <https://www.icrc.org/ihl/INTRO/195>.

[67] Art. 48, API. The principle of distinction 'is the foundation upon which the codification of the laws and customs of war rests.' International Committee of the Red Cross, 'Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts ("API"), 8 June 1977: 'Commentary' (ICRC, 2012) available online at http://www.icrc.org/ihl.nsf/COM/470-750073?OpenDocument (visited 22 March 2014), at para. 1863. This principle has become part of customary international humanitarian law. Rule 1, 'The Principle of Distinction between Civilians and Combatants' and 'Rule 7, The Principle of Distinction between Civilian Objects and Military Objective,' ICRC Customary International Humanitarian Law Study, <https://www.icrc.org/customary-ihl/eng/docs/v1_rul>.

without distinction, as well as the use of weapons that are indiscriminate, are unlawful.[68] Second, belligerent parties may not employ means and methods of warfare in a manner that causes superfluous injury or unnecessary suffering.[69] The phrase 'means of combat' generally refers to the weapons used while 'methods of combat' generally refers to the way in which weapons are used.[70] This constraint reflects the 'most fundamental customary principle'[71] of the law relating to the conduct of hostilities; that the right of belligerents to adopt means of injuring the enemy, including the choice of weapons, is not unlimited.[72]

No rule of international humanitarian law specifically addresses autonomous weapon systems, which is unsurprising given the state of technology in 1977, when the 1949 Geneva Conventions were last revised. Nevertheless, activity that is not specifically prohibited in treaty law is not necessarily lawful.[73] Article 1 (2) of API contains a revised version of the Martens Clause: '[i]n 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

[68] Art. 51 (4), API. The prohibition of indiscriminate attacks is also part of customary international humanitarian law. 'Rule 11, Indiscriminate Attacks' and 'Rule 12, Definition of Indiscriminate Attacks,' ICRC Customary International Law Study.

[69] Art. 35 (2), API, This constraint on the means and methods of warfare also forms part of customary international humanitarian law. 'Rule 70, Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering, ICRC Customary International Law Study. In *The Nuclear Weapons Case*, the International Court of Justice defined 'unnecessary suffering' as 'a harm greater than that unavoidable to achieve legitimate military objectives.' para. 78. By prohibiting unnecessary suffering, international humanitarian law acknowledges that '*necessary suffering* to combatants is lawful, and may include severe injury or loss of life.' W H Parks, 'Conventional Weapons and Weapons Reviews,' *Yearbook of International Humanitarian Law* (2005), 55, 140 (emphasis in original).

[70] ICRC Commentary to art. 51, API, para. 1957, <https://www.icrc.org/applic/ihl/ihl.nsf/INTRO/470>. The humanitarian character of the principles of the law of armed conflict applies to all forms of warfare and all kinds of weapons, *including future weapons. The Legality of Nuclear Weapons*, para. 86.

[71] Roberts & Guelff, Documents on the Law of War, p. 9.

[72] In his Dissenting Opinion in The Legality or Threat of Use of Nuclear Weapons Advisory Opinion, Judge Shahabudeen makes a compelling argument that the prohibition on causing unnecessary suffering must apply to civilians as well as combatants, p. 404.

[73] T Meron, 'The Martens Clause, Principles of Humanity, and Dictates of Public Conscience,' 94 *The American Journal of International Law*, 1 (2000), 78 – 79, 87

the dictates of public conscience.' The Martens Clause itself is a rule of customary international law.[74]

The practical effect of the dynamic principles of 'considerations of humanity' and 'dictates of public conscience' varies depending on the means and/or method of warfare at issue[75] and these phrases from the Martens Clause do not usually, by themselves, delegitimize weapons and methods of war.[76] Modern human rights law, including the United Nations Charter, informs interpretations of these principles.'[77] Thus, the doctrinal basis of human dignity underlying the Charter and other international conventions instructs our application of the 'considerations of humanity' and 'dictates of public conscience' language of the Martens Clause to means and methods of warfare. The 'dictates of public conscience' with respect to the development and use of autonomous weapons systems are still evolving.[78] Nevertheless, the requirement of 'considerations of humanity' must inform our current discussions about autonomous weapons. This new technology, by removing complex war-fighting decisions from the responsibility of humans, creates new practical effects on humanity, i.e. virtually *all* of humanity.

Arguably, the basic principles of international humanitarian law have become *jus cogens* norms, i.e. canons from which no derogation is permitted.[79] Many of the more precise rules of humanitarian law, however, do not enjoy this status.[80]

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[74] Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996 (Dissenting Opinion Judge Shahabuddeen), p. 405.
[75] *Ibid*, p. 406.
[76] Meron, 'The Martens Clause, Principles of Humanity, and Dictates of Public Conscience,' p. 88. One example where the Martens Clause arguably delegitimizes a means or method of warfare is the use of nuclear weapons. *Ibid*, Legality of the Threat or Use of Nuclear Weapons, (Dissenting Opinion Judge Shahabuddeen), p. 411.
[77] Legality of the Threat or Use of Nuclear Weapons, (Dissenting Opinion Judge Weeramantry), pp. 490 - 491.
[78] M Rosenberg & J Markoff, 'At Heart of U.S. Strategy, Weapons That Can Think,' *The New York Times*, 26 October 2016, pp. 1 and 23.
[79] Greenwood, 'Historical Development and Legal Basis,' p. 39.
[80] *Ibid*.

III. The Law of Targeting: The Use of Force During Armed Conflict

In order to understand how the development and employment of autonomous weapon systems impacts the exercise of force, it is necessary to review the process(es) modern armed forces undertake to plan and execute attacks. In modern warfare, the process of selecting and engaging targets can be extraordinarily complex, involving multiple stakeholders, interests and values, and includes a mix of human thinking, automation and autonomy. Word limits prevent a comprehensive description of all facets of targeting. Instead, I will review the general principles and concepts that guide this process, using the targeting doctrine of the United States, the United Kingdom and Australian armed forces as a model.

'A target is any structure, object, person, organization, thought process, attitude or behaviour which can be influenced by a weapon ….'[81] Selected targets should be relevant to strategic, operational and tactical goals.[82] Essentially, the targeting process identifies resources that the enemy can least afford to lose or that provide her with the greatest advantage. Subsequently, targeters identify the subset of those targets that must be neutralized to achieve success.[83]

The North Atlantic Treaty Organisation ('NATO') defines targeting as the 'process of selecting and prioritizing targets and matching the appropriate response to them, taking into account operational requirements and capabilities.'[84] According to U.S. military doctrine, valid targets are those that have been vetted as: '[a] part of target development that ensures all

[81] 'Campaign Execution,' *Joint Doctrine Publication 3-00*, 3rd ed. U.K. Ministry of Defence, October 2009, para. 3B-2, nte 2. Therefore, the targeting process may include the use of 'non-lethal' force as well. However, this dissertation will focus primarily on the use of lethal force by autonomous weapon systems.
[82] Chairman, U.S. Joint Chiefs of Staff, *Joint Targeting, Joint Publication 3-60*, 31 January 2013, p. vii.
[83] *Ibid*, pp. vii - viii.
[84] *NATO Glossary of Terms and Definitions*, North Atlantic Treaty Organisation, Nato Standardisation Agency, 2008, p. 2-T-3, <available online at https://fas.org/irp/doddir/other/nato2008.pdf>.

vetted targets meet the objectives and criteria outlined in the commander's guidance and ensures compliance with the law of armed conflict and rules of engagement.'[85]

Four general principles guide the targeting process. First, it should be focused, i.e. every target proposed for engagement should contribute to attaining the objectives of the mission. Second, targeting should be 'effects-based,' i.e. it attempts to produce desired effects with the least risk and least expenditure of resources. Third, it is interdisciplinary in that targeting entails participation from commanders and their staffs, military lawyers, analysts, weaponeers,[86] 'other agencies, departments, organisations, and multinational partners.'[87] Finally, targeting should be systematic; a rational process that methodically analyses, prioritises, and assigns assets against targets.[88] A single target may be significant because of its particular characteristics. The target's real importance, however, 'lies in its relationship to other targets within the operational system'[89] of the adversary.

There are two general categories of targeting: deliberate and dynamic. Deliberate targeting shapes the battlespace and addresses planned targets and efforts, i.e. beyond the next twenty-four hours. Dynamic targeting manages the battlespace and refers to decisions requiring more immediate responses, usually within the current twenty-four hour period.[90] Targets have temporal characteristics in that their vulnerability to detection, attack, or other

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[85] 'No-Strike and the Collateral Damage Estimation Methodology,' CJCSI 3160.01A, *Chairman of the Joint Chiefs of Staff Instruction*, U.S. Department of Defence, 12 October 2012, Enclosure C, p. C-2, nte. 7, citing JP 3-60, *Joint Targeting*, reference f.

[86] A weaponeer is an 'individual who has completed requisite training to determine the quantity and type of lethal or nonlethal means required to create a desired effect on a given target.' *Ibid*, p. GL-11.

[87] JP 3-60, Joint Targeting, p. viii.

[88] *Ibid*. See P Margulies, 'Making Autonomous Weapons Accountable: Command Responsibility for Computer-Guided Lethal Force in Armed Conflicts,' in J Ohlin (ed.) *Research Handbook on Remote Warfare* (Northampton: Edward Elgar Press, forthcoming 2016). (<http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2734900>.

[89] JP 3-60, Joint Targeting, p. II-5; 'Operations Series, ADDP 3.14,' *Targeting*, 2nd ed. Australia Department of Defence, 2009, para. 1.21, <http://www.defence.gov.au/foi/docs/disclosures/021_1112_Document_ADDP_3_14_Targeting.pdf>. Australian targeting doctrine contains a fifth principle: legitimacy: '[a]ll legal obligations, domestic and international are understood and met.' *Ibid*, para. 1.6.

[90] JP 3-60, Joint Targeting, pp. II-1 – II-2 and ADDP 3.14, Targeting, paras. 1.10 – 1.1.2.

engagement varies in relation to the time available to engage them.[91] Targets that are especially time-sensitive present the greatest challenges to targeting personnel who must compress their normal decision cycles into much shorter periods.

As mentioned above, targeting decisions must satisfy law of war obligations (discussed in more detail below).[92] In this context, targeting personnel bear three essential responsibilities. First, they must positively identify and accurately locate targets that comport with military objectives and rules of engagement. Second they must identify possible concerns regarding civilian injury or damage to civilian objects in the vicinity of the target.[93] Finally, they must conduct collateral damage estimates with due diligence and 'within the framework of the operational imperatives of accomplishing mission objectives, force protection and collateral damage mitigation.'[94]

In U.S. military doctrine, the methodology of collateral damage estimation 'is a balance of science and art.'[95] Targeting personnel must use their combined expertise, experience and current intelligence to apply the science to the conditions of the operational environment. In addition to the potential for collateral damage and other law of war considerations, commanders may weigh and balance many other factors into their decision-

[91] JP 3-60, Joint Targeting, p. I-5.
[92] 'Targeteers and planners must understand and be able to apply the basic principles of international law as they relate to targeting.' *Ibid*, Appendix A, Legal Considerations in Targeting, p. A-1.
[93] *Joint Doctrine Publication 3-00*, para. 337.
[94] 'No-Strike and the Collateral Damage Estimation Methodology,' Chairman of the Joint Chiefs of Staff Instruction, U.S. Department of Defence, 12 October 2012, Enclosure A, p. A-6 (emphasis added)'; Joint Doctrine Publication 3-00, para. 3B-8; ADDP 3.14, Targeting, para. 1.24.
[95] *Ibid*, Enclosure D, p. D-2. The U.S. military personnel must consider five essential questions when performing collateral damage estimates: 1) Is the target positively identified? 2) Are there protected or collateral objects, civilian or noncombatant personnel, involuntary or unwitting human shields, or significant environmental concerns within the effects range of the weapon recommended to attack the target? 3) Can the damage to those collateral concerns be mitigated by striking the target with a different weapon or with a different method of engagement, yet still accomplish the mission? 4) If not, what is the estimate of the number of civilians and noncombatants that will be injured or killed by the attack? and 5) Are the expected collateral effects of the attack excessive in relation to the expected military advantage gained and should this decision to attack the target be addressed by the next level of command based on the ROE in effect? *Ibid*, pp. D-A-6-D-A-7.

making such as operational and strategic objectives, rules of engagement, target characteristics, political risks and risks to friendly forces and the mission itself.[96]

After targets are engaged, commanders must assess the effectiveness of the engagement.[97] 'Direct' effects are the immediate consequences of military action whilst 'indirect' effects are the delayed and/or displaced second, third or higher order consequences, resulting from intervening events or mechanisms. Effects can 'cascade,' i.e. ripple through a targeted system and effect other systems.[98] The assessment process is continuous and helps commanders adjust operations as necessary and make other decisions designed to ensure the success of the mission.[99]

Finally, the work of targeting is increasingly an automated (if not autonomous) process. 'Targeting automation is decision support technology.'[100] It refers to the use of computer applications to speed the accurate development and use of information that matches objectives with targeting, and facilitates the assessment of effects. U.S. military doctrine holds that, whilst automation increases the speed of the targeting process, 'it is not a replacement for human thinking or proactive communications'[101] and personnel must 'fully comprehend foundational targeting concepts.'[102] The next section describes the most important targeting rules of international humanitarian law with respect to autonomous weapon systems.

A. Applicable Rules of Targeting in International Humanitarian Law

The international humanitarian law provisions prescribing how belligerents should conduct targeting – i.e. Articles 48 – 59 of API – integrate the principles of military necessity

[96] *Ibid*, pp. D-3 and D-A-2.
[97] Joint Doctrine Publication 3-00, para. 338.
[98] ADDP 3.14,' Targeting, para. 1.21.
[99] 'No-Strike and the Collateral Damage Estimation Methodology,' p. D-1.
[100] *Ibid*, Appendix B Targeting Automation, p. B-1. (emphasis added).
[101] *Ibid*, p. B-4.
[102] *Ibid*.

and humanity. The targeting rules (perhaps the most important in international humanitarian law[103]) attempt to delineate the parameters for the use of force during armed conflict and therefore are the most relevant to a discussion of the development and use of autonomous weapon systems.

Articles 48 and 52 enshrine the customary law duty of parties to an armed conflict to distinguish between the civilian population and combatants and between civilian objects and military objectives, and thus direct operations only against combatants and/or military objectives.[104] Consequently, military necessity will not provide a basis for derogation from this prohibition.[105] In addition to attacks directed against civilians, '[a]cts or threats of violence the primary purpose of which is to spread terror among the civilian population are prohibited.'[106] Article 51 (4) expresses the rule of customary international humanitarian law that prohibits indiscriminate attacks, which include:

(a) those which are not directed at a specific military objective;[107]

(b) those which employ a method or means of combat which cannot be directed at a specific military objective; or

(c) those which employ a method or means of combat the effects of which cannot be limited as required by API.[108]

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[103] M Waxman, 'Detention As Targeting: Standards of Certainty and Detention of Suspected Terrorists,' 108 *Columbia Law Review* (2008) 1365, 1394, nte 103 (citing Christopher Greenwood, 'The Law of War (International Humanitarian Law)' in M Evans (ed.) *International Law*, 2nd ed. (Oxford University Press, 2003) p. 793. 'The question who, or what, is a legitimate target is arguably the most important question in the law of war ….').

[104] *Prosecutor v. Tihomir Blaškić*, Judgment, IT-95-14-A, Appeals Chamber, 29 July 2004, para. 109. Article 52 defines 'military objectives' as "those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.'

[105] *Prosecutor v. Stanislav Galić*, Judgment, IT-98-29-A, Appeals Chamber, 30 November 2006, para. 130.

[106] Art. 51 (2), API. The object and purpose of Article 51 (2) is to confirm the customary rule that civilians must enjoy general protection against the danger arising from hostilities as well as the customary prohibition against attacking civilians. Galić, para. 103.

[107] The ICRC Commentary to art. 51 explains that military objectives principally include 'the armed forces, their members, installations, equipment and transports.' para. 1951, <http://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?viewComments=LookUpCOMART&articleUNID=4BEBD9920AE0AEAEC12563CD0051DC9E>. Limited areas of strategic physical space, such as bridgeheads or mountain passes may, in certain circumstances, qualify as military objectives. *Ibid*, para. 1955.

Article 54 prohibits attacks against objects that are indispensable to the survival of the civilian population 'for the specific purpose of denying them for their sustenance value to the civilian population or to the adverse Party,'[109] regardless of motive. Such indispensable objects would include food supplies, crops ripe for harvest, drinking water reservoirs and water distribution systems.[110] To avoid additional civilian suffering, Article 56 bans attacks against works or installations containing dangerous forces, i.e. dams, dykes and nuclear power plants.

Article 57 addresses the precautions that 'those who plan or decide upon' an attack must exercise to avoid or minimize civilian casualties. Planners and executors of attacks must do everything feasible to verify that the target of the attack is a military objective and the provisions of API do not forbid the operation.[111] Furthermore, belligerent forces must 'take all feasible precautions in the choice of means and methods of attack'[112] to avoid and minimize incidental injury to civilians and damage to civilian objects.[113] 'Feasible

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[108] Oeter, 'Methods and Means of Combat,' pp. 127 -128. Attacks that employ certain means of combat which cannot discriminate between civilians and civilian objects and military objectives are 'tantamount to direct targeting of civilians.' *Prosecutor v. Pavle Strugar*, Judgment, IT-01-42-A, Appeals Chamber, 17 July 2008, note 689 (citing *Galić* Trial Judgment, note 101). Similarly, encouragement of soldiers to fire weapons for which they lack training may be indicative of the indiscriminate nature of an attack. *Strugar*, para. 274. Furthermore, the indiscriminate nature of an attack may be circumstantial evidence that the attack actually was directed against the civilian population. Galić (Appeals Chamber), at para. 132.

[109] A belligerent party may, in extreme cases of military necessity, destroy objects that *are* indispensable to the survival of the civilian population in portions of *its* territory that are under *its* control. ICRC Commentary to Art. 54 of API, para. 2121, <http://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?viewComments=LookUpCOMART&articleUNID=C5F28CACC22458EAC12563CD0051DD00>.

[110] *Ibid.* Article 54 was drafted before the development of nation-wide and global computer networks that operate and maintain vital communication, transportation, electrical and defence systems. Whether these networks should be considered as objects indispensable to the survival of the civilian population will be considered in the chapter on international criminal law.

[111] Art. 57 (2) (a) (i). As technology develops, the scope of what is 'practicable,' and therefore legally necessary, may expand accordingly. J Beard, 'Law and War in the Virtual Era,' 103 *American Journal of International Law*, 3 (July 2009), 409, at 433 – 439.

[112] Art. 57 (2) (a) (ii).

[113] Rules 15 – 17, ICRC Customary International Law Study, *supra* note …. According to U.K. military doctrine, when considering the means or methods of attack to be used, 'a commander should have regard to the following factors:

a. the importance of the target and the urgency of the situation;

b. intelligence about the proposed target—what it is being, or will be, used for and when;

c. the characteristics of the target itself, for example, whether it houses dangerous forces;

precautions' are precautions that are practicable or practically possible considering all circumstances ruling at the time, including humanitarian and military considerations.[114] Thus, this duty does not require an attacker to be certain that the target of the attack is lawful.[115] Instead the obligation is to act with due diligence and in good faith.[116]

The rule of proportionality, expressed in Articles 51 (5) (b) and 57 (2) (a) (iii), is the most challenging obligation within the realm of 'precautions-in-attack.' This rule requires parties to armed conflict to 'refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.'[117] This duty requires consideration and balancing of at least three abstract values: '*excessive* incidental injury to civilians and/or damage to civilian objects,' 'concrete and direct' and 'military advantage.'

The adjective 'excessive' is important because, as Professor Dinstein observes, incidental civilian damage during armed conflict is inevitable due to the impossibility of

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d. what weapons are available, their range, accuracy, and radius of effect;

e. conditions affecting the accuracy of targeting, such as terrain, weather, and time of day;

f. factors affecting incidental loss or damage, such as the proximity of civilians or civilian objects in the vicinity of the target or other protected objects or zones and whether they are inhabited, or the possible release of hazardous substances as a result of the attack;

g. the risks to his own troops of the various options open to him. JSP383, Joint Service Manual of the Law of Armed Conflict, para. 5.32.4.

[114] Art. 10, Protocol II to Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects ("CCW").

[115] Y Dinstein, *The Conduct of Hostilities Under the Law of International Armed Conflict*, 2nd ed. (Cambridge University Press, 2010), p. 139; W Boothby, *The Law of Targeting* (Oxford University Press, 2012), p. 121.

[116] *Dinstein*, p. 139. Feasibility determinations depend on diverse factors such as access to intelligence concerning the target and the target area, availability of weapons, personnel and different means of attack, control (if any) over the area to be attacked, the urgency of the attack and 'additional security risks which precautionary measures may entail for the attacking forces or the civilian population.' J Wright, '"Excessive' Ambiguity: Analysing and Refining the Proportionality Standard,' 94 *International Review of the Red Cross* (Summer 2012), 819, 827 (citing N Melzer, *Targeted Killing in International Law* (Oxford University Press, 2009), p. 365).

[117] Art 57 (2) (a) (iii). 'Concrete and direct,' JSP 383, Joint Service Manual of the Law of Armed Conflict, para. 5.33.3. For a discussion of the customary law basis of the rule of proportionality customary law, see *Prosecutor v. Zoran Kupreškić*, Judgment, IT-95-16-T, 14 January 2000, para. 524.

keeping all civilians and civilian objects 'away from the circle of fire in wartime.'[118] However, the term does not lend itself to empirical calculations as it is impossible to prove that a particular factory is worth X number of civilians.[119] Furthermore, calculations of *expected* incidental damage to civilians (whether excessive or not) will always be approximations[120] 'to help inform a commander's decision making.'[121]

The language '"concrete and direct"' means that the advantage to be gained is identifiable and quantifiable and one that flows directly from the attack, as opposed to a vague hope that it might improve the military situation in the long term.'[122]

The ICRC Commentary to Article 52 (2) (a) (iii) observes that 'a military advantage can only consist in ground gained and in annihilating or weakening the enemy armed forces.'[123] Other commentators, however, argue that military advantage is a contextual notion with diverse variables.[124] Furthermore 'an attack' in this context may be comprised of a number of coordinated actions including diversionary tactics and disruption of

[118] Y Dinstein, 'The Principle of Distinction and Cyber War in International Armed Conflicts,' 17 *Journal of Conflict & Security Law*, 2 (2012), 261, 269.
[119] A Rogers, *Law on the Battlefield*, 2nd ed. (Manchester University Press, 2004), p. 20. Commanders may consider a (non-exhaustive) list of intangible concerns to determine what is excessive: '[h]ow important is the military objective sought to be achieved? What are the pros and cons of each option available to achieve that objective? For each option, what is the probability of success? What are the costs of failure? What are the risks of civilian casualties present in each option? What are the risks of military casualities involved in each option? How are casualites of either kind to be weighed against the military benefits of the attack?' Department of Defense Law of War Manual, nte. 320.
[120] United States military doctrine defines 'Collateral Damage Estimate' as '[a]n approximate calculation of potential collateral damage through analysis prior to target engagement.' 'No Strike and the Collateral Damage Estimation Methodology,' *Chairman of the Joint Chiefs of Staff Instruction*, CJCSI 3160.01A, 12 October 2012, p. GL-4. Thus, collateral damage estimates do not predict the actual outcome of weapon use. Operational environments, weapon performance and accuracy of intelligence can contribute to collateral damage estimates that differ from actual results. *Ibid*, p. D-2.
[121] *Ibid*, p. D-2.
[122] JSP 383, Joint Service Manual of the Law of Armed Conflict, para. 5.33.3.

[123] *Ibid*, para. 2218. Such advantage, however, 'may or may not be temporally or geographically related to the object of the attack.' Elements of Article 8 (2)(b)(iv) of the Rome Statute for the International Criminal Court, note 36.
[124] For example, the 'the military advantage' of an attack may change depending on the overall purpose of the military mission. Y Dinstein, 'Legitimate Military Objectives Under the Current Jus in Bello,' in A Wall (ed.), *Legal and Ethical Lessons of NATO's Kosovo Campaign*, 78 *International Law Studies* (Newport, Naval War College, 2002), p. 186.

communications.[125] Thus, the military advantage anticipated from an attack refers to the advantage expected from the attack considered as a whole and not only from isolated or specific parts of the attack.[126] Phrased differently, 'military advantage' is not restricted to immediate tactical gains, but may be assessed in the full strategic context.[127]

Proportionality analyses, often made during the stress of military operations, are notoriously difficult and require a degree of subjectivity on the part of military commanders.[128] In 2000, a report issued by the Office of the Prosecutor of the International Criminal Tribunal for the Former Yugoslavia ('ICTY') observed that '[i]t is much easier to formulate the principle of proportionality in general terms than it is to apply it to a particular set of circumstances because the comparison is often between unlike quantities and values. One cannot easily assess the value of innocent human lives as opposed to capturing a particular military objective.'[129] The language contained in Articles 51 (5)(b) and 57 (2)(a)(iii): 'which would be excessive in relation to,' links and relativises the two core values at stake, and guarantees that proportionality 'does not function as a rule of equity within armed conflict.'[130]

Thus, the proportionality rule 'is not a standard of precision.'[131] Rather, military commanders must use their common sense and good faith when they weigh up the

[125] Department of Defense Law of War Manual, Section 5.7.7.3.
[126] JSP 383, Joint Service Manual of the Law of Armed Conflict, para. 5.33.5. Importantly, the terms 'anticipated' and 'expected' guarantee that proportionality analysis will not be retrospective. It does not concern the actual incidental damage caused nor the military advantage achieved by the attack. The 'decision taken by the person responsible has to be judged on the basis of all information available to him at the relevant time, and not on the basis of hindsight.' Galić, nte. 109, citing the Statements of Understanding made by Germany upon ratification of API, 14 February 1991.
[127] Department of Defense Law of War Manual, Section 5.7.7.3.
[128] ICRC Commentary to Art. 57, API, para. 2208, <https://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=D80D>.
[129] *Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia* (2000), para. 48 <http://www.icty.org/sid/10052>.
[130] May & Newton, Proportionality in International Law, p. 172.
[131] *The Targeted Killing Case*, Judgment, Supreme Court of Israel, President A. Barak, 11 December 2005, para. 58.

humanitarian and military interests at stake.[132] The ICRC Commentary recognizes that the rule, 'such as it is,'[133] attempts to balance the competing interests of military necessity and the protection of civilian populations.[134] Not surprisingly, the ICRC prefers to set this balance substantially on the side of humanity: '[t]he Protocol does not provide any justification for attacks which cause extensive civilian losses and damages. Incidental losses and damages should *never* be extensive.'[135] More recently, a group of international humanitarian law experts, in disagreement with the latter approach, opined that 'extensive collateral damage may be legal if the anticipated concrete and direct military advantage is sufficiently great. Conversely, even slight damage may be unlawful if the military advantage expected is negligible.'[136]

The requirements of the Article 57 rules concerning precautions-in-attack (as well as the other targeting rules codified in API) reflect elementary considerations of humanity (i.e. human dignity) and the international humanitarian law principle that civilians and civilian objects shall be spared, as much as possible, from the effects of hostilities.[137] Similarly, these rules speak to military necessity and the need of armed forces for disciplined soldiers

[132] ICRC Commentary to Art. 57, API, para. 2208.
[133] The ICRC acknowledged that the rule 'is by no means as clear as it might have been.' *Ibid*, para. 2219.
[134] Questions that may impact a commander's proportionality analysis include: what are the relative values to be assigned to the anticipated military advantage gained and the expected injury to non-combatants and/or damage to civilian objects; what do you include or exclude in calculating these values; to what extent is a military commander obligated to expose her own forces to danger in order to limit civilian casualties or damage to civilian objects? Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, para. 49. Since different commanders possess different doctrinal backgrounds and different levels of combat experience, this report suggested that the standard to apply for assessing past proportionality determinations should be that of the 'reasonable military commander.' *Ibid*, para. 50.
[135] ICRC Commentary to Article 51 (5), para. 1980, (emphasis added), <http://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?viewComments=LookUpCOMART&articleUNID=4BEBD9920AE0AEAEC12563CD0051DC9E>.
[136] Tallin Manual, Rule 51 (7). The Netherlands armed forces distinguish between what is lawful and what is *acceptable* in proportionality analysis. Thus, when planning attacks, Dutch commanders must try to ensure that no collateral damage occurs. Author interview with Colonel Hans Folmer, Commander of Cyber Command, Netherlands Ministry of Defence, 20 January 2015.
[137] Galić, Judgment, para. 190.

who will fight most effectively and facilitate the re-establishment of peace.[138] Thus, this dual proscriptive and permissive approach – based in the value of human dignity -- runs through the laws and customs of war from the writings of Grotius, Vattel and their contemporaries to modern day treaty and customary international humanitarian law.

Given the complexities of combat and the battlespace, the general principles of Article 57 do not give rise to specific rules that particular types of weapons must be used in a specific case.[139] Instead, parties to armed conflict 'retain considerable discretion to prioritise military considerations and the framework of operational requirements, and not simply humanitarian constraints.'[140] Targeting assessments, therefore, often entail a degree of subjectivity.[141]

Nevertheless, the targeting rules of international humanitarian law apply to the use of autonomous weapon systems (like any other weapon systems). Professional armies must 'expect military commanders employing a system with autonomous functions to engage in the decision-making process that is required by international humanitarian law.'[142] Logically, it is impossible for commanders to *direct* weapons at specific military objectives, as required by Article 51 (4) (b) of API, without a proper understanding of the weapon. Thus, deployment of autonomous weapons systems without a proper understanding of how the system works will constitute an indiscriminate attack and be subject to criminal sanction, at least in

[138] '[n]o responsible military commander would wish to attack objectives which were of no military interest.' ICRC Commentary to Art. 57, API, para. 2195, available <https://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=D80D14D84BF36B92C12563CD00434FBD>.

[139] Oeter, 'Methods and Means of Combat,' pp. 189 – 190. Nor does the rule imply any prohibition of specific weapons. ICRC Commentary to Art. 57, API, para. 2201, <https://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=D80D14D>.

[140] Oeter, 'Methods and Means of Combat,' p. 190.

[141] 'In considering whether commanders and others responsible for planning, deciding upon, or executing attacks have fulfilled their responsibilities, it must be borne in mind that they have to make their decisions on the basis of their assessment of the information from all sources which is available to them at the relevant time.' Joint Service Manual on the Law of Armed Conflict, p. 85. This means looking at the situation as it appeared to the individual at the time when she made her decision. *Ibid.* Tallin Manual, note 384.

[142] Colonel R. Jackson, Panel on 'Autonomous Weaponry and Armed Conflict', Annual Meeting of American Society of International Law, Washington DC, April 2014.

jurisdictions that recognize the dolus eventualis standard for mens rea.[143] Moreover, prior to deploying an autonomous weapon,[144] the superior must ensure one of two criteria: 1) once programmed, the artificial intelligence software controlling the autonomous weapon system has the robust capacity to comply with Article 57, or 2) deployment of the autonomous weapon system is itself an expression of a 'feasible precaution in the choice of means and methods of attack' within the meaning and spirit of the law.[145]

B. Autonomous Weapon Systems and Compliance with the Laws of Targeting

Nothing in international humanitarian law per se, makes the application of these targeting rules by autonomous weapon systems unlawful, *provided* that the artificial intelligence of the autonomous functions is capable of compliance with the rule(s).[146] Currently, the limited powers of artificial 'vision' and object recognition severely restrict the capacity of autonomous technologies to comply with the principle of distinction.[147] Thus, deployment of an autonomous weapon system programmed to seek out and attack an enemy (and only that enemy) would be lawful exclusively in remote areas such as deserts or the high seas, where the likelihood of the presence of civilians is extremely low and more complex

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[143] M Schmitt, Remarks during Panel on "The International Legal Context" at 'Autonomous Military Technologies: Policy and Governance for Next Generation Defence Systems,' Chatham House, London, 24 February 2014; Permission to cite provided in electronic mail message to author, 15 March 2014.

[144] By definition, once the commander deploys an autonomous weapon platform, she may lose her ability to take additional feasible precautions as well as make proportionality judgments. During the Clinton administration, after U.S. armed forces under his command launched automated cruise missiles against the headquarters of Saddam Hussein's intelligence service in Baghdad, President Clinton was aghast to learn that the missiles neither had cameras mounted on them, nor could they be 'turned back' prior to striking their targets. R Clarke, *Against All Enemies: Inside America's War on Terror* (New York: Free Press, 2004), pp. 82 – 83.

[145] Jackson, Panel on 'Autonomous Weaponry and Armed Conflict'; Art. 8 (2) (b) (iv) of the Rome Statute of the International Criminal Court prohibits attacks where the anticipated civilian injury and damage is 'clearly excessive" to the expected military advantage. No similar provision exists in treaty or customary law that criminalises failures to take feasible precautions under Arts. 57 (2) (a) (i) or (ii). I am grateful to Professor Robin Geiß for clarifying this point.

[146] The humanitarian character of the principles of the law of armed conflict applies to all forms of warfare and all kinds of weapons, including future weapons. The Legality of Nuclear Weapons, *supra* note … para. 86.

[147] M Cummings, 'Man versus Machine or Man + Machine?' *IEEE Intelligence Systems*, September/October 2014, 7, <http://hal.pratt.duke.edu/sites/hal.pratt.duke.edu/files/u10/IS-29-05-Expert%20Opinion%5B1%5D_0.pdf>. Peter Margulies, on the other hand, claims that machine recognition of human faces and landscape images have improved greatly, although still requires 'regular, frequent human monitoring and assessment.' Margulies, 'Making Autonomous Weapons Accountable: Command Responsibility for Computer-Guided Lethal Force in Armed Conflicts.'

assessments, such as proportionality, unnecessary.[148] Even this restricted scenario contains additional challenges. Article 41 of API, for example, prohibits the targeting of individuals who clearly express an intention to surrender. Although this assessment can be difficult for human soldiers, sailors and pilots as well,[149] the launch of an autonomous weapon system without this recognition capability would be unlawful.[150]

Indeed, the ability to make the difficult value judgments often present in complex proportionality analysis (as well as other precautions in attack) probably presents the greatest cognitive challenge to the lawful operation of autonomous weapon systems.[151] The data-processing strengths of modern computers miss the qualitative ability to assess the competing human priorities of military advantage and the protection of civilians. This reflective capacity, the presence of accumulated knowledge, experience, instinct[152] and 'common-sense,' resides, at times, in the human mind.[153] Given the present state of artificial intelligence, without human-machine teamwork in situations where proportionality evaluations and other value-based decisions are necessary, the deployment of a lethal autonomous weapon system would be illegal pursuant to the targeting rules of international humanitarian law.

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[148] B Boothby, 'How Far Will the Law Allow Unmanned Targeting to Go?' in D Saxon (ed.) *International Humanitarian Law and the Changing Technology of War* (Leiden: Martinus Nijhoff, 2013), pp. 57 – 59 and 62.

[149] During the trench warfare of the first world war, the 'onus fell rather on the would-be prisoner to get his surrender accepted, something difficult to do when friend and enemy met so rarely face-to-face, when face-to-face encounters tended to provoke hair-trigger reactions, and when a pacific shout from a dark dug-out in a foreign language might be misinterpreted.' J Keegan, *The Face of Battle* (New York, Penguin Books, 1978), pp. 282 – 283.

[150] Boothby, 'How Far Will the Law Allow Unmanned Targeting to Go?' p. 59.

[151] M Schmitt and J Thurnher, '"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict,' 4 *Harvard Natl. Sec. J.* (2013), 231, 266 - 267. M Sassóli, 'Automomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified,' 90 *International Law Studies* 308 (2014), 331 – 33.

[152] Reliance on one's natural instincts, of course, can be fallible. Aristotle, *On Rhetoric: A Theory of Civic Discourse*, George A. Kennedy, Trans. 2nd ed. Oxford, Oxford University Press, 2007, p. 94.

[153] Sassòli, 'Automomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified,' 334. ICRC Commentary to Art. 57, API, para. 2208, <https://www.icrc.org/applic/ihl/ihl.nsf/INTRO/470>.

Nevertheless, as the technology improves, it is possible to envisage scenarios where an autonomous weapon system can fulfill targeting obligations more successfully than humans.[154] Tests of new 'machine-learning' systems[155] demonstrate that 'machine-learning' artificial intelligence often exhibits better judgment than humans in response to certain situations.[156] Unburdened by stress and fatigue and capable of processing more data, more quickly, than human soldiers, machines – in some situations - will exhibit more 'tactical patience'[157] and, potentially, more accuracy when distinguishing between civilian and combatants.

Similarly, autonomous weapon systems could provide opportunities for greater pre-cautionary measures – including more accurate proportionality analysis - than human soldiers planning and executing an attack. An autonomous weapon system, unworried about its own survival, can delay the use of force, thereby reducing doubt about the nature of a target. It can also use less force, including non-lethal force, when engaging the enemy, and so put civilians at lesser risk.[158] Consequently, the use of these autonomous systems will, in some situations, impact the process of balancing military necessity and humanity embodied in proportionality

[154] Sassòli, 'Automomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified,' 310 – 311.

[155] Although algorithm-based artificial intelligence is the most common form in use today, 'Statistical Machine Learning,' whereby autonomous robots learn to modify their behaviour by trial-and-error, is a significant area of research. L Steels, 'Ten Big Ideas of Artificial Intelligence,' *Remarks to 25th Benelux Conference on Artificial Intelligence*, Delft Technical University, 8 November 2013; Author Interview with Gianfranco Visentin, Head, Automation and Robotics Department, European Space Agency, Noordwijk, 4 November 2013; P Margulies, 'Making Autonomous Weapons Accountable: Command Responsibility for Computer-Guided Lethal Force in Armed Conflict.'

[156] R Brooks, 'A Brave New World? How Will Advances in Artificial Intelligence, Smart Sensors and Social Technology Change Our Lives?' Panel Discussion at World Economic Forum, 22 January 2015, <http://www.weforum.org/videos/brave-new-world>.

[157] 'Tactical patience' refers to the ability to permit a combat situation to develop to ensure that actions taken (such as attacks) are appropriate and lawful. T McHale, 'Executive Summary for AR 15-6 Investigation, 21 February 2010 CIVCAS Incident in Uruzgan Province,' *Memorandum for Commander, United States Forces-Afghanistan/International Security Assistance Force*, Afghanistan, <http://www.rs.nato.int/images/stories/File/April2010-Dari/May2010Revised/Uruzgan%20investigation%20findings.pdf>.

[158] Sassòli, 'Automomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified,' 310; M Schmitt and J Thurnher, '"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict,' 264.

analysis.[159] Indeed, the introduction of these weapons to the battlespace can alter the meaning and scope of these two principles.[160]

A number of individuals and non-governmental organizations have called for an international ban on the development and use of lethal autonomous weapon systems,[161] arguing inter alia, that use of these weapon systems will violate international humanitarian law. Human Rights Watch, for example, contends that 'fully autonomous weapons' would not be able to fulfill the requirements of distinction, 'especially in contemporary combat environments.'[162] Moreover, Human Rights Watch argues that autonomous weapon systems lack the 'human qualities' that are necessary to assess an individual's intentions, an assessment that is key to distinguishing targets.'[163] If an autonomous weapon system is used in an environment where it cannot distinguish between combatants and civilians, then its use is indiscriminate and unlawful.[164]

While that last statement is correct in principle, it would not preclude the use of autonomous weapon systems in conditions where they *can* distinguish between combatants and civilians. Furthermore, nothing in international humanitarian law speaks to a general duty

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[159] Professors May and Newton suggest that the time has arrived to consider, as *lex ferenda*, the lives of combatants as factors in a proportionality assessment. Proportionality in International Law, p. 151. In that context, in certain circumstances, particularly when capture is possible, there may be little military advantage to be gained from the use of lethal force by autonomous weapon systems against, or in the vicinity of, human soldiers.

[160] The notions of military necessity and humanity can evolve as new technology affects the ways wars can be fought and social perceptions of acceptable human suffering change. H Natsu, 'Nanotechnology and the Future of the Law of Weaponry,' 91 *International Law Studies* (2015), 486, 501 – 502 and 507; Margulies, 'Making Autonomous Weapons Accountable: Command Responsibility for Computer-Guided Lethal Force in Armed Conflict.'

[161] See the Campaign to Stop Killer Robots, <http://www.stopkillerrobots.org/>. Professor Christoph Heyns, United Nations Special Rapporteur for Extrajudicial Executions, has called for national moratoria on the production, transfer, deployment and use of lethal autonomous robots ('LARs') 'until such time as an internationally agreed upon framework on the future of LARs has been established; ….' Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Execution, A/HRC/23/47, 9 April 2013, para. 113, http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47_en.pdf.

[162] *Losing Humanity: The Case Against Killer Robots*, Human Rights Watch, November 19, 2012, pp. 30 – 31, available online at http://www.hrw.org/reports/2012/11/19/losing-humanity-0. Also see *Killer Robots and the Concept of Meaningful Human Control*, Memorandum to Convention on Conventional Weapons (CCW) Delegates, Human Rights Watch, April 2016, pp. 2, 4 and 16.

[163] *Ibid*, p. 31.

[164] Art. 51 (4)(b), API.

to gauge 'an individual's intentions' prior to engaging a target.[165] A belligerent may attack an enemy soldier, and kill her, without measuring that enemy's thought processes or emotional state at the time. Soldiers often fire artillery at human targets many kilometres distant. Pilots often drop bombs on targets from high altitudes. A suggestion that all such attacks violate the law of armed conflict and/or that the weapon systems used are illegal is untenable.[166] Thus, Human Rights Watch appears to find 'obligations' in the principle of distinction that do not exist in law.

Human Rights Watch also claims that lethal autonomous weapon systems should be banned because they 'cannot identify with humans, which means that they are unable to show compassion, a powerful check on the willingness to kill.'[167] The laws of war, however, do 'not seek to promote 'love,' 'mercy' or human empathy …, but respect based on objective criteria.'[168] This contention, therefore, is also irrelevant under international humanitarian law.

Furthermore, Human Rights Watch claims (without providing any scientific evidence) that an autonomous weapon system 'could not be programmed to duplicate the psychological processes in human judgment that are necessary to assess proportionality.'[169] The organization contends that 'humans are better suited to make such value judgments, which cannot be boiled down to a simple algorithm.'[170] Although these arguments are true, today,[171] the ability of computers to address complex decisions will increase as artificial intelligence

[165] An exception would be an enemy soldier manifesting her intention to surrender as discussed above.
[166] M Schmitt & J Thurnher, '"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict,' 248.
[167] Losing Humanity: The Case Against Killer Robots, p. 38.
[168] Sassòli, 'Automomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified,' 318.
[169] *Ibid*, 34.
[170] *Ibid*.
[171] M Cummings, 'Man versus Machine or Man + Machine?' *IEEE Intelligence Systems*, September/October 2014, 7, <http://hal.pratt.duke.edu/sites/hal.pratt.duke.edu/files/u10/IS-29-05-Expert%20Opinion%5B1%5D_0.pdf>.

technology continues to develop.[172] More importantly, however, the delegation of these value judgments to autonomous weapon systems constitutes a transfer of the power of human reasoning. As discussed below, *that* scenario produces a loss of human dignity, contradicting the very raison d'etre of international humanitarian law.

IV. Autonomous Weapon Systems, the Law of Targeting, and Human Dignity

Many of the tasks involved in the targeting process(es) do not require weighing of, or reflection about, important values. The gathering of data, calculations of expected damage (to targets and civilians and civilian objects), even the fusion of information for the identification of objects and persons as friendly or enemy, are illustrative of sub-processes more efficiently performed by autonomous and/or automatic technology.

Conversely, final decisions concerning feasible precautions combine subjective and objective judgments involving the principles of military necessity and humanity. Evaluation of what is necessary in war is a difficult and subjective process. Consequently, 'different people often assess military necessity differently.'[173] Commanders making these assessments may consider the broader imperatives of winning the armed conflict in addition to the demands of the immediate circumstances. Considerations of military necessity that encompass only immediate situations 'could prolong the fighting and increase the overall suffering of the war.'[174] Therefore, in addition to knowledge and experience, interpretations

[172] In addition, Human Rights Watch makes the confusing argument that even when autonomous weapons can acquire the required level of reason, they would fail to have other qualities '– such as the ability to understand humans and the ability to show mercy – that are necessary to make wise legal and ethical choices *beyond the proportionality test*.' Losing Humanity: The Case Against Killer Robots, p. 34 (emphasis added). It is important to clarify that the law does not impose obligations on belligerents 'beyond the proportionality test,' or beyond other international humanitarian law rules.

[173] *U.S. Department of Defense Law of War Manual*, Office of General Counsel, 12 June 2015, para. 2.2.3.

[174] *Ibid*, 2.2.3.1.

of ‘everything feasible’ and ‘all feasible precautions’ will be a matter of common sense and good faith.’[175]

Delegation of responsibility for these decisions to artificial intelligence directing autonomous weapons would remove a great deal of pressure from soldiers and their commanders. This short-term gain, however, creates a long-term disadvantage. As discussed in chapters three and four, the ability to think and communicate about difficult concepts and values reflects the core of personal autonomy and human identity. Conveyance of this responsibility to machines is a transfer of human value; nothing could damage human dignity more. The onus for taking the precautionary measures described in Article 57 of API, therefore, must remain with the human commanders and operators who have the capacity to exercise their judgment over, and interact with, lethal autonomous weapon systems.

Some commentators might respond that the human reasoning process for these value-based decisions is simply shifted from the human commander or soldier to the person who programmes the artificial intelligence software for each weapon. For example, William Boothby observes that it ‘may sometimes be possible at the mission planning stage for a human being to determine that in all foreseeable circumstances programmed attacks will always comply with these evaluative rules.’[176] With respect to an autonomous aerial weapon system, the person planning the mission inter alia will specify the area to be searched and/or the objective to be targeted, the munitions to be carried, the associated target recognition technology required for the mission and the necessary quality of recognition.[177]

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[175] ICRC Commentary to art. 57, API, para. 2198, <https://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?action=openDocument&documentId=D80D14D84BF36B92C12563CD00434FBD>.

[176] Presentation to Expert Meeting on Lethal Autonomous Weapon Systems, Convention on Certain Conventional Weapons, 13 – 17 April 2015, p. 3.

[177] Boothby, The Law of Targeting, p. 283.

The unpredictability of warfare, however, makes this argument unsatisfactory. The moral and legal reasoning involved in these planning decisions only brings the autonomous weapon system to the entrance of the battlespace. It is impossible to foresee all of the changing circumstances that result from the fluidity and violence of armed conflict. Consequently, it would be impossible for an operator of an autonomous weapons system to programme the machine to address every contingency. The human planner – whether intentionally or simply by default – leaves many other issues to the artificial intelligence software.

In addition, one can argue that my position will lead to a counter-productive 'normative drift'[178] in international humanitarian law. By using concerns about human dignity to limit the use of lethal autonomous weapons, the international humanitarian law goal of reducing the suffering of war is 'turned on its head.' For example, robotic swarms of autonomous weapons are designed to quickly overwhelm an opponent, resulting in sharp, but short wars. The fielding of these lethal autonomous weapon systems, therefore, has the potential to reduce human casualties of the attacking forces, and possibly avoid civilian injuries as well.[179] Consequently, the employment of these weapons, consistent with the principle of military necessity, could accelerate and facilitate the return to peace.[180] Open-ended claims about threats to human dignity, consequently, apart from skewing the balance between military necessity and humanity, could lead to greater violations of international humanitarian law. On the other hand, this same balancing process, operating at the heart of international humanitarian law, might simultaneously affirm the use of autonomous weapons and avert their offence to human dignity.

[178] C Tams, 'The Use of Force Against Terrorists,' 20 *European Journal of International Law* (2009), 383, 389 and 392 (discussing jus ad bello and the 'normative drift' with respect to the scope of the right of states to self-defence).
[179] M Newton, 'Back to the Future: Reflections on the Advent of Autonomous Weapon Systems,' 47 *Case Western Reserve Journal of International Law* (2015), 16-17 and 21-22.
[180] By mitigating human suffering and property damage, armed forces can accelerate recovery in post-conflict situations. 'No-Strike and the Collateral Damage Estimation Methodology,' CJCSI 3160.01A, p. C-4.

This argument, however, ignores the fact that the concept of human dignity can inform assessments of military necessity and humanity in multiple, nuanced ways, depending on the circumstances.[181] For example, autonomous machines can still replace humans in many important functions during the conduct of hostilities – thereby reducing the suffering caused by war – while human soldiers and commanders continue to make complex, value-based decisions more effectively. Boothby, for example, describes how, if humans plan an autonomous weapon attack in a 'relatively depopulated area,' or 'within an exclusively military area,' then precautions taken in the pre-mission planning may address legal concerns adequately for the duration of the mission,[182] while minimizing risk to human soldiers. This outcome would support the principles of military necessity and humanity, as well as the over-arching value of human dignity.

Furthermore, circumstances could arise during armed conflict where the use of autonomous weapon systems could improve compliance with international humanitarian law. For example, autonomous weapon systems might neutralize, more quickly and accurately than human soldiers, an armed group that is mistreating prisoners of war and/or civilians. In those particular situations, concerns about law and human dignity arguably would demand their use.[183] This argument, however, actually supports the claim that the *systematic* use of autonomous weapons vitiates human dignity. If a military commander has the ability to identify those complex situations where a particular autonomous weapon system should be used, she will do so based on her training, experience and accumulated knowledge.[184] These qualities of reason and reflection – the capacity to respect and protect the rights of others --

[181] J Waldron, *The Harm in Hate Speech* (Cambridge Massachusetts, Harvard University Press, 2012,) p. 140.
[182] Boothby, The Law of Targeting, p. 284.
[183] A similar situation might arise where the only available soldiers available to a commander have a history of disrespect for the rules of international humanitarian law and/or human rights law.
[184] Boothby, *The Law of Targeting* p. 409.

will not develop (much less be used) when the employment of autonomous weapons becomes the default norm.

V. The Law of Targeting, Human Dignity and the Design of Autonomous Weapon Systems

International humanitarian law facilitates 'the difficult moral and legal choices that *require human judgment* in order to preserve human dignity and life to the greatest degree possible in light of the military mission.'[185] As autonomous technology for warfare continues to develop within the framework(s) of international law, the importance of preserving human dignity compels the use of coactive design of autonomous technology and human machine interdependence. An emphasis on teamwork between human and computer protects the principals and obligations enshrined in international humanitarian law *and* encourages the development of more advanced technologies:

> '….the U.K. position is that [international humanitarian principles], and the requirement for precautions in attack, are best assessed and applied by a human. Within that process a human may of course be supported by a system that has the appropriate level of automation to assist the human to make informed decisions. This is *the intelligent partnership* we referred to yesterday.'[186]

A coactive design of autonomous weapon systems permits flexibility in the degree of human-to-machine supervision in the face of the uncertainties of armed conflict.[187] Humans can provide 'high-level direction' whilst machines autonomously perform complex computations for specific tasks according to predetermined rules.[188]

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[185] M Newton, 'Back to the Future: Reflections on the Advent of Autonomous Weapon Systems,' 16 (emphasis added).
[186] U.K Government, 'Statement to the Informal Meeting of Experts on Lethal Autonomous Weapon Systems, *Convention on Certain Conventional Weapons,* April 2015, para. 2 (emphasis added), http://www.unog.ch/80256EDD006B8954/(httpAssets)/3AA5E280106A73EFC1257E2900472797/$file/2015_LAWS_MX_UK_IHL.pdf.
[187] A Clare, et. al. 'Assessing Operator Strategies for Real-Time Replanning of Multiple Unmanned Vehicles,' 6 *Intelligent Decision Technologies* (2012), 221 – 222.
[188] *Ibid*, 221, M Newton, 'Back to the Future: Reflections on the Advent of Autonomous Weapon Systems,' 21-22.

Tension will arise, however, between the methodical practice of 'deliberate' targeting to assure compliance with the law of war and the ever-increasing speed of autonomous weapon technology.[189] Modern communication technology permits state armed forces and non-state actors to use the 'long screwdriver,' i.e. the predilection for more high-ranking and, by implication, more remote control over attack decisions.[190] Increasingly autonomous weapons technology, however, shortens the screw-driver, resulting in a significant military advantage. In battlespace environments where reaction cycles are measured in micro-seconds, for example, what will the term 'feasible' precautionary measures actually mean? Kimberly Trapp argues that during warfare, the feasibility of precautionary measures are 'conditioned by time constraints and by the speed limitations of a State's information gathering and dissemination capabilities.'[191]

This reality (which, arguably, provides more weight to the priorities of military necessity than concerns about humanity) ignores the possibility that autonomous weapons technology will one day operate at such speeds that *all* threats will be immediate and the notion of 'deliberate' target assessments impossible and/or suicidal. Professor Sassóli observes that '[a]s the weapons actually delivering kinetic force become increasingly quicker and more complex, it may be that humans become simply too overwhelmed by information

[189] Such pressures are not a recent phenomenon. In 1841, for example, in correspondence with the Government of the U.K concerning 'The Caroline Case,' U.S. Secretary of State Daniel Webster articulated a standard for the use of force in self-defence: 'a show of necessity of self-defence, instant, overwhelming, *leaving no choice of means, and no moment of deliberation*.' 'British-American Diplomacy: The Caroline Case,' *Lillian Goldman Library, The Avalon Project*, 2008 (emphasis added), <http://avalon.law.yale.edu/19th_century/br-1842d.asp>. Although this standard derives from the jus ad bello context, it fairly describes armed conflict situations in which the need to return fire and/or attack will be immediate. K Trapp, 'Great Resources Mean Great Responsibility: A Framework of Analysis for Assessing Compliance with API Obligations in the Information Age,' in Saxon, International Humanitarian Law and the Changing Technology of War, note 50.

[190] Boothby, The Law of Targeting, p. 408.

[191] *Ibid*, p. 167. 'The extent to which a state prioritises the safety of its armed forces is … the fault line of compliance with API obligations to take precautionary measures.' *Ibid*, p. 170.

and the decisions that must be taken to direct them.'[192] The growing development of autonomous swarm technology represents the clearest trend toward this state of affairs. Decisions made literally at the speed of light by machines will obliterate opportunities for reasoned reflection and gradually reduce human involvement in the application of the law.[193]

These concerns militate for a co-active design for autonomous weapon systems to ensure that the use of autonomous weapon systems complies with international humanitarian law. That policy would be consistent with the positions of states that advocate for limitations to autonomous weapon systems so that they remain subject to 'restrictions' expressed variously as 'meaningful human control,' appropriate levels of human judgment over the use of force,' etc.[194] Human-machine interdependence would ensure continued protection for human dignity implicit in the duties of international humanitarian law.

It is crucial, therefore, to consider how the design of lethal autonomous weapons systems should be adapted to the targeting rules of International Humanitarian Law. Law should steer the development of new weapons technologies.[195] Therefore, Article 36 ('New

[192] Sassòli, 'Automomous Weapons and International Humanitarian Law: Advantages, Open Technical Questions and Legal Issues to Be Clarified,' 310, citing R Arkin, *Ethical Robots in Warfare*, Georgia Institute of Technology (Jan. 20, 2009), 2. <http://www.cc.gatech.edu/ai/robot-lab/online-publications/arkin-rev.pdf>.

[193] E Jensen, 'The Future of the Law of Armed Conflict: Ostriches, Butterflies and Nanobots,' 35 *Michigan Journal of International Law* (Winter 2014), 253, 300 (citing Colonel (ret.) Thomas Adams who contends that future autonomous weapons 'will be too fast, too small, too numerous and will create an environment too complex for humans to direct'). 'Robots on Battlefield: Robotic Weapons Might be the Way of the Future, But They Raise Ethical Questions About the Nature of Warfare,' Townsville Bull (Austr.), 18 September, 2009, 210.

[194] 'Statement by South Africa,' Meeting of Experts on Lethal Autonomous Weapon Systems, Convention on Certain Conventional Weapons, 13 - 17 April 2015; 'Statement of Chile,' Meeting of Experts on Lethal Autonomous Weapon Systems, Convention on Certain Conventional Weapons, 13 April 2015; 'Denmark: 'General Statement by Susanne Rumohr Haekkerup, Ambassador for Disarmament, Non-Proliferation and Arms Control, Meeting of Experts on Lethal Autonomous Weapon Systems, Convention on Certain Conventional Weapons, 13 - 17 April 2015; 'Final Statement by Germany,' Meeting of Experts on Lethal Autonomous Weapon Systems, Convention on Certain Conventional Weapons, 17 April 2015; U.S. Department of Defence Policy Directive 3000.09, 21 November 2012, Enclosure 3 (1) (b) (1).

[195] S Sohm, 'Obligations Under International Law Prior to the Use of Military Force: Current Developments Relating to the Legal Review of New Weapons and Methods of Warfare,' 28 *Journal of International Law of Peace and Armed Conflict* (2015), 104 – 110, presented to Convention on Certain Conventional Weapons ('CCW') Meeting on Lethal Autonomous Weapon Systems, Geneva 11 – 15 April 2016. Professor Jensen refers to the 'vital signaling role' that international humanitarian law plays in the development of state practice, in

Weapons') of API admonishes 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 Party.'[196] The purpose of Article 36 is to prevent the use of weapons that violate international law in all circumstances and to impose limits on the use of weapons that violate international law in some circumstances. Article 36 requires states to determine their lawfulness before the new weapons are developed, acquired[197] or otherwise incorporated into the state's arsenal.[198]

This rule has not yet acquired the status of customary law[199] as only a relatively small number of states have acknowledged that they have established formal review processes under Article 36.[200] However, one of those countries, the United States, is perhaps the leading developer of autonomous weapon systems. Therefore, it is worthwhile to examine the appropriate contours of a legal review for these systems.

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particular vis a vis the development of new weapons. E Jensen, 'The Future of the Law of Armed Conflict: Ostriches, Butterflies and Nanobots,' 35 *Michigan Journal of International Law* (Winter 2014), 253, 262.

[196] <https://www.icrc.org/ihl/INTRO/470>. Means of warfare refer to weapons while methods of warfare refer to how the weapon is used. Thus, an autonomous weapon system would be a means of warfare. Schmitt and Thurnher, '"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict,' 271.

[197] For the purposes of compliance with art. 36, it is insufficient to rely on the promise of another state or the manufacturer of an autonomous weapon system that it can be used in compliance with international law, because that assessment may be incorrect. G Giacca, Remarks to panel on 'Challenges '[of Autonomous Weapons] to International Humanitarian Law,' Informal Expert Meeting on Lethal Autonomous Weapons, Convention on Conventional Weapons, Geneva, 13 April 2016, http://www.unog.ch/80256EE600585943/(httpPages)/37D51189AC4FB6E1C1257F4D004CAFB2?OpenDocument.

[198] *A Guide to the Legal Review of New Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977*, ICRC, Geneva, 2006, p. 4, < https://www.icrc.org/eng/assets/files/other/icrc_002_0902.pdf>.

[199] Cf Schmitt and Thurnher, '"Out of the Loop:" Autonomous Weapon Systems and the Law of Armed Conflict,' 271, who argue that 'the obligation to conduct legal reviews of new means of warfare before their use is generally considered … reflective of customary international law.

[200] As of 2006, only nine states had informed the ICRC that they had 'in place national mechanisms to review the legality of weapons ….' 'A Guide to the Legal Review of new Weapons, Means and Methods of Warfare: Measures to Implement Article 36 of Additional Protocol I of 1977,' nte 8.

Preliminarily, as Parks observes, 'no single model for compliance with Article 36 exists.'[201] It is important, in the context of autonomous weapon *systems*, to consider what must be reviewed during an Article 36 process. A weapon system includes the weapon itself – the device that is designed to kill or injure persons and/or damage property – and other components necessary for the weapon's operation.[202] Logically, a legal review of an autonomous weapon system must evaluate the weapon or weapons designed for (the intended) use) of the system as well as the artificial intelligence hardware and software that will control targeting processes.[203]

For states that produce autonomous weapon systems for their own use or for export, legal reviews should commence at the concept or design phase and continue through the development, testing and acquisition periods. This policy will compel researchers and developers to focus their efforts, at the earliest possible stage, on ensuring that the results of their work will comply with the demands of international humanitarian law.[204] It also ensures that human dignity maintains its place as the point of departure for this legal analysis. Moreover, after autonomous weapon systems are deployed to the battlefield, they should be subject to regular review based on their technical performance.[205]

As new technologies emerge and are applied to weapon systems, participants in legal reviews must have a reasonable understanding[206] of how the systems work, or will work, or

[201] Parks, 'Conventional Weapons and Weapons Reviews,' 107. As Schmitt and Thurnher observe, all state parties to API are under a treaty obligation to Art. 36 conduct legal reviews. '"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict,' 271.
[202] *Parks*, 'Conventional Weapons and Weapons Reviews,' 115 – 116.
[203] Legal reviews address the general legality of a weapons system as such, not its use in a specific situation. Schmitt and Thurnher, '"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict,' 276.
[204] ICRC, A Guide to the Legal Review of New Weapons, Means and Methods of Warfare, 951 – 952.
[205] Giacca, 'Remarks to panel on 'Challenges '[of Autonomous Weapons] to International Humanitarian Law,' In addition, novel uses of existing capabilities or technology may require legal review. *Ibid.*
[206] Parks suggests the rather vague criteria that legal reviewers have 'some sense' how the new weapons work. Parks, 'Conventional Weapons and Weapons Reviews,' 100.

possess the ability to obtain this knowledge.[207] The complexities of autonomous weapon systems will require a multi-disciplinary approach, with computer scientists, robotics engineers and other specialists assisting the military lawyers conducting the review.[208] Given the speed at which autonomous technologies are changing and advancing, complete records of each legal review of each new system, and each new modification of a system, are necessary to ensure consistency.[209]

For the reasons described above, legal reviews of the designs of new lethal autonomous weapon systems must ensure that the system will function consistently with international humanitarian law. In order to preserve human dignity, reviewers should insist that each new system employs a co-active design that permits the exercise of human reasoning for complex, value-based decisions such as proportionality evaluations.[210] This policy should continue as legal reviews of the same system(s) are completed at the development, testing and acquisition phases.

VI. Conclusions

In international humanitarian law, the 'hard cases are those which are in the space between the extreme examples.'[211] In order for the use of autonomous weapons systems to comply with the rules of this body of law, as well as its underlying precept of human dignity, armed forces should not field fully autonomous weapons. At the same time, militaries should

[207] Comparisons of proposed new weapons to already existing weapon systems may inform a legal review. For example, although the drafting of DOD Directive 3000.09 was not a 'legal review' in the context of Article 36 of API, military lawyers with experience in Article 36 reviews participated in the process, which included studies of the performance of older weapon systems such as the Patriot missile defence system and Aegis system. Colonel R Jackson, Panel on 'Autonomous Weaponry and Armed Conflict,' Annual Meeting of American Society of International Law ('ASIL'), Washington D.C. April 2014.

[208] ICRC, A Guide to the Legal Review of New Weapons, Means and Methods of Warfare, pp. 1, 6, 22 and 26; Sohm, 'Obligations Under International Law Prior to the Use of Military Force: Current Developments Relating to the Legal Review of New Weapons and Methods of Warfare,' 7 (CCW version).

[209] 'A Guide to the Legal Review of New Weapons, Means and Methods of Warfare,' *supra* note …, p. 955.

[210] See Margulies, 'Making Autonomous Weapons Accountable: Command Responsibility for Computer-Guided Lethal Force in Armed Conflict' ('Approval of an autonomous weapon system in the weapons review phase should be contingent on substantial ongoing human engagement with the weapon system').

[211] Barak, The Targeted Killing Case, para. 46.

not abandon autonomous technologies that assist soldiers and commanders to do their jobs more effectively within legal limits. Co-active designs of autonomous weapon systems that guarantee human-machine interdependence during targeting processes will to help to ensure compliance with international humanitarian law, including the concept of human dignity.

Nevertheless, continued pressure for faster weapon systems and 'systems-in-systems' to increase 'military effectiveness' (i.e. military advantage over opponents) will work against efforts to maintain teamwork between human warfighters and their machines.[212] Fundamentally, this condition will impede the exercise of human thought and reasoning in decisions during armed conflict, weakening personal autonomy and the value of human dignity as a starting point for compliance with the law.

[212] Professor Jensen argues that 'the incorporation of autonomous weapons into regular armed forces will diminish the role of humans in targeting decisions.' 'The Future of Armed Conflict: Ostriches, Butterflies and Nanobots,' 286.