Overcoming International Inertia: The Creation of War Manual for Lethal Autonomous Weapons Systems

Jay Ettinger

Introduction

A swarm of micro-drones loaded with small explosive charges descends on a small village in a foreign land, tasked with finding and killing a list of specific enemies. These drones are not controlled remotely, but instead make automated life-or-death decisions through a shared distributed artificial intelligence ("AI") system. Although this may sound like the plot of a Hollywood movie, this is a possible future use of a U.S. Air Force test project called the Perdix, which involves an autonomous swarm of micro-drones capable of performing a variety of low altitude missions.[1] This is just one example of the many forms of lethal autonomous weapon systems ("LAWS") currently being developed. The potential power of LAWS has led a number of experts to predict that this technology "will have a revolutionary impact on warfare."[2] Some going so far as to say that LAWS will encourage a "'seismic shift on the field of battle' and 'fundamentally transform the way war is waged.'"[3]

As the pace of new military technology development continues to rapidly increase, leaders have struggled to use the principles of International Humanitarian Law ("IHL") to provide meaningful guidance and limitations to the development and use of emerging technologies.[4] Nowhere is this phenomenon more

1. *See* Chris Jenks, *The Gathering Swarm: The Path to Increasingly Autonomous Weapons Systems*, 57 JURIMETRICS 341, 353 (2017); Kyle Mizokami, *The Pentagon's Autonomous Swarming Drones Are the Most Unsettling Thing You'll See Today*, POPULAR MECHS. (Jan. 9, 2017), https://www.popularmechanics.com/military/aviation/a24675/pentagon-autonomous-swarming-drones/.

2. *See* KELLEY M. SAYLER, CONG. RESEARCH SERV., R45178, ARTIFICIAL INTELLIGENCE AND NATIONAL SECURITY 37 (2020).

3. *Id*. (quoting Gen. John R. Allen & Amir Husain, *On Hyperwar*, 143/7/1,373 U.S. NAVAL INST. PROC. 30 (2017)).

4. *See, e.g.*, Kristen E. Tullos, *From Cyber Attacks to Social Media Revolutions: Adapting Legal Frameworks to the Challenges and Opportunities of New Technology*, 26 EMORY INT'L L. REV. 733, 740–743 (2012) (concluding

prevalent than in the fractured international response to the development of LAWS.[5] Although it is still early in LAWS development, this technology, once realized, will likely radically change the nature of warfare.[6] Nations in support of LAWS development argue that the technology can be developed to comply with IHL obligations. LAWS may even be able to perform military operations with a stricter adherence to IHL principles than currently capable by human operators.[7] Opponents contend that LAWS technology may *per se* violate IHL, as well as create an unacceptable threat to peace.[8] As a result, they believe that an absolute ban on LAWS development is necessary.[9] Given the potentially substantial military value of LAWS technology and its unclear legal status under IHL, it is highly unlikely that advanced military nations would consent to a treaty banning LAWS development at this stage.[10]

This note seeks to evaluate the likelihood of a ban on LAWS

---

that fitting new technologies, such as cyber operations, into historic legal regimes requires modification and adaptation).

5. *Compare* Kenneth Anderson et al., *Adapting the Law of Armed Conflict to Autonomous Weapon Systems*, 90 INT'L L. STUD. 386, 406 (2014) (concluding that "there is no reason, in principle, why a [LAWS] system could not satisfy the requirements of targeting law."), *with* Christof Heyns (Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions), *Annual Report*, ¶ 113, U.N. DOC. A/HRC/23/47 (Apr. 9, 2013) [hereinafter *Report of the Special Rapporteur*] (calling for an international moratorium on the development of LAWS).

6. *See Autonomous Weapons Systems: Profound Implications for the Future of Warfare*, INT'L COMM. RED CROSS (May 6, 2016), https://www.icrc.org/en/document/autonomous-weapons-systems-profound-implications-future-warfare.

7. *See, e.g.*, Grp. of Governmental Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, Autonomy in Weapon Systems, Statement Submitted by the U.S., ¶ 16, U.N. DOC. CCW/GGE.1/2017/WP.6 (Nov. 10, 2017) ("In many cases, the use of autonomy in weapon systems could enhance the way law of war principles are implemented in military operations.").

8. Meeting of Experts on Lethal Autonomous Weapon Sys., Statement by Ambassador Tehmina Janjua, PR of Pakistan (Apr. 11, 2016), https://www.unog.ch/80256EDD006B8954/(httpAssets)/D6F11030CC982C11C1257F93005933A0/$file/2016_LAWS+MX_GeneralExchange_Statements_Pakistan.pdf (declaring State view that LAWS cannot be programmed to comply with IHL obligations).

9. *See id.* at 3 (arguing for a pre-emptive ban on the development and use of LAWS).

10. *See* John Lewis, *The Case for Regulating Fully Autonomous Weapons*, 124 YALE L.J. 1309, 1316–17 (2015) (arguing that due to military advantage it would be "unrealistic for major world powers to ban [LAWS] altogether").

development and to explore a potential alternative option to progress the international legal framework around LAWS development and use. Part I discusses IHL obligations for new weapons technologies, the current legal status of LAWS, and the basis for a ban on LAWS development. Part II summarizes the challenges facing proponents of the total ban on LAWS development and describes the obstacles facing the current UN-based approach for developing a legal framework for LAWS development and use. Part II concludes that the creation of a private group of experts tasked with creating a war manual presents the best opportunity to progress the legal framework needed for the development and use of LAWS, and may help lay the foundation for a treaty to ban specific forms of LAWS.

I. Background

In order to understand the challenges faced by the international movement opposing LAWS, it is important to understand what is unique about LAWS technology and the complex IHL implications of such a technology. This section will provide a background on the complicated definitional understanding of what qualifies as LAWS, an overview of the key IHL obligations and how they are implicated by LAWS technology,[11] and finally a look at the methods being pursued to stop the development of LAWS technology.

A. Current Legal Status of LAWS Development and Use

1. Description and Capabilities of Lethal Autonomous Weapons Systems

There is no universally accepted definition of what qualifies as LAWS. There is even a fundamental debate over whether LAWS should be defined as (1) the broader category of autonomous technology systems, some of which may be legally problematic, or as (2) the problematic subset of a broader category of systems with some autonomous functions.[12] As an

11. This does not include a discussion of criminal responsibility for LAWS, which is an important and complex area of analysis but goes beyond the scope of this note.

12. *See Autonomous Weapon Systems: Evaluating the Capacity for 'Meaningful Human Control' in Weapon Review Processes* 2 (Article 36, Discussion Paper, Nov. 2017), http://www.article36.org/wp-

example, the International Committee of the Red Cross ("ICRC") defines an autonomous weapon system as "[a]ny weapon system with autonomy in its critical functions."[13] A weapon system that is able to "select (i.e. search for or, detect, identify, or track) and attack (i.e. use force against, neutralize, damage, or destroy) targets without human intervention."[14] The United States Department of Defense formulates its definition for LAWS slightly differently, defining it as "weapon system[s] that, once activated, can select and engage targets without further intervention by a human operator."[15] The degree of autonomy in a system exists on a spectrum that is commonly simplified for clarification into three categories based on the degree of human involvement in the system.[16] These categories are: (a) Human-*in*-the-Loop Weapons: robots that can select targets and deliver force only with a human command; (b) Human-*on*-the-Loop Weapons: robots that can select targets and deliver force under the oversight of a human operator who can override the robots' actions; and (c) Human-*out-of*-the-Loop Weapons: robots that are capable of selecting targets and delivering force without any human input or interaction.[17]

Systems with some degree of autonomy have been implemented on the battlefield.[18] Notable examples include missile defense systems such as Israel's Iron Dome, which uses radar to identify, track, and shoot down incoming missiles, rockets, mortars, and drones,[19] and sentry robots used by South Korea in the Demilitarized Zone, which use heat and motion sensors to identify people and can shoot machine gun rounds or

---

content/uploads/2013/06/Evaluating-human-control-1.pdf ("Such divergent starting points add a layer of complexity to the discussion in the CCW which it will be necessary to get beyond in order to have a productive debate.").

13. INT'L COMM. RED CROSS, AUTONOMY, ARTIFICIAL INTELLIGENCE AND ROBOTICS: TECHNICAL ASPECTS OF HUMAN CONTROL 5 (2019) [hereinafter ARTIFICIAL INTELLIGENCE AND ROBOTICS].

14. *Id.*

15. U.S. DEP'T OF DEF., DIR. 3000.09, AUTONOMY IN WEAPON SYSTEMS (2012).

16. BONNIE DOCHERTY, HUM. RTS. WATCH, LOSING HUMANITY: THE CASE AGAINST KILLER ROBOTS 30 (2012), https://www.hrw.org/sites/default/files/reports/arms1112ForUpload_0_0.pdf [hereinafter LOSING HUMANITY].

17. *Id.* at 2.

18. *Id.* at 3.

19. *Id.* at 10–11. The Iron Dome system sends a recommended response to the operator who must make an immediate decision on whether or not to give the command to fire, therefore, it is not considered fully autonomous, *id.*

grenade launchers if granted approval by a human operator.[20] As of now, "[t]here are no autonomous weapons systems [("AWS")] in use today that directly attack human targets without human authorization."[21] However, future developments in AI could enable systems to use image, facial and behavior recognition to independently identify targets and make lethal decisions in real time.[22] Some military experts predict that these types of fully autonomous weapons systems could be created in the coming decades.[23] The U.S. Air Force anticipates "by 2030 machine capabilities will have increased to the point that humans will have become the weakest component in a wide array of systems and processes."[24]

2. International Humanitarian Law Obligations for Weapons Technology Development

When developing new military technology, States must evaluate whether the technology can be operated in compliance with core IHL principles. Under Article 36 of Geneva Convention Protocol I ("Protocol I"), in order to develop, acquire, or adopt a new "weapon, means or method of warfare," the State must first conduct a review to determine whether the technology would violate IHL in "some or all circumstances."[25] The weapons review obligation of Article 36 has likely not reached the status of customary international law.[26] Indeed, only a few States currently utilize systematic approaches to weapons review.[27]

---

20. *Id.* at 13–15.

21. ARTIFICIAL INTELLIGENCE AND ROBOTICS, *supra* note 13, at 6.

22. *Id.*

23. LOSING HUMANITY, *supra* note 16, at 8.

24. WERNER J.A. DAHM, U.S. AIR FORCE, REPORT ON TECHNOLOGY HORIZONS: A VISION FOR AIR FORCE SCIENCE & TECHNOLOGY DURING 2010-2030, at 106 (2010).

25. Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts art. 36, June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Additional Protocol I].

26. *See* Natalia Jevglevskaja, *Weapons Review Obligation Under Customary International Law*, 94 INT'L L. STUD. 186, 206–13 (2018) (citing the lack of recognition of a pre-existing obligation for weapons testing at the conference establishing Protocol I, the inconsistency of state practice, and the conflicting *opinio juris*).

27. William H. Boothby, *The Legal Challenges of New Technologies: An Overview*, *in* NEW TECHNOLOGIES AND THE LAW OF ARMED CONFLICT 21, 26 (Hitoshi Nasu & Robert McLaughlin eds., 2014); *see also id.* at 212 (noting that the United States and Israel, two non-signatory countries, are among the few States that do conduct systematic weapons reviews).

However, States are still bound by the underlying IHL obligations of weapons law and targeting law, even if they do not conduct a formal review prior to implementation.[28]

The first step is to review whether the weapon is already prohibited or restricted by existing treaty or customary law.[29] Next, the state must evaluate whether the weapon can be used in accordance with the core IHL obligations.[30] The State is not required to evaluate all possible misuses of the weapon, but rather the evaluation should relate to the "normal or expected use" of the weapon.[31] Finally, if no existing treaty or customary law would prevent the weapon's use, the State should evaluate whether its use would violate the 'Martens Clause'.[32] The Martens Clause is a catch-all provision that is intended to provide baseline level protections to civilians, requiring States to act from the "principles of humanity, and the dictates of public conscience," even in the absence of positive treaty law.[33] According to the ICRC Commentary on Protocol I, the purpose of the Martens Clause is to "prevent[] the assumption that anything which is not explicitly prohibited by the relevant treaties is therefore permitted" and to protect the core principles of IHL "regardless of subsequent developments of types of situation or technology."[34] Many have argued that the Martens Clause is particularly important in ensuring adequate protection of civilians when weapons technology has developed faster than IHL can adapt to the technology.[35]

In order for a new weapons technology to be compliant with IHL during its Article 36 review, the weapon must meet the obligations of "weapons law" and "targeting law".[36] Weapons law

---

28. VINCENT BOULANIN & MAAIKE VERBRUGGEN, STOCKHOLM INT'L PEACE RESEARCH INST., ARTICLE 36 REVIEWS: DEALING WITH THE CHALLENGES POSED BY EMERGING TECHNOLOGIES 4 (2017).

29. *Id.*

30. *Id.*

31. INT'L COMM. RED CROSS , COMMENTARY ON THE ADDITIONAL PROTOCOLS OF 8 JUNE 1977 TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949 ¶ 1469 (Yves Sandoz et al. eds., 1987) [hereinafter COMMENTARY ON THE ADDITIONAL PROTOCOLS].

32. *See* Additional Protocol I, *supra* note 25, art. 1, ¶ 2.

33. *Id.*; *see also* BONNIE DOCHERTY, ET AL., HEED THE CALL: A MORAL AND LEGAL IMPERATIVE TO BAN KILLER ROBOTS, HUM. RTS. WATCH 8 (2018), https://www.hrw.org/sites/default/files/report_pdf/arms0818_web.pdf [hereinafter HEED THE CALL].

34. COMMENTARY ON THE ADDITIONAL PROTOCOLS, *supra* note 31, ¶ 55.

35. *See* HEED THE CALL, *supra* note 33, at 11.

36. Jeffrey S. Thurnher, *Examining Autonomous Weapon Systems from a*

evaluates whether a weapon is *per se* unlawful.[37] Targeting law evaluates whether the weapon can be operated within a military environment in a lawful manner.[38] These core IHL obligations are codified in Protocol I and have also been recognized as customary international law.[39]

The first obligation of "weapons law" is that a weapon cannot be "of a nature to strike military objectives and civilians or civilian objects without distinction."[40] To be legal, the weapon must have the capacity to target legitimate military objectives and must not create disproportionate harm to civilians and other noncombatants in *at least some battlefield contexts*.[41] Examples of weapons that fail to meet this standard under customary IHL include incendiary weapons, cluster bombs, and biological weapons.[42] The second "weapons law" obligation is that the weapon cannot cause unnecessary suffering or superfluous injury.[43] The purpose is to prevent inhumane or needless injuries to combatants.[44] The International Court of Justice ("ICJ") has previously defined "unnecessary suffering" as "a harm greater than that unavoidable to achieve legitimate military objectives."[45] Historical examples of weapons that violate this obligation include lasers used to blind soldiers and "dum-dum" bullets (bullets that expand on impact causing large and painful wounds) — as these weapons caused extreme suffering without progressing any legitimate military purpose.[46]

Law of Armed Conflict Perspective, *in* NEW TECHNOLOGIES AND THE LAW OF ARMED CONFLICT, *supra* note 27, at 213, 219.

37. *Id.*

38. *Id.*

39. *See* Additional Protocol I, *supra* note 25, art. 1, ¶2; Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. Rep. 226 (July 8).

40. Additional Protocol I, *supra* note 25, art. 51 ¶, 4.

41. *See* COMMENTARY ON THE ADDITIONAL PROTOCOLS, *supra* note 31, art. 51, ¶ 4 ("Far too often the purpose of attacks was to destroy all life in a particular area or to raze a town to the ground without this resulting, in most cases, in any substantial military advantages.").

42. *Rule 71:Weapons that Are by Nature Indiscriminate*, INT'L COMM. RED CROSS: CUSTOMARY IHL DATABASE, https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule71 (last visited Dec. 30, 2019).

43. Additional Protocol I, *supra* note 25, art. 35, ¶ 2.

44. Thurnher, *supra* note 36, at 219.

45. Legality of the Threat or Use of Nuclear Weapons, *supra* note 39, ¶ 78.

46. *Rule 70: Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering*, INT'L COMM. RED CROSS: CUSTOMARY IHL DATABASE, https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule70#refFn_3460CD3C_00025 (last visited Mar. 30,

After a weapon is found not to be *per se* illegal under "weapons law", "targeting law" evaluates whether the weapon can be lawfully operated in a specific battlefield context.[47] Two key principles of "targeting law" are (1) distinction and (2) proportionality.[48] The requirement that actors distinguish between combatants[49] and civilians, and between military and civilian objects, is a "cardinal" principle of IHL.[50] The goal of distinction does not demand perfect results but instead requires that actors make decisions using reasonable judgment given the military context in which they are operating.[51] Changes to the character of warfare, such as the increased presence of non-state insurgent and terrorist groups, have made it increasingly difficult for military actors to distinguish between combatants and non-combatants in real-time combat operations.[52]

Next, the principle of proportionality requires that actors balance the extent and risk of collateral harm against the military advantage of the operation or action.[53] This is a highly context-specific assessment and has led international courts, military manuals, and others to adopt a "reasonable military commander" standard.[54] For example, the International Criminal Tribunal for the Former Yugoslavia described its standard for proportionality as follows: "In determining whether an attack was proportionate it is necessary to examine whether a reasonably well-informed person in the circumstances of the actual perpetrator, making reasonable use of the information available to him or her, could have expected excessive civilian

---

2020).

47. *See* Thurnher, *supra* note 36, at 220.

48. *See* LOSING HUMANITY, *supra* note 16, at 30.

49. *See* INT'L COMM. RED CROSS, INTERPRETIVE GUIDANCE ON THE NOTION OF DIRECT PARTICIPATION IN HOSTILITIES UNDER INTERNATIONAL HUMANITARIAN LAW (2009) [hereinafter INTERPRETIVE GUIDANCE ON THE NOTION OF DIRECT PARTICIPATION IN HOSTILITIES]. Combatants are defined by the amorphous legal description as those in "direct participation in hostilities," *id.* at 41–42.

50. Additional Protocol I, *supra* note 25, art. 48; Legality of the Threat or Use of Nuclear Weapons, *supra* note 39, ¶¶ 78–80.

51. *See* Kenneth Anderson & Matthew C. Waxman, *Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't Work and How the Laws of War Can*, Hoover Inst. at 11.

52. LOSING HUMANITY, *supra* note 16, at 30.

53. Additional Protocol I, *supra* note 25, art. 51, ¶ 5(b), art. 57, ¶ 2(a); Thurnher, *supra* note 36, at 221.

54. LOSING HUMANITY, *supra* note 16, at 33.

casualties to result from the attack."[55] Gross failures to account for the collateral damage of military operations can amount to a war crime.[56] A weapon is not IHL compliant if it does not allow an operator to use their judgment when making targeting decisions within the given battlefield context.[57] New weapons technology such as LAWS can only be lawfully used if the State can assure through an Article 36 review that the technology can adhere to IHL obligations within the battlefield context in which it is being used.

3. *IHL Implications of LAWS Technology*

LAWS technology raises a number of complex issues, ranging from the technical feasibility of IHL compliance, to legal and ethical questions over whether non-human intelligence should be allowed to make life-and-death decisions on the battlefield, to the significant public policy implications of wars conducted by robots.[58] The novelty of LAWS technology and these complex legal, moral, and practical considerations has resulted in a highly unsettled and contentious international legal status for LAWS development and use.[59]

LAWS are not likely to be *per se* illegal under "weapons law" due to being indiscriminate in their impact or causing unnecessary suffering or superfluous injury.[60] The evaluation of these factors is based on the nature of the weapon in the uses for which it is designed.[61] LAWS are not likely to be *per se* illegal

---

55. LOSING HUMANITY, *supra* note 16, at 33 (quoting Prosecutor v. Gali, Case No. IT-98-29-T, Judgment and Opinion, ¶ 58 (Int" Crim. Trib. for the Former Yugoslavia Dec. 5, 2003).

56. *See* Rome Statute of the International Criminal Court, art. 8(2)(b)(iv), July 17, 1988, 2187 U.N.T.S. 38544 ("[I]ntentionally launching an attack in the knowledge that such attack will cause incidental loss of life or injury to civilians or damage to civilian objects . . . which would be clearly excessive in relation to the concrete and direct overall military advantage anticipated.").

57. *See* Thurnher, *supra* note 36, at 223.

58. *See, e.g.*, ARTIFICIAL INTELLIGENCE AND ROBOTICS, *supra* note 13, at 10–13 (discussing the predictability and reliability requirements for LAWS technology); LOSING HUMANITY, *supra* note 16, at 30–37 (discussing the challenges to compliance with IHL); HEED THE CALL, *supra* note 33, at 19–27 (discussing the moral implications of AI decision-making in lethal operations).

59. *See Autonomous Weapon Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons*, *Legal Issues Concerning Autonomous Weapon Systems,* INT'L COMM. RED CROSS 1, 40–41 (Mar. 2016) (describing the unsettled status of LAWS).

60. *See* Anderson et al., *supra* note 5, at 399–400.

61. *Id.* at 399.

under weapons law because, in theory, the systems can be designed to discriminate and not cause unnecessary suffering.[62] LAWS are able to be designed with the ability to strike specific targets.[63] This ability to control the impact of the weapon is an important point of distinction as compared to other weapons previously deemed indiscriminate, such as cluster bombs, chemical weapons, incendiary weapons, and anti-personnel landmines.[64] And if LAWS use conventional forms of lethal force (e.g. standard bullets or explosives), the presence of autonomous functionality would not likely affect considerations of whether the weapon causes "unnecessary suffering" or "superfluous injury".[65] The more significant legal questions are whether LAWS can be designed to comply with IHL "targeting law" and the degree of human involvement that is legally necessary. [66]

In order for LAWS to be compliant with IHL "targeting law," "they must be able to *reliably* and *predictably* distinguish between combatants and non-combatants, as well as make rapid judgments on the proportionality of an attack against its potential collateral harms.[67] First, there is a question as to whether computer algorithms will be able to gauge the complex, context-dependent, and humanistic clues that soldiers must use to distinguish combatants and non-combatants in the modern battlefield where combatants often attempt to conceal their identities.[68] Second, even if such a distinction is technically

62. *See id.* at 399–400.

63. *See id.* at 400.

64. *See Rule 70: Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering*, *supra* note 46.

65. Thurnher, *supra* note 36, at 220.

66. *See generally* ARTIFICIAL INTELLIGENCE AND ROBOTS, *supra* note 13, at 10–11 (discussing the IHL implications related to the technical feasibility of LAWS technology); Peter Asaro, *On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-Making*, 94 INT'L REV. RED CROSS 687, 698 (2012) [hereinafter *On Banning Autonomous Weapon Systems*] (discussing the need for a moral agent in making judgment decisions under IHL).

67. *See* ARTIFICIAL INTELLIGENCE AND ROBOTS, *supra* note 13, at 10.

68. HUM. RTS. WATCH, MIND THE GAP: THE LACK OF ACCOUNTABILITY FOR KILLER ROBOTS, 8 (2012) [hereinafter MIND THE GAP], https://www.hrw.org/report/2015/04/09/mind-gap/lack-accountability-killer-robots; *see also* ARMIN KRISHNAN, KILLER ROBOTS: LEGALITY AND ETHICALITY OF AUTONOMOUS WEAPONS 99 (2009) ("Distinguishing between a harmless civilian and an armed insurgent could be beyond anything machine perception could possibly do. In any case, it would be easy for terrorists or insurgents to trick these robots by concealing weapons or by exploiting their sensual and behavioral limitations.").

feasible, there is a question as to whether these systems can *reliably* make sound decisions given the vast array and often rapidly changing nature of battlefield contexts.[69] For example, one potential risk to the system's reliability is the introduction of bias to decision-making originating in the data sets used to train the AI system.[70] Even if both of these technical feasibility questions can be adequately addressed, there is a further question as to whether lethal decision-making inherently requires human involvement under IHL.[71] And if there is such a requirement, what degree of human involvement is sufficient to meet IHL obligations must also be determined.[72]

Many commentators argue that decision-makers must act with human emotions and human judgment to meaningfully adhere to IHL obligations.[73] For instance, determining someone's status as a combatant often requires the attribution of intention to another human's actions.[74] Opponents to LAWS development argue that understanding another's intent, which is fundamentally an emotional state, requires human emotion on the part of the decision-maker.[75] Subtle context-specific differences in human intentions, such as the difference between a mother running to protect her child out of fear rather than in a threatening manner, may not be able to be recognized by LAWS algorithms in the same way as it might be by a human

69. MIND THE GAP, *supra* note 68, at 8.

70. *See* ARTIFICIAL INTELLIGENCE AND ROBOTS , *supra* note 13, at 17–18 (surveying the various types of bias that can impact AI systems).

71. *See On Banning Autonomous Weapon Systems*, *supra* note 66, at 699 ("There are really two questions here, however. The empirical question is whether a computer, machine, or automated process could make each of these decisions of life and death and achieve some performance that is deemed acceptable. But the moral question is whether a computer, machine or automated process ought to make these decisions of life and death at all.").

72. *See generally* Rebecca Crootof, *A Meaningful Floor for "Meaningful Human Control,"* 30 TEMP. INT'L & COMP. L.J. 53, 53–54 (2016) (describing the international agreement for on the broad principle that all weaponry should be subject to "meaningful human control" despite a wide ranges of definitions of what that requires).

73. *See, e.g.*, *Report of the Special Rapporteur*, *supra* note 5, ¶ 72 ("Proportionality is widely understood to involve distinctively human judgement."); Marcello Guarini & Paul Bello, *Robotic Warfare: Some Challenges in Moving from Noncivilian to Civilian Theaters*, *in* ROBOT ETHICS: THE ETHICAL AND SOCIAL IMPLICATIONS OF ROBOTICS 129, 138 (Patrick Lin et al. eds., 2012) ("A system without emotion . . . could not predict the emotions or action of others based on its own states because it has no such emotional states.").

74. *See* LOSING HUMANITY, *supra* note 16, at 31.

75. *See id.*

soldier.[76] The opponents also contend that the obligation for proportionality is "abstract, not easily quantified, and highly relative to specific contexts and subjective estimates of value," and therefore requires human judgment.[77] Opponents further argue that there may be a temptation to treat proportionality as a strictly quantifiable consideration that can be "objectively and straightforwardly measured," but that this is a false promise.[78] And although the ICRC provides some guidance on the factors to consider when making proportionality determinations,[79] they are highly context-specific determinations that were designed with the presupposition that the decision-makers are human.[80] Furthermore, calculations that attempt to balance the relative value of human life are fundamentally moral decisions that should be made by moral actors.[81] "[M]ost humans possess an innate resistance to killing that is based on their understanding of the impact of loss of life, which fully autonomous weapons, as inanimate machines, do not share."[82]

On the other hand, supporters of LAWS development argue that the question "is not whether [fully autonomous weapons] can 'be ethical,' but whether they can perform at the level of a human soldier" regarding their compliance with IHL obligations.[83] They are quick to point out that human soldiers are far from infallible.[84] Human soldiers are often operating in highly stressful battlefield situations and their judgment can be compromised by fear, panic, or other limitations of human cognition.[85] In fact, supporters contend that LAWS may even be able to more strictly adhere to IHL obligations by "reduc[ing] misidentification of military targets, better detect[ing] or

76. *Id.* at 31–32.

77. Peter Asaro, *Modeling the Moral User*, IEEE TECH. & SOC'Y MAG., Spring 2009, at 20, 21.

78. *On Banning Autonomous Weapon Systems*, *supra* note 66, at 697.

79. *See, e.g.*, INTERPRETIVE GUIDANCE ON THE NOTION OF DIRECT PARTICIPATION IN HOSTILITIES, *supra* note 49, at 65 (discussing the three criteria for direct participation in hostilities: (a) *threshold for harm*; (b) *direct causation*; and (c) *belligerent nexus*).

80. *See On Banning Autonomous Weapon Systems*, *supra* note 66, at 700.

81. *See id.* at 701 ("In short, when it comes to a system of justice, or the state, or their agents, making determinations regarding the human rights of an individual, the ultimate agents and officials of the state must themselves be human.").

82. HEED THE CALL, *supra* note 33, at 2.

83. Lewis, *supra* note 10, at 1314–15.

84. *See id.* at 1315.

85. *See* Anderson & Waxman, *supra* note 51, at 15.

calculat[ing] possible collateral damage, or allow[ing] for using smaller quanta of force compared to human decision-making."[86] Finally, supporters argue that LAWS can be designed to maintain human involvement in lethal decision-making, and therefore continued development should be allowed.[87]

While the balance between the competing positions on LAWS is still evolving, there is an emerging consensus that all weapon systems should be subject to "meaningful human control."[88] However, there is significant divergence in opinion over how to define what qualifies as "meaningful human control."[89] As an example, the ICRC has stated that "meaningful human control" entails "strict operational constraints with respect to the task carried out, the targets attacked, the operational environment, the geographical space and time of operation, the scope to enable human oversight of the operation of the weapon system, and the human ability to deactivate it if need be."[90] Although many entities and states have put forth varying formulations of "meaningful human control," most require three main components: (1) that "[h]uman operators are making informed, conscious decisions about the use of weapons;" (2) that "[h]uman operators have sufficient information to ensure the lawfulness of the action they are taking given what they know about the target, the weapon, and the context for action;" and (3) that "[t]he weapon is designed and tested, and that human operators are properly trained, to ensure effective control over the use of the weapon."[91] These elements are

86. *Id.* at 14.

87. *See, e.g.*, Group of Governmental Experts, *supra* note 7, ¶ 14 (noting that it would be feasible to have human operators monitor and intervene in the operation of autonomous weapons systems if necessary).

88. *See* Crootof, *supra* note 72, at 53.

89. *Compare* U.S. DEP'T OF DEF., DIR. 3000.09, AUTONOMY IN WEAPON SYSTEMS ¶ 4(a) (2012) ("Autonomous and semi-autonomous weapon systems shall be designed to allow commanders and operators to exercise *appropriate levels of human judgment* over the use of force.") (emphasis added) *with* Thomas Nash, ,Dir.,, Article 36, Remarks to CCW on Autonomous Weapons Systems (May 15, 2014), http://www.article36.org/statements/701/ (arguing that compliance with distinction, proportionality, and precaution is not enough, and that meaningful human control also requires "deliberative moral reasoning, by human beings, over attacks.").

90. *Autonomous Weapons: Decisions to Kill and Destroy Are A Human Responsibility*, INT'L COMM. RED CROSS (Apr. 11, 2016), https://www.icrc.org/en/document/statement-icrc-lethal-autonomous-weapons-systems.

91. Michael C. Horowitz & Paul Scharre, Meaningful Human Control in Weapons Systems 4 (Mar. 2015) (working paper) (on file with the Center for

considered vitally important because they ensure that there are fail-safe mechanisms of human oversight in case the weapon system malfunctions, and that there is an accountable human actor that can be held responsible for any breach of IHL. Moreover, they place a moral human agent in the final position to make life-and-death decisions.[92]

The imprecise definition of "meaningful human control" is largely a result of a lack of State consensus over the legal status of LAWS development and use.[93] Since 2014, there have been annual informal expert meetings under the structure of the 1980 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"). These meetings are aimed at addressing the rising concerns related to LAWS development and use.[94] This group has not been able to reach consensus on how to define "meaningful human control" or even whether "meaningful human control" is the most appropriate formulation of the legal standard.[95] For instance, the United States does not use the legal standard of "meaningful human control," but instead uses the legal standard of "appropriate levels of human judgment."[96] This subtle difference may have significant implications on how much control must be maintained during a military operation using LAWS. "Appropriate human judgment" places the emphasis on the operator's capacity to judge the likely effect of using the system rather than focusing on effective control of the weapon once

---

New American Study), https://s3.amazonaws.com/files.cnas.org/documents/Ethical_Autonomy_Working_Paper_031315.pdf?mtime=20160906082316.

92. DANIELE AMOROSO & GUGLIELMO TAMBURRINI, INT'L COMM. ROBOT ARMS CONTROL, WHAT MAKES CONTROL OVER WEAPON SYSTEMS "MEANINGFUL"? 8 (2019), https://www.icrac.net/wp-content/uploads/2019/08/Amoroso-Tamburrini_Human-Control_ICRAC-WP4.pdf.

93. *See* Crootof, *supra* note 72, at 59 ("Meaningful human control, as a phrase, is particularly useful in that it invites commentary and interpretation from a wide variety of stakeholders, including State representatives, weapon designers and manufacturers, human rights activists, philosophers, and (of course) lawyers.").

94. Dustin A. Lewis, et al., *War-Algorithm Accountability*, HARV. L. SCH. PROG. INT'L L. & ARMED CONFLICTv (2016), http://blogs.harvard.edu/pilac/files/2016/09/War-Algorithm-Accountability-August-2016-compressed.pdf.

95. *See id.* at vi–vii.

96. U.S. DEP'T OF DEF., DIR. 3000.09, AUTONOMY IN WEAPON SYSTEMS ¶ 4(a) (2012).

engaged.[97] Most recently, the Report from the 2019 meeting of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems ("GGE"), a subgroup of experts meeting under the CCW, concluded that "human judgement [*sic*] is essential" in the area of LAWS, but did not specify how that obligation may be met.[98]

B. Calls for a Ban on LAWS Development.

There is a movement of States, NGOs, individuals, and businesses calling for a complete ban on LAWS development and use.[99] Some actors argue that the Martens Clause already prohibits States from developing and using LAWS because the technology is incompatible with "the principals [*sic*] of humanity" and "the dictates of public conscience."[100] They also argue that there should be a treaty banning LAWS modeled after the largely successful 1995 ban on anti-personnel landmines and blinding lasers.[101]

1. LAWS as a Violation of the Martens Clause

97. Heather M. Roff, *Meaningful Human Control or Appropriate Human Judgment? The Necessary Limits on Autonomous Weapons* 3, (ASU GLOBAL SECURITY INITIATIVE, Briefing Paper for Delegates at the Review Conference of the Convention on Certain Conventional Weapons, 2016), http://www.article36.org/wp-content/uploads/2016/12/Control-or-Judgment_-Understanding-the-Scope.pdf.

98. Grp. of Governmental Experts on Emerging Techs. in the Area of Lethal Autonomous Weapons Sys., *Report of the 2019 Session*, ¶ 17(e), U.N. DOC. CCW/GGE.1/2019/3 (Sept. 25, 2019) [hereinafter 2019 GGE Report].

99. *See, e.g.*, CAMPAIGN TO STOP KILLER ROBOTS, COUNTRY VIEWS ON KILLER ROBOTS (2018) https://www.stopkillerrobots.org/wp-content/uploads/2018/11/KRC_CountryViews22Nov2018.pdf (listing twenty-eight countries that support a ban on fully autonomous weapons); *Lethal Autonomous Weapons Pledge*, FUTURE OF LIFE INST., https://futureoflife.org/lethal-autonomous-weapons-pledge/?cn-reloaded=1 (last visited Jan. 4, 2019) (including signatures of 247 organizations and 3253 individuals to support a ban on LAWS).

100. *See* HEED THE CALL, *supra* note 33, at 1.

101. Additional Protocol to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be deemed to be Excessively Injurious or to have Indiscriminate Effects, Oct. 13, 1995, 1380 U.N.T.S. 370); *see* Thalif Deen, *Global Campaign to Ban Killer Robots Models Landmine Treaty*, INTER PRESS SERV (Apr. 20, 2013), http://www.ipsnews.net/2013/04/global-campaign-to-ban-killer-robots-will-sidestep-landmines/.

Opponents of LAWS development argue that systems granting algorithms the ability to make life-or-death targeting decisions violate the Martens Clause, regardless of the system's ability to meet IHL distinction and proportionality obligations.[102] Legal experts disagree over whether the Martens Clause serves as a mere reminder that customary law is still applicable in the absence of treaty law or whether it provides a basis for its own source of law "elevat[ing] the principles of humanity and the dictates of public conscience to independent legal standards against which to judge unanticipated situations and emerging forms of military technology."[103] Opponents of LAWS development contend that LAWS violate this broader view of the Martens Clause, arguing that automated lethal decision-making is *per se* inhumane and that public opinion against LAWS indicates that their development is against the "dictates of public conscience."[104]

First, opponents contend that in order to act in accordance with "the principles of humanity," actors must exercise compassion and make legal and ethical judgments.[105] Compassion requires the ability to empathize, a trait that human beings naturally possess.[106] Despite autonomous weapons' potential sophistication, they will never be a sentient being able to truly understand physical and psychological suffering and, will therefore lack the empathetic capacity necessary to act in a humane manner.[107] Christof Heyns, UN Special Rapporteur on extrajudicial, summary or arbitrary executions, echoed this concern stating, "[t]aking humans out of

---

102. *See generally* HEED THE CALL, *supra* note 33, at 2–3 ("Even if fully autonomous weapons could adequately protect human life, they would be incapable of respecting human dignity.").

103. *Id.* at 14–15.

104. *See* Patrick Lin, *The Right to Life and the Martens Clause* 1, 2 (Apr. 2015), http://ethics.calpoly.edu/ccw_testimony.pdf ("[E]ven if the weapons aim only at lawful targets, they seem to violate a basic right to life—that is, a right not to be killed arbitrarily, unaccountably, or otherwise inhumanely."); Lewis et al., *supra* note 94, at iv ("The primary concerns are couched in terms of delegating decisions about lethal force away from humans—thereby "dehumanizing" war—and, in the process, of making wars easier to prosecute.").

105. HEED THE CALL, *supra* note 33, at 20.

106. *Id.* at 21 (quoting *The Fundamental Principles of the Red Cross and Red Crescent*, INT'L COMM. RED CROSS 1, 2 (1996) ("[F]eelings and gestures of solidarity, compassion, and selflessness are to be found in all cultures.").

107. *See id.* at 21–22; *see also* Lin, *supra* note 104, at 2 ("[M]aking decisions to kill another human being—one of the most profoundly serious decisions we can ever make—demands respect in the form of reflection and meaning that machines cannot give.").

the loop also risks taking humanity out of the loop."[108] Furthermore, opponents contend that LAWS cannot be designed with the capacity to exercise sufficient moral or ethical judgment.[109] Patrick Lin, Director of the Ethics & Emerging Sciences Group at California Polytechnic State University, acknowledges that human soldiers often do not act with ideal moral or ethical judgment, but argues that "the difference with LAWS is that robots can *never* be motivated by the right reasons—or wrong reasons or any reasons at all" meaning that LAWS "lack the capacity for moral respect."[110] Even LAWS technology with some degree of human involvement may have a profound impact on the psychology of warfare. Many studies show "how disconnecting a person, especially via distance, makes killing easier and abuses and atrocities more likely."[111] D. Keith Shurtleff, an ethics instructor at the Soldier Support Institute, worries that "as war becomes safer and easier, as soldiers are removed from the horrors of war . . . there is a very real danger of losing the deterrent that such horrors provide."[112]

Second, opponents argue that the broad cross-section of actors expressing their concern with the legal and policy implications of LAWS technology is evidence that LAWS development contravenes the "dictates of public conscience."[113] In support of this position, opponents cite public survey results such as a YouGov U.S. poll, which found that 33% of respondents "strongly support" and 20% "somewhat support" a campaign to ban on fully autonomous weapons systems, and an Open Roboethics international poll, which found that 67% of people indicated that all types of LAWS should be internationally banned.[114] Opponents also cite the positions taken by States including the twenty-eight countries that have officially

108. *Report of the Special Rapporteur*, *supra* note 5, ¶ 89.

109. *See* HEED THE CALL, *supra* note 33, at 22.

110. Lin, *supra* note 104, at 3 (emphasis added).

111. P.W. Singer, *Military Robots and the Laws of War*, NEW ATLANTIS, Winter 2009, at 25, 42.

112. *Id.*

113. *See* HEED THE CALL, *supra* note 33, at 29.

114. Charli Carpenter, *U.S. Public Opinion on Autonomous Weapons*, YOUGOV AMERICA (May, 2013), https://www.duckofminerva.com/wp-content/uploads/2013/06/UMass-Survey_Public-Opinion-on-Autonomous-Weapons.pdf; OPEN ROBOETHICS INITIATIVE, *The Ethics and Governance of Lethal Autonomous Weapons Systems: An International Public Opinion Poll* 1, 5 (Nov. 9, 2015), http://www.openroboethics.org/wp-content/uploads/2015/11/ORi_LAWS2015.pdf.

supported a ban on fully autonomous weapons. [115] Finally, as evidence of the broad public concern with the development of LAWS, organizations such as the Campaign to Stop Killer Robots and the Future of Life Institute have organized a diverse coalition of non-governmental organizations, key businesses, and leading researchers in support of an international ban. [116]

2. *Treaty to Ban the Development and Use of LAWS*

Opponents to LAWS development also propose creating a formal treaty to ban the development and use of LAWS.[117] The ban would create clear and binding legal obligations that would eliminate any uncertainty about the Martens Clause applicability to LAWS.[118] In addition to the concerns with IHL compliance surveyed above, opponents are also highly concerned with the public policy risks associated with LAWS development, including: (a) the progression of an AI arms race;[119] (b) the reduced political cost for initiating conflict caused by a shift to robotic warfare;[120] and (c) the potential abuse of LAWS technology by authoritarian states or terrorist groups.[121]

The development of LAWS will have a profound impact on the nature of warfare.[122] As stated in The Future of Life Institute's open letter to UN CCW, "Lethal autonomous weapons

115. *See, e.g.*, CAMPAIGN TO STOP KILLER ROBOTS, *supra* note 99.

116. *See, e.g.*, FUTURE OF LIFE INST., *supra* note 99 (pledge signed by 247 organizations); *About Us*, CAMPAIGN TO STOP KILLER ROBOTS (last visited Jan. 7, 2020), https://www.stopkillerrobots.org/about/.

117. *See* HEED THE CALL, *supra* note 33, at 44.

118. *See id.*

119. *See* Lewis, et al.,, *supra* note 94, at iv.

120. *See On Banning Autonomous Weapon Systems supra* note 66, at 692 ("[T]o remove the combatants who operate them from area [sic] of conflict and reduce the risks of causalities for those who possess them, they tend to also reduce the political costs and risks of going to war."); *see also* LOSING HUMANITY, *supra* note 16, at 40 ("The prospect of fighting wars without military fatalities would remove one of the greatest deterrents to combat.").

121. *See* Ariel Conn, *The Risks Posed By Lethal Autonomous Weapons*, FUTURE OF LIFE INST. (Sept. 4, 2018), https://futureoflife.org/2018/09/04/the-risks-posed-by-lethal-autonomous-weapons/ (describing the threat to peace if bad actors obtained LAWS technology); *see also An Open Letter to the United Nations Convention on Certain Conventional Weapons*, FUTURE OF LIFE INST. (Aug. 27, 2017), https://futureoflife.org/autonomous-weapons-open-letter-2017/ ("These can be weapons of terror, weapons that despots and terrorists use against innocent populations, and weapons hacked to behave in undesirable ways.").

122. *See* Thurnher, *supra* note 36, at 226.

threaten to become the third revolution in warfare. Once developed, they will permit armed conflict to be fought at a scale greater than ever, and at timescales faster than humans can comprehend."[123] The serious legal and public policy implications of LAWS development are even more concerning if development progresses without any concrete international understanding of the limitations or legal obligations imposed on those developing this technology. However, while most actors agree that LAWS development must be meaningfully addressed, there is a wide disparity in the approaches supported.[124]

II. ANALYSIS

Part II will first analyze the near-term prospects of a total ban on LAWS development. Second, it will evaluate the challenges facing the current U.N.-based approach. Finally, it will recommend the formation of a private group of experts to begin to develop a war manual for LAWS development, testing, and use. The development of a war manual will provide a forum in which many of the key legal and definitional disputes can be surfaced and debated among scholars, technologists, and NGOs. Given the rapid evolution of LAWS technology, the war manual also presents the best opportunity to maintain the progression of the legal framework for LAWS use and development with the emergence of the technology itself.

A. Challenges Facing the Near-Term Prospects of a Total Ban or Moratorium on LAWS Development.

1. LAWS Unclear Legal Status Under IHL

The first argument put forward by those opposing LAWS development is that the technology is *per se* illegal under IHL weapons law and targeting law, and therefore should be banned.[125] Although there are still unanswered questions about the reliability and predictability of the technology, it is likely that LAWS can be designed with a sufficient ability to comply

123. *See* FUTURE OF LIFE INST., *supra* note 121.

124. *See cf.*, Lewis, *supra* note 94, at v (summarizing the general debate between those supporting a complete ban versus those supporting regulation).

125. *See generally* LOSING HUMANITY, *supra* note 16, at 46 (concluding that LAWS would "be unable to meet basic principles of international humanitarian law").

with IHL weapons and targeting obligations as to render their development not *per se* illegal.[126]

Even if there are battlefield circumstances in which LAWS would not be able to perform in sufficient compliance with IHL "targeting law", this alone does not render a weapon *per se* illegal.[127] Given that we are currently in the nascent stages of LAWS development, there are many questions about the future performance reliability and predictability of this technology that remain unknown. States may discover over the course of LAWS development that there are some battlefield circumstances—such as in a dense urban environment where combatants and non-combatants are not easily distinguished—that the systems simply cannot adequately distinguish combatants or properly balance proportionality considerations with sufficient reliability as to comply with IHL obligations.[128] Even if this issue cannot be overcome technologically it does not render LAWS illegal if there exists other circumstances in which its performance *can* meet IHL obligations.[129] For example, an autonomous submarine operating in an undersea environment defending against enemy submarines would not likely pose a high risk of violating IHL obligations.[130] Historically, there has been a high standard set in order for a weapon to be *per se* illegal under targeting law. Take for instance the ICJ's inability to find nuclear weapons as *per se* illegal, despite the weapons indiscriminate and disproportionate effects, because the court concluded there may be *some* extreme circumstances in which its use may be valid under IHL.[131] Thus, because there are likely circumstances that LAWS could be operated legally, the development of the technology is not likely *per se* illegal under

126. *See generally* Thurnher, *supra* note 36, at 226 (concluding that there is little evidence to suggest that LAWS would be unlawful *per se*).

127. *See* Anderson et al., *supra* note 5, at 401 (arguing that even if a weapon is prohibited in some battlefield environments, it not *per se* illegal if it can be used legally in other environments).

128. *See id.* at 402.

129. *See id.* at 401 (quoting Jeffrey S. Thurnher, *The Law that Applies to Autonomous Weapon Systems*, 17 AM. SOC'Y INT'L L. INSIGHTS (Jan. 18, 2013), www.asil.org/insights/volume/17/issue/4/law-applies-autonomous-weeapon-systems) ("[C]ontext and environment in which the weapon system operates play a significant role in this analysis."); *see also* Additional Protocol I, *supra* note 25, art. 48.

130. Lewis, *supra* note 10, at 1315.

131. Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, ¶ 97 (July 8).

"targeting law".[132]

Second, the Martens Clause is not likely to provide a sufficient legal basis to prevent LAWS development in the absence of a multilateral treaty. The first issue confronting those who seek a LAWS ban based on the Martens Clause is that the clause itself has no clearly accepted interpretation.[133] There is limited historical evidence that the positive law obligation interpretation carries sufficient legal recognition to provide a basis for a total ban.[134] For example, a number of States cited to the Martens Clause in their submissions to the ICJ arguing, as Japan did, that the "use of nuclear weapons is clearly contrary to the spirit of humanity that gives international law its philosophical foundation."[135] Although the court recognized the existence and applicability of the Martens Clause, it did not clarify the extent to which natural law can create legal obligations not found in customary or treaty law and still ultimately concluded that the use of nuclear weapons were not *per se* illegal.[136]

Furthermore, even if the Martens Clause can impose binding legal obligations, there is likely not sufficient international agreement that LAWS violate the "principles of humanity" or the "dictates of public conscience."[137] One argument offered that LAWS are in violation of the Martens Clause is that the removal of humans from the battlefield may reduce the costs of initiating war leading to more frequent military actions.[138] However, this same argument has found limited success when used to object to other new weapons technology such as remotely-piloted drones.[139] Supporters argue that LAWS are not counter to the "principles of humanity."[140] They contend that because the technology offers the potential to

---

132. *See* Thurnher, *supra* note 36, at 226.

133. Rupert Ticehurst, *The Martens Clause and the Laws of Armed Conflict*, 317 INT'L REV. RED CROSS 125, 126 (1997).

134. *See id.* at 133–34 (concluding that the powerful military States have constantly opposed the influence of natural law on the laws of armed conflict).

135. *Id.* at 130–31 (quoting Japan, oral statement before the ICJ, p.18).

136. *See* Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, ¶ 87 (July 8). *But see* Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 375, 183–89 (July 8) (Shahabuddeen, J., dissenting) (concluding that the Martens Clause provides a basis to impose a prohibition on nuclear weapons).

137. Additional Protocol I, *supra* note 25, art. 1.

138. *See On Banning Autonomous Weapon Systems*, *supra* note 66, at 692.

139. Anderson & Waxman, *supra* note 51, at 18.

140. *See id.*

reduce the risk of harm or death to humans, it may actually present a more humane method of warfare.[141]

Additionally, LAWS opponents cite to survey results to support their conclusion that LAWS run counter to the dictates of public conscience.[142] These surveys may not capture the public's view on LAWS as clearly as they first suggest. Research by Michael C. Horowitz has shown that opposition to LAWS is contextual.[143] Horowitz found that individuals' support or opposition of LAWS development depended on whether they are given contextual information about potential benefits or risks of the technology (e.g. the potential ability to protect U.S. soldiers or risk of other countries developing the technology first).[144] In the end, given the unsettled nature of its interpretation and the lack of historic precedent in which the Martens Clause was used to impose obligations beyond treaty and customary law, it is unlikely to provide a sufficient legal basis to impose a ban on LAWS development.

2. Challenges to a Multilateral Treaty Banning LAWS Development and Use

The near-term prospects of a multilateral treaty banning LAWS development and use—which includes the major military powers—are not great. Two of the most significant challenges facing the ban are (1) the uncertain legal status of the technology[145] and (2) the potential military advantage of LAWS[146] in combination with the competitive pressure from rival States.[147] The powerful influence of these factors and the early stage nature of LAWS development create highly unfavorable conditions for the creation of a treaty banning LAWS development and use.

Evaluating the impact of each of the aforementioned challenges indicates that there are key differences that

---

141. *See id.*

142. *See, e.g.*, HEED THE CALL, *supra* note 33, at 30–31.

143. Michael C. Horowitz, *Public Opinion and the Politics of the Killer Robots Debate*, RES. & POL., Jan.–Mar. 2016, at 1.

144. *See id.* at 7 (arguing that the influence of context on public opinion "suggest that it is too early to argue that AWS violate the public conscience provision of the Martens Clause because of public opposition").

145. *See* Thurnher, *supra* note 36, at 226.

146. Lewis, *supra* note 10, at 1317.

147. *See* CONG. RESEARCH. SERV., *supra* note 2.

distinguish a LAWS ban from prior successful weapons bans, such as the ban on anti-personnel landmines or blinding lasers.[148] First, LAWS' incompatibility with IHL obligations, as surveyed in the section above, is not as clear as previous weapons. For example, anti-personnel land mines faced more significant challenges with IHL compliance due to the operator's inability to control the impact of the explosives and the operator's inability to distinguish between combatants and non-combatants.[149] Even when banning this more legally problematic weapon, the United States, China, Russia, and India still declined to sign the treaty.[150] As discussed previously, at a minimum LAWS have the potential to adhere to IHL obligations in some battlefield contexts.[151] Therefore, the legal basis supporting a total ban on LAWS is not as strong as the previous examples.

Second, LAWS have the potential to offer a much greater military advantage than previously banned weapons.[152] Historically, the major military powers have been cautious to limit their military options through international treaties, particularly when the treaty involves strategically important weapons.[153] A number of experts believe that AI functionality will have a revolutionary impact on warfare.[154] LAWS technology has the potential to create a significant competitive asymmetry for the State that can first successfully develop the technology.[155] In fact, the U.S. Military has explicitly stated that its goal for AI development is to create "an enduring competitive edge that lasts a generation or more."[156] This significant first-

148. *See generally* Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction, Sept. 18, 1997, 2056 U.N.T.S. 211; Additional Protocol to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be deemed to Be Excessively Injurious to Have Indiscriminate Effects, Oct. 13, 1995, 1380 U.N.T.S. 370.

149. *See* Lewis, *supra* note 10, at 1320.

150. *Id.* at 1317.

151. *Id.* at 1315.

152. *Id.* at 1317.

153. *See, e.g.*, Jodi Preusser Mustoe, *The 1997 Treaty to Ban the Use of Landmines: Was President Clinton's Refusal to Become a Signatory Warranted?*, 27 GA. J. INT'L & COMP. L. 541, 555 (1999) (discussing the United States' decision not to sign the Oslo Treaty because it wanted to retain the ability to use landmines in particular circumstances).

154. CONG. RESEARCH SERV., *supra* note 2, at 36.

155. *See id.*

156. *Id.* (quoting Christian Davenport, *Robots, Swarming Drones, and Iron*

mover advantage has created a high-degree of competition in LAWS development, in particular between the United States, Russia, and China.[157] All three are heavily invested in LAWS development and view it "as fundamental to the future of armed conflict."[158] Some conceptualize this competition as an "AI arms race."[159] Each major military power is concerned that attempts to limit or outright ban LAWS development may put them at a competitive disadvantage if their peer States are not party to the treaty or do not abide by the treaty obligations.[160] Even if all major military States were party to the treaty, the prohibition on LAWS development would be challenging to enforce due to the dual use (civilian and military) functionality of AI technology.[161] This would make it difficult for an overseeing treaty body to ensure that States were complying with their treaty obligation not to develop AI technology for LAWS purposes.

B. Challenges Facing the Existing Approach to Building a Legal Framework for LAWS Development and Use.

With many nations aggressively pursuing LAWS technology, there is an urgent need to develop standards to influence and regulate the testing and deployment of this new technology.[162] The current UN-focused approach is not progressing quickly enough to provide meaningful guidance to States.[163] As stated by one observer, "the pace of diplomacy [is]

Man: Welcome to the New Arms Race, WASH. POST (June 17, 2016), https://www.washingtonpost.com/news/checkpoint/wp/2016/06/17/robots-swarming- drones-and-iron-man-welcome-to-the-new-arms-race/?hpid=hp_rhp-more-top-stories_no-name%3Ahomepage%2Fstory&utm_term=.00284eba0a01).

157. CONG. RESEARCH SERV., *supra* note 2 ("Potential international rivals in the AI market are creating pressure for the United States to compete for innovative military AI applications.").

158. Matt Bartlett, *The AI Arms Race in 2019*, MEDIUM.COM (Jan. 28, 2019), https://towardsdatascience.com/the-ai-arms-race-in-2019-fdca07a086a7.

159. *See generally id.* (describing the emerging AI arms race primarily between the United States, Russia, and China).

160. *See* Lewis, *supra* note 10, at 1317.

161. *See* Anderson & Waxman, *supra* note 51, at 21 (discussing the challenges with enforcing a LAWS ban because the underlying AI technology can be used in both a civilian and military context).

162. Markus Wagner, *The Dehumanization of International Humanitarian Law: Legal, Ethical, and Political Implications of Autonomous Weapon Systems*, 47 VAND. J. TRANSNAT'L L. 1371, 1421 (2014).

163. CONG. RESEARCH SERV., *supra* note 2, at 26.

falling behind the speed of technological advancement."[164]

Historically, the development of IHL has been heavily dependent on state practice and consequently takes a significant amount of time for custom to ripen.[165] Additionally, given the high stakes of creating a body of law that grants the use of deadly force in the name of national security, the codification of state practice into multilateral treaties is a highly sensitive and contested process.[166] The process is also highly pluralistic, which while valuable for accounting for diverse interests, can make progress challenging.[167] As described by Michael Schmitt, "[c]onfronted with a cacophony of inputs—private and public, military and civilian, domestic and international—the IHL lawyer frequently finds clarity and consensus elusive."[168]

Adding to this challenge, States are often and increasingly reticent to issue expressions of *opinio juris* (official legal opinions) on developing areas of IHL.[169] State *opinio juris* animates the interpretation and application of IHL treaties.[170] It serves as the vessel through which said agreements are revealed[171] and is a critical bellwether for the degree of consensus, acceptance, and legitimacy of any international legal rule.[172] States are often reluctant to express *opinion juris* on new applications of IHL in order not to limit their battlefield options or provide evidence of a new customary norm.[173] For example, the United States has not offered a thorough expression of *opinion juris* to justify its use of targeted drone strikes against terrorist suspects that addresses the key relevant aspects of IHL.[174] These same dynamics have posed serious challenges for

164. *Id.* (quoting Paul Scharre, *We're Losing Our Chance to Regulate Killer Robots*, DEF. ONE (Nov. 14, 2017), http://www.defenseone.com/ideas/2017/11/were-losing-our-chance-regulate-killer-robots/142517/).

165. *See* Eric Talbot Jensen, *The Future of the Law of Armed Conflict: Ostriches, Butterflies, and Nanobots*, 35 MICH. J. INT'L L. 253, 261 (2014).

166. Michael N. Schmitt & Sean Watts, *The Decline of International Humanitarian Law* Opinio Juris *and the Law of Cyber Warfare*, 50 TEX. INT'L L.J. 189, 191 (2015).

167. *Id.*

168. *Id.* at 190–91.

169. *See id.* at 193.

170. *Id.* at 194.

171. *Id.*

172. *Id.* at 210.

173. *See id.* at 211 (arguing that States increasingly use a "wait-and-see approach" for new areas of IHL application).

174. *Id.* at 215.

the UN CCW's attempts to progress a legal framework for the application of IHL to LAWS.

The UN CCW has been meeting annually since 2014 in an attempt to better define the legal status of LAWS development and use.[175] At the 2016 CCW meeting, States agreed to form a Group of Government Experts ("GGE") with the mandate to "assess questions related to emerging technologies in the area of LAWS."[176] Throughout the subsequent meetings, the GGE has failed to produce an official definition of LAWS or issue any official guidance for LAWS development or use.[177]

Progressing the legal framework exclusively through the mechanism of the UN CCW presents a number of challenges at this stage. First, as discussed above, major military powers are often resistant to taking official positions on definitions or regulations early in the development of new strategically important technology.[178] Second, the sheer number of contributors to the GGE makes it difficult to reach consensus on issues beyond the lowest common denominator.[179] Finally, there is a fundamental disagreement over whether LAWS are *per se* illegal, which makes any form of compromise problematic.[180]

C. Global Leaders Should Facilitate a Private Group of Experts to Develop a LAWS War Manual and to Suggest Regulation Recommendations.

Given the profound implications LAWS will have on the nature of warfare, international actors must find a way to advance the legal framework to keep up with and constrain the development and use of LAWS. There has been a broadening legal lag in the modern era as warfare technology evolves far more rapidly than the laws governing its use.[181] IHL plays an

175. CONG. RESEARCH. SERV., *supra* note 2, at 26.

176. *Id.*

177. *Id.*

178. *See, e.g.*, Schmitt & Watts, *supra* note 166, at 223–24 (discussing the United States' reluctance to take official legal positions on cyber warfare due to the nascent developmental stage of the technology).

179. *See* Barbara Rosen Jacobson, *Lethal Autonomous Weapons Systems: Mapping the GGE Debate*, DIPLO, Aug. 2017 at 1, 2.

180. *Compare* Thurnher, *supra* note 36, at 226 ("[T]here is little evidence to suggest that the systems would be unlawful *per se*"), *with* LOSING HUMANITY, *supra* note 16, at 46 ("[LAWS] would be unable to meet basic principles of international humanitarian law . . . .").

181. *See* Jensen, *supra* note **Error! Bookmark not defined.**, at 254

important signaling role guiding States and their legal advisors in the research and development of new weapons technology.[182] It is therefore crucial that international actors explore new methods and fora to speed up the articulation of IHL principles for emerging technology. In this pursuit, world leaders should support a private group of experts to progress the development of a legal framework for LAWS development and use through the creation of a war manual. This group should include legal scholars, technologists, key NGOs, the ICRC, and it should involve active consultation with States.

In recent decades, non-state actors have played an increasingly influential role in the articulation of international law in the context of the law of armed conflict.[183] One important means that non-state actors have used to influence the law of armed conflict is through the creation of war manuals, which largely attempt to describe the law as it exists. Key examples include the 1994 San Remo Manual on International Law Applicable to Armed Conflicts at Sea ("San Remo Manual"),[184] the Harvard Manual on International Law Applicable to Air and Missile Warfare ("Air and Missile Manual"),[185] and the Tallinn Manual 2.0 On International Law Applicable to Cyber Operations ("Tallinn Manual 2.0").[186]

The Tallinn Manual 2.0 is particularly instructive for the role a private group of experts could play in developing a legal framework for LAWS. Similar to LAWS, at the time the Tallinn Manual 2.0 was created, the international legal framework for cyber warfare was falling behind the rapidly evolving technology

("[B]ecause modern specialists in violence constantly seek new and unexpected ways of defeating adversaries, the codified body of the law of armed conflict always lags at least a generation behind.").

182. *See id.* at 264.

183. *See* Schmitt & Watts, *supra* note 166, at 195.

184. INT'L INST. HUMANITARIAN L., SAN REMO MANUAL ON INTERNATIONAL LAW APPLICABLE TO ARMED CONFLICTS AT SEA (1994), https://www.legal-tools.org/doc/118957/pdf.

185. THE PROGRAM ON HUMANITARIAN POL'Y AND CONFLICT RSCH. AT HARVARD UNIV., MANUAL ON INTERNATIONAL LAW APPLICABLE TO AIR AND MISSILE WARFARE (2013), https://assets.cambridge.org/97811070/34198/frontmatter/9781107034198_frontmatter.pdf.

186. INT'L GRP. OF EXPERTS AT THE INVITATION OF THE NATO COOP. CYBER DEF. CTR. OF EXCELLENCE, TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS, (Michael N. Schmitt ed., 2d ed. 2017), https://assets.cambridge.org/97811071/77222/frontmatter/9781107177222_frontmatter.pdf.

used to conduct cyberattacks.[187] The Tallinn Manual 2.0 represented an effort to bring together an international coalition of experts to provide detailed analysis on how international law applies to cyber operations.[188] Tallinn Manual 2.0 director Michael Schmitt stated that the goal was to be a "restatement of the law" and that the experts "wanted to maintain fidelity to the law as we believe States would interpret it on that date."[189] This is important because the Tallinn Manual 2.0 lacked authority to create new legal obligations.[190] However, commentators are quick to point out that Tallinn experts' attempt to interpret and analogize how IHL obligations might apply in the cyber context has the practical effect of attempting to extend the law to areas not yet codified by international agreements.[191] The International Group of Experts who wrote the Tallinn Manual 2.0 included 19 experts from around the world that were acting in their own personal capacity, meaning that the manual does not represent the official views of any States.[192] However, the group actively sought out state input to help shape their formulations of the law.[193] The Tallinn Manual 2.0 also includes an extensive commentary that sought to explain any differing understandings or interpretations of their rules found in state practice.[194] This was important as it allowed the manual to capture the differing State interpretations of the applicability of IHL within this emerging field of law.

---

187. *See* Schmitt & Watts, *supra* note 166, at 194.

188. Michael Schmitt, *Tallinn Manual 2.0 on the International Law of Cyber Operations: What It Is and Isn't*, JUST SEC. (Feb. 9, 2017), https://www.justsecurity.org/37559/tallinn-manual-2-0-international-law-cyber-operations/.

189. Lianne J.M. Boer, *Lex Lata Comes With a Date; or, What Follows from Referring to the "Talinn Rules"*, 113 AJIL UNBOUND 76, 77–78 (2019) (emphasis omitted) (quoting US Naval War College, *Cycon 2012 | Michael Schmitt: Tallinn Manual Part I*, 3.12 (June 5–8, 2012) and HLS Program on International Law and Armed Conflict, *Michael N. Schmitt: Pilac Lecture on Cyber Operations and IHL: Fault Lines and Vectors*, at 55.26, 52.52 (Apr. 3, 2015)).

190. *Id.*; *see* Statute of the International Court of Justice, art. 38, ¶ 1.

191. *See* Dan Efrony & Yuval Shany, *A Rule Book on the Shelf? Tallinn Manual 2.0 on Cyberoperations and Subsequent State Practice*, 112 AM. J. INT'L L. 583, 583–84 (2018).

192. Schmitt, *supra* note 188.

193. *Id.* (describing "The Hague Process" which involved 50 States in the review of manual chapters).

194. *Id.* (aiming to show if there was (1) a clear split in the law; (2) a majority and minority view; (3) a view held by few; or (4) an understanding that the law is clearly unsettled).

While manuals created by private groups of experts are not legally binding, they can play an important role in progressing the legal framework within their domain.[195] For example, in the years after the creation of the San Remo Manual, a considerable number of States have adopted San Remo rules into their own naval manuals or guidelines.[196] And although there are experts who question the practical impact of the Tallinn Manual 2.0 on State practice,[197] they cannot deny that it has generated considerable reaction by scholars, policymakers, and members of the industry.[198]

Given that the legal discussion regarding LAWS progressed by the UN CCW cannot even agree upon basic definitions, the discussion would likely benefit from a concerted effort to articulate the definitions and applicability of IHL to LAWS.[199] A private group of experts working in their personal capacity would allow for more flexibility in the discussion because it would not involve States having to take formal positions on key issues. The project should follow the example of the Tallinn Manual 2.0 and actively seek out state input so that the final product can best articulate the current legal status of LAWS development and use. The process of creating a LAWS manual could also help to build broad consensus or surface disagreement.[200] The group could also offer legal and technical recommendations on how States could undertake their Article 36 testing obligations in order to ensure the technology is able to comply with IHL. It is important to note that a LAWS manual would not be a binding document. Further UN discussions around potential bans or regulations of LAWS would still be required. But a LAWS manual could facilitate that process by attempting to articulate how IHL may apply to LAWS, which could be used as a starting point for further discussion.

---

195. *See* Yahli Shereshevsky, *Back in the Game: International Humanitarian Lawmaking by States*, 37 BERKELEY J. INT'L L. 1, 58 (2019) (quoting Kubo Mac□ák, *From Cyber Norms to Cyber Rules: Re-engaging States as Law-makers*, 30 LEIDEN J. INT'L L. 877, 894 (2017)) (stating that the Tallinn Manual 2.0 serves the function of being "an intermediate stage on the way towards the generation of cyber 'hard law'").

196. Wolff Heintschel von Heinegg, *The Current State of the Law of Naval Warfare: A Fresh Look at the San Remo Manual*, *in* THE LAW OF WAR IN THE 21ST CENTURY: WEAPONRY AND THE USE OF FORCE, at 269, 269 (INT'L L. STUD., Vol. No. 82, 2006).

197. *See* Efrony & Shany, *supra* note 191, at 654.

198. *See id.* at 584.

199. *See* 2019 GGE Report, *supra* note 98.

200. Anderson & Waxman, *supra* note 51, at 25.

III. Conclusion

This note has discussed some of the potential legal challenges related to the development and use of LAWS under IHL. LAWS technology likely represents a fundamental shift in the conduct of warfare. Consequently, its development and use has generated significant interest and concern among NGOs, companies, citizens, and States alike. Some of these voices question whether LAWS can be developed to perform in compliance with the key legal obligations of IHL "weapons law" and "targeting law". Others argue that LAWS' non-human decision-making may violate the principals of humanity rendering the technology *per se* illegal. Currently, there is an emerging legal recognition for a need for "meaningful human control" over LAWS, although understandings of how to define and sufficiently provide "meaningful human control" remain unsettled. In response to the rising apprehension of LAWS, there are also a growing number of actors calling for a total ban on LAWS development.

This note has argued that given the unclear legal status of LAWS under IHL, the potentially significant military value of the technology and the global competitive pressures, the near-term prospects of a treaty banning or imposing significant regulations on LAWS development or use is highly unlikely. LAWS are not likely *per se* illegal under weapons or targeting law, and the Martens Clause does not provide a sufficient legal basis to ban LAWS development in the absence of positive legal obligations. Thus, in order to progress the development of a legal framework for IHL application to LAWS, global leaders should promote and fund a private group of international experts to create a war manual on LAWS. Although this will not create binding law, it will provide a forum to surface many of the critical legal and definitional disputes the currently prevent action and may provide a first draft for a legal framework to address LAWS that can be used to anchor future State discussions.