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ANALYZING THE POTENTIAL FOR UNIVERSAL DISARMAMENT OF AUTONOMOUS WEAPONS SYSTEMS OR HOW I LEARNED TO STOP WORRYING AND LOVE THE KILLER ROBOT

INTRODUCTION

Lethal autonomous weapons systems (LAWS)¹ have recently become the subject of debate among scholars, world leaders, nongovernmental organizations (NGOs), and the popular media.² While the dangers of autonomous robotics have existed for decades in science fiction,³ technology has only recently made the implementation of robots capable of military combat a real possibility.⁴ With the advent of this technology, however, many government leaders, politicians, scientists, and business leaders are advancing the argument that just because autonomous weapons can exist does not mean they should.⁵

1. LAWS are weapons systems capable of identifying targets and using deadly force without human control. These devices have also referred to as autonomous weapons systems, autonomous military systems, lethal autonomous robotics, and “killer robots.” U.S. DEP’T. DEF., DIRECTIVE 3000.09, AUTONOMY IN WEAPON SYSTEMS (2017); PATRICK LIN ET AL., AUTONOMOUS MILITARY ROBOTICS: RISK, ETHICS, AND DESIGN (2008); Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, U.N. Doc. A/HRC/23/47 (2013); *Home*, CAMPAIGN STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/> (last visited Oct. 7, 2018); Samuel Gibbs, *Elon Musk Leads 116 Experts Calling for Outright Ban of Killer Robots*, GUARDIAN (Aug. 20, 2017), <https://www.theguardian.com/technology/2017/aug/20/elon-musk-killer-robots-experts-outright-ban-lethal-autonomous-weapons-war>.

2. See Gibbs, *supra* note 1; Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), CCW/GGE.1/2017/CRP.1 (Nov. 17, 2017).

3. See, e.g., ISAAC ASIMOV, *Runaround*, in I, ROBOT 17, 20 (Street & Smith, 1942), available at http://kaitnieks.com/files/asimov_isaac_i_robot.pdf (demonstrating a fear of killer robots in 1942); TERMINATOR (Pacific Western Productions 1984); I, ROBOT (20th Century Fox 2004).

4. HUMAN RIGHTS WATCH, LOSING HUMANITY THE CASE AGAINST KILLER ROBOTS (2012).

5. An open letter published by the future life institute calling for the prohibition of LAWS has been signed by Tesla and SpaceX founder, Elon Musk, as well as renowned theoretical physicist Stephen Hawking. *Autonomous Weapons: An Open Letter From AI & Robotics Researchers*, FUTURE LIFE INSTITUTE (July 28, 2015), <https://futureoflife.org/open-letter-autonomous-weapons/>.

The purpose of this Note is twofold. First, it examines the use of human-out-of-the-loop weapons, robotics technology, and autonomy in order to predict how states will react to the prospect of banning autonomous weapons. Second, this Note proposes that the creation of a new framework agreement on LAWS and the formation of a new international organization tasked with developing and implementing LAWS regulations would be favorable compromise to interested parties. Part I briefly details the history of unmanned weapons and the recent development of robotics and autonomy in military technology. Part II summarizes some of the most popular arguments advanced by proponents and critics of autonomous weapons. Part III analyzes successful multilateral disarmament treaties in order to ascertain whether universal disarmament of robotic weapons is likely to occur. Finally, Part IV considers the interests of states in developing robotic weapons and proposes that effective disarmament of autonomous weapons would require the creation of an immediate binding agreement. Such an agreement would initially be permissive in allowing research and development of LAWS, but would resolve to continue to further regulate LAWS over time through the establishment of a permanent international organization. This proposal argues that the only effective method of reducing the use of autonomous weapons is through a multilateral treaty. Because universal disarmament of all autonomous weapons is unlikely, the only practical solution is to permit their use, but with regulations that are designed and implemented in tandem with the incremental development and implementation of LAWS.⁶

I. A BRIEF HISTORY OF UNMANNED WEAPONS, ROBOTICS, AND AUTONOMY IN WAR

This Part describes the historic use of unmanned weapons in armed conflicts and tracks the development of unmanned weapons through the recent use of human-in-the-loop and human-on-the-loop systems.⁷ This Part also addresses the most recent

6. See KENNETH ANDERSON & MATTHEW WAXMAN, *LAW AND ETHICS FOR AUTONOMOUS WEAPONS SYSTEMS: WHY A BAN WON'T WORK AND HOW THE LAWS OF WAR CAN 2* (2013) (describing the "incremental" development of LAWS).

7. Human-in-the-Loop Weapons are "[r]obots that can select targets and deliver force only with a human command;" Human-on-the-Loop Weapons are "[r]obots that can select targets and deliver force under the oversight of a human operator who can override the robots' actions;" and Human-out-of-the-

projections for potential uses of autonomous weapons and out-of-the-loop systems in combat and discusses the legal mechanisms that currently restrict the use of LAWS.

A. Unmanned Weapons in War

Before discussing the potential dangers and advantages of the most modern pieces of unmanned warfighting technology, it may be helpful to recall the use of unmanned weapons in the past. Introducing robots into the battlefield is seen by some as a means of removing human soldiers from dangerous situations,⁸ an objective which has been pursued in the past through the use of booby traps and land mines.⁹ The function of these devices has primarily been defensive—a combatant would place mines to target enemies advancing on a position or to force the enemy into a more favorable position.¹⁰

The American Civil War saw the first large-scale use of explosive booby traps and land mines, and their use continued to grow until the late twentieth century.¹¹ During the Vietnam War, the North Vietnamese used a variety of booby traps to kill or incapacitate enemy soldiers without placing their own troops at risk.¹² Through the United Nations (U.N.) and NGOs' significant involvement, however, the use of mines in warfare has since been greatly limited by 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 (CCW)¹³ and the Ottawa Convention, which

Loop Weapons are “[r]obots that are capable of selecting targets and delivering force without any human input or interaction.” HUMAN RIGHTS WATCH, *supra* note 4.

8. Jeremy Rabkin & John Yoo, *Killer Robots' Can Make War Less Awful*, WALL ST. J. (Sept. 2, 2017), <https://www.wsj.com/articles/killer-robots-can-make-war-less-awful-1504284282>.

9. See Mathew Bolton, Thomas Nash, & Richard Moyes, *Ban Autonomous Armed Robots*, ARTICLE 36 (Mar. 5, 2012), <http://www.article36.org/statements/ban-autonomous-armed-robots/>; U.S. MARINE CORPS, PROFESSIONAL KNOWLEDGE GAINED FROM OPERATIONAL EXPERIENCE IN VIETNAM, 1969, SPECIAL ISSUE, MINES AND BOOBYTRAPS 1 (1989).

10. *Id.* at 3.

11. GARY D. SOLIS, *THE LAW OF ARMED CONFLICT* 736 (2nd ed. 2010).

12. U.S. MARINE CORPS, *supra* note 9.

13. The CCW is a multilateral treaty which seeks to reduce or restrict the use of specific weapons which cause superfluous injury or have indiscriminate effect. The protocols of this treaty restrict the use of non-detectable fragments, mines, boobytraps, incendiary weapons, and blinding laser weapons.

prohibits party states from using anti-personnel land mines in war.¹⁴ Nevertheless, the use of mines is not universally prohibited,¹⁵ and countries, such as the United States, Russia, Israel, China, and South Korea have been reluctant to agree to new restrictions.¹⁶

In recent history, militaries have begun utilizing human-in-the-loop systems, which are robotic systems that can engage enemies only through human command.¹⁷ These systems take the form of land, sea, and air vehicles that require a remote operator.¹⁸ Weaponized unmanned ground vehicles, such as the iRobot Packbot and the TALONS SWORDS platform used by the United States and Australia in military activity in Iraq and Afghanistan, are remotely operated robots, capable of delivering lethal and non-lethal assaults.¹⁹ Unmanned aerial vehicles (UAVs), such as the MQ-1 Predator and MQ-9 Reaper, used by the U.S. Air Force have similarly been used to remotely target suspected terrorists.²⁰ Despite strong opposition to this practice, the use of remotely operated weapons is likely to remain a part of modern warfare.²¹

The current state of weapons technology is difficult to assess due to the swift rate of advancement and secrecy of military

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 (Protocol II), Oct. 10, 1980, 1342 U.N.T.S. 137.

14. The Ottawa Convention is a multilateral agreement which prohibits states from using, producing, and stockpiling anti-personnel mines. Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction art. 1, Sept. 18, 1997, 2056 U.N.T.S. 211.

15. The Ottawa convention's strict prohibition applies only to anti-personnel mines and has not been ratified by key states. *Id.* Sara Schmitt, *The Ottawa Convention: Signatories and States-Parties*, ARMS CONTROL ASS'N, <https://www.armscontrol.org/factsheets/ottawasigs> (last updated Jan. 2018).

16. *Id.*

17. Human-in-the-loop systems require a human command to deliver force, in contrast to human-on-the-loop systems, which can select and engage targets under human oversight or human-out-of-the-loop systems, which require no human interaction to select and engage targets. HUMAN RIGHTS WATCH, *supra* note 4.

18. Hin-Yan Liu, *Categorization and Legality of Autonomous and Remote Weapons*, 94 INT'L REV. RED CROSS 627, 631 (2012).

19. RONALD ARKIN, GOVERNING LETHAL BEHAVIOR IN AUTONOMOUS ROBOTS 12 (2009).

20. Liu, *supra* note 18, at 631.

21. *Id.*

activity.²² The introduction of autonomous systems, as well as the implementation of states' domestic guidelines on autonomous weapons, however, indicates a clear trend towards increased weapon autonomy.²³ The United States, for example, has increased spending on unmanned weapons from \$4.5 billion USD in fiscal year 2017 to \$7.5 billion USD in 2018.²⁴ Without intervention, the United States and other states will likely continue to develop and implement autonomous weapons.²⁵

LAWS have been given the following description:

robotic weapon systems that, once activated, can select and engage targets without further intervention by a human operator. The important element is that the robot has an autonomous 'choice' regarding selection of a target and the use of lethal force.²⁶

States, however, have declined to reach consensus on an internationally accepted definition of LAWS or the extent to which autonomy currently exists in weapons systems.²⁷ Currently, the weapons with the most autonomy are primarily defensive in nature and do not employ lethal force.²⁸ For instance, the Phalanx weapons system, a weapon designed to autonomously target and destroy incoming missiles, is used by the United States to protect ships and bases.²⁹ Israel's Harpy UAV drone autonomously detects and destroys radar emitters.³⁰ The South Korean

22. *Id.* at 630.

23. *Id.* at 632; see also Heather Roff, *Weapons Autonomy is Rocketing*, FOREIGN POL'Y MAG. (Sept. 28, 2016), <http://foreignpolicy.com/2016/09/28/weapons-autonomy-is-rocketing/>; PABLO KALZMANOVITZ, *Judgement Liability and the Risks of Riskless Warfare*, in AUTONOMOUS WEAPONS SYSTEMS 137, 147 (Nehal Bhuta et al. eds., 2016).

24. Brian K. Hall, *Autonomous Weapons Safety*, 86 JOINT FORCE Q. 86, 88 (2017); DAN GETTINGER, SUMMARY OF DRONE SPENDING IN THE FY 2019 DEFENSE BUDGET REQUEST, CENTER FOR THE STUDY OF THE DRONE AT BARD (2018).

25. Liu, *supra* note 18, at 634.

26. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 7; Cf. U.S. DEP'T. DEF., *supra* note 1; HUMAN RIGHTS WATCH, *supra* note 4, at 2 (applying similar definitions).

27. Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2.

28. American Society of International Law (ASIL1906), *Autonomous Weaponry and Armed Conflict*, YOUTUBE 39:00 (Apr. 10, 2014), <https://www.youtube.com/watch?v=duq3DtFJtWg>.

29. Hall, *supra* note 24 at 89.

30. *Harpy NG*, ISR. AEROSPACE INDUSTRIES, http://www.iai.co.il/2013/36694-16153-en/Business_Areas_Land.aspx (last visited Oct. 1, 2017).

military uses an autonomous gun, the SGR-1s, which can autonomously identify enemies in the DMZ.³¹ Although the weapon requires a human command to fire,³² some reports say it can be programmed to autonomously make the decision to fire at targets.³³

Though not yet used in combat, states are quickly pursuing offensive autonomous weapons, which could enter the battlefield and selectively engage targets.³⁴ The United States, for example, is currently developing nano drones, which could use hive mind technology to perform offensive operations.³⁵

B. Applicable Humanitarian Law

While there is no existing international law specifically addressing the use of human-out-of-the-loop systems, some critics of the technology argue that existing principles of international humanitarian law (IHL) support the proposition that LAWS should be banned.³⁶ The most analogous legal obligation stems from the U.N. Convention on Certain Conventional Weapons, which restricts the use of land mines, booby traps and “other devices.”³⁷ The phrase “other devices” is likely not broad enough, however, to include LAWS and has never been interpreted to do so.³⁸

Other legal obligations that LAWS are said to violate are the general principles of discrimination and proportionality, which are fundamental to humanitarian law.³⁹ Human Rights Watch

31. HUMAN RIGHTS WATCH, *supra* note 4, at 13–14.

32. *Id.*

33. *Id.* ARKIN, *supra* note 19, at 167.

34. Gjert Lage Dynda, Tor Arne Berntsen & Sigrid Redse-Johansen, *Autonomous Military Drones: No Longer Science Fiction*, NATO REV. (July 28, 2017), <https://www.nato.int/docu/review/2017/Also-in-2017/autonomous-military-drones-no-longer-science-fiction/EN/index.htm>.

35. *Id.*

36. HUMAN RIGHTS WATCH, *supra* note 4, at 30–36 (suggesting that the use of LAWS would violate humanitarian law, a set of international rules governing the use of force, by breaching rules of distinction, proportionality, military necessity, and the Martens Clause).

37. 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, *supra* note 13, art. 2.

38. *Id.* (“‘Other devices’ means manually-emplaced munitions and devices designed to kill, injure or damage and which are actuated by remote control or automatically after a lapse of time.”).

39. KALZMANOVITZ, *supra* note 23, at 145.

has taken the position that, if LAWS were permitted to be introduced into the battlefield, there would be no ability to ensure proper discrimination of targets and proportionality of military activity.⁴⁰ Similar to the Convention, however, the argument that LAWS violate general principles of humanitarian law is difficult to advance authoritatively due to the newness of the technology.⁴¹ Because the technology of LAWS is so new, it is difficult to make an accurate assessment of their ability to discriminate targets, or the extent to which they might be considered inhumane.⁴²

The United States has implemented domestic policy restricting the use and development of LAWS in Department of Defense Directive 3000.09, which requires “appropriate levels of human judgement over the use of force.”⁴³ This policy has been criticized, however, for being vague.⁴⁴ Under this directive, the United States could use LAWS without human supervision when military necessity requires it to do so.⁴⁵ Furthermore, the directive lacks the precedence of international law norms, and may be altered by the United States.⁴⁶ Similar restrictions have also been unilaterally adopted by other states throughout the world.⁴⁷

Without existing international law directly and expressly prohibiting the use of LAWS, a legal void exists, generating uncertainty.⁴⁸ The recent advancement, and projected advancement to come, in LAWS technology has sparked an outcry from various groups who feel the use of such weapons creates new risks in

40. HUMAN RIGHTS WATCH, *supra* note 4, at 30–36.

41. See KALZMANOVITZ, *supra* note 23, at 149 (arguing that it is possible for LAWS to be programmed in such a way that they comply with principles of humanitarian law).

42. Hall, *supra* note 24, at 90.

43. U.S. DEP’T. DEF., *supra* note 1.

44. ROBIN GEISS, THE INTERNATIONAL—LAW DIMENSION OF AUTONOMOUS WEAPONS SYSTEMS 25 (2015).

45. *Id.*

46. See 10 U.S.C. § 125 (2014) (describing the power granted to the Secretary of Defense to abolish military duties).

47. Gary E. Marchant, Braden Allenby, Ronald Arkin & Edward T. Barrett, *International Governance of Autonomous Military Robots*, 12 COLUM. SCI. & TECH. L. REV. 272, 291–94 (2011).

48. HUMAN RIGHTS WATCH, *supra* note 4.

warfare.⁴⁹ These have been addressed in part by the U.N. General Assembly's Special Rapporteur, suggesting that states develop a code regarding the ethics and use of autonomous weapons.⁵⁰ These guidelines, however, have not been universally adopted, and they lack the legal effect that would be made readily apparent by the existence of a formal treaty.⁵¹ In 2013, the High Contracting Parties to the CCW established a Group of Government Experts on LAWS ("Expert Group"), which convenes annually to discuss the prospect of restricting LAWS.⁵² While the Expert Group affirmed that state responsibility could be invoked where states use or misuse LAWS, they failed to agree on a definition of LAWS, the extent to which they currently exist, or any restrictive measures.⁵³

II. ARGUMENTS FOR AND AGAINST THE PROHIBITION OF LAWS

Though the subject is only now coming to the forefront of international legal debates, LAWS have sparked controversy long before their implementation became a realistic projection of the future of combat.⁵⁴ The notion that robots should not be created with the capacity to kill dates back to the 1942 short story, "Runaround," in which Isaac Asimov lays out the three laws of robotics.⁵⁵ This Part introduces and discusses some of the most prominent arguments made for and against the prohibition of LAWS in armed conflict.

49. NGOs, such as Human Rights Watch and the Campaign to Stop Killer Robots, contend that using robots in warfare will reduce the threshold for states to use force. *Id.* HUMAN RIGHTS WATCH, *supra* note 4, at 13–14.

50. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 7.

51. See *The Solution*, CAMPAIGN STOP KILLER ROBOTS, <http://www.stopkillerrobots.org/the-solution/> (last visited Oct. 7, 2018).

52. Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2, ¶16 (e).

53. *Id.*

54. Science fiction works have capitalized on images of "killer robots" for decades. See e.g., ASIMOV, *supra* note 3.

55. *Id.* ("One, a robot may not injure a human being, or, through inaction, allow a human being to come to harm. . . . Two . . . a robot must obey the orders given it by human beings except where such orders would conflict with the First Law. . . . And three, a robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.").

A. Arguments For the Prohibition of LAWS

LAWS have been criticized almost since their inception.⁵⁶ NGOs, such as Human Rights Watch,⁵⁷ the International Committee for Robot Arms Control,⁵⁸ and Article 36⁵⁹ seek to ban or strictly limit the development and use of LAWS. Tech industry leaders and scientists have publicly opposed the use of artificial intelligence in weapons,⁶⁰ and popular media outlet articles have been highly critical of LAWS, designating them as “Killer Robots.”⁶¹ Among the most common criticisms advanced against LAWS are those pertaining to ethical dilemmas, a reduced threshold for the use of force, a lack of legal accountability, and the potential for a new arms race.⁶²

1. Ethics

The predominant objection made by various groups seeking to limit or prohibit the use of LAWS is that their use would be unethical.⁶³ The notion that a robot could be endowed with the power to determine which humans will live and which will die does not sit well with those who see the potential of being on the receiving end of this technology.⁶⁴ This issue extends beyond the

56. LIN, *supra* note 1 (criticizing the ethics of implementing LAWS in 2008).

57. HUMAN RIGHTS WATCH, *supra* note 4.

58. *Home*, INT’L COMM. ROBOT ARMS CONTROL, <https://www.icrac.net/> (last visited Nov. 12, 2018).

59. *Autonomous Weapons*, ARTICLE 36, <http://www.article36.org/issue/autonomous-weapons/> (last visited Oct. 7, 2018).

60. *Autonomous Weapons: An Open Letter From AI & Robotics Researchers*, *supra* note 5.

61. Paul Scharre, *Should We Fear Killer Robots?*, CNN (Nov. 14, 2017), <http://www.cnn.com/2017/11/14/opinions/ai-killer-robots-opinion-scharre/index.html>; Ian Sample, *Ban on Killer Robots Urgently Needed, Say Scientists*, GUARDIAN (Nov. 12, 2017), <https://www.theguardian.com/science/2017/nov/13/ban-on-killer-robots-urgently-needed-say-scientists>; *Killer Robots: Experts Warn of ‘Third Revolution in Warfare,’* BBC (Aug. 21, 2017), <http://www.bbc.com/news/technology-40995835>.

62. See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 7; LIN, *supra* note 1; HUMAN RIGHTS WATCH, *supra* note 4; Christopher P. Toscano, *Friend of Humans: An Argument for Developing Autonomous Weapons Systems*, 8 J. NAT’L SEC. L. & POL’Y 189 (2015).

63. See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 7; LIN, *supra* note 1; HUMAN RIGHTS WATCH, *supra* note 4.

64. See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10. See also *Banning Killer Robots in 2017*,

potential for LAWS to violate humanitarian law, but is instead focused on the broader ethical dilemma: Even if a robot could be programmed to comply with all humanitarian law, is it ethical for humans to grant an object which lacks the capacity for compassion and moral judgement, the power not only to kill, but to discern who to kill?⁶⁵ While an analysis of the deep philosophical questions inherent to the relevant ethical issues are beyond the scope of this paper, it is necessary to discuss briefly the arguments involved to understand the international legal debate surrounding LAWS.⁶⁶

Autonomous robots follow a “sense-think-act” paradigm: they “sense” what is around them through various information gathering sensors; they “think” by assessing the appropriate response to any given stimulus; and they “act” in accordance with that determination.⁶⁷ In the future, LAWS will likely have an increased ability to learn, that is, they will adjust the way that they think based on their past observations, actions, and stimuli.⁶⁸ This method of reasoning makes LAWS particularly adept at making quantitative judgements, but leaves them largely incapable of making qualitative judgements.⁶⁹ While it may be possible to program general compliance with IHL, the principle of proportionality requires consideration of the larger context of a given situation and the totality of the circumstances.⁷⁰ Moreover, the value of a military objective, which dictates the amount of permissible collateral damage, is subject to change, in ways LAWS could not perceive.⁷¹

Some argue that it may be possible for LAWS to undertake actions consistent with an ethically acting human, despite their inability to think ethically or to perceive a situation for its full

HUM. RTS. WATCH (Jan. 15, 2017), <https://www.hrw.org/news/2017/01/15/banning-killer-robots-2017>.

65. See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10; LIN, *supra* note 1.

66. Ethics is a main focus of the argument on LAWS and is at the center point of any legal system.

67. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 8.

68. See LIN, *supra* note 1, at 20.

69. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 11.

70. *Id.* at 13–14.

71. *Id.* See also U.S. DEP'T. DEF., DEPARTMENT OF DEFENSE LAW OF WAR MANUAL 245 (2015).

political and ethical context. Ronald Arkin, a roboticist at the Georgia Institute of Technology, has proposed the use of an “ethical governor”—a framework which would constrain a robot’s actions to those that are ethical.⁷² The ethical governor would require a LAWS to quantify various criteria to determine if a lethal attack is legal under IHL, and then, only engage if performing such an attack would be consistent with operational orders.⁷³ Furthermore, it is argued by those who advocate for the use of LAWS that it is more ethical to continue to develop and use LAWS.⁷⁴ In certain circumstances, LAWS are likely to be better than human soldiers at distinguishing targets,⁷⁵ and can reduce the amount of collateral damage.⁷⁶ Therefore, depending on the way LAWS are used, it would be more ethical to use them and cause less overall injury to civilians.⁷⁷

2. Reduced Threshold For Force

The adoption of LAWS into the arsenals of states would, according to some, lower the threshold for using force.⁷⁸ It is speculated that, by using LAWS instead of human soldiers, a state would have less incentive to refrain from using force.⁷⁹ Because humans tend to be averse to “getting killed, losing their loved ones, and having to kill other people,” there is typically great political incentive to avoid war.⁸⁰ Where human soldiers can be replaced with unfeeling machines, states might be more willing to resort to force.⁸¹ Similar to drones, which have allowed states to perform operations that they would not have otherwise

72. ARKIN, *supra* note 19, at 69; HUMAN RIGHTS WATCH *supra* note 4, at 27.

73. ARKIN, *supra* note 19, at 69; HUMAN RIGHTS WATCH, *supra* note 4, at 27; *see also* LIN, *supra* note 1, at 35–40 (arguing that it may someday be possible to create “functional morality”—a program which would mimic the act of a moral person).

74. *See* Peter Asaro, *How Just Could a Robot War Be?*, in CURRENT ISSUES IN COMPUTING AND PHILOSOPHY 50, 61 (Adam Briggles et al. eds., 2008); *see also* KALZMANOVITZ, *supra* note 23, at 145.

75. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 13.

76. Toscano, *supra* note 62.

77. *Id.*

78. *Id.*

79. *Id.* HUMAN RIGHTS WATCH, *supra* note 4, at 40.

80. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 11.

81. HUMAN RIGHTS WATCH, *supra* note 4, at 40.

attempted due to the risk soldiers face, LAWS would permit states to engage in warfare that otherwise would not occur.⁸²

In rebutting this claim, LAWS advocates, Jeremy Rabkin and John Yoo,⁸³ assert that LAWS could make war less likely.⁸⁴ According to Rabkin and Yoo, the decision of whether or not to go to war is determined by the particular political leader rather than the types of weapons at his or her disposal.⁸⁵ The pair note that "George W. Bush and Barack Obama had roughly the same military at their disposal, but they used it very differently."⁸⁶

3. Legal Accountability

The use of devices, which can make their own decisions, raises issues of legal accountability.⁸⁷ Because robots lack moral agency, they cannot be held accountable for their actions.⁸⁸ Where no human is in-the-loop, it seems unfair to hold any individual accountable for the actions of LAWS. If, for example, a weapon autonomously decides to engage in conduct which violates IHL, neither the programmer of the machine's software nor the commander who implemented the device would have intended for the act to occur.⁸⁹

While no mechanism for accountability has yet been applied, it is possible that avenues for a remedy already exist.⁹⁰ Although there has been some resistance to holding the out-of-the-loop commander responsible for decisions made by the robot, the commander may be the most logical choice, as he or she ultimately made the decision to use the weapon.⁹¹ It would be difficult to meet a required *mens rea* element where the commander could

82. *Id.* at 39.

83. Jeremy Rabkin and John Yoo are law professors who have publicly argued in favor of autonomous weapons development. See Rabkin, *supra* note 8.

84. *Id.*

85. *Id.*

86. *Id.*

87. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 14–15.

88. *Id.* at 14.

89. Paola Gaeta, *Autonomous Weapons Systems and the Alleged Accountability Gap*, in AUTONOMOUS WEAPON SYSTEMS: IMPLICATIONS OF INCREASING AUTONOMY IN THE CRITICAL FUNCTIONS OF WEAPONS 47 (2016); *but see* Rabkin, *supra* note 8 (arguing that no accountability gap would actually exist).

90. *Id.*

91. *Id.*

not predict an IHL violation by the machine.⁹² Nevertheless, a remedy may remain under state responsibility, which requires no mens rea element be satisfied.⁹³ This notion was affirmed in the 2017 meeting of the Group of Governmental Experts, who reported that states are responsible for their use of LAWS and have a duty to ensure accountability when they use LAWS.⁹⁴

4. Arms Race Potential

Both critics and proponents of LAWS have asserted that the new weapons technology will revolutionize warfare.⁹⁵ Some go as far as to say that the innovation is on par with gunpowder or nuclear weapons.⁹⁶ Those who support banning or at least tightly restricting LAWS see potential for a new global arms race, conjuring images of Cold War era tension.⁹⁷ Those in favor of developing LAWS perceive the revolution as a positive development.⁹⁸ Similar to the way smart bombs have limited the number of civilian casualties in war, proponents, such as Jeremy Rabkin and John Yoo, believe the arms revolution that would be fostered by this technology would “make war less awful.”⁹⁹

92. *Id.*

93. *Id.* Cf. Rebecca Crootof, *War Torts: Accountability for Autonomous Weapons*, 164 U. PA. L. REV. 1347, 1402 (2016) (suggesting an entirely new mechanism for handling civil liability in war crimes that would provide a remedy for wrongful acts conducted by LAWS).

94. Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2, ¶ 16(c) (“Responsibility for the deployment of any weapons system in armed conflict remains with States. States must ensure accountability for lethal action by any weapon system used by the State’s forces in armed conflict in accordance with applicable international law, in particular international humanitarian law. The human element in the use of lethal force should be further considered”).

95. *Autonomous Weapons: An Open Letter From AI & Robotics Researchers*, *supra* note 5; Alexander Valez-Green, *The Foreign Policy Essay: The South Korean Sentry—A “Killer Robot” to Prevent War*, LAWFARE (Mar. 1, 2015), <https://www.lawfareblog.com/foreign-policy-essay-south-korean-sentry%E2%80%94killer-robot-prevent-war>; Rabkin, *supra* note 8.

96. *Autonomous Weapons: An Open Letter from AI & Robotics Researchers*, *supra* note 5 (“autonomous weapons have been described as the third revolution in warfare, after gunpowder and nuclear arms”).

97. *Id.*

98. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 11–12.

99. Rabkin, *supra* note 8.

5. Other Vulnerabilities

From the perspective of the states developing LAWS technology, it may be difficult to see the negative implications through the same lens as states that cannot afford the financial burden of weapons development and envision a future on the receiving end of LAWS.¹⁰⁰ The truth of the matter is that, if developed, LAWS will eventually enter into the arsenal of every military organization, whether that be of state, private militias, or terrorist groups.¹⁰¹ Critics often ask: what is to happen when a LAWS falls into the hands of a military force that feels unconstrained by any international laws, which might regulate its use?¹⁰² Rather than being carefully programmed to adhere to humanitarian law, these weapons, when in the wrong hands, could be used to attack indiscriminately.¹⁰³ Furthermore, because LAWS are mere computers,¹⁰⁴ they may also be vulnerable to hacking, which would mark a revolution not only in traditional warfare, but in cyberwarfare as well.¹⁰⁵

B. Arguments Against Prohibiting LAWS

While states on the forefront of LAWS technology have demonstrated openness towards some form of regulation, these states have also demonstrated a desire to continue developing LAWS. This section details some of the most prominent arguments in favor of autonomous weapons development advanced by states and scholars who believe the advent of LAWS will be a humane

100. For example, Russia, a state which has begun investing in developing LAWS technology has encouraged the international community to refrain from a premature, over restrictive regulatory regime. *See* Group 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, *Examination of Various Dimensions of Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, in the Context of the Objectives and Purposes of the Convention: Submitted by the Russian Federation*, CCW/GGE.1/2017/WP.8 (Nov. 10, 2017) [hereinafter Russian Federation Governmental Experts Examination].

101. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 16.

102. HUMAN RIGHTS WATCH, *supra* note 4, at 31.

103. *Id.*

104. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 18.

105. *Id.*

improvement to warfare. These arguments include the advantages of force protection, reduced emotional influence in the battlefield, reduction in civilian casualties, and affordability.

1. Force Protection

Force protection is the most obvious advantage of autonomous weapons systems.¹⁰⁶ Incidental to completing every military objective is the goal of minimizing one's own harm in the process.¹⁰⁷ LAWS would allow states to significantly reduce their own risks while engaging in military activity.¹⁰⁸

Critics of this argument suggest that while this is beneficial to the LAWS-using state, it shifts the burden onto the civilians in the location where the LAWS are being used.¹⁰⁹ In traditional combat, combatants engage in military activities at their own risk, but in a situation where LAWS are used in the place of human soldiers, the local civilians in the vicinity of military activity would be placed at greater risk than the soldiers who deploy the LAWS.¹¹⁰

2. Less Emotional Influence

Those who support LAWS suggest that, in addition to being more expendable than human soldiers, LAWS may also be more adept at adhering to IHL.¹¹¹ While proportionality and distinction are often questioned, there is little doubt that LAWS will be more adept than humans in following laws prohibiting certain acts.¹¹² A LAWS would be incapable of violating human rights unless programmed to do so.¹¹³ On the battlefield, soldiers can become victims of their own emotions and prejudice.¹¹⁴ A LAWS

106. See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10.

107. See Robin Geiss, *The Principle of Proportionality: Force Protection as a Military Advantage*, 45 ISR. L. REV. 71, 90 (2012).

108. *Id.*

109. See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10.

110. *Id.* at 16.

111. KALZMANOVITZ, *supra* note 23, at 145; See Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10.

112. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10; Rabkin, *supra* note 8.

113. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 10.

114. *Id.*

on the other hand, will never be able to become overwhelmed by emotions in ways that affect its efficiency as a soldier or that might lead it to commit IHL violations.¹¹⁵ This argument is abbreviated to its simplest form in a comment made by the U.N. Special Rapporteur: "Robots also do not rape."¹¹⁶

3. Fewer Civilian Casualties

Despite claims that LAWS lack the capacity to adequately distinguish targets and to gauge proportionality, their designed purpose is, in fact, to reduce collateral damage.¹¹⁷ Unlike explosives or poisonous gasses, LAWS are intended to be used in highly populated areas while leaving the civilians unharmed.¹¹⁸ If allowed to be developed and brought into the battlefield, properly functioning LAWS would make war safer for civilians who would otherwise be at risk.¹¹⁹

4. Cost

Finally, a significant benefit of using LAWS is the cost. The cost of developing LAWS is high at the moment, with development efforts costing states billions of dollars.¹²⁰ Once an adequate design is realized, however, it would be relatively inexpensive to manufacture a fleet of LAWS.¹²¹ The cost of manufacturing a human-in-the-loop explosive disposal robot, for example, is \$117,000 USD, while the cost of training an explosive ordinance disposal technician to perform similar operations would be approximately \$1 million USD.¹²² Furthermore, LAWS are significantly more expendable than their human counterparts, both due to their affordability, and the lack of political backlash militaries would face when loosing mechanical warfighters.¹²³

115. *Id.*

116. *Id.*

117. Valez-Green, *supra* note 95; Rabkin, *supra* note 8.

118. Toscano, *supra* note 62, at 202.

119. *Id.*

120. Toscano, *supra* note 62, at 189.

121. Liu, *supra* note 18, at 633; *see* Toscano, *supra* note 62, at 246; *see also* Rabkin, *supra* note 8.

122. Toscano, *supra* note 62, at 202.

123. Asaro, *supra* note 74, at 58; *See also* Rabkin, *supra* note 8. *See also* Marchant et al., *supra* note 47, at 288 ("It's also about building the capability to continue to project power with fewer casualties, and to do so because culture and society are changing to make fatalities, whether soldier or civilian, less acceptable. . . .").

Proponents of LAWS have suggested that implementation of low cost LAWS would allow greater opportunities to keep civilians, as well as soldiers, safe.¹²⁴ When a soldier takes the time to adequately identify a target, they risk their lives and the state for which they fight risks the financial and political cost associated with losing soldiers. A LAWS, however, has no inherent interest in self-preservation and would cost its implementing government relatively little if it were destroyed.¹²⁵ It would, therefore, be able to abstain from using force until a target could be thoroughly assessed.¹²⁶ The additional time LAWS could spend determining whether and what amount of force is required would reduce cost to the warfighting state while ensuring that fewer civilians become victims due to mistaken identity.¹²⁷

The low cost and minimized risk LAWS could provide, however, is considered by critics a negative attribute of these devices.¹²⁸ The proliferation of LAWS is almost inevitable among states because they are expected to become cheap to manufacture.¹²⁹ As LAWS become cheaper and more prominent in warfare, there is a greater possibility that these weapons could enter the hands of terrorist groups or other actors who do not bind themselves to humanitarian laws.¹³⁰

III. PAST EFFORTS TO BAN WEAPONS

Many debates regarding LAWS remain unresolved.¹³¹ Various actions by members of the international community point to the conclusion that although complete prohibition of LAWS would not be feasible, the dangers presented by this technology will

124. See Marchant et al., *supra* note 47, at 280; see also Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 13.

125. See Toscano, *supra* note 62.

126. Marchant et al., *supra* note 47, at 280; Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 13.

127. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 13.

128. Marchant et al., *supra* note 47, at 280 (“However, this reduced cost may, in turn, reduce the rigor with which non-violent alternatives are pursued and thus encourage unnecessary-and therefore unjust-wars.”).

129. Liu, *supra* note 18, at 633–34.

130. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 18.

131. See Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2 (acknowledging the need for further discussion on LAWS).

nevertheless warrant substantial regulation.¹³² As of 2017, twenty-six states have called for a complete ban of LAWS,¹³³ though none of these states have made significant investments in LAWS development.¹³⁴ Dozens of states continue deliberations on future restrictions on LAWS, evidencing some global desire to police development and use of LAWS.¹³⁵ Other states that have already made significant investments in LAWS technology, however, have a significant interest in retaining the ability to develop and use the weapons.¹³⁶

Because there is no clear controlling international law defining the scope and limitation of their use,¹³⁷ a single multilateral treaty addressing LAWS must be adopted.¹³⁸ To determine the feasibility of implementing a multilateral disarmament treaty, this Part will discuss past global disarmament efforts targeting specific weapons.

A. Treaties Banning Specific Weapons

The proposition of banning a particular weapon from the battlefield is not a novel concept.¹³⁹ Since the adoption of the Strasbourg Agreement in 1675,¹⁴⁰ states have come together on multiple occasions to designate certain tools of war as too inhumane

132. See Marchant et al., *supra* note 47.

133. *Country Views on Killer Robots*, CAMPAIGN STOP KILLER ROBOTS (Nov. 16, 2017), http://www.stopkillerrobots.org/wp-content/uploads/2013/03/KRC_CountryViews_16Nov2017.pdf.

134. The United States, Russia, the U.K., China, Israel, and Iran have all begun or expressed interest in developing LAWS, and none have called for a ban. Rep. of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *supra* note 1, at 9; Toscano, *supra* note 62; see also *Country Views on Killer Robots*, *supra* note 133.

135. See Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2.

136. Harold C. Hutchison, *Russia Says it Will Ignore Any UN Ban of Killer Robots*, BUS. INSIDER (Nov. 30, 2017), <http://www.businessinsider.com/russia-will-ignore-un-killer-robot-ban-2017-11>.

137. Toscano, *supra* note 62, at 192.

138. Cf. HUMAN RIGHTS WATCH, *supra* note 4, at 46 (calling on all states to adopt a binding instrument prohibiting the use and development of LAWS).

139. SOLIS, *supra* note 11, at 732.

140. The Strasbourg agreement is the first codified constraint on the use of poisoned weapons. The agreement prohibited French and German forces from using poisoned bullets during King Louis XIV's attempt to assert French control over Lorraine. Jean Pascal Zanders, *International Norms Against Chemical and Biological Warfare: An Ambiguous Legacy*, 8 J. CONFLICT & SEC. L. 391, 394 (2003).

for the battlefield and have mutually agreed on their prohibition.¹⁴¹ These treaties will be useful in determining whether LAWS would be appropriate weapons to prohibit and the extent to which their use could be restricted.¹⁴² One of the first widely accepted multilateral attempts at banning particular weapons was the 1899 Hague Convention, which prohibited expanding bullets, asphyxiating and deleterious gases, and projectiles and explosives launched from balloons.¹⁴³ The Hague Convention sought to “diminish the evils of war so far as military necessities permit,” and the prohibition of these weapons was a means of achieving this objective.¹⁴⁴ Later treaties have continued to target various instruments of warfighting, such as landmines and chemical, biological, and nuclear weapons.¹⁴⁵

Some international disarmament agreements are broad in scope, prohibiting particular uses of weapons rather than the weapons themselves.¹⁴⁶ Protocol I of the Geneva Convention, for example, prohibits all weapons that have indiscriminate effect.¹⁴⁷ While these broad rules restrict states’ use of certain

141. *Id.*

142. *Cf.* ANDERSON, *supra* note 6, at 24 (analyzing past weapons treaties to assess the viability of a prohibition on LAWS).

143. Marjorie W. Whiteman, *Prohibited Weapons*, 10 DIG. INT’L L. 450 (1968).

144. Convention (IV) Respecting the Laws and Customs of War on Land preamble, Oct. 18, 1907, 36 Stat. 2277, 539 T.S. 631.

145. 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 (Protocol II), *supra* note 13; Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Apr. 10, 1972, 1015 U.N.T.S. 163 [hereinafter Biological Weapons Convention]; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction preamble, Apr. 29, 1997, 1975 U.N.T.S. 45.

146. *See* Whiteman, *supra* note 143, at 450–51 (distinguishing general principles and rules of war which restrict certain uses of weapons from specific rules which prohibit a weapons use).

147. Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I) art. 51(4)(b), June 8, 1977, 1125 U.N.T.S. 609 (“Indiscriminate attacks are prohibited. Indiscriminate attacks are: (a) those which are not directed at a specific military objective; (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 this Protocol; and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.”).

weapons, the agreement permits some degree of flexibility.¹⁴⁸ For example, the use of flamethrowers against human targets is prohibited under this treaty because it would cause unnecessary suffering, but states are not barred from keeping and using flamethrowers in ways that are in accordance with IHL.¹⁴⁹ Certain weapons, however, are subject to restrictions implemented by specific disarmament treaties, such as the Ottawa Convention, which prohibits the use and stockpiling of land mines.¹⁵⁰ Because LAWS, like flamethrowers, are not per se illegal under the CCW framework, a separate specific treaty targeting LAWS would be necessary for restricting their use. The question then becomes whether LAWS are an appropriate subject of a specific disarmament treaty.

B. What Makes a Weapon a Candidate for Prohibition?

States are free to abstain from using a particular weapon based on their own unilateral decision. Successful treaties that ban weapons tend to be predicated, however, on principles of IHL, the weapon's mass effect, and the threat a weapon poses to humanity.¹⁵¹ The Ottawa Convention, which prohibits the use of anti-personnel land mines, declares that the agreement to ban anti-personnel mines is necessary for the protection of civilians, a key principle of IHL.¹⁵² The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (enacted 1976) and the Chemical Weapons Convention (enacted 1993) both prohibit biological and chemical weapons, declaring

148. See Whiteman, *supra* note 143, at 450–51 (discussing situations in which a weapon may be permissible despite general rules restricting its use).

149. SOLIS, *supra* note 11, at 741–42.

150. See Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, *supra* note 14, art. 1.

151. See Ken Rutherford, *The Hague and Ottawa Conventions: A Model for Future Weapon Ban Regimes?*, NONPROLIFERATION REV. 36, 42–43 (1999) (discussing the significance adherence to principles of IHL, and preserving international peace had on the adoption of the Hague Conventions and the Ottawa Convention).

152. Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, *supra* note 14, preamble (“Determined to put an end to the suffering and casualties caused by anti-personnel mines, that kill or maim hundreds of people every week, mostly innocent and defenseless civilians”).

them to be weapons of mass destruction.¹⁵³ These two treaties, which prohibit chemical and biological weapons, and the Treaty on the Non-Proliferation of Nuclear Weapons state that the agreements are necessary to prevent harm that would result to all humankind.¹⁵⁴ In addition, though rarely stated in the text itself, morality has long been a driving force for disarmament and has played a key role in the prohibition of certain weapons.¹⁵⁵

LAWS, unlike land mines, are designed to be discriminate weapons, and do not violate IHL *per se*.¹⁵⁶ The destructive power of LAWS and the threat that these weapons pose to the world at large, however, may support the notion that states would be willing to ban them.¹⁵⁷ Acknowledging the threat posed by certain extremely destructive weapons, states have agreed to restrictions on biological, chemical, and nuclear weapons in the past.¹⁵⁸ States, however, have also demonstrated reluctance towards prohibiting new weapons technologies.¹⁵⁹ During discussions about banning asphyxiating gas during the 1899 Hague Peace Conference,¹⁶⁰ a U.S. diplomat made the following statement about the weapon:

153. Biological Weapons Convention, *supra* note 145, preamble; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, *supra* note 145.

154. Biological Weapons Convention, *supra* note 145, preamble; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, *supra* note 145; Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 729 U.N.T.S. 161.

155. SOLIS, *supra* note 11, at 577; ANDERSON, *supra* note 6, at 8.

156. While land mines are, by their nature, indiscriminate weapons, LAWS have potential to increase a military's ability to distinguish lawful target from unlawful ones. See Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, *supra* note 14, preamble; Cf. ANDERSON, *supra* note 6, at 10–11.

157. See Biological Weapons Convention, *supra* note 145, preamble; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, *supra* note 145, preamble (acknowledging weapons' destructive effect as a reason for their prohibition).

158. See Biological Weapons Convention, *supra* note 145, preamble; Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, *supra* note 145.

159. See, e.g., WILLIAM I. HULL, THE TWO HAGUE CONFERENCES AND THEIR CONTRIBUTIONS TO INTERNATIONAL LAW 88 (1908).

160. The Hague peace conferences were among the first multilateral efforts to codify limitations on certain aspects of warfighting. See *id.*

(i) That no shell emitting such gases is as yet in practical use, or has undergone adequate experiment; consequently, a vote taken now would be in ignorance of the facts as to whether the results would be of a decisive character, or whether injury in excess of that necessary to attain the end of warfare, the immediate disabling of the enemy, would be inflicted.

(ii) That the reproach of cruelty and perfidy, addressed against these supposed shells, was equally uttered formally against firearms and torpedoes, both of which are now employed without scruple. Until we know the effects of such asphyxiating shells, there was no saying whether they would be more or less merciful than missiles now permitted.¹⁶¹

Similar notions have been expressed contemporarily regarding LAWS. At the November 2017 meeting of the Group of Governmental Experts, representatives of Russia made the following statement:

According to the Russian Federation, the lack of working samples of such weapons systems remains the main problem in the discussion on LAWS. Certainly, there are precedents of reaching international agreements that establish a preventive ban on prospective types of weapons. However, this can hardly be considered as an argument for taking preventive prohibitive or restrictive measures against LAWS being a by far more complex and wide class of weapons of which the current understanding of humankind is rather approximate.¹⁶²

This shared interest in pursuing LAWS by states, which have invested in their development, makes it unlikely that they will be banned, despite the potential for mass destruction and the questionable moral implications associated with their use.¹⁶³

C. Attempts to Ban Nuclear Weapons

If LAWS are to be the revolutionary warfighting technology anticipated by critics and proponents alike,¹⁶⁴ it is unlikely that an agreement would be reached on a complete and total ban of

161. *Id.*

162. Russian Federation Governmental Experts Examination, *supra* note 100, ¶ 6.

163. *Cf.* ANDERSON, *supra* note 6.

164. *Autonomous Weapons: An Open Letter from AI & Robotics Researchers*, *supra* note 5. Hall, *supra* note 24, at 88 (referring to LAWS as “game-changing”); Rabkin, *supra* note 8.

the technology in combat.¹⁶⁵ Because the drastic change LAWS are anticipated to bring to the battlefield has often been analogized to the transformation brought about by nuclear weapons,¹⁶⁶ past attempts at restricting the latter may provide insight into the practicality of restricting LAWS.

Nuclear weapons are powerful, leave behind radiation, and cause significant civilian casualties.¹⁶⁷ States, however, continue to possess stockpiles legally.¹⁶⁸ Because states with nuclear capabilities have a staggering military advantage over those that do not, there is little incentive for nuclear capable states to disarm.¹⁶⁹ Since the introduction of nuclear weapons, however, states have gradually acquiesced to limitations on their use and proliferation.¹⁷⁰ After the first use of a nuclear weapon in 1945, an arms race began, and states sought to secure nuclear weapons for themselves.¹⁷¹ As global consciousness grew of the threat of global destruction posed by nuclear weapons, disarmament efforts became more effective.¹⁷² In 1963, nuclear-capable states began placing restrictions on testing nuclear weapons.¹⁷³ In 1970, the Treaty on the Non-Proliferation of Nuclear Weapons came into effect, and has significantly prevented nuclear proliferation.¹⁷⁴ Beginning with the 1987 signing of the Intermediate-Range Nuclear Forces Treaty, the United States and the Soviet Union began bilaterally reducing nuclear arsenals.¹⁷⁵ Since the

165. See ANDERSON, *supra* note 6, at 10–11.

166. See Stuart Russell, *Take a Stand on AI Weapons*, 521 NATURE 415, 415 (2015); Crootof, *supra* note 93, at 1402.

166. *Autonomous Weapons: An Open Letter From AI & Robotics Researchers*, *supra* note 5; Rabkin, *supra* note 8.

167. See Robert S. Norris & Thomas B. Cochran, *Nuclear Weapons*, ENCYCLOPEDIA BRITANNICA <https://www.britannica.com/technology/nuclear-weapon> (last visited Oct. 7, 2018).

168. See Jacob H. Van Rijn, *Nuclear Disarmament: Toward Zero*, 5 YALE J. INT'L AFF. 69, 72 (2010).

169. *Id.*

170. *Id.* at 70–72.

171. *Id.*

172. *Id.*

173. See Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, Oct. 10, 1963, 480 U.N.T.S. 6964.

174. *Id.*; Treaty on the Non-Proliferation of Nuclear Weapons, *supra* note 154.

175. Van Rijn, *supra* note 168, at 72; *Treaty on Elimination of Intermediate-Range and Shorter-Range Missiles Between the United States of America and the Union of Soviet Socialist Republics*, NUCLEAR THREAT INITIATIVE (Dec. 22, 2017), <http://www.nti.org/learn/treaties-and-regimes/treaty-between-the->

end of the Cold War, the United States and Russia have continued to reduce stockpiles of nuclear weapons.¹⁷⁶ Non-nuclear states have also continued to strengthen their resolve for a nuclear-free world by signing a variety of bilateral and regional disarmament agreements,¹⁷⁷ as well as the 2017 Treaty on the Prohibition of Nuclear Weapons.¹⁷⁸

D. Practicality

Complete disarmament of LAWS through a single treaty is unlikely to occur at this early stage in the development of LAWS. If LAWS are as revolutionary as commentators anticipate, history has told us—and Russia has affirmed—that states will continue to develop the systems as a matter of self-interest.¹⁷⁹ As with nuclear weapons, however, legal permissibility does not insinuate complete and unrestricted development and use.¹⁸⁰ Just as nuclear weapons have become gradually restricted over time, LAWS, even without restrictions beyond IHL norms at the outset, would become restricted as well.¹⁸¹ There is, nevertheless, no compelling reason why the world must wait for and see the full extent of damage that may be caused by LAWS before beginning to regulate them.¹⁸² Currently, uncertainty about the future of LAWS has been a source of tension among states discussing them, and has prevented significant agreement on their

united-states-of-america-and-the-union-of-soviet-socialist-republics-on-the-elimination-of-their-intermediate-range-and-shorter-range-missiles/.

176. Van Rijn, *supra* note 168, at 72.

177. *See, e.g.*, The African Nuclear-Weapons-Free Zone Treaty, *opened for signature* April 11, 1996, 35 I.L.M. 698; Latin America Nuclear Weapons Free Zone Treaty, *opened for signature* Feb. 14, 1967, 634 U.N.T.S. 281; South Pacific Nuclear Weapons Free Zone Treaty, *opened for signature* Aug. 6, 1985, 1445 U.N.T.S. 177.

178. Treaty on the Prohibition of Nuclear Weapons, *opened for signature* Aug. 9, 2017, C.N.476.2017.TREATIES-XXVI.9 (prohibiting state parties from engaging in a wide variety of activities related to nuclear weapons).

179. ANDERSON, *supra* note 6, at 8–9; Russian Federation Governmental Experts Examination, *supra* note 100.

180. Though not per se illegal under IHL, use and development of these weapons are limited by IHL principles and by a growing body of restrictive regimes. *See id.*; *See also* Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. Rep. 226 (July 8).

181. ANDERSON, *supra* note 6, at 24 (arguing that international norms relating to LAWS should develop incrementally over time).

182. *See* Marchant et al., *supra* note 47, at 280.

regulation.¹⁸³ As time continues to pass without an international consensus on LAWS, states continue to make strides in LAWS technology.¹⁸⁴ As investments in LAWS increase, states will become less likely to sign a disarmament agreement while the technology is in its infancy.¹⁸⁵ Therefore, rather than waiting decades for a piecemeal disarmament strategy, states should immediately adopt a largely permissive agreement to solidify resolve to limit the potential harm that LAWS might cause and to facilitate further restrictions of LAWS as they become necessary.

IV. PROPOSED SOLUTION

The advent of LAWS has sparked significant disagreement among states and experts in the field.¹⁸⁶ The 2017 meeting of the Group of Governmental Experts revealed the extent of this disagreement.¹⁸⁷ States disagree on the potential threat LAWS pose, and there is no consensus on a universal definition of the term “LAWS” or on the extent to which LAWS already exist.¹⁸⁸ The significance of LAWS in future warfare, however, is uncontroverted.¹⁸⁹ Both those who support and those who oppose LAWS acknowledge that LAWS will dramatically impact the warfighting capabilities of those who possess these weapon in the future.¹⁹⁰ This mutual understanding of potential has been the catalyst for international dialogue on the future potential and limitation of LAWS, even by states, such as Russia, who

183. Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2, ¶ 16(e).

184. See ANDERSON, *supra* note 6, at 24.

185. *Id.*

186. See Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2, annex II (discussing the current disagreements among states).

187. *Id.* (failing to reach significant agreement on international LAWS regulations, but instead resolving to continue discussions in the future).

188. Toscano, *supra* note 62, at 246; See also Russian Federation Governmental Experts Examination, *supra* note 100.

189. See *Autonomous Weapons: An Open Letter from AI & Robotics Researchers*, *supra* note 5 (urging a ban on LAWS due to the significant impact they will have on warfighting); Cf. ANDERSON, *supra* note 6 (discussing the significance of LAWS while suggesting states refrain from banning them).

190. *Id.*

oppose LAWS restrictions.¹⁹¹ Although a complete moratorium on LAWS at this stage in the technology's development is neither practical nor likely to be effective,¹⁹² states have demonstrated some interest in exploring the possibility of regulating.¹⁹³ International participation in discussions regarding potential limitations to LAWS development and their use in the future evidences a willingness by states, including those on the forefront of LAWS development, to define the outermost boundaries for LAWS. This Part proposes that states adopt a preliminary agreement setting forth highly permissive guidelines for LAWS development and implementation, and that the international community creates a designated international organization whose primary function is to facilitate further restrictions as international consensus on the threat LAWS pose develops.¹⁹⁴

A. Timing

The speed with which a regulatory regime is adopted is critical to its potential for universal acceptance and effectiveness.¹⁹⁵ As has been demonstrated by the adoption of CCW Protocol IV, which prohibits the use of lasers to permanently blind enemy combatants, a weapons limitation may be effective when adopted while a weapons technology is in its infancy.¹⁹⁶ The first prohibition of expanding bullets occurred shortly after their invention, and it has held strong for over a century.¹⁹⁷ On the other hand, nuclear weapons, which were permitted to proliferate and develop without significant regulation for decades following their conception, have proven to be extremely difficult to

191. Russian Federation Governmental Experts Examination, *supra* note 100 (discussing Russia's interest in continued dialogue despite a desire to continue research and development of LAWS).

192. Toscano, *supra* note 62, at 243–44; ANDERSON, *supra* note 6.

193. See Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2.

194. Cf. Marchant et al., *supra* note 47 (suggesting, among other solutions, that a framework convention as well as “trans governmental dialogue.”).

195. *Id.*

196. SOLIS, *supra* note 11, at 743–45.

197. See Alfons Vanheusden, W. Hays Parks & William H. Boothby, *The Use of Expanding Bullets in Military Operations: Examining the Kampala Consensus*, 50 MIL. L. & L. WAR REV. 535, 537–38 (2011) (discussing the history of expanding bullet restrictions).

restrict.¹⁹⁸ Land mines, though less massively devastating, have similarly taken decades to restrict in a significant way.¹⁹⁹

Although a sooner-rather-than-later approach of regulation may have been preferable in the development and implementation of nuclear weapons and land mines, premature over-restriction presents its own threats.²⁰⁰ Past prohibitions on weaponized submarines and aircrafts have eroded over time as the weapons became more widely accepted and understood.²⁰¹ As those weapons developed and evolved incrementally, so too did the norms and principles guiding their legal use.²⁰² Rather than adopting complete restriction of LAWS while the technology is only just being introduced, a regulatory regime should recognize that future understanding of the weapons technology will aid in its restriction. Acting now to adopt a framework for a regulatory regime and defining only the most agreeable limitations to the use and development of LAWS would minimize the risk of the limitations falling to the wayside and help expedite the application of future restrictions.

B. Defining Agreeable Boundaries

To be agreeable to states that have demonstrated an interest in pursuing LAWS technology and have opposed strict regulation and prohibition, the framework agreement should avoid attempting to find solutions for the immediate sources of contention.²⁰³ Instead, the agreement should resolve to find solutions in the future as understanding of LAWS on the battlefield becomes more concrete.²⁰⁴ The framework agreement should refrain from formally adopting a definition for LAWS. States should instead apply any agreed upon terms to systems that would fall within the broadest definition and resolve to adopt a universally acceptable definition in the future. Similarly, the agreement should refrain from designating the amount of

198. See Van Rijn, *supra* note 168 (summarizing the decades-long attempts to restrict nuclear weapons).

199. See SOLIS, *supra* note 11, at 736–41 (tracking the development of land mine restrictions from their first use in the U.S. Civil War through the 1997 Ottawa Convention).

200. ANDERSON, *supra* note 6.

201. *Id.* at 8–9.

202. *Id.*

203. *Cf. id.*

204. *Cf. id.*

human control required by weapons system, and instead should resolve to find an answer to this question through continued international cooperation and dialogue between those states wishing to prohibit LAWS and those that wish to explore their potential.

Furthermore, to facilitate the continued dialogue about LAWS, an independent international organization should be created. This organization would provide states and NGOs the opportunity to meet regularly, to discuss challenges, and to resolve disagreements pertaining to LAWS. A similar function is currently being performed by the CCW Expert Group on an ad hoc basis.²⁰⁵ While the Expert Group has been valuable in facilitating international dialogue on LAWS,²⁰⁶ an independent organization would allow for the constant development of legal understanding and movement towards a restrictive regime. Similar organizations, such as the Organization for the Prohibition of Chemical Weapons (OPCW) and the Comprehensive Test Ban Treaty Organization (CTBTO), have performed comparable functions in implementing weapons restricting treaties.²⁰⁷ Like the OPCW and the CTBTO, a new organization dedicated to regulating and restricting LAWS would permit continued dialogue, facilitate international cooperation, and help states protect themselves against aggressive use of LAWS.²⁰⁸

CONCLUSION

Autonomous weapons are almost certainly going to be part of the future of warfare and are poised to drastically change the

205. In compliance with their ability to “agree by consensus on recommendations for further work for consideration,” the Expert Group has informal meetings, which have been held annually since 2014. Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, Final Rep. ¶ 35 CCW/MSP/2015/9 (Jan. 27, 2016).

206. See Rep. of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), *supra* note 2.

207. These organizations facilitate the object and purpose of their respective treaties while providing a forum for member states to participate in their application. Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, *supra* note 145, art. VIII; Comprehensive Nuclear Test Ban Treaty art. II, Sept. 24, 1996, 35 I.L.M. 1439.

208. Cf. *OPCW Mission Statement*, ORG. PROHIBITION CHEMICAL WEAPONS, <https://www.opcw.org/about-opcw/mission/> (last visited Oct. 7, 2018).

ways in which wars are fought.²⁰⁹ The inability to reach consensus on the potential benefits or harms LAWS stand to bring about ensures that states that have already invested resources in developing LAWS technology will likely continue to do so.²¹⁰ Although the potential power of LAWS might make them a significant global threat on par with weapons of mass destruction,²¹¹ these weapons are unlikely to be completely banned so long as states continue to have an interest in exploring the technology. While LAWS technology is in its infancy, however, a framework could be established through a new international organization committed to reducing the harmful effects caused by LAWS, whereby the international community would be able to expedite restrictions on LAWS as consensus on their dangers develops.

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209. Marchant et al., *supra* note 47, at 276.

210. Liu, *supra* note 18, at 634.

211. *Autonomous Weapons: An Open Letter from AI & Robotics Researchers*, *supra* note 5; Hall, *supra* note 24, at 88 (referring to LAWS as “game-changing”); Rabkin, *supra* note 8.

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