NOTE

LAWS unto Themselves: Controlling the Development and Use of Lethal Autonomous Weapons Systems

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ABSTRACT

Lethal Autonomous Weapons Systems ("LAWS") are robots used to deliver lethal force that possess near-human decision making abilities. Although LAWS do not yet exist, recent military advancements have laid the foundation for the development of autonomous weapons technology. Current weapons, such as the United Kingdom's Taranis or the United States's X-47B, are capable of choosing their own routes, identifying their own targets, and determining to use lethal force. Fully autonomous LAWS, on the other hand, have no human involvement when decisions are made. This autonomy provides a number of military advantages including: lack of types of human emotions that lead to war crimes, the ability to process greater amounts of information better than a human, and the preservation of fiscal and human resources. The international community is demanding action to regulate this entirely new type of weapon.

The international law governing weapons currently limits weapons in two different ways. First a weapon that either causes unnecessary injury or is unable to make a distinction between civilian and military targets is considered

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per se unlawful. The current state of LAWS technology provides insufficient data upon which to determine if LAWS will violate either prohibition. The second limitation on weapons prohibits individual uses of a weapon that fail to make a distinction between civilian and military targets, and uses that are not proportional to the military necessity of the attack. It is not clear, however, that these rules apply to all of the states that are currently developing LAWS. Additionally, it is unclear who would be held responsible if a LAWS did violate international weapons law. These areas of uncertainty require a multilateral treaty to be sufficiently addressed.

This Note proposes a multilateral treaty that aims to regulate the development and use of LAWS. The treaty must include articles on distinction and proportionality, as well as an article that creates avenues for holding multiple actors accountability for the unlawful actions of LAWS. Draft language for each of these articles has been provided. The treaty should also create a body capable of monitoring compliance with the LAWS convention based on the Universal Periodic Review conducted by the Human Rights Council, or, alternatively, modeled after the Chemical Weapons Convention.

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INTRODUCTION

Brandon Bryant is a sensor operator with the United States Air Force.[1] He and the pilot next to him play a pivotal role in modern warfare.[2] Together they pilot an MQ-1B Predator,[3] but neither the pilot nor Bryant, the wingman, is in the cockpit.[4] Bryant watches from Arizona as the Predator "drone" flies down a road in the Kunar Province of Afghanistan.[5] As a sensor operator, Bryant's job is to be the eyes of the operation, controlling the Predator's cameras and lasers.[6] He is monitoring a group of men making their way down the road.[7] Bryant notices that the men are wearing long shirts and baggy pants.[8] He can also see that the men have something on their backs.[9] A voice in his headset tells him that these are rifles.[10] The same voice then walks Bryant through a checklist.[11] This is the targeting process.[12] Bryant uses a laser to target the two men at the front of the group.[13] After the checklist is finished Bryant hears "missile off the rail."[14] The pilot has released a Hellfire missile[15] from the Predator.[16] The missile is launched towards the laser-designated target—the men at the front of the group.[17] Minutes later the smoke clears; the men on the road in Afghanistan are dead, and in Arizona, Bryant's job is over.[18]

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1 *See* Matthew Power, *Confessions of a Drone Warrior*, GQ (Oct. 23, 2013), http://www.gq.com/news-politics/big-issues/201311/drone-uav-pilot-assassination.

2 *See id.*

3 The Predator drone is an Unmanned Combat Aerial Vehicle ("UCAV") used by the United States military in the armed conflicts in Afghanistan and Iraq. *See* Christopher Drew, *For U.S., Drones Are Weapons of Choice in Fighting Qaeda*, N.Y. TIMES, Mar. 17, 2009, at A1.

4 *See* Power, *supra* note 1.

5 *See id.*

6 *See id.*

7 *See id.*

8 *See id.*

9 *See id.*

10 *See id.*

11 *See id.*

12 *See id.*

13 *See id.*

14 *See id.*

15 The Hellfire is a class of air-to-ground, tactical missile. *See HELLFIRE II*, LOCKHEED MARTIN, http://www.lockheedmartin.co.uk/uk/what-we-do/products/HELLFIREII.html (last visited Jan. 16, 2015). Hellfire missiles are capable of remote laser targeting with a range of 0.5 to 8 kilometers. *See Hellfire II Missile System*, DEFENSE UPDATE, http://defense-update.com/products/h/hellfire.htm (last visited Jan. 16, 2015).

16 *See* Power, *supra* note 1.

17 *See id.*

18 *See id.*

But what if Bryant were not there? What if the pilot were not there? What if the drone flew itself down the road, monitored its own cameras, determined what the Afghans were carrying, targeted the men, ran its own checklist, and then released a missile? What if a drone could do all this without anyone in Arizona? This will soon be a reality. These machines are lethal autonomous weapons systems ("LAWS").[19] The international law norms that currently exist are not sufficient to address all the concerns this new technology presents.

The time is ripe for countries to come together and create a multilateral treaty that will govern this burgeoning weapons technology. Part I of this Note provides background on LAWS, including a review of basic weapons terminology, the current state of automatic and semi-autonomous weapons technology, and the factors motivating states to develop this technology. Part II outlines the international rules currently governing weapons systems and specifically differentiates between rules that declare a weapon intrinsically unlawful and those that only prohibit specific uses of a weapon. This Part also identifies a notable gap in the application of the existing framework to LAWS. Lastly, Part III proposes a multilateral treaty on LAWS addressing governing principles of international law, methods of holding actors accountable for the bad acts of LAWS, and methods of monitoring compliance with the new treaty regime.

I. BACKGROUND

Although LAWS do not currently exist, the foundation has been laid for this technology to become reality in the not too distant future.[20] Weapons development in this area has progressed from automatic to semi-autonomous, which is the current state of the technology, and soon this development will move from semi-autonomous to fully autonomous.[21] This inevitable progression to full auton-

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19 This Note adopts that term as the most accurate description of this technology. Other scholars have chosen different names. *See, e.g.*, ARMIN KRISHNAN, KILLER ROBOTS: LEGALITY AND ETHICALITY OF AUTONOMOUS WEAPONS 33 (2009) (Killer Robots); Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions*, ¶ 1, Human Rights Council, U.N. Doc. A/HRC/23/47 (Apr. 9, 2013) (by Christof Heyns) [hereinafter Special Rapporteur] (lethal autonomous robotics ("LARs")).

20 *See* Michael N. Schmitt, *Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics*, HARV. NAT'L SECURITY J. FEATURES 4–5 (2013), http://harvardnsj.org/wp-content/uploads/2013/02/Schmitt-Autonomous-Weapon-Systems-and-IHL-Final.pdf (discussing the state of autonomous weapons systems in modern warfare).

21 *See id.*

omy is due to the myriad of battlefield that autonomous weapons will provide.[22]

A. What's in a Name?

A lethal autonomous weapons system can be understood by examining each part of its name. "Lethal" is clear enough to understand: it means "capable of causing death."[23] "Weapons system" is equally easy to understand, although not quite as commonplace as lethal. Weapons system means that LAWS are not necessarily the actual weapon, but rather they are the storage, transportation, and delivery mechanisms.[24]

"Autonomous," on the other hand, is a more difficult concept because its definition changes based on context.[25] It can be used to define political divisions, philosophical concepts, or (as here) technological capabilities.[26] The first component of technological autonomy is automation—the ability of software to operate without human involvement.[27] A machine that is automated, but not autonomous, "follows a script" that dictates the outcome of all scenarios.[28] This script is a set of instructions in the software programming that controls the machine's actions.[29] The script can be simple and merely instruct the machine to carry out a few moves that it repeats until told to stop; for example, assembly line robots are scripted to have a single function such as soldering a car door.[30] Scripts become more complex when they are structured in terms of "if-this-then-that" programmed

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22 Memorandum from Dr. Paul Kaminski, Chairman, Def. Sci. Bd. for Under Sec'y of Def. for Acquisition, Tech., and Logistics (July 19, 2012), *in* DEF. SCI. BD., U.S. DEP'T OF DEF., TASK FORCE REPORT: THE ROLE OF AUTONOMY IN DOD SYSTEMS, at i, ii (2012), *available at* http://www.acq.osd.mil/dsb/reports/AutonomyReport.pdf ("[T]he true value of [autonomous weapons] systems is not to provide a direct human replacement, but rather to extend and complement human capability by providing potentially unlimited persistent capabilities, reducing human exposure to life threatening tasks, and with proper design, reducing the high cognitive load currently placed on operators/supervisors.").

23 *Lethal Definition*, MERRIAM-WEBSTER.COM, http://www.merriam-webster.com/dictionary/lethal (last visited Jan. 16, 2015).

24 *See* Schmitt, *supra* note 20, at 3; *Weapons System Definition*, THEFREEDICTIONARY BY FARLEX, www.thefreedictionary.com/weapon§ystem (last visited Jan. 16, 2015).

25 *See* KRISHNAN, *supra* note 19, at 43.

26 *See id.*

27 *See* William C. Marra & Sonia K. McNeil, *Understanding "The Loop": Regulating the Next Generation of War Machines*, 36 HARV. J.L. & PUB. POL'Y 1139, 1149–52 (2013).

28 Chad R. Frost, *Challenges and Opportunities for Autonomous Systems in Space*, *in* FRONTIERS OF ENGINEERING: REPORTS ON LEADING-EDGE ENGINEERING FROM THE 2010 SYMPOSIUM 89–90 (2011).

29 *See* KRISHNAN, *supra* note 19, at 43.

30 *See id.* For a beginner's introduction to automated robots in assembly line as well as

responses.[31] The United States's MK 15 Phalanx Close-In Weapons System is an example of automated weaponry.[32] Mounted aboard U.S. Navy vessels, the Phalanx follows an "if-this-then-that" script.[33] *If* the Phalanx detects incoming missiles or aircraft, *then* the script instructs the Phalanx to evaluate and track the threat.[34] *If* the Phalanx determines that the threat is an enemy projectile, *then* the script instructs the Phalanx to automatically fire on the threat.[35]

Autonomy, by contrast, allows machinery to replicate the human decisionmaking process by giving machines the capacity to integrate new information and reach their own improvised outcome, outside the confines of a script.[36] Unlike automated programming, fully autonomous programming does not follow an "if-this-then-that" script.[37] Rather, if the LAWS detects incoming missiles, it could choose to do a myriad of things such as call for reinforcements, return fire, disengage, or find and target the source of the missile.[38] Current technology employs lethal, semi-autonomous weapons systems; it is just a matter of the degree of autonomy that separates existing weapons from LAWS.

B. Current Technology

LAWS can be divided into the following three categories based on the level of human involvement in the use of the weapon: man *in* the loop, man *on* the loop, and man *off* the loop.[39] The most common—and the least autonomous—are man in the loop weapons capable of acting only after human authorization.[40] The development of LAWS began with man in the loop technology in 2010 with border sentry robots.[41] An example is the South Korean SGR-A1, a stationary robot currently in use on the Demilitarized Zone between South

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general robotics background information, see generally Tom Harris, *How Robots Work*, HOWSTUFFWORKS, http://science.howstuffworks.com/robot.htm (last visited Jan. 16, 2015).

31 *See* KRISHNAN, *supra* note 19, at 44.

32 *See* HUMAN RIGHTS WATCH, LOSING HUMANITY: THE CASE AGAINST KILLER ROBOTS 9 (2012), *available at* http://www.hrw.org/sites/default/files/reports/arms1112ForUpload_0_0.pdf.

33 *See* KRISHNAN, *supra* note 19, at 44.

34 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 9–10.

35 *See id.*

36 *See* Marra & McNeil, *supra* note 27, at 1151.

37 *See* Frost, *supra* note 28, at 90.

38 *See* U.S. DEP'T OF DEF., 14-S-0553, UNMANNED SYSTEMS INTEGRATED ROADMAP, FY2013–2038, at 67 (2013) (explaining that autonomous weapons "may demand the ability to integrate sensing, perceiving, analyzing, communicating, planning, decision making, and executing").

39 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 2.

40 *See id.*

41 *See id.* at 13–14.

Korea and North Korea.[42] This robot is equipped with voice and gesture recognition technology.[43] If an enemy approaches the robot, the SGR-A1 can command the person to put her hands up and surrender.[44] Should the person not put her hands up—as determined by the gesture recognition technology—the SGR-A1 sends a signal to a human operator who can choose to use lethal force.[45] The fact that a human makes the final decision and initiates the use of lethal force is what makes the SGR-A1 man in the loop technology. The United Kingdom's Taranis is another example of current man in the loop technology.[46] Taranis is an unmanned combat air vehicle ("UCAV"), otherwise known as a drone, able to identify targets and independently decide whether to use force.[47] Before the Taranis can deploy lethal force, however, it must receive permission from a remote human operator.[48]

Alternatively, man on the loop weapons do not require humans to make any affirmative decisions, such as whether to deploy lethal force, but a human is continuously monitoring and capable of overriding the weapon's actions.[49] The United States X-47B UCAV drone is the closest to a man on the loop machine. The X-47B is capable of autonomously taking off from and landing on an aircraft carrier, refueling, and navigating.[50] Initially the X-47B has a human in the loop because a human programs the mission parameters, such as the end destination.[51] Once it takes off, however, a human is monitoring the flight and is capable of overriding the UCAV's decisions, but the X-

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42 *See id.*; Tracie McDaniel, *Gun-Toting Sentry Robots Deployed in South Korea*, DAILYTECH (July 15, 2010, 1:00 PM), http://www.dailytech.com/Guntoting+Sentry+Robots ‡eployed+In+South+Korea/article19050.htm.

43 *See* Awesome-O, *Samsung Techwin's SGR-A1 Robot Sentry Video*, ROBOTICS ZEITGEIST (Nov. 14, 2006, 3:55 PM), http://robotzeitgeist.com/2006/11/samsung-techwins-sgr-a1-robot-sentry.html.

44 *See id.*

45 *See* Lewis Page, *South Korea to Field Gun-Cam Robots on DMZ*, REGISTER (Mar. 14, 2007, 12:34 PM), http://www.theregister.co.uk/2007/03/14/south_korean_gun_bots/.

46 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 17.

47 *See* Special Rapporteur, *supra* note 19, ¶ 45.

48 *See id.*; *see also* Michael N. Schmitt & Jeffrey S. Thurnher, *"Out of the Loop": Autonomous Weapon Systems and the Law of Armed Conflict*, 4 HARV. NAT'L SECURITY J. 231, 239 (2013).

49 *See* Special Rapporteur, *supra* note 19, ¶ 41.

50 NORTHROP GRUMMAN, X-47B UCAS UNMANNED COMBAT AIR SYSTEM (2014), *available at* http://www.northropgrumman.com/Capabilities/X47BUCAS/Documents/UCAS-D_Data_Sheet.pdf.

51 *See* W.J. Hennigan, *New Drone Has No Pilot Anywhere, So Who's Accountable?*, L.A. TIMES (Jan. 26, 2012), http://articles.latimes.com/2012/jan/26/business/la-fi-auto-drone-20120126 (explaining that humans would program a drone's flight plan).

47B is actually making decisions such as the best route to reach the destination.[52] This aspect of the X-47B, by which humans oversee but do not direct the actions of the robot, is man on the loop technology.

Finally, man off the loop systems are fully autonomous. Theoretically, fully autonomous systems allow a weapon system to independently identify a target, determine based on programmed limits that lethal force is lawful and appropriate, and then carry out that force without ever consulting a human being.[53] This self-determining action is what distinguishes a lethal autonomous weapon from a drone that is controlled by remote pilots like Brandon Bryant. Though full autonomy does not yet exist, states have great incentives to develop such independently-acting technology.

C. The Future of LAWS

Once developed, these man off the loop LAWS will become popular weapons due to the multitude of advantages they provide over current weapons systems. First, LAWS have the ability to act without regard to self-interest.[54] LAWS are not driven by a fear of harm or motivated by self-preservation.[55] This emotionlessness means that LAWS are capable of self-sacrifice if necessary.[56] LAWS are also impervious to any hatred or ill will towards the current "enemy" and are thus capable of acting without passion.[57] The importance of this lack of emotion can be seen in the implications of the Kandahar massacre of 2012. There a U.S. soldier murdered sixteen Afghan civilians, almost all women and children.[58] The soldier responsible has been sentenced to life in prison,[59] but the motive behind the crime is, unfortunately, still unclear.[60] The prosecution argued that the soldier

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52 *See id.*

53 *See* Schmitt & Thurnher, *supra* note 48, at 239.

54 *See* KRISHNAN, *supra* note 19, at 46.

55 *See* RONALD C. ARKIN, GA. INST. OF TECH., TECHNICAL REP. GIT-GVU-07-11, GOVERNING LETHAL BEHAVIOR: EMBEDDING ETHICS IN A HYBRID DELIBERATIVE/REACTIVE ROBOT ARCHITECTURE 6 (2007).

56 *See id.*

57 *See id.* at 6–8 (identifying problematic statistics on the treatment of enemy combatants during Operation Iraqi Freedom and stating that LAWS lack "emotions that cloud their judgment or result in anger and frustration with ongoing battlefield events").

58 *See* Gene Johnson, *Robert Bales, U.S. Soldier Who Pled Guilty to Afghanistan Massacre, Faces Victims at Court Sentencing*, WORLDPOST (Oct. 21, 2013, 5:12 AM), http://www.huffingtonpost.com/2013/08/21/robert-bales-sentencing_n_3791324.html.

59 *See* Eric M. Johnston, *U.S. Soldier Who Killed Afghan Villagers Gets Life Without Parole*, REUTERS, Aug. 23, 2013, *available at* http://www.reuters.com/article/2013/08/23/us-usa-afghanistan-trial-idUSBRE97L0YV20130823.

60 *See Army: Bales, Wife Laughed About Killing Charges*, USA TODAY (Aug. 19, 2013,

enjoyed the power that killing gave him.[61] The defense claimed that the soldier's actions were a result of his diagnosed posttraumatic stress disorder.[62] Both explanations of the soldier's actions highlight the benefits of LAWS. Robots feel neither power nor trauma. Furthermore, should LAWS cause civilian harm, their actions will be more easily discovered and investigated than the actions of a human soldier.[63] LAWS can be programmed to leave an electronic trail that would allow a user country to follow the actions of the robot—this will create easier accountability for the actions of LAWS than those of human soldiers in the event of unplanned lethality.[64] This means that LAWS will be less likely to commit atrocity crimes and will actually make identifying the party responsible for unwanted casualties more reliable.

Second, LAWS will have access to a larger amount of information in decisionmaking than any one human, which will ensure that uses of lethal force are based on the most comprehensive view of a situation.[65] Currently, commanders are bombarded by an amount of information that is impossible for one person to adequately digest.[66] This information overload is only increasing with the growing prevalence of intelligence based on electronic surveillance because militaries are using more signals in more places to gather more information.[67] LAWS are able to receive, process, and store all this information more effectively than a human could.[68] The mass information storage and integration capability of machines like LAWS will ensure the information is processed better than it would be by a human decisionmaker, who has only limited attention and memory retention abilities.[69] In turn this will increase the accuracy of target identification.[70] To achieve even greater accuracy, LAWS will integrate new information without inserting human biases—e.g., confirmation bias, which makes people as-

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8:27 PM), http://www.usatoday.com/story/news/world/2013/08/19/army-soldier-wife-laughed-about-killing-charges/2674853/.

61 *See* Jack Healy, *In 2 Cases of Mass Murder, Military Juries Render Heavy Judgments*, N.Y. TIMES, Aug. 24, 2013, at A10.

62 *See id.*

63 *See* Special Rapporteur, *supra* note 19, ¶ 52.

64 *See id.*

65 *See* Gary E. Marchant et al., *International Governance of Autonomous Military Robots*, 12 COLUM. SCI. & TECH. L. REV. 272, 280 (2011).

66 *See id.*

67 *See id.*

68 *See* KRISHNAN, *supra* note 19, at 41.

69 *See id.*

70 *See id.* at 42.

sume new information fits into a preformed conclusion[71]—that can lead to misidentifying civilians as enemy targets.[72] LAWS will thus limit the number of unanticipated civilian casualties by ensuring as much is known as possible about a target before using lethal force.

Third, LAWS are more efficient in their use of both fiscal and manpower resources than traditional troops and even man in the loop robots. Scholars have created two terms for these logistical benefits: "force projection" and "force multiplication."[73] Force projection seeks to minimize the user country's human casualties[74] by sending more technology and fewer human troops into wars, conflicts, and other operations.[75] LAWS further the goal of force projection by sending robots to the front lines rather than soldiers.[76] LAWS achieve force projection in a less obvious way as well. The human operator of a man in the loop, remote-controlled UCAV must remain in close proximity to the robot.[77] This proximity to man in the loop machines actually puts the operators in danger.[78] By having a fully autonomous robot, no humans are put in danger.[79] Force multiplication, on the other hand, refers to the goal of doing more with fewer troops.[80] This force multiplication will be achieved with autonomous technology because groups of individual LAWS can essentially act with one mind. For example, the United States Air Force ("USAF") is investing in the development of swarm technology.[81] The premise of a swarm is that any amount of robots can be linked to one main decisionmaker—either human or LAWS—allowing the robots to work together in the fulfillment of a single task.[82] Initially, USAF intends to utilize this technology by allowing one human operator to control robots that will autonomously fly to an "area of interest" and gather important intelli-

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71 Robert Wright, *How 'Confirmation Bias' Can Lead to War*, ATLANTIC (July 25, 2012, 9:32 PM), http://www.theatlantic.com/international/archive/2012/07/how-confirmation-bias-can-lead-to-war/260347/.

72 *See* ARKIN, *supra* note 55, at 6–7.

73 *See* Special Rapporteur, *supra* note 19, ¶ 51.

74 *See id.*

75 *See* Susan S. Gibson, *Lack of Extraterritorial Jurisdiction over Civilians: A New Look at an Old Problem*, 148 MIL. L. REV. 114, 116 (1995).

76 *See* Schmitt, *supra* note 20, at 6.

77 *See* U.S. DEP'T OF DEF., UNMANNED SYSTEMS ROADMAP 2007–2032, at 43 (2007).

78 *See id.* For an example of one way these human operators are in danger, see *infra* notes 104–07 and accompanying text.

79 *See* KRISHNAN, *supra* note 19, at 37.

80 *See* Special Rapporteur, *supra* note 19, at ¶ 51.

81 *See* U.S. AIR FORCE, UNMANNED AIRCRAFT SYSTEMS FLIGHT PLAN 2009–2047, at 34 (2009).

82 *See id.* at 33–34.

gence about a possible target.[83] This will decrease the manpower needed to gather this information.[84] LAWS are valuable for this ability to save human lives through force projection and force multiplication, while also achieving the same or greater military targeting results.

Fourth, autonomy shortens the response time from the identification of a potential target to the implementation of a planned reaction. This compressed response window is also an argument for advancing technology from man *on* the loop to man *off* the loop. The USAF has predicted that autonomous technology will be able to "observe, orient, decide, and act"[85] in a matter of "micro or nano-seconds."[86] This shortened response time has both macro and micro applications. At the macro level, LAWS will be able to plan and effectuate an attack in far less time than it would take the human command chain.[87] This is important because the amount of time the military has to plan and initiate these attacks is diminishing rapidly.[88] For example, an airstrike by the United States took about three days to plan in the Gulf War, one hour to plan during the beginning of Operation Iraqi Freedom, and five minutes in the later stages of the Iraq conflict.[89] This shows that the military is engaged in actively shortening the planning time.[90] On the micro level, it takes human pilots about one second to take evasive action when receiving incoming fire, but one goal in developing these robots could be greatly decreasing that response time.[91] The ability of LAWS to act immediately is an important objective for militaries.[92]

Lastly, these fully autonomous systems could arguably be less susceptible to certain forms of remote intervention by unauthorized entities.[93] These interventions take three forms with existing UCAVs:

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83 *See id.* at 34.

84 *See id.*

85 *Id.* at 16.

86 *See id.* at 41.

87 *See* KRISHNAN, *supra* note 19, at 40. For examples of similar efforts being made by other United States military branches, see U.S. DEP'T OF DEF., *supra* note 38, at 69 (stating, for example, "[t]he Navy is developing low-cost, ubiquitous, intelligent, tactical [Unmanned Ground Systems] that will operate as a force multiplier integrated with manned, unmanned, and optionally manned systems").

88 *See* KRISHNAN, *supra* note 19, at 40.

89 *See id.*

90 *See id.*

91 *See id.* at 40–41.

92 *See id.* at 40.

93 *See id.* at 38–39 (stating that autonomous weapons will be much harder to hijack because they do not need to exchange much data with control stations).

spoofing, intercepting video feeds, and hostile takeovers. The first form is focused on interfering with the UCAV's link to the Global Positioning System ("GPS"). Spoofing allows unauthorized entities to take control of a UCAV by tricking the drone into thinking it is somewhere other than where it actually is.[94] One would start by using a GPS jammer to prevent the machine from receiving the encrypted GPS signal it needs to fly.[95] Once the drone has lost its encrypted signal it will be forced to look for an alternate, unencrypted GPS signal.[96] The person spoofing then projects his own signal that directs the drone to wherever he wants.[97] Students at the University of Texas were able to spoof an unencrypted drone in a matter of minutes using only $1,000 worth of technology.[98] This potential for spoofing will exist with LAWS as well and is one reason critics of LAWS call for their prohibition.[99]

LAWS, however, will be less susceptible than traditional UCAVs to the other two forms of interference, which makes them a valuable military asset. Current UCAV drone technology requires a data connection to the pilot on the ground, which makes the information it gathers susceptible to interception.[100] In 2008, Iraqi insurgents intercepted a data feed of a UCAV over Afghanistan and were able to view the live video streams that were being transmitted back to the United States.[101] Since LAWS are self-contained decisionmaking units, they will not need a constant data link to troops on the ground.[102] The last form of interference is remote takeover of a UCAV.[103] This occurred recently in Northern Ireland when British soldiers were using a remote controlled device to defuse explosives.[104] Outside actors took control of the device via remote takeover and

94 *See Researchers Use Spoofing to 'Hack' into a Flying Drone*, BBC NEWS (June 29, 2012, 6:54 AM), http://www.bbc.com/news/technology-18643134.

95 *See* Katia Moskvitch, *Are Drones the Next Target for Hackers?*, BBC FUTURE (Feb. 6, 2014), http://www.bbc.com/future/story/20140206-can-drones-be-hacked.

96 *See id.*

97 *See id.*

98 *See Drone Hacked by University of Texas at Austin Research Group*, WORLDPOST (June 29, 2012, 3:40 PM), http://www.huffingtonpost.com/2012/06/29/drone-hacked-by-universit_n_1638100.html; *Researchers Use Spoofing to 'Hack' into a Flying Drone*, *supra* note 94.

99 *See* Special Rapporteur, *supra* note 19, ¶ 98.

100 *See* Moskvitch, *supra* note 95.

101 *See* Ki Mae Heussner & Luis Martinez, *Hacked Drones: How Secure Are U.S. Spy Planes?*, ABC NEWS (Dec. 18, 2009), http://abcnews.go.com/Technology/hacked-drones-secure-us-spy-planes/story?id=9366687.

102 *See* KRISHNAN, *supra* note 19, at 43.

103 *See id.* at 39.

104 *See id.*

aimed it at the remote operator.[105] The operator narrowly avoided being himself the target of the machine he was supposed to be piloting.[106] Fully autonomous LAWS, on the other hand, are not dependent on a land-based pilot so there is no signal with which to interfere.[107] This makes LAWS a more secure technology than existing UCAVs.

Many international actors have acknowledged these factors that motivate the development of LAWS, and international bodies and states alike have emphasized that now, before autonomous technology exists, is the time to act and regulate these weapons.

D. International Community Reaction

Nongovernmental organizations ("NGOs"), international organizations ("IOs") and treaty bodies, and states have tried to address the issues raised by LAWS. Due to the increasing conversation by international actors empowered to bring about change, now is the ideal time to resolve these problems.

Two organizations were created precisely to address and mobilize awareness of LAWS. The first is the International Committee for Robot Arms Control ("ICRAC"), an NGO founded in 2009 that takes a multidisciplinary approach to analyzing military robots.[108] ICRAC seeks to have LAWS declared per se illegal and prevent countries from developing any sort of fully autonomous military technology.[109] The second is the descriptively titled Campaign to Stop Killer Robots, an organization founded in 2013 for the sole purpose of banning LAWS.[110]

In April of 2013, the United Nations ("UN") Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions presented a report to the UN Human Rights Council that called upon all states to implement national moratoria on "the testing, production, assembly, transfer, acquisition, deployment and use of [LAWS] until . . . an internationally agreed upon framework on the future of [LAWS] has been

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105 *See id.*

106 *See id.*

107 *See id.*

108 *See Who We Are*, INT'L COMMITTEE FOR ROBOT ARMS CONTROL, icrac.net/who (last visited Jan. 16, 2015). The founders—a roboticist, a physicist, a bioethicist, and a philosopher—represent this multidisciplinary approach. *See id.*

109 *See 2014 Mission Statement*, INT'L COMMITTEE FOR ROBOT ARMS CONTROL, icrac.net/statements (last visited Jan. 16, 2015).

110 *See About Us*, CAMPAIGN TO STOP KILLER ROBOTS, www.stopkillerrobots.org/about-us/ (last visited Jan. 16, 2015).

established."[111] Subsequently, the Conference on the Convention on Certain Conventional Weapons ("CCW") convened a special session in May of 2014 devoted solely to the study of LAWS.[112] This meeting was attended by eighty-six States, dozens of international organizations, and many of the leading experts in the fields of weapons, robotics, and international humanitarian law.[113]

In response to the actions above, many states have formally declared the importance of addressing the issue of LAWS.[114] The statements were made over the course of a year at three different, internationally important venues: the Human Rights Council, a seminar on LAWS, and the UN General Assembly First Committee on Disarmament and International Security.[115] The general sentiment of these comments highlighted the need for international discussion on LAWS and addressed the possible venues for doing so.[116] Only one country, the United Kingdom, specifically disagreed and said that the existing legal framework was sufficient to regulate these weapons.[117] The United States is currently drafting its own standards to govern the development of LAWS.[118] Instead of these ad hoc means of addressing LAWS, a more unified solution is needed.

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111 Special Rapporteur, *supra* note 19, ¶ 113.

112 The meeting discussed four thematic areas: technical issues, ethics and sociology, legal aspects, and operational and military aspects. Ultimately, the Conference concluded that much work was left to be done. *See* Chairperson of the Meeting of Experts, *Report of the 2014 Informal Meeting of Experts on Lethal Autonomous Weapons (LAWS)*, U.N. Doc CCW/MSP/2014/3 (June 11, 2014), *available at* http://daccess-dds-ny.un.org/doc/UNDOC/GEN/G14/048/96/PDF/G1404896.pdf?OpenElement.

113 *See id.*

114 *See* Campaign to Stop Killer Robots, Country Statements on Fully Autonomous Weapons (Nov. 4, 2013), *available at* http://www.stopkillerrobots.org/wp-content/uploads/2013/03/KRC_Status_4Nov2013.doc (statements included the following: Costa Rica: "My delegation feels that we should begin international dialogue soon on the issue of lethal autonomous robotics . . . ." Cuba: "We agree that we must look at the question urgently internationally and we must do so in a serious and rational manner." Egypt: "Regulations should be put into place before such systems (LARs) are to be developed and/or deployed." Japan: "We think it useful to start discussion about basic elements related to those weapons, including their definition." Switzerland: "[We are] of the view that there is a need to understand, identify, and clarify the potential challenges associated with fully autonomous weapon systems . . . ." United States: "[W]e welcome discussion among states of the legal, policy, and technological implications associated with lethal fully autonomous weapons in an appropriate forum that has a primary focus on international humanitarian law issues . . . .").

115 *See id.* at 1–2.

116 *See generally id.*

117 *See id.* at 16–17.

118 *See* U.S. Air Force, *supra* note 81, at 41 ("Ethical discussions and policy decisions must take place in the near term in order to guide the development of future [Unmanned Air-

Thus far, the proposed plans for dealing with LAWS have been an outright ban,[119] implementing "soft" or multifaceted regimes to regulate,[120] allowing existing international law alone to govern,[121] or some combination of all three.[122] The outright ban is becoming increasingly less likely. As recently as 2013 the United States—a country with some of the most developed autonomous technology—has expressed its intent to continue developing these weapons.[123] To determine how LAWS should be regulated, the existing international weapons laws must be examined.

II. International Weapons Law Regime

Weapons development is currently governed by international law in two ways: (1) weapons can be ruled unlawful per se, or (2) weapons can be ruled unlawful based on the ways in which they are used.[124] Per se weapons bans are based on the requirements to avoid superfluous injury or unnecessary suffering, and that weapons have the capacity to be aimed at a lawful military objective.[125] Unlawful uses of otherwise lawful weapons arise when a weapon does not, in an actual attack, distinguish between a lawful military objective and an unlawful civilian objective or when the use is disproportionate to the military necessity.[126]

A. Per Se Unlawful Weapons

Scholars that oppose the development of LAWS argue that existing principles of customary international law forbid the use of all

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craft Systems] capabilities, rather than allowing the development to take its own path apart from this critical guidance.").

119 *See* Human Rights Watch, *supra* note 32, at 46.

120 *See* John F. Weaver, *Abhor a Vacuum: The Status of Artificial Intelligence and AI Drones Under International Law*, N.H. B.J., Spring/Summer 2013, at 14, 19–20.

121 *See* Benjamin Kastan, *Autonomous Weapons Systems: A Coming Legal "Singularity"?*, 2013 U. Ill. J.L. Tech. & Pol'y 45, 81; Schmitt & Thurnher, *supra* note 48, at 279–81; Tyler D. Evans, Note, *At War with the Robots: Autonomous Weapons Systems and the Martens Clause*, 41 Hofstra L. Rev. 697, 732–733 (2013).

122 *See* Krishnan, *supra* note 19, at 161–65 (arguing for an arms control regime that bans autonomous mini/microrobots, implements design standards, and allows the principle of distinction to govern the use of LAWS).

123 *See* U.S. Dep't of Def., *supra* note 38, at 3 (discussing future funding for unmanned systems); *see also* U.S. Air Force, *supra* note 81, at 15–16 (outlining the future of unmanned systems in the U.S. Air Force).

124 *See* Schmitt, *supra* note 20, at 8.

125 *See infra* Part II.A (explaining per se unlawful weapons).

126 *See infra* Part II.B (explaining unlawful uses of otherwise lawful weapons).

LAWS in all contexts.[127] Per se weapons bans are not without precedent.[128] Historically, per se weapons bans were rooted in existing international norms prohibiting weapons that consistently caused or would consistently cause superfluous injury and unnecessary suffering, or weapons incapable of discriminating between military and civilian targets.[129]

Article 35(2) of Additional Protocol I to the Geneva Conventions ("AP I")[130] prohibits weapons that are "of a nature to cause superfluous injury or unnecessary suffering."[131] Although this rule originated in treaty law, it has become customary law.[132] Customary international law rules are ones that all states are bound to comply with even if they are not parties to a particular treaty, which here is the Geneva Conventions.[133] Examples of per se illegal weapons under this rule are explosive bullets, asphyxiating gas, and bayonets with serrated heads.[134] One important difference between those weapons and LAWS is that per se illegal weapons were all prohibited after they had entered the battlefield and the injurious effects were realized.[135] There is only one instance of a weapon being banned before it was

127 *See, e.g.*, HUMAN RIGHTS WATCH, *supra* note 32, at 36; MEREL EKELHOF & MIRIAM STRUYK, PAX, DEADLY DECISIONS: 8 OBJECTIONS TO KILLER ROBOTS 12–15 (2014), *available at* http://www.paxvoorvrede.nl/media/files/deadlydecisionsweb.pdf; Bonnie Docherty, *The Trouble with Killer Robots*, FOREIGN POL'Y (Nov. 19, 2012), http://www.foreignpolicy.com/articles/2012/11/19/the_trouble_with_killer_robots.

128 *See* Marchant et al., *supra* note 65, at 289–90 ("There are, for example, multiple conventions in international law which purport to deal with specific technologies and practices, such as agreements pertaining to biological weapons, chemical weapons, certain types of ammunition, the hostile use of environmental modification, land mines, incendiary weapons, blinding laser weapons, and numerous others." (footnotes omitted)).

129 A weapon is only per se illegal under this provision of Additional Protocol I to the Geneva Conventions if it is entirely incapable of being aimed at a military objective. *See id.* at 296; *see also* Schmitt, *supra* note 20, at 17.

130 Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), June 8, 1977, 1125 U.N.T.S. 4 [hereinafter AP I].

131 *Id.* at art. 35(2). The relevant sections in full state that "1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited. 2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering." *Id.* at art. 35(1)–(2).

132 *See* WILLIAM H. BOOTHBY, WEAPONS AND THE LAW OF ARMED CONFLICT 26 (2009).

133 For more information on the formation and obligations under customary international law, see The Paquete Habana, 175 U.S. 677 (1900); *see also* Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226 (July 8); The Case of the S.S. "Lotus" (Fr. v. Turk.), 1927 P.C.I.J. (ser. A) No. 10 (Sept. 7).

134 *See* BOOTHBY, *supra* note 132, at 60.

135 *Cf. id.* at 209 (distinguishing the prohibition against laser weapons from other per se illegal weapons on this ground).

fully developed and put into use: the blinding laser.[136] Protocol IV to the Convention on Prohibitions or Restrictions on the Use of Certain Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects ("Protocol IV")[137] bans the development of lasers that were "specifically designed" to cause permanent blindness.[138] This was based on the idea that blindness was an unnecessary injury in the context of warfare under the requirement to avoid inflicting "superfluous injury or unnecessary suffering."[139] As such, Protocol IV allowed the development of lasers for combat purposes to continue if it did not involve blindness—e.g., lasers for targeting.[140]

LAWS opponents use AP I Article 51(4)(b)[141] to argue that LAWS are indiscriminate weapons and thus per se unlawful.[142] A weapon violates this principle when it is incapable of targeting a lawful, military objective.[143] An example of a per se unlawful weapon under this provision is the V2 rocket.[144] Used in World War II, the V2 was banned because the one-ton payload it carried had an extremely inaccurate range of 100 to 150 miles.[145] It is unclear, however, whether this rule has reached customary international law status.[146] Therefore, this principle may only apply to the 173 states party to AP I, which excludes, among others, the United States.[147] Further, a study

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136 *See id.*

137 Protocol on Blinding Laser Weapons (Protocol IV) 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, T.I.A.S. No. 09-721.2 [hereinafter Protocol IV].

138 *Id.* at art. 1. The article states that "[i]t is prohibited to employ laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision, that is to the naked eye or to the eye with corrective eyesight devices." *Id.*

139 BOOTHBY, *supra* note 132, at 211.

140 *See id.* at 209–11. These nonblinding laser weapons are being developed even today; the United States, for example, is deploying a new laser weapon this year, designed to be mounted to a Navy ship, that will be able to shoot down UCAVs and projectiles fired at hypersonic (faster than the speed of sound) speed. *US Navy Ready to Deploy New Laser Gun*, ALJAZEERA AM., Feb. 17, 2014, http://america.aljazeera.com/articles/2014/2/17/us-navy-ready-to deploynewlasergun.html.

141 "4. Indiscriminate attacks are prohibited. Indiscriminate attacks are: . . . (b) [t]hose which employ a method or means of combat which cannot be directed at a specific military objective . . . ." AP I, *supra* note 130, at art. 51(4)(b).

142 *See id.* at art. 51(4)(b); BOOTHBY, *supra* note 132, at 84; Schmitt, *supra* note 20, at 10.

143 *See* Schmitt, *supra* note 20, at 10.

144 *See* BOOTHBY, *supra* note 132, at 80.

145 *See id.* at 80 n.35.

146 *See id.* at 82.

147 *See Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts* (*Protocol I*), *8 June 1977: State Parties*,

conducted on international humanitarian law was unable to conclude if Article 51(4)(b) could be applied before a weapon is actually used on the battlefield.[148] Importantly, one scholar has suggested that weapons are generally developed with the goal of creating greater accuracy. Accordingly, most weapons that do not advance the goal of accuracy, and thus are potentially indiscriminate, are scrapped before they are used.[149] Because it is unclear whether this rule is a customary international law norm or if it even applies to weapons not yet used in warfare, the prohibition on indiscriminate weapons is not a strong basis on which to ground an argument for the illegality of LAWS.

Unlike per se unlawful weapons, LAWS are not being "specifically designed" for the purpose of inflicting superfluous injury or unnecessary suffering, nor are they necessarily indiscriminate.[150] They are, essentially, a new mode of delivering a lethal payload. The result of a Hellfire missile launched from a LAWS would be the same as the result of a Hellfire missile launched from MQ-1B Predator. Unlike the blinding laser, LAWS do not inflict a new form of injury.[151] Additionally, it cannot be said, at this level of development, that LAWS are entirely incapable of distinguishing between lawful and unlawful targets.[152] Further, it is not even clear that this provision of international law is binding on all countries. Because it is not a foregone conclusion that countries are prohibited from developing LAWS, these new weapons should be regulated the same as all existing weapons: based on their use.

B. Unlawful Uses of Weapons

For weapons that are not per se unlawful, their legality is assessed based on each use and analyzed under principles of distinction and proportionality.[153] AP I Article 51(4)(a)[154] makes unlawful attacks

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INT'L COMM. RED CROSS, https://www.icrc.org/applic/ihl/ihl.nsf/States.xsp?xp_viewStates=XpagesNORMStatesParties&xp_treatySelected=470 (last visited Jan. 16, 2015).

148 *See* 1 JEAN-MARIE HENCKAERTS & LOUISE DOSWALD-BECK, INT'L COMM. OF THE RED CROSS, CUSTOMARY INTERNATIONAL HUMANITARIAN LAW 247–50 (2009).

149 *See* BOOTHBY, *supra* note 132, at 84.

150 *See, e.g.*, U.S. AIR FORCE, *supra* note 81, at 33–34 (stating that autonomous weapons will be developed "to conduct benign mission operations" and "attacks against adversary integrated air defense systems").

151 *See* U.S. DEP'T OF DEF., *supra* note 38, at 73–76 (noting that many current projectiles could be adapted to operate with autonomous weapons systems including the Hellfire missile, as well as Laser Homing Attack or Anti-Tank Missile, the Hydra-70 rocket, and the Direct Attack Guided Rocket).

152 *See* Schmitt, *supra* note 20, at 11.

153 *See* Kastan, *supra* note 121, at 54; *see also* Schmitt & Thurnher, *supra* note 48, at 251–60.

that are not "directed at a specific military objective"—this is the distinction principle.[155] The distinction principle does not prohibit civilian casualties, but instead requires the missile to generally hit its target.[156] Unlike per se illegality, a violation of this provision does not prohibit use of the weapon entirely.[157] Rather, that specific use would be illegal and the weapon could continue to be employed in situations where it is better able to distinguish lawful and unlawful targets.[158] As noted above, however, the customary status of this provision is unclear.[159] Thus, it is possible that the United States—a country with stated goals of developing autonomous weaponry[160]—could legally use LAWS in violation of the principle of distinction.

The second requirement, proportionality, demands that military necessity outweighs the harm to civilians.[161] This is codified in AP I Articles 51(5)(b)[162] and 57(2)(a)(iii).[163] Importantly, the principle of proportionality does not bar civilian damage, but rather places a limit on the acceptable amount of civilian damage.[164] A proportionality analysis is unnecessary, for instance, if the military target is in a deserted location.[165] When a proportionality assessment is required, there are two factors that must be considered: (1) the amount of civilian damage likely to occur, and (2) the military necessity of destroying

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154 "4. Indiscriminate attacks are prohibited. Indiscriminate attacks are: (a) those which are not directed at a specific military objective . . . ." AP I, *supra* note 130, at art. 51(4)(a).

155 *Id.*

156 *See* BOOTHBY, *supra* note 132, at 81.

157 *See* Schmitt, *supra* note 20, at 10.

158 *See id.* at 2.

159 *See* BOOTHBY, *supra* note 132, at 82.

160 *See* U.S. AIR FORCE, *supra* note 81, at 33; U.S. DEP'T OF DEF., *supra* note 38, at 1.

161 *See* Marchant et al., *supra* note 65, at 296.

162 AP I Article 51(5)(b) states:

> 5. Among others, the following types of attacks are to be considered as indiscriminate: . . . (b) [a]n attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.

AP I, *supra* note 130, at art. 51(5)(b).

163 AP I Article 57(2)(a)(iii) states:

> 2. With respect to attacks, the following precautions shall be taken: (a) Those who plan or decide upon an attack shall: . . . (iii) [r]efrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated . . . .

Id. at art. 57(2)(a)(iii); *see also* Schmitt, *supra* note 20, at 18–19.

164 *See* Schmitt, *supra* note 20, at 20–21.

165 *See* Kastan, *supra* note 121, at 56.

that specific target at that specific moment.[166] The first step is determining the amount of damage to civilians or civilian property that will result from a specific attack at a specific time.[167] This determination is largely mathematical and one militaries already use "collateral damage estimation methodology" ("CDEM"), which is essentially a statistical analysis that could be conducted by software, to calculate.[168] There are a few elements of the proportionality analysis, however, that have not yet been mathematically determined. One problem that arises in calculating civilian damage is determining who is a civilian in the first instance.[169] Another is evaluating military necessity, which requires looking at the military advantage gained by each target.[170] Additionally, certain targets, such as locations of cultural or medical significance, are illegal to target under any circumstances.[171] A possible solution is to program the machine with guideline ranges in which to operate that have been determined by a military commander.[172]

Thus, it must be concluded that LAWS are not per se illegal and none of the use restrictions are so insurmountable as to render their development unlawful or futile. LAWS must, therefore, be used within the bounds of the use restrictions. The use restriction provisions, however, raise questions as to how they will be applied to LAWS and whether they will apply to countries that are actively working towards developing LAWS. As shown above, scholars have sought to determine what the application of these principles would be, but it must also be acknowledged that the solutions are just hypotheses. There is no definitive showing of the capacities or limitations that must be built into LAWS and their deployment in order for their use to be lawful. As such, it is important to determine whether the current norms are acceptable to regulate and, if not, what should be added to the international regime to control this technology.

166 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 32–34.

167 *See* KRISHNAN, *supra* note 19, at 92.

168 *See* Schmitt, *supra* note 20, at 19–20. For a more detailed description of CDEM and a proposed improvement, see Steven P. Dillenburger, Minimization of Collateral Damage in Airdrops and Airstrikes (Sept. 2012) (unpublished Ph.D. dissertation, Air Force Institute of Technology), *available at* http://gradworks.umi.com/35/39/3539263.html.

169 *See* Schmitt, *supra* note 20, at 16.

170 *See* IAN HENDERSON, THE CONTEMPORARY LAW OF TARGETING 198 (2009).

171 *See* Kastan, *supra* note 121, at 55.

172 *See* Schmitt, *supra* note 20, at 20–21.

C. *Gaps in the Framework*

After the legal framework is established, a gap remains: who is held accountable for violations of international law norms perpetrated by LAWS?[173] The existing rules on attribution of responsibility do not make this clear.

The principles in AP I apply to "those who plan or decide upon an attack."[174] Thus, from the outset, accountability evaluations of LAWS have to creatively apply the existing law with uncertainty as to the correct interpretation.[175] With LAWS, it is not a human who plans or decides upon an attack, but rather it is a machine that completes all of those functions.

There are three models of liability that could be used to ensure someone is held responsible for the misconduct of LAWS: (1) products liability, (2) command responsibility, and (3) direct responsibility of the robot.[176] No current technology exists for holding the robot directly accountable, and it is not likely to be developed in the near future, so this third model can be dismissed for the time being.[177]

Under a products liability regime, either the software designer or the manufacturer of the LAWS would be accountable for any violation of the laws of armed conflict perpetrated by LAWS.[178] As the Human Rights Watch explains in its *Losing Humanity* report, criminal liability could be placed on one of these civilian actors only if he or she acted with intent to break international law.[179] This liability would clearly inhere if a product were manufactured to violate the laws of armed conflict.[180] The report goes on to point out that products liability works differently for military weapons than commercial products.[181] Products liability in the commercial setting generally allows someone injured by a product to seek recompense from the manufacturer.[182] Private manufacturers of military technology, however, are

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173 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 42–45; KRISHNAN, *supra* note 19, at 103–05.

174 *See* BOOTHBY, *supra* note 132, at 232–33.

175 *See, e.g.*, *id.* at 233.

176 *See* KRISHNAN, *supra* note 19, at 103–05; Special Rapporteur, *supra* note 19, ¶¶ 78–79.

177 *See* KRISHNAN, *supra* note 19, at 105.

178 *See id.* at 103–04; Special Rapporteur, *supra* note 19, ¶ 79.

179 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 43–44.

180 *See* Schmitt, *supra* note 20, at 15 & n.47.

181 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 44; *see also* KRISHNAN, *supra* note 19, at 104.

182 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 44.

rarely considered accountable for malfunctions of their weapons.[183] This form of liability is not currently available to regulate LAWS.

Human Rights Watch also claims that it would not be fair to impose criminal liability for a fully autonomous weapon on a military commander.[184] Those using this claim often emphasize that these robots would be "fully autonomous" as a way of showing that the commander should not be held liable.[185] Full autonomy, however, may include unpredictability akin to human action.[186] If a commander can be held responsible for the actions of a fully autonomous human, why can he or she not be held liable for a fully autonomous machine with near-human decisionmaking capacity?[187] Applying the existing law for command responsibility, there are three ways a commander could be held liable: (1) if the commander *knew* the autonomous robot was capable of violating the law of war, (2) if the commander *should have* known that the robot was capable of violating those laws, or (3) if the robot *was used* in violation of the laws of war and the commander did nothing to hold responsible parties accountable.[188]

III. Governing LAWS

As one scholar noted, "the most reliable way to outlaw the use of specific weapons, or at least ensure their review, is for states to pursue a multilateral convention banning or stigmatizing weapons of that kind."[189] The best way to determine the applicable rules and eliminate the existing gaps is to create a multilateral treaty. Not a treaty that bans or stigmatizes, but rather one that addresses standards for the development and use of LAWS. An effective LAWS treaty regime can be achieved by repurposing provisions from existing, widely ratified treaties. A treaty would need to determine the governing legal

183 *See* Krishnan, *supra* note 19, at 104.

184 *See* Human Rights Watch, *supra* note 32, at 42.

185 *Id.*

186 *See* Special Rapporteur, *supra* note 19, ¶ 42 (stating that autonomous systems actions may be unpredictable in chaotic situations, such as armed conflicts or when they interact with other autonomous systems).

187 *See* Schmitt, *supra* note 20, at 33; *cf.* Human Rights Watch, *supra* note 32, at 43 (arguing that robots cannot be deterred through command reprimand). *But see* Special Rapporteur, *supra* note 19, ¶ 78 (stating that this form of responsibility is problematic because command responsibility is framed in terms of what a commander knew or should have known, and commanders might not have the technological expertise to assess the future actions of LAWS).

188 *See* Antonio Cassese et al., Cassese's International Criminal Law 187 (3d ed. 2013) (restating the existing law for command responsibility).

189 *See* Vik Kanwar, *Post-Human Humanitarian Law: The Law of War in the Age of Robotic Weapons*, 2 Harv. Nat'l Security J. 616, 625 (2011) (book review).

principles, impute accountability, and create a monitoring mechanism. The model provisions, where it is practical to do so, are set out below.[190]

A. Existing Weapons Law

The multilateral treaty needs to contain a section on governing law that will crystalize existing international law for clarity and slightly extend provisions accepted in existing, widely ratified treaties. The importance of a legal principles section is to ensure that the existing rules apply to LAWS and provide comments that will give interpretive analysis guides for the development of LAWS specifically.

1. Distinction

First, an article is needed to address the law of "distinction" as applied to LAWS. Because there is no consensus on the customary status of this principle, codification into a treaty is the only way to ensure that the states developing LAWS are bound by it. The definition of distinction found in AP I Article 51(4)[191] is largely sufficient. It should, however, be altered slightly for the purpose of a LAWS convention to place the emphasis on the nature of the weapon rather than the nature of the attack.

> ***Draft Article 1:***
>
> *Lethal autonomous weapons systems must (1) be capable of being directed at a specific military objective, and (2) not be employed in such a way that is of a nature to strike military objectives and civilians or civilian objects without distinction.*

Some scholars have argued that LAWS would be fundamentally incapable of determining the difference between a civilian and a soldier, particularly in today's conflicts with un-uniformed combatants.[192] In deference to this difficulty the treaty can propose that robots treat

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190 The provisions provided are those that can be established in a single article. The ones not provided are those that would either need greater negotiation or that could occur in a technical index.

191 That definition is as follows:

> 4. 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.

AP I, *supra* note 130, at art. 51(4).

192 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 30.

potential targets as innocent civilians when the robot is unsure of the true nature of the target.[193] The default would thus be nonengagement unless it can be proven definitively that the target is a lawful one.[194] The comments would be the appropriate place to address the possibility of a nonengagement default, thus suggesting it as the best way to comport with the treaty requirements. It would still leave room, however, for alternate technologies that are also compliant with the provision.

2. Proportionality

Second, another article in the treaty must address the proportionality principle. Those in the international community that advocate for a ban on LAWS claim that these robots will never be able to adequately conduct a proportionality assessment because such an assessment is based on human judgment.[195] This is not a reason, however, to ban the technology.[196] It means that the technology can only be used if it has the capability to reason like a human commander[197] or in situations where a human commander has already conducted the proportionality assessment. This is one area where there are a wide range of acceptable technologies that could be created over the course of developing LAWS. Therefore, this article will need to be drafted in broad and inclusive language. The best way to achieve this is to codify the existing rules on proportionality.[198] It would be important for states to include comments during the drafting process on best practice techniques for ensuring LAWS are compliant with this rule.

Draft Article 2:

> *Lethal autonomous weapons systems shall neither be used in nor initiate an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to*

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193 *See* Schmitt, *supra* note 20, at 19.

194 *See id.*

195 *See, e.g.*, BOOTHBY, *supra* note 132, at 79.

196 "[Proportionality] is not a criterion against which the legitimacy of a weapon can sensibly be considered, because what is proportionate can only meaningfully be determined in relation to an attack on a particular occasion . . . ." *Id.*

197 For an explanation of the technology that would allow robotic reasoning, see generally ARKIN, *supra* note 55.

198 AP I Article 57(2)(b) states:

> [A]n attack shall be cancelled or suspended if it becomes apparent . . . that the attack may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated . . . .

AP I, *supra* note 130, at art. 57(2)(b).

civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.

3. Specialized Rules from the Convention on Conventional Weapons

Optimally, the treaty should also include provisions similar to those governing landmines, another specialized weapon regime. Additional Protocol II of the Convention on Conventional Weapons governs the use of "mines, booby-traps, and other devices."[199] This Protocol contains three possibly applicable provisions that require limiting the use of these weapons against civilian populations, location recording, and neutralization mechanisms.[200] Article 3(7) of this Protocol[201] could be copied nearly verbatim into a treaty on LAWS. This would allay the concerns that dictators would use these robots against their own populations and that, since robots cannot feel empathy, they will be used against enemy civilians.[202] The inclusion of this provision cannot absolutely prevent these uses of LAWS, but it will ensure that such actions would be illegal.

Draft Article 3:

It is prohibited in all circumstances to direct lethal autonomous weapons systems either in offence or by way of reprisals, against the civilian population as such or against individual civilians.

Protocol II also requires that mines' locations be recorded.[203] This provision could be applied to LAWS by requiring LAWS to leave

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199 *See* Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps, and Other Devices 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, *entered into force* Dec. 3, 1998, 2048 U.N.T.S 93 [hereinafter Protocol II].

200 *See id.* at art. 3.

201 *Id.* at art. 3(7) ("It is prohibited in all circumstances to direct weapons to which this Article applies, either in offence, defence or by way of reprisals, against the civilian population as such or against individual civilians or civilian objects.").

202 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 38 (stating these concerns).

203 The text of the treaty provides: "All information concerning minefields, mined areas, mines, booby-traps and other devices shall be recorded in accordance with the provisions of the Technical Annex." Protocol II, *supra* note 199, at art. 9(1). The technical annex elaborates upon this requirement by saying:

> (i) [t]he location of the minefields, mined areas and areas of booby-traps and other devices shall be specified accurately by relation to the coordinates of at least two reference points and the estimated dimensions of the area containing these weapons in relation to those reference points; . . . (iii) [f]or purposes of detection and clearance of mines, booby-traps and other devices, maps, diagrams or other records

a digital trail. Inclusion of this provision would increase the ability of states to monitor the actions of these autonomous weapons. The provisions on remotely delivered mines are particularly relevant. These are mines that are dropped into a location from an aircraft.[204] Article 6(3) requires these mines have a method of either self-destruction or self-neutralization.[205] The recording requirements from Technical Annex 1(a) and the Article 6(3) language could largely be copied into a LAWS convention.[206] This provision would ensure that, in the event of malfunction, the user country would be able to locate or disable the weapon and prevent further harm. This would address the fear—popularized by science fiction movies[207]—that these robots would begin making decisions to kill absent military need.[208] Commentary would need to address, however, the availability of these records to a monitoring body or, in the event of a claim, in front of an international dispute resolution body. This would be determined through state negotiation.

Draft Article 4:

(a) The lethal autonomous weapons system shall record and the State shall preserve for five years the data relating to:

(i) the location of the lethal autonomous weapons, accurately recorded by relation to the coordinates of at least two reference points and the estimated dimensions of the area containing these weapons in relation to those reference points; and

(ii) complete information on the type, number, method of delivery, type of ammunition on board, date and

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shall contain complete information on the type, number, emplacing method, type of fuse and life time, date and time of laying, anti-handling devices (if any) and other relevant information on all these weapons laid.

Id. at Technical Annex (1)(a)(i)–(iii).

204 *See id.* at art. 2(2).

205 *See id.* at art. 6(3).

206 Article 6(3) provides:

3. It is prohibited to use remotely-delivered mines other than anti-personnel mines, unless, to the extent feasible, they are equipped with an effective self-destruction or self neutralization mechanism and have a back-up self-deactivation feature, which is designed so that the mine will no longer function as a mine when the mine no longer serves the military purpose for which it was placed in position.

Id.

207 *See generally* Greg Whitmore, *Killer Robots in Film—In Pictures*, GUARDIAN (Feb. 22, 2014, 2:04 PM), http://www.theguardian.com/film/gallery/2014/feb/22/killer-robots-in-film-in-pictures-alien-blade-runner-terminator (providing an illustrative list of killer robots in movies since the 1920s).

208 *See supra* note 104 and accompanying text.

time of release, and other relevant information in the event of loss of communication.

(b) It is prohibited to use lethal autonomous weapons systems, unless, to the extent feasible, they are equipped with an effective self-destruction or self-neutralization mechanism.

B. Accountability

A common concern amongst scholars and NGOs is the potential impossibility, under existing international law, of holding someone accountable for uses of LAWS in violation of international humanitarian law.[209] The treaty should encompass two forms of accountability—products liability and command responsibility.

First, products liability should be expanded by inclusion in the treaty. Because a treaty is a new set of norms, it can stretch beyond existing legal frameworks. Thus, a LAWS treaty should include a provision holding a negligent weapons manufacturer responsible for the malfunctions of an autonomous weapon. This has not been included in any previous treaty regime.[210] The actual dimensions of a products liability rule would thus require negotiation amongst the interested states. The Council of Europe attempted to create a general—i.e., not related to weapons—products liability treaty, the European Convention on Products Liability in Regard to Personal Injury and Death.[211] Despite being opened in 1977 and only requiring three states to ratify it, the Convention has yet to enter into force.[212] This Convention imposes a strict liability standard, under which a producer is liable under its national laws for any damage caused by a product that does not "provide the safety which a person is entitled to expect."[213] This rigidity is unpopular and thus should not be incorporated into a LAWS convention. It is helpful, however, to show that products liability schemes should be implemented under the national laws of the country producing the weapons. This prerogative is also seen in the Convention on the Law Applicable to Products Liability.[214] Although also

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209 *See supra* Part II.C (examining gaps in the application of existing international law to LAWS).

210 *See* KRISHNAN, *supra* note 19, at 104.

211 European Convention on Products Liability in Regard to Personal Injury and Death, Jan. 27, 1977, E.T.S. No. 091 [hereinafter COE Products Liability Convention].

212 *See European Convention on Products Liability in Regard to Personal Injury and Death*, COUNCIL OF EUR. TREATY OFF., http://www.conventions.coe.int/Treaty/Commun/ChercheSig.asp?NT=091&CM=8&DF=05/01/2015&CL=ENG (last visited Jan. 16, 2015) (showing current ratification and accession status of the treaty).

213 *See* COE Products Liability Convention, *supra* note 211, at arts. 1, 2(c), 3(1).

214 *See* Convention on the Law Applicable to Products Liability, *done* Oct. 2, 1973, HCCH

an unpopular treaty regime, it similarly emphasizes that the law of products liability is within the sphere of national law.[215]

Many treaties require states to take action in their national laws to secure an international law obligation. The exact wording of these provisions occurs along a spectrum. An example of the stringent side of the spectrum is the Convention on International Civil Aviation,[216] which provides:

> [E]ach contracting State *shall establish all necessary provisions in its national laws* or regulations to make such compliance mandatory for any civil aircraft . . . . Each contracting State *shall make any violation of such applicable laws or regulations punishable by severe penalties* and shall submit the case to its competent authorities in accordance with its laws or regulations.[217]

A milder wording can be seen in the Genocide Convention,[218] which states, "[t]he Contracting Parties confirm that genocide, whether committed in time of peace or in time of war, is a crime under international law which they undertake to *prevent and to punish*."[219] The least burdensome requirement on the states can be seen in the Convention on the Civil Aspects of International Child Abduction,[220] which specifies that "Contracting States shall take all appropriate measures to secure within their territories the implementation of the objects of the Convention. For this purpose they shall use the most expeditious procedures available."[221] In order to achieve wide ratification of a treaty dealing with this unpopular issue, the formulation should be highly deferential to state sovereignty by taking the least restrictive form.

Draft Article 5:

Contracting states shall take all appropriate measures to secure within their territories a products liability regime for

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No. 22, http://www.hcch.net/upload/conventions/txt22en.pdf [hereinafter HCCH Products Liability].

215 *See id.* at arts. 4–6.

216 Int'l Civil Aviation Org. [ICAO], *Convention on International Civil Aviation*, Dec. 7, 1944, ICAO Doc. 7300/9 (9th ed. 2006) [hereinafter Chicago Convention].

217 *Id.* at art. 3 bis (c) (emphasis added).

218 Convention on the Prevention and Punishment of the Crime of Genocide, Dec. 9, 1948, 78 U.N.T.S. 277 [hereinafter Genocide Convention].

219 *Id.* at art. 1 (emphasis added).

220 Convention on the Civil Aspects of International Child Abduction, *done* Oct. 25, 1980, HCCH No. 28, http://www.hcch.net/upload/conventions/txt28en.pdf [hereinafter Hague Convention on International Child Abduction].

221 *Id.* at art. 2.

damages and loss of life resulting from defects in lethal autonomous weapons systems.

Second, the treaty should establish command responsibility for military officers who use LAWS. The LAWS treaty should alter provisions found in the Rome Statute,[222] which established and governs the International Criminal Court.[223]

Draft Article 6:

For those crimes that a State's existing international obligations provide for individual criminal responsibility and without prejudice to other obligations of international law, responsibility of commanders and other superiors adheres when:

A military commander or person effectively acting as a military commander shall be criminally responsible for crimes within the jurisdiction of the Court committed by lethal autonomous weapons systems under their effective command and control, or effective authority and control as the case may be, as a result of their failure to exercise control property over such forces, where:

(a) that military commander or person either knew or, owing to the circumstances at the time, should have known that the lethal autonomous weapons systems were committing or about to commit such crimes; and

(b) that military commander or person failed to take all necessary and reasonable measures within his or her power to prevent or repress their commission or to submit the matter to the competent authorities for investigation and prosecution.

A comment must be added to assuage the concerns of scholars who claim that a commander will not have enough knowledge of the complex LAWS technology to be held responsible under a "known or should have known standard." This comment would emphasize that a

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222 Rome Statute of the International Criminal Court, July 17, 1998, 2187 U.N.T.S. 3.

223 The Rome Statute provides:

(a) A military commander or person effectively acting as a military commander shall be criminally responsible for crimes within the jurisdiction of the Court committed by forces under his or her effective command and control, or effective authority and control as the case may be, as a result of his or her failure to exercise control properly over such forces, where: (i) That military commander or person either knew or, owing to the circumstances at the time, should have known that the forces were committing or about to commit such crimes; and (ii) That military commander or person failed to take all necessary and reasonable measures within his or her power to prevent or repress their commission or to submit the matter to the competent authorities for investigation and prosecution.

Id. at art. 28(b).

commander is obligated to become knowledgeable in the functionality and limitations of LAWS before deploying them.

A treaty would also have the option of addressing the future possibility of holding LAWS directly liable for their actions. For example, if a robot were capable of feeling regret or a sense of responsibility, they would become a moral agent capable of being punished.[224] One scholar has suggested that robots could be destroyed as a method of punishment.[225] This solution would not seem adequate to absolve the commander of responsibility. The state of this technology is still too distant to accurately imagine what the scope of the technology's capabilities will be. Thus, this provision would need to be created through interstate negotiation.

C. Monitoring

A LAWS treaty should also incorporate a monitoring provision. There are two general options to effectively accomplish this. The stronger method would be to create a monitoring body similar to that provided for in the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction ("Chemical Weapons Convention").[226] The less stringent method would entail creating reporting requirements similar to those used in the Human Rights Council.

The Chemical Weapons Convention provides for the creation of the Organization for the Prohibition of Chemical Weapons.[227] The Convention requires that thirty days after the entry into force, each state party must submit to the Organization for the Prohibition of Chemical Weapons declarations that disclose the chemical weapons it owns or that are under its jurisdiction.[228] This declaration must include inventories, the location of all stockpiles, the quantities of weapons the state owns, and plans for the destruction of all chemical weapons.[229] After they have submitted these declarations, the Organization for the Prohibition of Chemical Weapons is authorized to conduct on-site inspections.[230] This means that the state parties are

224 *See* HUMAN RIGHTS WATCH, *supra* note 32, at 45; KRISHNAN, s*upra* note 19, at 105.

225 *See* KRISHNAN, s*upra* note 19, at 105.

226 Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction, Jan. 13, 1993, S. TREATY DOC. NO. 103-21, 1974 U.N.T.S. 317 (entered into force Apr. 29, 1997) [hereinafter CWC].

227 *Id.* at art. 8.

228 *See id.* at art. 3.

229 *See id.*

230 *See id.* at art. 4.

obligated to admit inspectors into the country to examine the stockpiles and oversee their destruction.[231]

A convention on LAWS could incorporate the same provisions. The Chemical Weapons Convention includes a verification annex.[232] This document provides all the technical details for how the Organization's inspectors carry out their duties.[233] The annex contains the administrative needs to conduct the inspections, the bases upon which inspectors can enter a country, and the rules on how inspections are to be conducted.[234] It also explains the rights and responsibilities of both the inspectors and the state being inspected.[235]

The LAWS convention would be fundamentally different in that inspectors would not be authorized to destroy the weapons. The other provisions, however, would remain relevant. The LAWS monitoring body could inspect the weapons systems and ensure that the weapons are being developed with the appropriate software to make the decisions required under international law.

Alternately, states could choose to create a treaty regime that monitors in a less invasive way than the Chemical Weapons Convention. The Universal Periodic Review conducted by the Human Rights Council is a possible template. Created in 2006 along with the transition of the Human Rights Commission to the Human Rights Council,[236] the Universal Periodic Review is a reporting-based procedure.[237] It requires countries to submit an initial National Report detailing the status of human rights in their country.[238] After a state completes its own review of its country's laws and procedures, the state sends its report to the Human Rights Council.[239] The Office of the High Com-

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231 *See id.* at art. 8.

232 *See id.* at Annex on Implementation and Verification.

233 *See id.*

234 *See id.*

235 *See id.*

236 *See* Human Rights Council, G.A. Res. 60/251, ¶ 1, U.N. Doc. A/RES/60/251 (Apr. 3, 2006).

237 *See* OFFICE OF THE HIGH COMM'R FOR HUMAN RIGHTS, FACT SHEET: HUMAN RIGHTS COUNCIL—UNIVERSAL PERIODIC REVIEW (2008) [hereinafter FACT SHEET], *available at* http://unmis.unmissions.org/Portals/UNMIS/Documents/General/UPR%20-%20Fact%20Sheet%20-%20ENGLISH.pdf; Dana Renee Bucy, *International Human Rights—Universal Periodic Review*, 44 INT'L LAW. 473 (2010).

238 *See* FACT SHEET, *supra* note 237. For an example of a National Report, see U.N. Human Rights Council, Working Group on the Universal Periodic Review, National Report Submitted in Accordance with Paragraph 15(a) of the Annex to Human Rights Council Resolution 5/1—United States of America, U.N. Doc. A/HRC/WG.6/9/USA/1 (Aug. 23, 2010).

239 *See Universal Periodic Review Process*, U.S. DEP'T OF STATE, http://www.state.gov/j/drl/upr/process/index.htm (last visited Jan. 16, 2015).

missioner for Human Rights ("OHCHR") then compiles a second, independent report based on information provided by treaty bodies, the United Nations Development Program, and the United Nations Children Fund.[240] Finally, the OHCHR compiles a third report based on the comments of interested nongovernmental organizations.[241] A working group of the Human Rights Council then convenes to discuss the reports.[242] The state, NGOs, and other relevant stakeholders all participate in a hearing with the working group.[243] Afterwards, the Human Rights Council, through the OHCHR, creates a responsive "Outcome Report" stating the areas that fell below the standards of international human rights law.[244] This process is completed in cycles every four years.[245] Though this procedure has less objective monitoring than the Chemical Weapons Convention, it still ensures integrity in the process by inviting NGOs and others to point out critical areas of concern.

Determining which method should be used will also be a question for the states choosing to draft this convention. The reporting procedure, however, is the most appropriate monitoring method for a convention on LAWS. The Chemical Weapon Convention is interested in eradicating a weapon deemed to be entirely unacceptable in modern warfare.[246] Furthermore, that Convention was about ending the use of chemical weapons even absent international law.[247] The Universal Periodic Review, on the other hand, is premised on promoting human rights and evaluating developments and challenges of States.[248] Importantly, another purpose is to "share best practices."[249] This would be useful with respect to LAWS, because an Outcome Report could provide guidance on the legality of a weapon before it is even used. This Report would also be able to recommend steps that could make a near-lawful weapon fully lawful.

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240 *See What is the UPR?*, UPR INFO, http://www.upr-info.org/en/upr-process/what-is-it (last visited Jan. 16, 2015).

241 *See id.*

242 *See Universal Periodic Review Process*, *supra* note 239.

243 *See* FACT SHEET, *supra* note 237.

244 *See Universal Periodic Review Process*, *supra* note 239.

245 *See* FACT SHEET, *supra* note 237.

246 *See* CWC, *supra* note 226, at 317–19

247 *Genesis and Historical Development*, ORG. FOR PROHIBITION CHEMICAL WEAPONS, http://www.opcw.org/chemical-weapons-convention/genesis-and-historical-development/ (last visited Jan. 16, 2015).

248 *See Universal Periodic Review Process*, *supra* note 239.

249 FACT SHEET, *supra* note 237.

Conclusion

Lethal autonomous weapons systems are coming. Many legal questions need to be addressed before these weapons should enter the battlefield. A treaty will establish, clearly and with binding authority, the governing rules under which these weapons will be used. Further, a treaty can provide an answer to those scholars that ask who would be held accountable if LAWS were to violate the established international laws. Additionally, the development of these weapons has been subject to calls from many international actors for a complete ban. Because of this unrest, a treaty could include a monitoring provision that would hopefully allay, or at least minimize, the concerns of those actors.