

## AUTONOMOUS WEAPONS AND THE LAW OF ARMED CONFLICT

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### I. Introduction

Control. Human beings have an innate, insatiable desire to control the world around them. Much of this desire comes from a sense of self-preservation embedded in the human subconscious. Thus, it is counter-intuitive that humans are also obsessed with automation. We want our gadgets to cook, clean, read, dictate, count, and solve problems for us. Now, we must decide if we want them to fight for us as well. While most international prohibitions on weapons specifically prohibit what weapons *do*, the issue of automation raises a fundamentally different concern. The issue is not what effect a weapon can achieve but, rather, how it achieves effects in a way that does not transgress the fundamental principles of the Law of War (LoW).

The discussion about how LoW should address autonomous weapons is overdue. These weapons already exist, at least to the point of being mostly autonomous. The Department of Defense (DoD) defines an autonomous weapon system as one that, “once active, can select and engage a target without further intervention by a human operator.”<sup>1</sup> This article uses the terminology “in-the-loop,” “on-the-loop,” and “out-of-the-loop” to describe the human role in a system’s ability to acquire and attack a target. Under this terminology, in-the-loop systems require a human to actively engage a target; on-the-loop systems can engage a target autonomously but can be stopped by a human operator; and out-of-the-loop systems act completely without human input.

Recent media stories have highlighted the viewpoints of anti-automation activists who maintain banning autonomous weapons entirely

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<sup>1</sup> U.S. DEP’T OF DEF., DIR., AUTONOMY IN WEAPON SYSTEMS 13 n.3000.09 (21 Nov. 2012). This definition also includes human-supervised systems that allow operators to override the system. This article refers to the “law of war” (LoW) and “law of armed conflict” (LOAC) interchangeably.

would solve any possible problems.<sup>2</sup> Yet, it is difficult to convince innovators to abandon new and exciting technologies. Autonomous technology and the issues associated with them already exist, and the international community must decide how to govern their development and the way they are used as the technology progresses. This article will begin by outlining the principles of the law of armed conflict (LOAC). It will then examine the laws governing weapons. Next, it will review existing and developing autonomous weapons technology, and finally, the article will explore the moral principles important to determining the answer to this question. Ultimately, it concludes that until technology is advanced enough to mirror human decision making processes, humans must remain a part of the “kill chain” for the foreseeable future, but that possibility of autonomous weapons that can follow LOAC are possible.

## II. Legal Foundation

### A. The Four Principles

The LOAC revolves around four core principles: distinction, proportionality, military necessity, and unnecessary suffering. Because distinction and proportionality are the most germane to reviewing the capabilities of robotic systems, they will be discussed at length below. At this point in time, a human’s decision to employ robotic systems would presumably account for the principles of military necessity and unnecessary suffering, although there may come a time when these higher-level decisions could be automated. Robots developed in the foreseeable future would account for the military necessity principle through the human decision on how to program and when to deploy a robot, and the unnecessary suffering principle would be incorporated into the human decision of how to arm the robot. Still, it is useful to introduce these terms.

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<sup>2</sup> Brid-Aine Parnell, *Killer Robots Could Be Banned by the UN Before 2016*, (18 Nov. 2013), available at <http://www.forbes.com/sites/bridaineparnell/2013/11/18/killer-robots-could-be-banned-by-the-un-before-2016/>. Multiple lobby groups, such as Article 36, have lobbied the United Nations (UN) to add autonomous weapons to next year’s Convention on Certain Conventional Weapons agenda. Article 36 is one of forty organizations involved in the Campaign to Stop Killer Robots, aimed at banning fully autonomous weapons.

Military necessity “consists in the necessity of those measures which are indispensable for securing the ends of war.”<sup>3</sup> Yet, military necessity “does not justify a violation of positive rules.”<sup>4</sup> That is to say, the need to achieve victory cannot be overshadowed by the proscriptive laws of war. The prohibition of weapons or tactics that cause unnecessary suffering is derived from the concept that all a state should seek to accomplish in war is to weaken the enemy force sufficiently enough to win. To harm a combatant in a way that would permanently maim or purposely cause lasting pain is seen as an affront to the laws of humanity.<sup>5</sup> This principle would primarily affect the way a robot is weaponized. In order to assess the robots themselves as instruments of war, it is more important to understand how they would comply with distinction and proportionality.

## B. Distinction

The concept of distinction on the battlefield was shaped by seventeenth century perspectives on gender.<sup>6</sup> The Italian philosopher Vitoria argued that “innocence” should be protected from war, and this virtue was most personified by virgin women and children.<sup>7</sup> In his own work on the laws of war, the Dutch jurist Hugo Grotius took a similar stance.<sup>8</sup> Laws concerning distinction, he advised, should reflect a need to protect society. Violence against the innocent harms not only the victim but the offender as well. He expanded the category of illegitimate

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<sup>3</sup> UCMJ art. 18, § 6 (1950). Originally stated in General Order 100, as written by Francis Lieber. *See also* U.S. DEP’T OF ARMY, FIELD MANUAL 27-10, THE LAW OF LAND WARFARE art. 3, at 17 (18 July 1956).

<sup>4</sup> United States v. List et al., Case No. VII, at 1256 (July 8, 1947–1948), *in* TRIALS OF WAR CRIMINALS BEFORE THE NUREMBERG MILITARY TRIBUNALS UNDER CONTROL COUNCIL LAW NO. 10, VOL. XI/2, *available at* <http://werle.rewi.hu-berlin.de/Hostage%20Case090901mit%20deckblatt.pdf> (last visited Dec. 16, 2013) (referring to bracketed page numbers in the U.S. Military Tribunal Nuremberg, Judgment on February 19, 1948).

<sup>5</sup> St. Petersburg Declaration to the Effect of Prohibiting the Use of Certain Projectiles in Wartime (Nov. 29–Dec. 11, 1868). In the past these ideas have been applied to the prohibition of expanding bullets and blinding lasers.

<sup>6</sup> *See, e.g.*, HELEN M. KINSELLA, THE IMAGE BEFORE THE WEAPON 68–69 (2011).

<sup>7</sup> *See id.* Vitoria did not classify non-virgin women as protected, since they were no longer a haven of innocence. His concept of discrimination was based on collective interest in preserving the virtue of the warring communities. *Id.*

<sup>8</sup> *See* HUGO GROTIUS, THE LAW OF WAR AND PEACE (1625) (Legal Classics Library 1925).

targets to include non-virgin women since they have no active part in either initiating or waging war.<sup>9</sup>

Disenchanted by battlefield violence in 1648, the parties that composed the Peace of Westphalia utilized these perspectives of distinction in their anti-Just War rhetoric. They adopted the concept of an international system of sovereign states whose definition of “civilized” included binding one’s self to law.<sup>10</sup> This was a significant departure from the basic assumption that warring entities determine their targets based upon strategy rather than pre-set criteria. Yet, this idea was not codified until the promulgation of United States’ General Order 100, commonly known as the Lieber Code.<sup>11</sup> With their brothers’ faces in their iron sights, Americans waged a vicious civil war that departed from the image of civilized conflict as envisioned by the authors of the Peace of Westphalia. Sherman’s “March to the Sea,” for example, was for many an affront to the ideals of distinction. However, Francis Lieber’s own interpretation of General Order 100 deemed Sherman’s brutal campaign legitimate because Lieber expanded the concept of distinction to those who actively participated in the war. Although most Americans saw distinction as a separation between soldiers and private citizens, Lieber argued that direct support could be offered to the enemy in various ways and codified a broader view of legitimate targets, thus complicating the determination of lawful targets.<sup>12</sup>

Even during the crafting of the Geneva Conventions following World War II, the concept of battlefield distinction took a thorough beating. Most states felt it was an illusory concept that would be abandoned once the first shot was fired in the next conflict. The controlling nations at the conference held a more utopian view—the ideal should be codified regardless of what states actually expect it will accomplish. The purpose of the laws set forth in the Geneva Conventions, after all, was to “humanize” war, and recognizing the

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<sup>9</sup> KINSELLA, *supra* note 7, at 74–78. Grotius’s idea of distinction incorporated the offender as well as the soldier. It would harm a soldier’s soul to take an innocent life. His view expanded the classification of protected persons to those who could not by law and nature take part in the hostilities. *Id.*

<sup>10</sup> *Id.* at 53.

<sup>11</sup> *Id.* at 85. In 1863 Abraham Lincoln signed the Lieber Code.

<sup>12</sup> JOHN F. WITT, *LINCOLN’S CODE* 237 (2012). Lieber emphasized military necessity as the qualifying variable for his utopian code. When the Civil War became egregiously costly to the United States he began to advocate a broader definition of a legitimate target than his code originally contemplated.

different types of human actors on a battlefield was inherent to accomplishing that mission. The parties to the Conventions argued that codifying a concept they hoped nations would observe would aid in its universal adoption.

And for the most part, they succeeded. The International Court of Justice described the principle of distinction as a concretely “intransgressible principle of international customary law.”<sup>13</sup> Similarly, the UN General Assembly has declared distinction applicable in all armed conflicts, regardless of their specific natures.<sup>14</sup> The customary and codified exception to the prohibition against targeting civilians is when they cross the line into directly participating in the conflict.<sup>15</sup> Civilians who directly participate in hostilities lose their protected status when they commit acts that meet the following three criteria:

- (1) the act will likely have an adverse effect on military operations or harm civilians;
- (2) there is an obvious causal link between the act and the harm it will result in; and
- (3) the act is purposefully designed to cause such harm.<sup>16</sup>

Despite this guidance, most states consider any acts that “are intended to cause actual harm to enemy personnel and materiel” as constituting

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<sup>13</sup> JEAN-MARIE HENCKAERTS & LOUISE DOSWALD-BECK, 1 CUSTOMARY INTERNATIONAL HUMANITARIAN LAW 26 (2005). This implies that there is no instance where distinction ceases to be a primary factor in determining whether or not the use of force is lawful. This principle has also been used to extend absolute responsibility over the individual pulling the trigger rather than his commander alone.

<sup>14</sup> G.A. Res. 2444, U.N. GAOR, 23d Sess., Supp. No. 1748, U.N. Doc. A/7433, at 50 (19 Dec. 1968). This includes international armed conflicts, domestic civil conflicts, and most pertinent to today, conflicts between state and non-state actors. It makes the definition of a non-state group extremely important in deciding whether a group is a lawful target.

<sup>15</sup> Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), art. 13, June 8, 1977, 1125 U.N.T.S. 3 [hereinafter AP I]. Article 13 states that “[c]ivilians shall enjoy the protection afforded by this Section, unless and for such time as they take a direct part in hostilities.” Thus, as soon as a civilian ceases to take a direct part in the conflict, he is again immune from targeting.

<sup>16</sup> NILS MELZER, INT’L COMM. OF THE RED CROSS, INTERPRETIVE GUIDANCE ON THE NOTION OF DIRECT PARTICIPATION IN HOSTILITIES UNDER INTERNATIONAL HUMANITARIAN LAW 46 (2009). The ICRC conducted a five-year advisory study on the notion of direct participation. It recommended ten guidelines, including this three-step test on the constitutive elements of direct participation in hostilities.

direct participation in hostilities.<sup>17</sup> The modern era of warfare, which seldom provides solid front lines and often includes chameleon-like combatants, is rife with doubt about whether a person is either a disguised combatant or taking a direct part in hostilities. In these cases the Geneva Conventions mandate that would-be attackers err on the side of caution and treat questionable persons discovered on the battlefield as protected civilians until their status can be determined.<sup>18</sup>

International law has a lot to say about the extent to which weapons must distinguish between legal and illegal targets during hostilities. The Draft Hague Rules of Air Warfare, commonly cited as a starting point for modern day Law of War documents, specifically outlaws weapons that “employ a method or means of combat which cannot be directed at a specific military objective.”<sup>19</sup> That is to say, it bans weapons that are indiscriminate by their nature. But what about weapons designed to be discriminate but with less-than-perfect accuracy? The International Criminal Court evaluates breaches of distinction by the act’s intent and specifically leaves room for malfunctions and human error.<sup>20</sup> For the purposes of this article, the rules of distinction that apply specifically to the employment, as opposed to nature, of the utilized weapon are extremely important. The prohibitions include firing a weapon blindly; firing a weapon at random; firing in conditions that hinder visibility; and firing near civilians with an imprecise device.<sup>21</sup>

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<sup>17</sup> Third Report on the Human Rights Situation in Colombia, OEA/Ser.L/V/II.102. doc., 9 rev. 126 (26 Feb. 1999). This vague definition encompasses a broad variety of activities. In a time when many acquisitions and activities relating to the military are contracted to civilians, there is an ongoing effort to tighten the definition.

<sup>18</sup> AP I, *supra* note 16, art. 51. Notably, the United States submitted a reservation to this article, stating that battlefield commanders retain their right to act to protect their troops, thus permitting commander to err on the side of a combatant if in their professional judgment the situation warrants it.

<sup>19</sup> 1996 Amended Protocol II on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices, arts. 3, 8, June 3, 1997, 35 I.L.M. 1206. The protocol is the second protocol to the Convention on Certain Conventional Weapons. The concept of indiscriminate weapons will be discussed more thoroughly in the section concerning weapons law, *infra*. Although never adopted, these rules are often used as a foundation for subsequent Law of War conventions and treaties.

<sup>20</sup> Rome Statute of the International Criminal Court, July 1, 2002, 2187 U.N.T.S. 90 [hereinafter Rome Statute]. The International Criminal Court (ICC) created a balance system between acceptable and unacceptable margins of error predicated upon military advantage and foreseen chances of collateral damage. It emphasizes an intent-based analysis of the act.

<sup>21</sup> YOREM DINSTEIN, CONDUCT OF HOSTILITIES UNDER THE INTERNATIONAL LAW OF ARMED CONFLICT (2004). These four provisions on weapons usage hint at the mandate to

The latter two prohibitions are the most pertinent to autonomous weapons, because they make the technical capabilities of the autonomous system's weapons germane to the system's legality.

This is the law, but what about reality? Has the codified principle of distinction led to actual distinction on the battlefield, and can new prohibitions achieve the same end? Many legal scholars argue that mandates against innovation will result in the opposite effect. States will pursue the technology regardless, and the wide gap between reality and international law could lead to a mass disregard for the LOAC.<sup>22</sup> When too many states violate such laws, the principle of reciprocity is rendered null, and even the states that first drafted the prohibitions may feel compelled to build illegal systems in response. What follows would be an arms race of reprisals involving illegal systems that knowingly breach the principle of distinction in order to punish a state that already has breached it.<sup>23</sup>

### C. Proportionality

Inspirational posters, catchy radio jingles, and a powerful wave of righteousness carried Americans through the second half of World War II. It was not until afterwards, when the horrors of war arrived home in the form of photographs and film clips, that they began to question how much more humane they had been than the ruthless Axis Powers they had been fighting. Although the United States had entered the war with a policy commitment to "precision bombing," its military and political leaders considered the advantages of massive bomb raids to outweigh the collateral damage inherent in such an offense.<sup>24</sup>

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restrain a weapon system and its operator if the conditions and methodology of firing render distinction impossible. *Id.*

<sup>22</sup> Mica Nishimura Hayashi, *The Principle of Civilian Protection and Contemporary Armed Conflict*, in *THE LAW OF ARMED CONFLICT* (Howard M. Hansel ed., 2007). Hayashi's approach to international law is to test its utopian goals with the consequences of its practical application. He determines that technology prohibitions that stifle innovation will be dismissed by scientists and inventors, and that once the technology exists, it will almost immediately find its way onto the battlefield. *Id.*

<sup>23</sup> HENCKAERTS & DOSWALD-BECK, *supra* note 14. A reprisal is a sanctioned breach of the LOAC in order to stop another's breach.

<sup>24</sup> SAHR LANZ-CONWAY, *COLLATERAL DAMAGE* 3-8 (2006). Throughout the war the United States maintained that it had not abandoned its "precision bombing" policy, ardent that every bomb dropped was intended for a specific target and was not employed to

During hostilities the need to wage a “total war” with Germany and Japan was nationally accepted, but afterwards Americans began to question whether the speed with which the atomic bomb had ended the war was worth the devastation. Still, they did not blame the technology. The desire to decrease war carnage has actually resulted in an increased affinity for more powerful weapons, as the American population largely associates technology with increased precision and thus fewer civilian casualties. U.S. commanders have consistently considered the precision capabilities of a weapon system in their calculations of proportionality.<sup>25</sup>

It is the responsibility of these commanders and their subordinates to ensure that the collateral damage that results from their actions is not “excessive in relation to the concrete and direct military advantage anticipated.”<sup>26</sup> The use of the term “excessive” is commonly used in discussions of proportionality, not to be confused with “extensive.” Extensive collateral damage would be acceptable if the expected military advantage outweighs the loss of life. It is only a violation of the principle of proportionality if the “incidental loss of life or injury to civilians . . . [is] clearly excessive in relation to the . . . military advantage anticipated.”<sup>27</sup> The term “anticipated” is of the utmost importance. The *ex post facto* rubric for whether an act did or did not violate the principle of proportionality is what the actor reasonably expected the outcome to be.<sup>28</sup>

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incite fear. There has been significant debate since the end of the war on how much validity there was to those proclamations.

<sup>25</sup> *Id.* at 130. International law assesses acts based upon reasonable expectations, and the United States considers the technical capabilities of a weapons system a primary factor in determining if an act would or would not violate the principle of proportionality. The increased precision capabilities of weapons has elevated Americans’ bar for an acceptable military advantage.

<sup>26</sup> AP I, *supra* note 16, art. 51(5)(b). The degree to which collateral damage is acceptable is related not only to the expected gain if the attack succeeds but also to the probability of it succeeding.

<sup>27</sup> Rome Statute, *supra* note 21, art. 8(2)(b)(iv). Although the United States does not submit to the jurisdiction of the ICC, the Rome Statute references accepted customary international law, including customary rules regarding what is considered proportional in relation to injury to civilians.

<sup>28</sup> DINSTEIN, *supra* note 22, at 121. The *ex post facto* analysis of an attack adopts a lens of reasonability and weighs, given the information available to the actor at the time of the attack, what the actor should have expected the collateral damage to be and what he expected to gain militarily from the attack. *Id.* Precautions are also considered, as discussed later on in this section.



The calculus of proportionality is not always confined to a single soldier's determination. Although the onus to prevent excessive damage to civilians does fall on every combatant, international law does not require decisions concerning proportionality be made within a vacuum. The scope for review when considering if an act is proportional to the anticipated collateral damage has been customarily expanded to be an "overall" assessment of the battle.<sup>29</sup> However, this analysis does not encompass an entire war. Most states consider the term "overall" to include a defined portion of the hostilities because states must be able to consider strategic military advantages in addition to tactical advantages when making their calculations.<sup>30</sup>

The determination of whether a military advantage is large enough to justify the incidental collateral damage caused "necessarily contains a large subjective element."<sup>31</sup> States' military and defense components attempt to make the subject more objective through Rules of Engagement.<sup>32</sup> International law dictates that calculations of anticipated collateral damage include three key components: civilians inside of the target; civilians possibly within range of a weapon's damage radius; and the possibility and effects of a weapons malfunction or error.<sup>33</sup> Accordingly, an entity wielding an autonomous system would have to consider how likely the weapons system is to malfunction or to make an error before employing it.

These three components also raise the question of whether an autonomous system is more likely to decrease the probability of human error or just perpetuate them through errors in software coding. The

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<sup>29</sup> Rome Statute, *supra* note 21, art. 8(2)(b)(iv).

<sup>30</sup> DINSTEIN, *supra* note 22, at 217. A strategic advantage should still be limited to a definable portion of the hostilities in order to ensure the military advantage foreseen is, in fact, concrete. If "overall" encompassed an entire war, there would be too many factors to prove a direct causal relationship between the action and the foreseeable military advantage gained.

<sup>31</sup> HANS BLIX, MEANS AND METHODS OF COMBAT IN INTERNATIONAL DIMENSIONS OF HUMANITARIAN LAW 135 (1988). This complicates how an engineer could automate a system to make the calculation itself. While this author considers only that international law is too vague to make the calculation objective, the ability to program a system with updated Rules of Engagement (ROE) is a possible solution.

<sup>32</sup> It is important to note that the ROE are not synonymous with LOAC. While ROE must comply with LOAC, they also incorporate domestic strategic, tactical, and political concerns not part of international law and subject to frequent change.

<sup>33</sup> Yoram Dinstein, *Collateral Damage and the Principle of Proportionality*, in NEW WARS, NEW LAWS 211 (David Wippman & Matthew Evangelista eds., 2005). The third component includes both technical and human error.

Additional Protocols to the Geneva Conventions require that an attack be canceled if the principle of proportionality is no longer met.<sup>34</sup> This implies that an ability to override a malfunctioning machine would be necessary to ensure a system meets international expectations for assessing proportionality and would also solve issues of coding errors.

#### D. Laws Governing Weapons Development and Adoption

“The right of belligerents to adopt means of injuring the enemy is not unlimited.”<sup>35</sup> At some point the conscious decision of an individual or a group to initiate an attack against another must become kinetic if it is to have any effect, and in the transition the attacker must choose its instrument of attack, that is, the weapon. Some forms of weapons are expressly forbidden or highly regulated by international law, such as chemical, biological, nuclear, and, most recently, blinding lasers. However, if no specific provision exists, states are instructed to assess a weapon under the general rules regulating armed conflict.<sup>36</sup>

International law, for the most part, adopts a *laissez faire* approach to the vast array of weapons not specifically mentioned by international law. Instead, international law specifies what a state must do domestically to ensure the laws of war are considered in the weaponization process. In particular, it emphasizes that the review must take place during “study, development, acquisition or adoption of a new

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<sup>34</sup> AP I, *supra* note 16, art. 57(2)(b). This provision provides express measures for taking precautions in an attack and states that “an attack shall be canceled or suspended if it becomes apparent that the objective is not a military one . . . [or] may be expected to cause incidental loss of civilian life . . . which would be excessive.” *Id.*

<sup>35</sup> Regulations Concerning the Laws and Customs of War on Land, annexed to Hague Convention (IV) Respecting the Laws and Customs of War on Land, art. 22, Oct. 18, 1907, T.S. 539. Section II of this annex discusses regulations governing hostilities. This is the first article of the section, implying that all additional regulations on hostilities stem from this core principle. Means to injure the enemy is certainly largely composed of weapon choice.

<sup>36</sup> INT’L COMM. RED CROSS, A GUIDE TO THE LEGAL REVIEW OF NEW WEAPONS, MEANS, AND METHODS OF WARFARE 2 (2006) [hereinafter ICCR GUIDE]. The International Committee of the Red Cross conducted a thorough study of what the “general rules” say about the process and provided a concise advisory opinion on the subject in this report. The study will be used heavily in this section of this article.

weapon.”<sup>37</sup> The substantive analysis should examine three different considerations:<sup>38</sup>

- (1) the design intent (conducted prior to development),
- (2) the technological capabilities (conducted post development); and
- (3) the types of injuries to people and the environment it would inflict (prior to fielding).

The third level of this review is intended to have a wide scope. That is, a weapon cannot be assessed in isolation from how it *may* be used. Although states are not required to include every possible way the weapon could be misused—as those realizations often occur *ex post facto*—states are required to consider all reasonably likely uses of the weapon in their analysis.<sup>39</sup>

How these three substantive levels are met is left to a state’s domestic laws and policies. In the United States, the DoD requires that all new weapons be reviewed upon completion of the design phase in regards to the intent of the design and upon completion of the development phase (in regards to the capabilities and likely injurious effects of the weapon). If acquiring a new weapon from another state, the DoD is required to conduct the second review before fielding the new weapon.<sup>40</sup>

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<sup>37</sup> AP I, *supra* note 16, art. 36. This article also specifically obligates a buyer state to conduct an analysis before employing a new weapon even if the building state has already conducted a study or fielded the weapon.

<sup>38</sup> ICCR GUIDE, *supra* note 37, at 18–19. This three-tiered review obligates the weapon building state to assess what it is building prior to initiating any development, after development, and before fielding. The second and third tier assessments can be conducted simultaneously if the weapon-building state is the state fielding the weapon. If another state is adopting the weapon, the adopting state must conduct an analysis at the third level for itself. *Id.*

<sup>39</sup> *Id.* at 10. The intent of this wide scope is to prevent a state from claiming that a weapon’s intended purpose makes it lawful even though other states may acquire and use the weapon for different purposes and in different ways. If, for instance, a weapon may be proven to be indiscriminate when a minor modification is made to it, the weapon would be unlawful, and the state would be expected to redesign it to prevent the ease of that modification.

<sup>40</sup> U.S. DEP’T OF ARMY, REG. 27-53, REVIEW OF LEGALITY OF WEAPONS UNDER INTERNATIONAL LAW § 4 (16 Oct. 1979). In addition to this general directive, each branch of the military *has been delegated* the task of creating specific review processes for weapons its organization plans to research, develop, and/or adopt, such as Air Force Instruction 51-402.

In the adoption of a weapon for use in the field, international law requires that the weapon system be used in a manner that allows for discrimination and the implementation of reasonable precautions. Weapons are indiscriminate by their nature, and may never be fielded, regardless of the context, if they meet one or both of the following criteria: they cannot be directed at a specific military objective, or their effects cannot be limited.<sup>41</sup>

It would stand to reason that if the system fielding a weapon causes the weapon to meet either of the above criteria, then it would be prohibited, even if the weapon itself makes it through the review process. This caveat is further supported by the ability of a review board to give conditional approval of a weapon.<sup>42</sup>

Many states have argued that their ability to field a weapon in hostilities should also depend on the conduct of their enemy. This is an issue of reciprocity. However, this argument is clearly refuted by international law, which provides that states are required to obey the LOAC “in all circumstances.”<sup>43</sup> In addition to the Geneva Conventions, the United States has also affirmed its commitment to this principle at the Nuremberg Trials. The U.S. Military Tribunal at Nuremberg refuted the claim that non-reciprocity relieves states and their soldiers from their obligations under LOAC.<sup>44</sup>

### III. Autonomous Systems

#### A. Land—Field Robots

There are multiple scenarios in which land-based robotic systems can be deployed. Because those that involve the use of multiple robots in a

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<sup>41</sup> AP I, *supra* note 16, art. 51(4). These regulations come from the provision that prohibits weapons that “strike . . . without distinction.” This should include systems that could not utilize a weapon in a manner that does not violate both criteria. *Id.*

<sup>42</sup> ICCR GUIDE, *supra* note 37, at 21–22. A reasonable interpretation of this would be that a review board could approve a new type of firearm, for example, provided that it never would be mounted on a system incapable of meeting certain accuracy and precision standards that would render it indiscriminate.

<sup>43</sup> All of the Geneva Conventions and Additional Protocols contain language to this effect, such as in AP I, article 1(1).

<sup>44</sup> *The United States of America v. Wilhelm von Leeb, et. al.*, Case No. XII (Nuremberg 1948). The court rejected the defendants’ argument that if an adversary violated international law, then they are released from their obligation to comply with that law.

crowded environment are the most chaotic and problematic scenarios, much of this section discusses the robots currently being tested by Special Weapons and Tactics (SWAT) teams. The reason that these robots pose a unique set of problems is that they operate in close proximity to human actors in violent situations. Stanford's Aerospace Robotics Laboratory (ARL)<sup>45</sup> is a leading research facility in autonomous robotics, and its record of experimentation with California law enforcement is useful to examine. From 1998 through 2002, California SWAT teams tested and fielded ARL's autonomous field robots for use in high-pressure scenarios, mostly hostage situations. The purpose of the autonomous robots, as designed by Stanford, is to substantially decrease the risk to police officers in the conduct of dangerous missions.<sup>46</sup>

The set-up of a SWAT mission is very similar to that of a military operation. The operation is led by the incident commander and the tactical commander, which is analogous to a platoon leader and a platoon sergeant in military terms. During the tests, both of these jobs were deemed irreplaceable by an autonomous system because of the extensive uncertainty both commanders have to manage.<sup>47</sup> Within these tests, it was observed that despite the technical capabilities of the robots, they could not adapt very well to unfamiliar objects. As a possible solution to this, Stanford is testing Object Oriented Electronic Dialogues that allow a robot to assess each object it faces and use models to decide if and how it should handle the object.<sup>48</sup>

The robots were, however, useful in allowing for quick collection and consolidation of information, to include real-time situation reports.

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<sup>45</sup> *Aerospace Robotics Lab*, STANFORD UNIVERSITY (2014), <http://www.stanford.edu/group/ar1/>.

<sup>46</sup> Henry L. Jones et al., *Autonomous Robots in SWAT Applications: Research, Design, and Operations Challenges*, ASS'N FOR UNMANNED VEHICLE SYS. INT'L (July 2002) (conference paper presented in Orlando, Florida). Stanford University's Aerospace Robotics Laboratory (ARL) conducted a four-year research study with the Palo Alto police department fielding a handful of autonomous systems.

<sup>47</sup> *Id.* This is the equivalent of an on-the-loop system. The robots move, communicate, and act autonomously but may be overridden or redirected at any time by the incident and tactical commanders. The robots lacked the necessary cognitive ability to plan and adjust to new situations.

<sup>48</sup> Hank Jones & Pamela Hinds, *Extreme Work Teams: Using SWAT Teams as a Model for Coordinating Distributed Robots*, ASS'N FOR COMPUTING MACHINERY (Nov. 2002) (conference paper on Computer Supported Cooperative Work presented in New Orleans, Louisiana). This solution would allow robots to deal with most new objects as long as they have a schema with which to associate the objects. Such a solution would still leave gaps when objects do not fit into any of the robot's models.

An issue that law enforcement—and even more so, soldiers—face today is vast engagement areas. Separate teams must communicate to the incident commanders and tactical commanders what is occurring in different areas simultaneously and then inform their subordinates of the ongoing situation.<sup>49</sup> Human beings are limited in their ability to process multiple perspectives at once and to communicate quickly, but a team of robots can use an internet network to pass visual and auditory data back and forth in less than a second. Stanford equipped its systems to use Distributed Local Models that continuously merge information between the systems and send the updates to the remote commander.<sup>50</sup>

Beyond research, many departments have already adopted the use of autonomous systems in the field. Smart Trakk is an autonomous vehicle whose main purpose is to transmit situation data. It is not “weaponized,” but its intelligent targeting capabilities make it a prime contender to become so if the military adopted it or a similar system. The system is equipped with a 40x zoom with a fixed laser for targeting purposes, as well as an advanced Global Positioning System (GPS) program named GeoLocation. Its Bumblebee II camera is capable of creating maps from digital photographs which can then be transferred over any Internet Protocol (IP) radio system. The robot is also equipped with a stereo-based obstacle avoidance system that allows it to maneuver without human control.<sup>51</sup>

Use of these land-based systems would likely decrease breaches of proportionality on the battlefield. The ability to merge information and account for a multitude of factors without time delays would enable informed decisions concerning the likely collateral damage and military advantage gained from any attack. Additionally, using Object Oriented Electronic Dialogues and other software that analyzes the system’s capabilities in reference to a specific target would help calculate the

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<sup>49</sup> *Id.* The need to consider multiple perspectives outside of their view causes significant time delays between incident and tactical commander updates and information dissemination. In high-pressure situations, this can lead to hasty decision-making that does not consider all of the facts and the entire situation.

<sup>50</sup> *Id.* Currently, the software includes a user control that would allow a commander to choose what a robot does with an object once the robot has identified feasible options.

<sup>51</sup> *SmartTrakk*, MOBILINTEL. CORP., <http://www.mobil-intelligence.com/smarttrakk.php> (last visited Jan. 7, 2014). The system can communicate using user datagram protocol (UDP) or transmission control protocol (TCP), allowing for the choice between real-time transmission and reliable transmissions that do not require buffer time. This system demonstrates the recognized targeting capabilities of autonomous robots.

possibility and effects of a malfunction or error in the execution of an attack.

On the other hand, these systems are not capable of matching a human's ability to properly distinguish between a combatant and a non-combatant. Although the systems are equipped with software that prevents them from being labeled as "indiscriminate by nature," they are limited in their ability to assess new objects without a prior frame of reference. The armed conflicts being fought today are laden with combatants who are determined to blend in with the population and who use new forms of weapons and protection. Nevertheless, the developments in Object Oriented Dialogues appear promising. There may well be a day when a system can consider enough factors about how to deal with an object that uncertainty will not be any more of an issue than it is with a human soldier encountering a new object. Currently, a human needs to be on-the-loop to ensure that a field robot does not target a non-combatant.

The principles of LOAC that govern weapons would permit the use of these systems, provided a human is on-the-loop.<sup>52</sup> However, these weapons could be used by those who do not care how discriminating the weapon is, and thus in weaponizing these systems it would be necessary to program an oversight requirement for the system to function. Once this is in place, the weapon's mapping and information collection capabilities would enable it to meet the principle of proportionality and military necessity.

## B. Sea

The newest development in naval warfare is the U.S. Navy's use of a system known as Counter Rocket Artillery and Mortar (C-RAM). These systems are designed primarily as defense systems capable of operating multiple weapons simultaneously. Originally intended to protect naval vessels, C-RAM systems have since been developed and deployed by the Army as well.<sup>53</sup>

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<sup>52</sup> On-the-loop, as opposed to in-the-loop, means the robot operates without human commands but with a human operator witnessing and able to override any of its actions.

<sup>53</sup> John Pike, *Counter Rocket, Artillery, and Mortar (C-RAM)*, GLOBALSECURITY.ORG, <http://www.globalsecurity.org/military/systems/ground/cram.htm> (last visited Jan. 7, 2014). In 2005 the Army contracted the latest Phalanx C-RAM models. Current Army

The Navy is currently testing but has yet to field the SeaRam Anti-Ship Missile Defense System. The system is equipped with eleven missile launchers and the high resolution search-and-track sensor system from the Phalanx 1B C-RAM system on which the SeaRam is based. This sensor system includes a Forward-Looking Infrared Imager (FLIR) which is designed for excellent accuracy in all light conditions.<sup>54</sup> What makes this weapon autonomous is its automatic target acquisition mode. The SeaRam was designed to be more precise than the Phalanx that caused a friendly fire incident in 1991, when the USS *Jarrett* intended to hit an incoming Iraqi missile and instead fired at the nearby USS *Missouri*.<sup>55</sup>

Not yet installed on an existing naval C-RAM, the Naval Research Laboratory is testing another type of C-RAM, the Cognitive Robot Abstract Machine.<sup>56</sup> This mechanism is designed to be pre-programmed with various algorithms that allow the system to infer and make decisions. The system is able to do this by using “designators” to classify and identify objects. The designators activate process modules that run algorithms which test action-based scenarios. The best scenario drives the decision the system adopts.<sup>57</sup>

Even while in automatic targeting mode, these systems must have a human operator. The DoD Directive requires that all robotic systems

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models incorporate lightweight counter mortar radar to detect and track fired rounds. The Centurion system has added strong armor to the system for its protection in the field. *Id.*

<sup>54</sup> M.S. Frick, *RAM and Phalanx: System of Systems Testing*, NAVY LEAGUE, available at <http://www.highbeam.com/doc/1P3-68057630.html>.

<sup>55</sup> *TAB H—Friendly-fire Incidents*, ENVTL. EXPOSURE REPORT (2000), available at [http://www.gulflink.osd.mil/du\\_ii/du\\_ii\\_tabh.htm](http://www.gulflink.osd.mil/du_ii/du_ii_tabh.htm). In May 1991, three U.S. Navy warships were attacking Iraqi-occupied Faylakah Island. The USS *Missouri* fired to protect itself from an Iraqi missile, and the burst caused the USS *Jarrett*'s Phalanx system to malfunction and mistake the USS *Missouri* as a threat. Luckily, no casualties were incurred. *Id.*

<sup>56</sup> Greg Trafton & Alan C. Schultz, *Human Robot Interaction and Cognitive Robotics*, NAVAL RES. LAB (2013), <http://www.nrl.navy.mil/aic/iss/aas/CognitiveRobots.php>. The Naval Research Laboratory hopes to perfect the cognitive processes such that the modeling of information is not only quicker but much more effective than human decision-making.

<sup>57</sup> *CRAM: Cognitive Robot Abstract Machine*, TECHNISCHE UNIVERSITÄT MÜNCHEN (Aug. 18, 2011), <http://ias.cs.tum.edu/research/cram>. The processes run by the C-RAM are referred to as reasoning processes. They are designed to fill the knowledge gaps that usually impair a robot's ability to make a decision. By using a number of algorithms designed to test situations against multiple schemas and scenarios, it enables the robot to mimic human inference processes.



maintain a human on-the-loop in case of malfunction or an error in programming if an autonomous system has the capability of being lethal.<sup>58</sup> The directive is not definitive on what that means. Instead, it simply requires that the systems be designed “to allow commanders and operators to exercise appropriate levels of human judgment over the use of force.”<sup>59</sup> The directive specifically cites the needs to minimize collateral damage and prevent weapons from firing on incorrect targets, such as occurred in the misfire incident involving the USS *Jarett*.

New C-RAM systems such as the SeaRam may make it difficult for the Navy to comply with the DoD Directive because of its eleven guns and quick reaction time. Human operators would be required to take corrective measures in less time than they would be able to react.<sup>60</sup> Furthermore, studies show that when an operator is tasked with monitoring more than one weapon, his attention significantly decreases. Subconsciously, he realizes that he is physically incapable of effectively manning the system in the event of an error.<sup>61</sup> This is concerning due to conflicting advantages. On one hand, if a system is expected to be programmed with near-perfect accuracy and precision, with complex algorithms to assess distinction and proportionality, it would make the norm for a permissible attack stricter.<sup>62</sup> On the other hand, if

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<sup>58</sup> AR 27-53, , *supra* note 40.

<sup>59</sup> Aaron Mehta, *U.S. DoD's Autonomous Weapons Directive Keeps Man in the Loop*, DEF. NEWS (Nov., 27 2012), <http://www.defensenews.com/article/20121127/DEFREG02/311270005/U-S-DoD-8217-s-Autonomous-Weapons-Directive-Keeps-Man-Loop>. This directive has the stated intent of avoiding unintended engagements. The policy makers behind the directive commented that its necessity comes from the need to confront the worst-case scenarios.

<sup>60</sup> Major Erin A. McDaniel, *Robot Wars: Legal and Ethical Dilemmas of Using Unmanned Robotic Systems in 21st Century Warfare and Beyond* (Dec. 12, 2008) (unpublished M.A. thesis, U.S. Army Command and General Staff College). Advanced targeting systems acquire and engage targets in under two seconds, far quicker than the average human being's reaction time, let alone the necessary time to realize the error and override the system. This on-the-loop scenario is effectively one where the human is out-of-the-loop, because the most he can do is explain what already happened. *Id.*

<sup>61</sup> Stephen Knouse, *Towards a Psychological Theory of Accountability*, INTERFACES 9 (1979). These studies have been tied to Knouse's theory of accountability. Knouse opines that when an individual does not feel that his position imposes on him a significant trust or duty, he does not feel responsible for his job. In this case, when an operator perceives his position to be futile—because he knows he would likely be incapable of preventing a malfunction or error in the system's judgment—he will lose motivation to be attentive. *Id.*

<sup>62</sup> Michael N. Schmitt, *Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics*, HARV. NAT'L SECURITY J. (FEB. 5, 2013, 2:07 PM), <http://harvardnsj.org/2013/02/autonomous-weapon-systems-and-international-humanitarian->

international law calls for erring on the side of human reason, then systems will be expected to allow their operators appropriate response time, which would help diminish human propagated errors (errors in coding or misinformation) and allow for legitimate override capabilities.

The question becomes, which approach will result in more lives saved—mechanical or human judgment? As long as disparity exists between the two, the bar for acceptable collateral damage cannot be raised, and the futile involvement of weapon systems operators will be exacerbated.

### C. Air

If there is one domain in which autonomous systems seem more of a reality than science fiction, it is the air. There is something about a sleek, lethal system drifting through the night sky that sends shivers up one's spine. The media does not have to work very hard to ignite fears over the Obama Administration's use of drones.<sup>63</sup> There has yet to be an unmanned aerial vehicle (UAV) that attacks its own target fully autonomously.

In 2007 Britain initiated Project Taranis to develop a semi-autonomous UAV system that could fend off an attacker, deploy weapons, and relay intelligence back to its mission commander. This UAV system was built from the previously successful Raven UAV project and was designed to allow a single mission commander to authorize the deployment of a weapon after the system acquires a target.<sup>64</sup> The actual product was so impressive that it stirred the concern

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law-a-reply-to-the-critics/ (If the standard for targeting accuracy and predication capabilities is higher, then the standard for acceptable collateral damage and errors in judgment will also be heightened. Such standards would become part of the review process for autonomous systems.)

<sup>63</sup> Jim Kouri, *Obama Drones Creating Fear Among Americans*, THE EXAMINER (FEB 7, 2013), <http://www.examiner.com/article/obama-drones-creating-fear-among-americans>. This is an example of a media article centered around the unease Americans feel about the Obama administration's use of drones. The concept of "eyes in the sky," make Americans fear for their own privacy.

<sup>64</sup> BAE Systems, *Taranis*, [http://www.baesystems.com/product/BAES\\_020273/taranis](http://www.baesystems.com/product/BAES_020273/taranis). The system is designed to program an unmanned aerial vehicle (UAV) to follow a flight path into enemy territory, identify a target, have that target verified by a mission commander, and deploy a weapons system.

of a number of anti-autonomous activists.<sup>65</sup> The system uses electro-optical and radar sensors to acquire its target, and after it receives authorization, it can deploy a weapon from either of its two weapons bays.<sup>66</sup>

Not to be left behind, the United States' plan for unmanned aerial system (UAS) development over the next few decades focuses largely on similar pursuits. A stated end-state for the U.S. Air Force's long-term UAS plans are UAVs that "find, fix, finish" targets from a single platform.<sup>67</sup> Although a follow-on 2009 study emphasized the need for "man in the loop" systems, it also included timeline planning for fully autonomous targeting. By fiscal year 2025, the plan requires the development of sufficient policy and doctrine to deal with UAS with autonomous targeting capabilities.<sup>68</sup>

But if it takes to 2025 for the policies to be in place, they may come too late. In 2012 the Air Force Research Laboratory awarded a \$10 million contract to Boeing for the development for an autonomous UAV prematurely named "Phantom."<sup>69</sup> The system is intended to be an all-around intelligence, surveillance, reconnaissance, and strike system. It will be employed with the Textron Common Smart Submunition system. This system uses a platform called BLU-108 for target acquisition, and Boeing has committed to improve the system for enhanced target

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<sup>65</sup> Robert Verkaik, *Britain's Taranis Drone Picks Its Own Targets, but Experts Warn Could Mark Start of Robot Wars*, INFOWARS (Jan. 2013), <http://www.infowars.com/britains-taranis-drone-picks-its-own-targets-but-experts-warn-could-mark-start-of-robot-wars/>. The specific concern from activists raised by the system's December 2012 test flight was that the mission commander would be responsible for more than one system and the drive for autonomy would end in removing the mission commander from the loop entirely.

<sup>66</sup> *UK Authorizes Project Taranis UCAV Technology Demonstrator*, DEF. UPDATE (2007), <http://defense-update.com/products/t/taranis-ucav.htm> (noting that the system is partially sponsored by the UK Ministry of Defense as part of their Strategic Unmanned Air Vehicle Experimental Programme).

<sup>67</sup> PHANTOM (UAS) FLIGHT PLAN 2000–2047 (2000). The UAS development was projected to focus initially on sensor capabilities to focus on the first two parts of that end state.

<sup>68</sup> U.S. AIR FORCE, U.S. AIR FORCE UNMANNED AIRCRAFT SYSTEMS FLIGHT PLAN 2009–2047 (2009).

<sup>69</sup> Bill Carey, *Boeing Phantom Works Develops 'Dominator' UAV*, AIN ONLINE (Nov. 2, 2012), <http://www.ainonline.com/aviation-news/ain-defense-perspective/2012-11-02/boeing-phantom-works-develops-dominator-uav>. The four-year study for this UAV is targeted to be complete in 2014.

discrimination capabilities. The system is projected to be completed by January of 2017.<sup>70</sup>

And the U.S. Navy would not be far behind with its own autonomous strike UAV. Tested on the USS *Truman*, the X-47B prototype is proof that the U.S. Navy has similar projections as the Air Force for autonomous flight. The X-47B is designed to fly not only without a pilot but without a remote pilot as well. Instructions are given to the UAV from an operator on board the aircraft carrier. Although it will not be tested with a weapon, the vehicle possesses a large weapons bay. The Navy hopes to field half a dozen autonomous combat UAVs by 2020. To achieve this objective, it initiated a competition for the next version of the X-47B in early 2013.<sup>71</sup>

Thus far, the U.S. Navy has been pleased with the prototype's performance. A large hurdle to overcome in removing a pilot from the equation altogether was the need to identify and maneuver around sailors on the aircraft carrier prior to and following take off. The UAV's ability to do so is a testimony to its distinction capabilities. Another concern was overcoming the risk of electromagnetic interference between the aircraft and the carrier's abundance of radar systems. The tests on the USS *Truman* have proved highly encouraging thus far.<sup>72</sup>

#### IV. Morality and the Means of Warfare

Thus far this study this article has discussed the way the international community has codified the principles of LOAC and the capabilities of existing and developing autonomous weapons, but long before General Order 100 and the Geneva Conventions, moral philosophies guided the

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<sup>70</sup> Bill Carrey, *Boeing Phantom Works Develops 'Dominator' UAV*, AI ONLINE (Nov. 2012), <http://www.ainonline.com/aviation-news/ain-defense-perspective/2012-11-02/boeing-phantom-works-develops-dominator-uav> (The system will carry a Small Diameter Bomb system, a precision strike weapon designed for minimized collateral damage).

<sup>71</sup> Sharon Weinberger, *X-47B Stealth Drone Targets New Frontiers*, BBC (Dec. 18, 2012), <http://www.bbc.com/future/story/20121218-stealth-drone-targets-life-at-sea> (explaining that the X-47B's maker, Northrop, will compete against a variety of companies who have a long history of serving the military, including Lockheed Martine and General Atomics. The project is part of the U.S. Navy's Unmanned Combat Air System Demonstration Program).

<sup>72</sup> *Id.* Although its first take-off test did not occur until 2013, the aircraft was tested on board the USS *Truman* for its maneuverability multiple times during 2012. *Id.*

ways in which states and organizations fought.<sup>73</sup> Recalling these philosophies will be important in assessing how international law should govern autonomous weapons. These philosophies were often embodied by concepts of honor and chivalry. In a sense, the universal principles of morality are the most common ground that exists in international law.<sup>74</sup> From those principles stem the few *jus cogens* principles of law, norms that are so well-founded and widespread that they are considered intransgressible and not up for debate.<sup>75</sup> Thomas Aquinas, a moral legal theorist, suggested that the best way positive laws can honor morality is to simply “promote good and avoid evil.”<sup>76</sup>

For LOAC, the promotion of good and avoidance of evil is embodied, in part, by the four core principles. The moral decision comes into play in the presence of gray areas, where there is no clear way to avoid harm or violence altogether. This is most often seen in the principle of proportionality, specifically in the tension between minimizing collateral damage and attaining military victory.<sup>77</sup> Many states that ascribe to Botero’s philosophy of *raison d’état*<sup>78</sup> do not see this tension. To him, the dominant goal of the state is preserving the

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<sup>73</sup> Mosely, Alexander, *Just War*, INTERNET ENCYCLOPEDIA OF PHIL. (2014), <http://www.iep.utm.edu/justwar/>. This concept of *jus in bello* that is at the core of the Law of Armed Conflict developed largely from philosophies of honor and justice during the Greek and Roman Empires. Religious scholars created moral philosophies to dictate when war was justified, such as Saints Augustine and Thomas Aquinas. *Id.*

<sup>74</sup> Alexander Boldizar & Outi Korhonen, *Ethics, Morals, and International Law*, 10 E.J.I.L. 282 (1992). Despite differences in how cultures interpret positive laws, the values the laws are intended to protect stem from senses of morality embedded in human nature.

<sup>75</sup> Jasmine Moussa, *Can Jus ad bellum Override Jus in bello? Reaffirming the Separation of the Two Bodies of Law*, 90 INT’L REV. RED CROSS 10 (Dec. 2008) (These norms are considered to be so universally strong that legal rulings and proclamations are unnecessary to support them. They are embodied by the domestic laws of every state. A common example is that unjustifiable murder is bad for all of society).

<sup>76</sup> William O’Hara, *Drone Attacks and Just War Theory*, SMALL WARS J., Sept. 2010, at 2. Aquinas described this sentiment as “just intention.” He believed that if governments seek to enact laws that always reflect this principle, then morality will always prevail. *Id.*

<sup>77</sup> *Id.* at 7. The more likely it is that collateral damage can be minimized, the more leeway a state has to pursue an attack it deems a military necessity. *Id.*

<sup>78</sup> Borelli, Gianfranco, *The Italian Art of Political Prudence*, 1996, available at <http://www.filosofia.unina.it/ars/rofs.html>. Borelli is a 16th century Italian philosopher who took inspiration from Machiavelli in analyzing the motivations of the Western state. He theorized that states seek to obtain enough power to be stable then maintain it at any cost. *Id.*

power it has obtained.<sup>79</sup> Thus, in most situations, victory on the battle field must be the primary consideration of the state. The International Court of Justice created a new category for human rights laws, such as those contained in the LOAC, referred to as those that are *intransgressible*. Although they are weighted more heavily than common state practice, it will not go so far as to label them *jus cogens*.<sup>80</sup>

What does this mean for autonomous weapon systems? States are more likely to comply with weapons laws that appeal to a common sense of morality and yet also respect their self-defense concerns. This means that the most effective international regulations on robots need to incorporate the most basic principles on which states agree but that do not appear too utopian. Modern moral legal theorists believe that the best way to do this is through an instrumentalist approach as opposed to a consequentialist approach.<sup>81</sup> This is the preferred method because it teaches an actor *how* rather than *what* to think, and thus is more amenable to future change and innovation.

Adopting this school of thought, most moral legal practices acknowledge the need for human reason in applying rules properly in a given context. In other words, these legal rules are *evidence-relative*.<sup>82</sup> This is extremely important when considering the states that ascribe to Bolero's' *raison d'état* theory. Morality can only prevail if the restrictions it places upon a group do not completely destroy its chances of achieving victory on the battlefield.<sup>83</sup> In the same light, if a state

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<sup>79</sup> Moussa, *supra* note 72, at 970 (arguing that this "survival of the fittest" mentality is not an excuse for disregarding international law. Instead, it says that international law should respect the reality that when a state is in danger of being obliterated it will always act to save itself first).

<sup>80</sup> 1966 I.C.J. 99 (Advisory Opinion on the Threat or Use of Nuclear Weapons). In 1996 the International Court of Justice acknowledged that extreme cases of self-defense may require a state to breach principles of the Law of Armed Conflict. This would only apply if the state's very existence were at stake. *Id.*

<sup>81</sup> Adil Ahmad Haque, *Law and Morality at War*, Rutgers School of Law Research Paper Series page number 6 n.114, at 6 (May, 16 2012), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2061375](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2061375). In essence, instrumentalism says that the way in which something should be evaluated is the effectiveness of the method as opposed to the actual outcome, which is known as a consequentialist approach.

<sup>82</sup> *Id.* at 4 (An evidence-relative rule obligates agents to assess certain situational aspects in determining how/when the rule should be applied. This infers that the most moral legal rules are not binary in nature; that is, there are additional answers beyond "yes" and "no.").

<sup>83</sup> *Id.* at 5. Moral laws become seen as "utopian" ideals that are apt to be ignored when states believe them to significantly impede necessary military actions. International law

believes that its enemies will not comply with the restrictions, it will not adhere to them due to fear of injury.<sup>84</sup> While it may acknowledge such restrictions as morally right, it will deem the need to protect the life of its citizens as more important.

## V. Conclusion

The question remains: how should international law govern autonomous weapons? Given the current international law framework, technical capabilities of such systems, and the fundamental moral values that create globally common ground, what is the solution? As discussed above, internationally shared moral philosophies demand attempts to minimize unnecessary injury without giving up any rights to self-defense. Laws that focus more on methodology, rather than outcomes, are more likely to gain adherence because states will not feel as if their legitimate options for attaining military victory have been prohibited.

The current capabilities of autonomous weapon systems improve upon human distinction capabilities in terms of target acquisition; yet, this improvement can only be utilized when a target can be predetermined before the weapon is deployed. In instances of uncertainty, autonomous systems lack reasoning capabilities equal to those of a human being. This could potentially be solved by allowing programming systems to always err on the side of caution, but it means giving up a number of opportunities to achieve a military victory that a state may not be willing to forego, another example of the difficult-to-strike balance between strategic and humanitarian considerations. Increased standards of precision when making an attack may very well raise the bar for what is considered a proportional attack during a conflict, but precision only matters if the way in which the weapon is coded is flawless. Since humans are not flawless, the work they perform will usually contain errors.

The current regime for weapons law emphasizes three reviews conducted at different points in the weapon creation process: pre-

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as a body of “soft” law is only as strong as its supporters. An important consideration in international weapons regulations is not creating laws that will be effectively ignored. *Id.*  
<sup>84</sup> *Id.* at 9–10 (pointing out that this mostly refers to the idea that international laws that are not multilaterally followed become moot. If only a few actors adhere to them, those actors will likely be harmed by states not adhering to them.

development, post-development, and pre-fielding. Considering the moral philosophies highlighted above, the first and last may be the most important (that is, not *what* does the weapon do, but rather *how* does it do it). Given the technical imperfections of autonomous systems, the final phase should require some way to solve errors in the weapon's coding, and the first phase should address the issue of distinction when uncertainty exists about a target.

The final step in coming to a substantive decision about the legal use of autonomous weapon systems is deciding how these two phases can best embody the principles of proportionality and distinction. As stated above, the heightened bar for what is considered a proportional attack can only stand as long as the weapon has no errors in coding. Minimizing collateral damage is the fundamental goal of proportionality; thus, if the risk of an error is too high, then that risk overshadows the weapon's technical capabilities. In terms of distinction, the toughest question is often when a target is no longer a valid target—or the opposite, when civilians divest themselves of their protected status. This is the issue of civilians directly participating in combat. There needs to be a way in which weapons can be designed to tell when a civilian is or is not a valid target.

Given the current framework of the international community through the LOAC, the present technical capabilities of modern weapons, and the overall moral goals of International Human Rights Law, the first review should ensure that the autonomous weapons system will be designed to keep a human being “on-the-loop.” The weapon may be capable of discerning and attacking a target without consulting the human operator, but there should be a level of oversight that can allow for control of the weapon in the event that an error in coding causes the weapon to make a mistake. Additionally, due to the risk of an enemy remotely re-programming the weapon to malfunction, appropriate oversight is necessary to prevent weapon misuse.<sup>85</sup> The final review should test the functionality level of that design intent. The human operator must have sufficient time and direct oversight to control the actions of the weapon. This is critical to commanding a weapon in situations of uncertainty. Although technical capabilities may improve to a level

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<sup>85</sup> Although not expressly discussed in this study, a major concern regarding autonomous weapons is that the enemy will be able to hack into the system's software and re-program it to meet enemy objectives. If the enemy is a non-state actor that does not abide by the LOAC, then this is an important consideration for protecting civilians.



where the degree of oversight can be more limited, current capabilities render direct human oversight absolutely necessary. An “on-the-loop” requirement is a logical balance between international humanitarian law and self-defense concerns that the international community can reasonably be expected to accept.

Yet, not everyone is apt to agree with mere *regulation* of these weapons systems. Several groups who emphasize human rights as the primary concern of international law are calling for a complete prohibition on weapons systems that can select and fire without human intervention.<sup>86</sup> One of the more tenuous arguments these groups make is that these systems would lack the ability to exercise human compassion, which would put civilians at an increased risk of becoming collateral damage. This argument comes from the concept that robots do not have the capacity to exercise human emotion in general. Human emotion often results in actions taken out of fear, revenge, and shock. There is not sufficient evidence that human restraint taken out of compassion would save any more lives than programming systems to err on the side of caution while removing the possibility of revenge killings and other attacks employed in a rush of emotion.

A more substantial argument is that countries themselves could use these systems as a reason to develop systems that touch and even cross the lines of the LOAC, because they feel removed from the chain of responsibility.<sup>87</sup> This author would respond that such an issue is not an issue of the law but, rather, one of enforcement. As the concept of command responsibility had to develop,<sup>88</sup> its application to autonomous

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<sup>86</sup> Q & A on *Autonomous Weapons*, HUM. RTS. WATCH, Oct. 21, 2013, at 3. *Human Rights Watch* published a review in 2012 entitled *Losing Humanity: The Case Against Killer Robots* that advocates for a complete ban on autonomous weapon systems. This Q & A outlines the primary arguments in the paper and responds to similar papers such as this one that advocate regulation above prohibition.

<sup>87</sup> *Id.* While international law may view the commanders who deploy these systems, as well as those responsible for coding them, as responsible, several states will be tempted to foster an environment where command responsibility does not extend to autonomous systems that are incapable of asserting human reason over a situation. The “out of my hands” mentality would be an easy trap into which many militaries will fall.

<sup>88</sup> Eugenie Levine, *Command Responsibility*, GLOBAL POL’Y FORUM (Feb. 2005). The legal concept of command responsibility can be traced to the Ordinance of Orleans in 1439, which applied a blanket responsibility to commanders for acts of their subordinates. After WWII, the *Yamashita* case applied a “must have known” standard to this responsibility. Post-Vietnam, the concept of “should have known” developed. In application to autonomous weapons, commanders that deploy a system in an unlawful way would be responsible for acts it commits. *Id.*

weapons systems will as well. The groups respond to this argument by arguing that complete prohibition would be easier to enforce than regulation.<sup>89</sup> As discussed above, this author disagrees. Particularly in an age of sophisticated groups of armed non-state actors, a prohibition on autonomous weapons systems is unrealistic, and this unrealistic ban would disillusion many actors from compliance with international weapons laws completely.

There remains one final question. This article addressed how the current international legal framework should be applied to autonomous weapons systems, but is that enough? Does this framework need to be adjusted in order to account for emerging technologies such as autonomous weapons systems. This author would propose not so much a change to the existing laws as a clarification. The application of human reason is littered throughout the LOAC. As scientists, policy makers, and legal scholars attempt to apply human reason to technological capability, a more substantive standard must be developed against which weapons systems can be measured during the weapons testing process. Ultimately, the end of the day the purpose of the LOAC is to protect humanity; thus, the ways in which it protects itself from the horrors of war should continue to emphasize human reason as an acceptable standard.

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<sup>89</sup> *Id.* Human Rights Watch contends that, in the same way blinding lasers were preemptively banned completely, autonomous weapons should be as well. However, this fails to account for the fact that this is more of a regulation, because laser technology is still allowed, just one use of it has been banned. *Id.*