LETHAL AUTONOMOUS WEAPONS AND THE PROFESSIONAL MILITARY ETHIC

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Since the Cold War, the United States has maintained a decisive advantage in military weapons technologies. Being the leader in developing new defense technologies comes with the ethical responsibility to lead in ensuring that these technologies comply with international norms, treaties, and the professional ethics of the servicemen that will be equipped with these weapons. Over the last decade, a significant body of work has been established on the potentials and pitfalls of adapting artificial intelligence into lethal and non-lethal defense technologies. Most of these arguments are made by ethicists, roboticists, lawyers, and computer engineers with understandably modest understandings of the complex operational environments in which these systems might be employed. This study attempts to build on the debate by offering a perspective from inside the military profession through the lens of The Framework of the Army Ethic. Using this lens, Lethal Autonomous Weapons Systems can be assessed to discern which types of operations they are ethically suited or unsuited for use. As stewards of the Army profession, it is incumbent on military leaders to be active in this debate to ensure that our force remains the world's leader in the ethical application of landpower.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

LETHAL AUTONOMOUS WEAPONS AND THE PROFESSIONAL MILITARY ETHIC, by Major Jonathan J Batt, 78 pages.

Since the Cold War, the United States has maintained a decisive advantage in military weapons technologies. Being the leader in developing new defense technologies comes with the ethical responsibility to lead in ensuring that these technologies comply with international norms, treaties, and the professional ethics of the servicemen that will be equipped with these weapons. Over the last decade, a significant body of work has been established on the potentials and pitfalls of adapting artificial intelligence into lethal and non-lethal defense technologies. Most of these arguments are made by ethicists, roboticists, lawyers, and computer engineers with understandably modest understandings of the complex operational environments in which these systems might be employed. This study attempts to build on the debate by offering a perspective from inside the military profession through the lens of The Framework of the Army Ethic. Using this lens, Lethal Autonomous Weapons Systems can be assessed to discern which types of operations they are ethically suited or unsuited for use. As stewards of the Army profession, it is incumbent on military leaders to be active in this debate to ensure that our force remains the world's leader in the ethical application of landpower.

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ACRONYMS

ADP	Army Doctrinal Publication
ADRP	Army Doctrinal Reference Publication
AI	Artificial Intelligence
AWS	Autonomous Weapons System
CCW	Convention on Prohibitions or Restrictions of the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects
DARPA	Defense Advanced Research Projects Agency
DOD	Department of Defense
DOTMLPF-P	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy
LOW	Law of War
LOAC	Law of Armed Conflict
MUM-T	Manned-Unmanned Teaming
ROE	Rules of Engagement
RPA	Remotely Piloted Aircraft
TTPs	Tactics, Techniques, and Procedures
UAV	Unmanned Aerial Vehicle
UN	United Nations

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CHAPTER 1

INTRODUCTION

> War is still, somehow, a rule-governed activity, a world of permissions and prohibitions- a moral world, therefore, in the midst of hell.
>
> —Michael Walzer, quoted in Ronald Arkin, *Governing Lethal Behavior in Autonomous Robots*

Background

Since the Cold War, the United States has maintained a decisive advantage in military weapons technologies. The ability of the United States to leverage its economy to fund its vast defense budget has facilitated rapid developments beyond the scope of all other states. From its advanced nuclear arsenal to its seemingly omnipresent drone fleet, the U.S. military is the benchmark from which all other militaries are compared. As the leader in developing new defense technologies, there is an ethical responsibility to ensure that these technologies comply with international norms, treaties, and the professional ethics of the service members that will be employing these weapons.

Concerns over the ethical use of weapons can be traced back to the longbow and crossbow, which drew widespread condemnation contemporaneously. During the 11th century, even the Church denounced the use of crossbows as morally reprehensible tools of war (Lin 2014, 64). Prohibitions on weapons have been successfully implemented in whole or part over the last century in an effort to bring a common level of morality to conflict. In recent history, conventions have been widely adopted to ban the use of blinding laser weapons, chemical weapons, and other types of weapons that are inherently indiscriminant or cause superfluous injury. These conventions are codified in

international humanitarian law (IHL) to form the basis for new international norms of armed conflict.

As the United States continues to refine its remote and autonomous systems, it is approaching the unique ability to produce competent lethal autonomous weapon systems (LAWS) that require no human-in-the-loop to kill on the battlefield. The Department of Defense defines an autonomous weapon as "a weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation" (Carter 2017, 1). This revelation raises numerous ethical concerns for the military as it weighs the merits and liabilities of employing LAWS rather than human-in-the-loop systems. Before these technologies come to fruition, public leaders should fully consider the ethical and functional concerns, ensuring that values are driving innovation and that innovation is not diminishing our values.

Discussions on the tactics, techniques, and procedures of warfighting are inherent to the professional non-commissioned officer and commissioned officer corps, to effectively advise civilian leaders on how military forces should be employed. Army officers are guided by the Army Ethic- "the evolving set of laws, values, and beliefs, embedded within the Army culture of trust that motivates and guides the conduct of Army professionals bound together in common moral purpose" (HQDA 2015, 1-2). This ethic serves as a starting point for the profession to understand its role in service. Army officers have unique insight into this culture which is why it is necessary for them to

participate in discussions on the future of the military; these discussions cannot be left entirely to those outside of the profession as critical context may be lost in the debate. This is not to say that military professionals should dominate the discussions. As this paper will explain, the profession and its ethic are firmly grounded in mutual trust. This foundational mutual trust requires honest, intellectual, and complete advice to civilian leaders so that they are armed with the most complete understanding of a problem before issuing guidance to the force.

Statement of Problem

This study is designed to investigate the concerns and restrictions on employing lethal autonomous weapons by the U.S. Army given the current lack of comprehensive guidance on the issue. There is currently only one document- Department of Defense Directive (DoDD 3000.09)- that specifically addresses the United States' position on LAWS. Additionally, the Department of Defense Law of War Manual (2015) addresses the fact that autonomous weapons are not unlawful *per se* but refers back to DoDD 3000.09 for further guidance. This absence of comprehensive guidance on LAWS is not unexpected, as the systems are still under development and presumably far from being fielded in combat, but leaves room for debate on the issue in the interim. The United States should continue to refine and codify its policy into law to prevent leaders from committing ethical errors, provide sound procurement strategies, and generate thought on the ethical use of these systems in the future.

Purpose of the Study

The purpose of this study is to increase the understanding of LAWS with respect to the ethics that bind our military. The debate over the use of autonomous weapons has been ongoing for several decades, mostly as a result of science-fiction stories that captivated and deeply worried a large number of people. This debate has only increased as technology has begun to catch up with the imagination of artists. The 21st century has witnessed the rise of artificial intelligence (AI) and the implementation of remotely piloted aircraft (RPA) which have brought this discussion to the international stage. Despite the attention, much of the debate remains compartmentalized within the legal, technical, and philosophical arenas, without perspective from military leaders. This study seeks to provide a starting point for debate within the military profession so that a greater understanding can be achieved across the spectrum.

Primary Qualitative Research Question

This study attempts to answer the question: how can the United States employ lethal autonomous weapons systems in modern-system warfare, consistent with the professional military ethic of the Army? Modern-system warfare is specifically used to frame the question in contemporary operations, given that future styles of warfare with LAWS cannot be predicted and analyzed in this project. The Army's professional military ethic was also selected as a lens for analysis given that ground combat is most likely the most complex dimension, and will offer the greatest ethical challenges in implementation.

Secondary Research Questions

Secondary research questions include:

SRQ 1: In which types of operations are LAWS most ethically appropriate? This question seeks to determine how LAWS can be used across the range of operations that the Army conducts. The Army conducts the Decisive Action tasks of Offense, Defense, Stability, and Defense Support to Civil Authorities (DSCA) in support of the Joint Force in Unified Land Operations. Offense, Defense, and Stability are conducted outside of the United States and its territories while DSCA is conducted within the Unites States and its territories.

SRQ 2: What changes to current doctrine are needed to account for LAWS? This question examines current Army doctrine and regulations to determine which major documents are affected by LAWS and what updates should be made to account for concerns, tactics, techniques, and procedures associated with such a fundamentally different type of weapon system.

SRQ 3: In what circumstances should the military evolve its ethics to accommodate the use of LAWS? By definition, the Army Ethic is "the evolving set of laws, values, and beliefs, embedded within the Army culture of trust that motivates and guides the conduct of Army professionals bound together in common moral purpose" (HQDA 2015, 2-1). This question will assess how any identified concerns can be mitigated by modifying existing components of The Framework of the Army Ethic.

The Framework of the Army Ethic		
	Legal Foundations	***Moral Foundations***
Army as Profession (Laws, values, and norms for performance of collective institution)	**Legal-Institutional** • The U.S. Constitution • Titles 5, 10, 32, USC • Treaties • Status-of-forces agreements • Law of war	**Moral-Institutional** • The Declaration of Independence • Just war tradition • Trust relationships of the profession
Individual as Professional (Laws, values, and norms for performance of individual professionals)	**Legal-Individual** Oaths: • Enlistment • Commission • Office USC—Standards of Exemplary Conduct UCMJ Rules of engagement Soldier's Rules	**Moral-Individual** Universal Norms: • Basic rights • Golden rule Values, Creeds, and Mottos: • "Duty, Honor, Country" • NCO Creed • Army Civilian Corps Creed • Army Values • The Soldier's Creed, Warrior Ethos
NCO noncommissioned officer UCMJ Uniform Code of Military Justice		U.S. United States USC United States Code
The *Army Ethic* is the evolving set of laws, values, and beliefs, embedded within the Army culture of trust that motivates and guides the conduct of Army professionals bound together in common moral purpose.		

Figure 1. The Framework of the Army Ethic

Source: Headquarters, Department of the Army, Army Doctrine Reference Publication 1, *The Army Profession* (Washington, DC: Government Printing Office, 2015), 2-3.

Assumptions

This study assumes that LAWS can be developed that will act completely in accordance with their programming. This is an important constraint as there is significant discussion surrounding the ability of systems using artificial intelligence and machine learning to circumvent their programming and act on their own accord. This is not to say that autonomous systems can be flawlessly programmed to accomplish any task, rather that the systems will do as they are programmed without radical self-actualization as depicted in numerous science-fiction scenarios. This potential has been widely addressed by many leaders in the technology community as a realistic threat. Stephen Hawking

spoke on this issue in 2017 before his death, stating that he "fear[s] that AI may replace humans altogether. If people design computer viruses, someone will design AI that improves and replicates itself. This will be a new form of life that outperforms humans" (Medeiros 2017). This situation, while alarming, is within the technical realm of concern rather than the practical-ethical realm examined here.

This study also assumes that LAWS will be used in a manner consistent with the current style of warfare rather than in a revolutionary manner. While this assumption seems straightforward, the development and widespread implementation of LAWS could likely breed new forms of warfare that would be challenging to identify and understand. For understanding, two types of warfare that could arise as a result of these weapons are subterranean warfare and swarm warfare. Tunneling and swarming both present radical departures from modern style warfare and would present a significant new array of legal and ethical challenges that are well beyond the scope of this project.

Definitions of Terms

Many terms and concepts presented in this study have varying definitions; for clarity, significant terms are defined below for consistent understanding.

Army Ethic. The evolving set of laws, values, and beliefs, embedded within the Army culture of trust that motivates and guides the conduct of Army professionals bound together in common moral purpose (HQDA 2015, 2-3).

Ethics. The societal values that govern a person's behavior.

Morals. A person's standard of behavior or beliefs concerning what is and is not acceptable for them to do.

Values. A person's principles or standards of behavior; one's judgment of what is important in life.

Virtue. Moral excellence; a quality considered morally good or desirable in a person.

Lethal autonomous weapon system (LAWS). These are the focus of this study and must be differentiated from all other types of systems that have a human 'in' or 'on' the loop. LAWS are weapon systems that, once activated, can select and engage targets without further intervention by a human operator. This does not include human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system.

Autonomous weapon system (AWS). A weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation (Carter 2017, 3).

Semi-autonomous weapon system. A weapon system that, once activated, is intended to only engage individual targets or specific target groups that have been selected by a human operator. This includes:

> Semi-autonomous weapon systems that employ autonomy for engagement-related functions including, but not limited to, acquiring, tracking, and identifying potential targets; cueing potential targets to human operators; prioritizing selected targets; timing of when to fire; or providing terminal guidance to home in on selected targets, provided that human control is retained over the decision to select individual targets and specific target groups for engagement.
>
> "Fire and forget" or lock-on-after-launch homing munitions that rely on TTPs to maximize the probability that the only targets within the seeker's

> acquisition basket when the seeker activates are those individual targets or specific target groups that have been selected by a human operator (Carter 2017, 3).

Singularity. A hypothetical moment in time when artificial intelligence and other technologies have become so advanced that humanity undergoes a dramatic and irreversible change.

Artificial intelligence. The capability of computer systems to perform tasks that normally require human intelligence such as perception, conversation, and decision-making. AI systems can learn and think independently to problem-solve and create unique solutions. AI is inherent in future LAWS concepts given the complexity of operational environments.

Distinction. Sometimes called discrimination, obliges parties to a conflict to distinguish principally between the armed forces and the civilian population, and between unprotected and protected objects. Distinction may be understood as encompassing two sets of reinforcing duties. Parties to a conflict must apply a framework of legal classes for persons and objects by: (1) discriminating in conducting attacks against the enemy; and (2) distinguishing a party's own persons and objects (DoD 2016, 62).

Proportionality. The principle that even where one is justified in acting, one must not act in a way that is unreasonable or excessive. Proportionality has also been viewed as a legal restatement of the military concept of economy of force.

Scope

This study will focus specifically on the ethical use of lethal autonomous weapons with respect to the Army Ethic. It is important to differentiate lethal autonomous weapons (LAWS) from autonomous weapon systems (AWS), semi-autonomous weapons, and

remotely piloted aircraft. As noted in the definitions introduced above, LAWS have the unique ability to 'select and engage targets' without human intervention or supervision. In the case of semi-autonomous weapons and RPAs, a human operator selects the targets, providing human control over the lethal system. Both sets of weapons have ethical challenges, but where semi-autonomous and RPAs have been found to be acceptable to the United States and international community, the debate over LAWS is still contested based on the lack of human supervision and direction. This study will only focus on systems in which a human operator is not on-the-loop or in-the-loop, known as a lethal autonomous weapon. While there is currently no formally accepted framework for understanding levels of autonomy, Figure 2 on the following page depicts an example framework using four levels of autonomy. Level Four in this framework is congruent with the definition of LAWS, and provides an additional means of understanding the scope of this study.

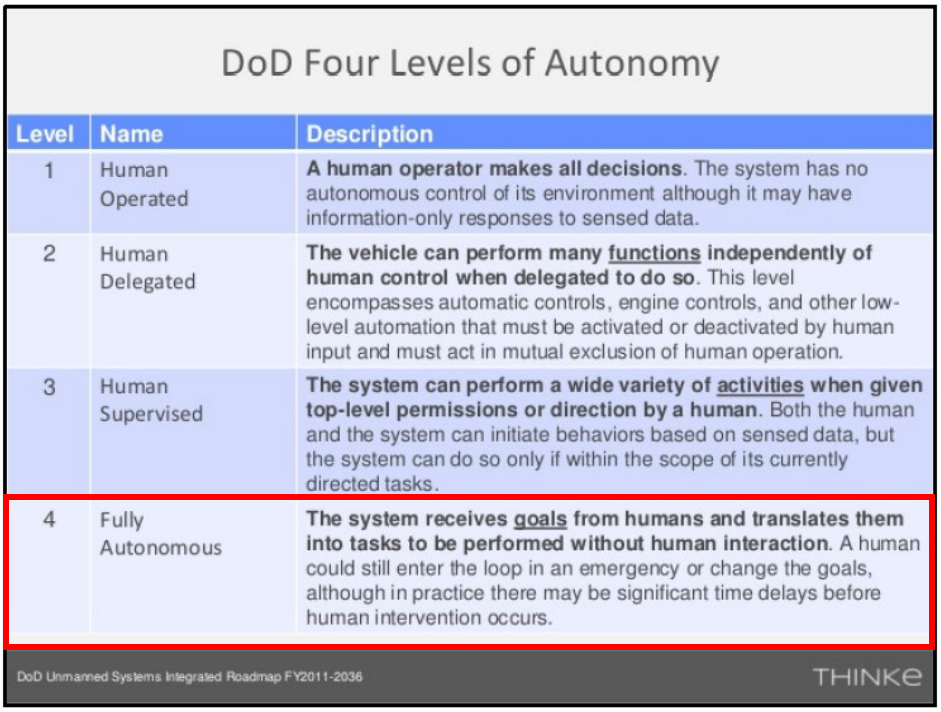

Figure 2. DoD Four Levels of Autonomy

Source: National Defense University, *Robotics and Autonomous Systems* (Washington, DC: National Defense University, 2017), 3. Red frame added by author.

Limitations

This study will be limited in its ability to understand the projected future capability of LAWS that are potentially under development due to classification. The United States and several other countries are overtly active in researching this capability but the progress and products are likely to remain classified for the foreseeable future to retain their competitive advantage. Given that the exact state-of-the-art of military technology is unknown, this study will assume that public knowledge of private sector technological developments is roughly on par with classified technologies.

The manner in which states engage in combat is constantly evolving, making the study of war and predicting future trends increasingly complicated. Ethics also evolve with society and war to match the contemporary norms, further complicating this study. Given these issues, this study will be limited to the current style of war and current ethical codes and laws. While defense researchers are striving to accomplish the Third Offset to revolutionize war, it is not likely that these developments will impact this study.

Delimitations

This study will focus solely on the codified Army doctrine, guidelines, and theory associated with the professional military ethic and will be unable to address the implications of LAWS being used by commanders outside of their intended purpose. All weapons possess the potential to be errantly selected for use in situations outside of their intended purpose. The Army trusts commanders to responsibly employ their weapon systems but in cases where leaders fail to consider the effects of their weapons, it is not the fault of the weapon per se.

In this study, only the Army Ethic is considered as a lens for analysis. While each service has its own codes, values, and policies, the Army has established a very clear guiding framework for examination. The Army is also the service that is most likely to encounter complex ethical challenges in implementation of LAWS. Given this circumstance, it is logical to use this framework and assess it against the greatest challenge.

Significance of the Study

> The practice or work of the military professional is "the daily exercise of their discretionary judgments while making decisions and taking actions that fulfill their moral and legal obligations under their [oath]."
>
> —LTC (RET) Don Snider, quoted in George Lucas
> *Routledge Handbook of Military Ethics*

This study is significant because it will initiate the conversation on the ethical use of LAWS in land warfare within the military profession. The recommendations from this study can also be used to update the Law of Armed Conflict manual in order to codify ethical boundaries for the future use of LAWS by U.S. forces. This prudent consideration of likely future weapons implementation, can mitigate against the potential for unethical use of these systems. History is replete with instances of civilian and military leaders employing weapons and tactics without prior substantive debate, only to later regret their decisions in the wake of further reflection.

Given that the U.S. military is likely to lead in the development of future autonomous systems, military professionals should proactively participate in this debate. This participation should extend beyond senior acquisitions officers and General Officers, in order to gain perspective from the warfighters that have to actually live and fight by the values of the Army. Ideally, this paper serves to motive other military professionals to discuss their beliefs in a professional forum, especially with diplomats, ethicists, and engineers, to develop greater understanding across fields.

Conclusion

This chapter presented the background, research questions, and scope of this research project. Of significance, this chapter highlighted the professional importance of

participating in ethical debates that affect the military, in order to provide context on how imposing mandates or restrictions can affect the service. The next chapter will present the literature review of the subject and provide detailed insight into The Framework of the Army Ethic, ethical decision-making, contemporary ethical debate on LAWS, and contemporary thought on the Army Ethic.

CHAPTER 2

LITERATURE REVIEW

> The most important human endeavor is the striving for morality in our actions.
> Our inner balance and even our very existence depend on it.
> Only morality in our actions can give beauty and dignity to life.
> —Albert Einstein, *AlbertEinsteinBlog*

Chapter Introduction

The literature review will provide context for this study by highlighting the spectrum of relevant concerns with respect to lethal autonomous weapons (LAWS). This section will be divided into five subsections covering: restatement of the research questions; arguments in support of lethal autonomous weapon systems; arguments prohibiting/restricting LAWS; previous research from military professionals; and relevant policy. The majority of the body of work on this topic has been developed in the preceding decade and is rapidly expanding as debate at the UN continues to attract attention. Despite the more recent emergence of LAWS specific material, the underlying ethical principles that frame the discussion are mature enough to provide a stable lens to assess the new capability. This predicament is not unique to autonomous weapon systems (AWS), as previously noted, numerous weapon systems have experienced similar turbulence as they arrived on the battlefield.

Restated Research Questions

The purpose of this study is to increase the understanding of LAWS with respect to the ethics that bind our military in war. This study attempts to answer the question:

How can the United States employ lethal autonomous weapons systems in modern-system warfare, consistent with the professional military ethic of the Army?

Secondary research questions include:

1. In which types of operations are LAWS most ethically appropriate?
2. What changes to current doctrine are needed to account for LAWS?
3. In what circumstances should the military evolve its ethics to accommodate the use of LAWS?

Arguments in Support of Laws

> Rather than trying to stigmatize or ban such emerging technologies in the area of lethal autonomous weapon systems, States should encourage such innovation that furthers the objectives and purposes of the Convention.
>
> —U.S. Delegation to the UN, "Humanitarian Benefits of Emerging Technologies in the Area of Lethal Autonomous Weapon Systems"

The most notable proponent of autonomous weapons proliferation is Dr. Ronald Arkin, a career military robotics researcher and Georgia Institute of Technology professor. Arkin has published a significant number of articles on the topic and his book, *Governing Lethal Behavior in Autonomous Robots,* is the single most comprehensive assessment of AWS in print. Arkin covers most of the major arguments in favor of autonomy including: inevitability, human failings, legality, and programming viability. He also proposes a complex algorithm for LAWS that conceptually regulates their behavior in accordance with the law of war (LOW), called the "ethical governor" (Arkin 2009, 178). Using this algorithm, Arkin was able to conduct a mathematical proof of concept of the concepts detailed in his analysis. While the ethical governor could

theoretically facilitate a future LAWS Turing Test to determine ethical proficiency in operations, Arkin has not yet operationalized the concept for practical testing.

Underpinning Arkin's concepts is the idea that LAWS have the potential to make war more humane by removing human ethical failings from the battlefield. He cites a 2006 Surgeon General's Office report that among other issues, notes the following of soldiers surveyed in Iraq:

1. Approximately 10% of Soldiers and Marines report mistreating non-combatants.
2. Only 47% of Soldiers and 38% of Marines agreed that non-combatants should be treated with dignity and respect.
3. Well over a third of Soldiers and Marines reported torture should be allowed, whether to save the life of a fellow Soldier or Marine or to obtain important information about insurgents.
4. 17% of Soldiers and Marines agreed or strongly agreed that all noncombatants should be treated as insurgents.
5. 45% of Soldiers and 60% of Marines did not agree that they would report a fellow soldier/marine if he had injured or killed an innocent noncombatant.
6. Combat experience, particularly losing a team member, was related to an increase in ethical violations (Arkin 2009, 31-32).

These grave acknowledgments are sufficient grounds for pause to consider the ethical state of our military at war. At a very minimum, the situation should be further researched to understand the implications of these responses. For Arkin, these results validate his drive to promote LAWS to reduce human suffering.

Given that AWS are already present on the battlefield with a high-degree of effectiveness, Arkin and others posit that the emergence of LAWS on the battlefield is inevitable. Dr. Andrew Ilachinski supported this assertion in his CNA white paper titled "*AI, Robots, and Swarms*," postulating that "the question is not whether the future of

warfare will be filled with autonomous, AI-driven robots, but when and in what form" (Ilachinski 2017, 231). The U.S. and other major military powers have invested significant resources into research and development of these technologies and, if history is any indication, the prospects for a preemptive ban are nil. Instead, proponents of LAWS argue that regulation is a much more realistic approach to the problem than attempting to ban them outright. Charles Dunlap argues in his essay *Autonomy and Autonomous Weapons*, that "we ought to work to find sensible regulations for them, ever conscious of the grim reality that even in the modern era, some of the worst atrocities have been carried out using not some piece of high-tech weaponry, but the most primitive of implements" (Dunlap 2016, 16).

Aside from the increasing presence of AWS on the battlefield, the inevitability argument is bolstered by the fact that LAWS do not appear to be unlawful *per se* at this time. A weapon is unlawful *per se* if "a treaty to which the United States is a Party or customary international law has prohibited its use under all circumstances. For example, the use of 'blinding laser' weapons is prohibited, regardless of how they are used" (DoD 2016, 336-337). Dr. Michael Schmitt offers a very detailed counterargument to activists against LAWS based on legal grounds, positing that "autonomy has no direct bearing on the probability they would cause unnecessary suffering or superfluous injury, does not preclude them from being directed at combatants and military objectives, and need not result in their having effects that an attacker cannot control . . . [thus] are not prohibited on this basis as a category" (Schmitt 2013, 35).

DoD LOW Manual Excerpt

Section 6.2.1: Review of New Types of Weapons

The development of new types of weapons has often resulted in public denunciation of their allegedly cruel effects and in attempts to prohibit their use in armed conflict. This has been true of the crossbow, siege engines for hurling projectiles, firearms, gunpowder, bayonets, and other weapons that have since been widely recognized as not prohibited by the law of war.

Like other aspects of the law of war, the rules relating to weapons are generally characterized as prohibitive law forbidding certain weapons or the use of weapons in certain instances rather than positive law authorizing the weapon or its use. The lawfulness of the use of a type of weapon does not depend on the presence or absence of authorization, but, on the contrary, on whether the weapon is prohibited. Thus, the mere fact that a weapon is novel or employs new technology does not mean that the weapon is illegal. The law of war does not require States to establish a general practice of using a weapon before it is to be regarded as legal. Moreover, it would appear absurd to suggest that a new type of weapon should automatically be prohibited because there is no State practice supporting such use, or to suggest that States must continue using a weapon in each conflict simply to maintain its legality.

Section 6.2.2: Questions Considered in the Legal Review of Weapons for Consistency With U.S. Law of War Obligations.

The review of the acquisition or procurement of a weapon for consistency with U.S. law of war obligations should consider three questions to determine whether the weapon's acquisition or procurement is prohibited:

- whether the weapon's intended use is calculated to cause superfluous injury;
- whether the weapon is inherently indiscriminate; and
- whether the weapon falls within a class of weapons that has been specifically prohibited.

Figure 3. DoD LOW Manual Excerpt

Source: U.S. Department of Defense, *The Department of Defense Law of Land Warfare Manual* (Washington, DC: Office of the General Counsel, 2016), 338-339.

Several proponents of LAWS also note that these systems are theoretically most effective when used to complement manned elements rather than replace them (Corn 2014; Schmitt 2013). This position is in concurrence with the Defense Science Board that stated "the true value of these 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" (Schmitt 2013, 6). They argued that viewing LAWS as interchangeable with human soldiers and attempting to interpret the Law of Armed Conflict (LOAC) in this manner is inappropriate. Instead, LAWS should be analyzed and tested as with any other new weapon system in accordance with Article 36 of AP I.

In April of 2018, the UN conducted a Group of Governmental Experts meeting in Geneva to continue its discussions with respect to the Convention on Certain Conventional Weapons (CCW) and LAWS that have been ongoing since 2013. Prior to this meeting, the U.S. issued its working paper on LAWS use, which focused on the key enabling abilities that LAWS could bring to the battlefield. The United States' position was that "rather than trying to stigmatize or ban such emerging technologies in the area of lethal autonomous weapon systems, states should encourage such innovation that furthers the objectives and purposes of the Convention" (USA 2018, 6). This posture is supported primarily by the concept that "smart weapons that use computers and autonomous functions to deploy force more precisely and efficiently have been shown to reduce risks of harm to civilians and civilian objects" (USA 2018, 1). The Russian Federation assumed a similar position, highlighting the importance of states retaining the

sovereign ability to develop weapons within the bounds of IHL and existing treaties to which they are a party (Russia 2018, 3).

Notable AI-Related Technology Developments in 2016

1. AI defeated the reigning world champion in the game of Go, a game that is so much more "complex" than chess that, prior to this event, most AI experts believed that it could not be done for another 15-20 years.
2. AI learned on its own where to find the information it needs to accomplish a specific task.
3. AI predicted the immediate future (by generating a short video clip) by examining a single photograph (and is also able to predict the future from studying video frames).
4. AI automatically inferred the rules that govern the behavior of individual robots within a robotic swarm simply by watching.
5. AI learned to navigate the London Underground by itself (by consulting its own acquired memories and experiences, much like a human brain).
6. AI speech recognition reached human parity in conversational speech.
7. An AI communication system invented its own encryption scheme, without being taught specific cryptographic algorithms (and without revealing to researchers how its method works).
8. An AI translation algorithm invented its own "interlingua" language to more effectively translate between any two languages (without being taught to do so by humans).
9. An AI system interacted with its environment (via virtual actuators) to learn and solve problems in the same way that a human child does.
10. An AI-based medical diagnosis system at the Houston Methodist Research Institute in Texas achieved 99% accuracy in reviewing millions of mammograms (at a rate 30x faster than humans).

Figure 4. Notable AI-Related Technology Developments in 2016

Source: Andrew Ilachinski, *AI, Robots, and Swarms: Issues, Questions, and Recommended Studies* (Arlington, VA: CNA, 2017), iii-iv.

Arguments Prohibiting/Restricting LAWS

> Without ethical and legal constraints on both the decision to wage it and its conduct, war is nothing more than the application of brute force, logically indistinguishable from mass murder.
>
> —David Whetham, *Ethics, Law and Military Operations*

The leading voice in advocating against LAWS is a professor of artificial intelligence and robotics, Dr. Noel Sharkey. Sharkey has published extensively on the concerns of AI and robotics in society, most recently joining the Harvard University-based NGO Human Rights Watch as a spokesperson for their Campaign to Stop Killer Robots. He has also founded his own organization with a corresponding mission, the International Committee for Robot Arms Control. Sharkey argued that LAWS are incapable of meeting the thresholds for proportionality, distinction, and will lead to moral disengagement in wars (Sharkey 2010). Along with the NGO 'Article 36,' he proposed that weapons must remain under meaningful human control to meet the thresholds for ethical use under international humanitarian law (IHL). In his working paper prepared for the April 2018 CCW Group of Experts Meeting, he outlined necessary conditions for meaningful human control as:

> A commander or operator should
> 1. have full contextual and situational awareness of the target area at the time of initiating a specific attack;
> 2. be able to perceive and react to any change or unanticipated situations that may have arisen since planning the attack, such as changes in the legitimacy of the targets;
> 3. have active cognitive participation in the attack;
> 4. have sufficient time for deliberation on the nature of targets, their significance in terms of the necessity and appropriateness of an attack and the likely incidental and possible accidental effects of the attack and…
> 5. have a means for the rapid suspension or abortion of the attack
> (Sharkey 2018, 4).

With respect to the principle of distinction, Sharkey pointed to the reality that "British teenagers beat surveillance cameras just by wearing hooded jackets. In a war with non-uniformed combatants, knowing who to kill would have to be based on situational awareness and on having human understanding of other people's intentions and their likely behavior" (Sharkey 2010, 379). For the foreseeable future, AI is not expected to reach a level of awareness that will facilitate this kind of human understanding of action and intention.

Nearly every advocate against LAWS noted that making proportionality decisions is inherently contextual and too subjective to be achieved by AI. "As it is already extremely complex to weigh military gain and human suffering in war situations, machines without meaningful human intervention will be incapable of applying the rule of proportionality" (Ekelhof, Merel, and Struyk 2014, 15). Given that there is no objective means of determining proportionality, the body of work noted the impossibility of developing a contextual algorithm to satisfy this requirement. Peter Singer highlighted the complexity of programming to account for this subjectivity saying: "a computer looks at an 80-year-old woman in a wheelchair the exact same way it looks at a T-80 tank. They are both just zeros and ones" (Singer 2012, 476).

Dr. Shannon Vallor posited a unique argument on ethical de-skilling in her 2013 article, *The Future of Military Virtue: Autonomous Systems and the Moral Deskilling of the Military*. In it, she argued that the "ideals of military virtue such as courage, integrity, honor and compassion help to distinguish legitimate uses of military force from amoral, criminal or mercenary violence, while also preserving the conception of moral community needed to secure a meaningful peace in war's aftermath" (Vallor 2013, 1). In

using LAWS to fight rather than humans, soldiers lose context and practice in the skilled application of these professional values, thereby degrading the entire system of its understanding of moral virtue. She cautioned that even in semi-autonomous applications of AWS that "we might be tempted to envision human supervisors of [LAWS] as elite military judges chosen for their Solomonic wisdom and discretion in the ethical use of lethal force; but in reality they may have even less room for discretion and fewer degrees of decision freedom than air traffic controllers" (Vallor 2013, 9). Vallor and others also argued that this arrangement will also lead to automation bias. Automation bias can plague the decision-making abilities of soldiers that have become further removed from practice in their profession and in navigating ethical dilemmas, resulting in greater trust in their pre-programmed AWS.

This situation, combined with the previously introduced concept of a lack of meaningful human control in LAWS, has led many experts to question whether accountability could be established in the kill chain. LAWS are programmed by software engineers, assembled by a defense contractor, and employed by a commander. Each contributor plays a role in the actions of LAWS on the battlefield, whether they are the algorithms used to determine whom to engage, the weapon effects, or the tactical situation into which it is deployed. Once initiated, none of these contributors can possibly know the outcome of the calculations the system makes in responding to novel threats and enemy counter-autonomous protocols. Given that the current and predicted state of the art of AI neural-nets is effectively a black-box, it would be impossible to determine the cause of the fault in the case of an errant killing. Dr. Robert Sparrow, another leading roboticist compares deploying LAWS to children reaching adulthood, stating that it

"would be analogous to holding parents responsible for the actions of their children once they have left their care" (Sparrow 2007, 69).

The DoD LOW Manual addressed this concern to a limited extent; it stated that "these rules do not impose obligations on the weapons themselves; of course, an inanimate object could not assume an 'obligation' in any event" (DoD 2016, 353-354). The manual went on to state that "in the situation in which a person is using a weapon that selects and engages targets autonomously, that person must refrain from using that weapon where it is expected to result in incidental harm that is excessive in relation to the concrete and direct military advantage expected to be gained" (U.S. DoD 2016, 354). This is the gap that Sparrow, Sharkey, and others note; that it would be impossible to predict the level of incidental harm without also knowing how the situation will develop or the counter-autonomous action that the enemy would take, thus making it impossible to assign accountability (Ekelhof, Merel, and Struyk 2014, 16).

Andrew Ilachinski referred to these unpredictable behaviors as 'emergent behavior.' His description mirrors the previously noted concern: "for an autonomous system to be able to adapt to changing environmental conditions, it must have a built-in capacity to learn, and to do so without human supervision. It may be difficult to predict, and be able to account for a priori unanticipated, emergent behavior" (Ilachinski 2007, vii). This emergent behavior is truly the focal point with respect to the debate on assigning responsibility for unintended engagements and potential atrocities on the battlefield.

A point of agreement between those that support and those that advocate against LAWS, is that at the present, the technology required to make LAWS that comply with

IHL and the LOW does not exist. The authors consistently indicate that the state of the art technology only allows for a high level of semi-autonomous action, as the systems do not have the inherent ability to conduct discrimination. Future technology has the potential to alleviate the noted concerns with respect to proportionality, discrimination, and military necessity but at the current time, it is not viewed as a likely outcome. A re-evaluation could occur in the future once the technology is developed but anti-LAWS advocates note that in the interim, without some form of regulation, states may employ sub-optimal systems to normalize their use. This normalization of LAWS would greatly increase the challenge in achieving their goal of regulation. Several authors noted historical examples of weapons and techniques being employed in combat prior to consideration of their ethical consequences, often pointing to the famous General Curtis LeMay quote during World War II, "if we'd lost the war, we'd all have been prosecuted as war criminals" (Cook 2013, 225).

The Future of Life Institute has focused its concern on the reality that the technology might someday exist to accomplish lawful warfare with LAWS, advocating that the UN should establish a moratorium to prevent an arms race in this area. They have published several open letters to the UN, with extremely broad support in the scientific community, including technology magnates Elon Musk, Stephen Hawing, Steve Wozniak, Nobel Laureates, and hundreds of other AI experts. These letters emphasize the stakes of the potential arms race and ask the UN CCW to preemptively ban them as a category.

> Lethal autonomous weapons threaten to become the third revolution in warfare. Once developed, they will permit armed conflict to be fought at a scale greater than ever, and at timescales faster than humans can comprehend. These can be

> weapons of terror, weapons that despots and terrorists use against innocent populations, and weapons hacked to behave in undesirable ways. We do not have long to act. Once this Pandora's box is opened, it will be hard to close. We therefore implore the High Contracting Parties to find a way to protect us all from these dangers (Future of Life Institute 2017).

The final aspect considered in the anti-LAWS discussion rests with the morality of using these weapons against humans in war. The moral argument was two-fold, (1) moral-disengagement through the use of LAWS and (2) the immorality of authorizing autonomous machines agency in killing humans. Moral disengagement is asserted to increase corresponding to the level of autonomy a state employs on the battlefield (Sharkey 2010). As fewer soldiers are placed in harms' way, a state has less 'skin-in-the-game;' this arrangement is argued to fundamentally alter the way societies look at war-resulting in strategic moral disengagement. The second component of the moral argument has a strong connection to societal and military values. Aaron Johnson and Sidney Axinn discuss this dilemma in their article *The Morality of Autonomous Robots*, in which they argue for a ban on autonomous weapons on a moral basis. The proposed four justifications for this position:

> (1) Such a robot treats a human as an object, instead of as a person with inherent dignity.
>
> (2) A machine can only mimic moral actions, it cannot be moral [by common definitions].
>
> (3) A machine run by a program has no human emotions, no feelings about the seriousness of killing a human.
>
> (4) Using such a robot would be a violation of military honor (Johnson and Axinn 2013, 1).

Military Community Commentary

The military community has published very little on the topic, but of those published, Paul Scharre and Jeffrey Caton have produced the two most significant works. Paul Scharre, a former army ranger, led the working group that produced DoDD 3000.09 as a staffer for the Office of the Secretary of Defense. He has published several articles independently and as a Center for a New American Security fellow, with a recently released book on autonomous warfare entitled *Army of None: Autonomous Weapons and the Future of War*.

In his 2016 study on ethical autonomy, *Autonomous Weapons and Operational Risk*, Sharre questioned the operational value of fully autonomous weapons and advocated for human oversight with tiered fail-safes. Scharre brought his understanding of interactions in combat to his work, citing the inherent uncertainty of battle and the infinite number of potentially lethal interactions that LAWS would face if fielded. He cited previous incidents of complex and routine failure in systems that incorporated autonomy including errant Patriot missile attacks and the near-catastrophic failure of the advanced F-22 fighter jets' computer system as it crossed the international dateline for the first time (Scharre 2016, 14).

> For example, if policymakers were told an autonomous weapon had a 1 in 10 chance of fratricide, they might reasonably avoid deploying such a system. However, if they were told that a system had a 1 in 10,000 chance of fratricide (99.99% safety rate), verified by testing, they might reasonably conclude that such a system was fairly safe. The odds of an accident would seem low. But if the number of potential interactions with friendly forces in a combat environment numbered in the "millions," as the Defense Science Board noted was the case with the Patriot, the actual number of fratricides could still be in the hundreds in a major military campaign, enough to have significant operational impact. Yet for those not used to assessing low probability, high consequence risk, a 1 in 10,000 risk might seem quite safe (Scharre 2016, 50).

Scharre concluded that MUM-T operations or ‘centaur warfighting’ is the most appropriate use of autonomous technology, incorporating various levels of constraints as human oversight is limited. His focus on mitigating risk was a very practical approach to realities on the battlefield in which the fog of war and friction dominate over prepared planning. By pointing to catastrophic or near-misses throughout history with then-advanced technology, he grounds the conversation in the realities of system failures in military operations. Figure 5 on the following page is an example used by Scharre and others to convey the potential hazards in trusting advanced technology; in the cited study, state of the art deep neural networks misidentified images with a high confidence-level (99.6%), producing unpredictable results (Scharre 2016, 16).

Neural Nets Failing (Confidently) to Identify Images

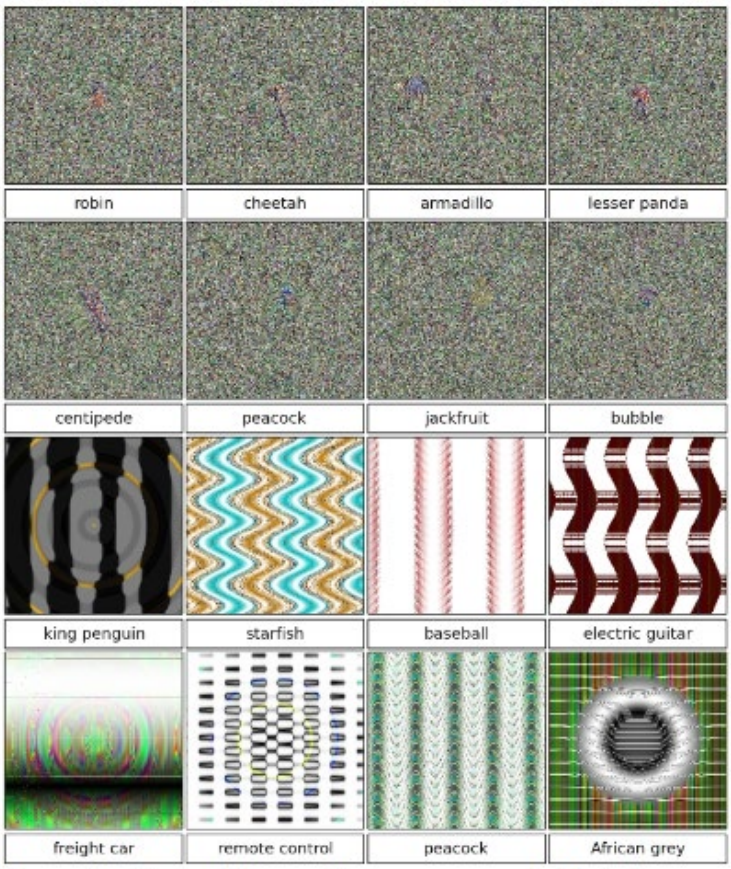

Figure 1. Evolved images that are unrecognizable to humans, but that state-of-the-art DNNs trained on ImageNet believe with $\geq$ 99.6% certainty to be a familiar object. This result highlights differences between how DNNs and humans recognize objects. Images are either directly (*top*) or indirectly (*bottom*) encoded.

Figure 5. Neural Nets Failing (Confidently) to Identify Images

Source: Anh Nguyen, Jason Yosinski, Jeff Clune, "Deep Neural Networks are Easily Fooled: High Confidence Predictions for Unrecognizable Images," accessed March 4, 2018. http://arxiv.org/pdf/1412.1897v4.pdf.

Jeffrey Caton, a retired Air Force officer and U.S. Army War College professor, is the other major contributor on AWS research from the military community. In his Strategic Studies Institute manuscript *Autonomous Weapon Systems: A Brief Survey of*

Developmental, Operational, Legal, and Ethical Issues, Caton comprehensively examined these four aspects of AWS implementation. He provided an extensive literature review of each of these areas of focus, concluding that "all parties involved with the development and operation of AWS need to ensure the human dimension is explicitly emphasized and monitored in doctrine, organizations, and processes" to avoid devolving into disengagement (Caton 2015, 61). Caton also notes that the U.S. has traditionally been the leader in establishing the status quo for acceptable actions in war, and should continue to lead in this realm by codifying clear policy on LAWS use (Caton 2015, 63).

Relevant U.S. Policy

> Military professionals require autonomy, to include moral autonomy, to be competent actors held responsible for what they do. By autonomy, I mean the ability to govern or control one's actions with some degree of freedom. Autonomous action is a precondition for responsible obedience and the opposite of blind obedience . . . [There is a] conceptual space within which military professionals exercise moral discretion. The map includes a definition of responsible obedience and disobedience. But it also includes two types of actions that do not fit the classic definitions of these alternatives. That each exhibit a defect in which discretion is used either to do what is morally wrong or to do what was explicitly not authorized. Nevertheless, they are not simply forms of disobedience. They are "protected" actions, protected because the discretion to commit them preserves the autonomy on which the moral responsibility of the military depends.
>
> –James Burk, quoted in Don Snider, "American Military Professions"

Army doctrine was surveyed to discern what regulations would impact LAWS development and implementation, with ADRP 1 *The Army Profession*, ADRP 6-22 *Leadership*, and the DoD LOW Manual selected as the most impactful documents. Other doctrinal documents, such as field manuals for the maneuver branches and targeting manuals, would certainly be affected based on future changes in tactics but would not necessarily drive the development of LAWS.

ADRP 1 is the foundational doctrinal manual for the Army which provides the Framework for the Army Ethic and discusses the organizational values of the Army. The Framework of the Army Ethic is the theoretical lens used in this study and will be covered in detail in the research methodology section. Critical to this publication is the discussion on the culture, values, and ethic that guides the actions of the Army and its personnel. With respect to the culture of the Army, ADRP 1 asserts that "the essential characteristics of the Army Profession—trust, honorable service, military expertise, stewardship, and esprit de corps—and the Army Ethic are inherent within the Army culture. Our culture is informed by and sustains the Army Ethic, the heart of the Army. Thus, our culture and ethic are integrated, interdependent, evolving, and enduring" (HQDA 2015, A-1).

ADRP 6-22 is the leadership manual of the Army which described the way in which the Army functions as an organization. This doctrinal manual covers the foundations of leadership, leader attributes, leader competencies, and responsibilities. It is particularly relevant to this study for its discussion on values, honor, ethical orders, and ethical reasoning. The manual asserted that it is likely that leaders will face dilemmas in combat for which they are not fully prepared. It suggests that leaders dedicate "time to reflect on the Army Values, studying, and honing personal leadership competencies will help. Talk to superiors, particularly those who have done the same. It is up to Army leaders to make values-based, ethical choices for the good of the Army and the nation" (HQDA 2012, 3-7). Leaders are not alone on the battlefield, "officers depend on the counsel, technical skill, maturity, and experience of subordinates to translate their orders into action, the ultimate responsibility for mission success or failure resides with the

officer in charge" (HQDA 2012, 2-1). Ultimately ethical reasoning is required for leaders to "find moral solutions to diverse problems" (HQDA 2012, 3-7).

The Department of Defense LOW manual was previously introduced, and provided the legal context to direct military personnel in their conduct in war. This 1,236 page manual was developed to synthesize the complex array of treaties, conventions, laws, traditions, and policies that affect DoD personnel in daily operations and in combat. It is the genesis of the former *The Law of Land Warfare* manual (FM 27-10). The DoD LOW Manual is a critical component of this study because it provides the legal foundation from which our ethics are derived. The manual is updated to reflect the reality of autonomous weapons and addresses several concerns raised by anti-LAWS advocates. Of significance, the manual stated that there is "no law of war prohibition on the use of autonomy in weapon systems […and the] law of war obligations of distinction and proportionality apply to persons rather than the weapons themselves" (DoD 2016, 353). The manual also contains relevant discussions on honor, the principles of war, and conduct of war that will be analyzed in detail later in the study.

Conclusion

This literature review covered the underlying issues in assessing the legality, ethics, and operational use of LAWS. Autonomous weapons technology is clearly a widely discussed topic, with authors contributing to the sample having backgrounds in law, military, robotics, ethics, computer science, international relations, physics, etc. With this foundation set, the next chapter will describe the lens and methodology through which LAWS will be examined.

CHAPTER 3

RESEARCH METHODOLOGY

> Having discussions about ethics is very difficult because it requires me to put on a philosopher's hat, which I do not have.
>
> —Anonymous Robotics Professor, quoted in Demy, Lucas, and Strawser, *Military Ethics and Emerging Technologies*

Chapter Introduction

This section serves to establish a framework for the research methodology and discuss the research model used to examine the employment of lethal autonomous weapon systems (LAWS). It will address how the research questions will be answered, discuss the strengths and weaknesses of the approach, and assess the potential ethical concerns of the research itself. To facilitate understanding, a visual model of the process is included below in the methodology subsection.

Research Questions

The purpose of this study is to increase the understanding of LAWS with respect to the ethics that bind our military in war. This study attempts to answer the question: How can the United States employ lethal autonomous weapons systems in modern-system warfare, consistent with the professional military ethic of the Army?

Secondary research questions include:

1. In which types of operations are LAWS most ethically appropriate?
2. What changes to current doctrine are needed to account for LAWS?
3. In what circumstances should the military evolve its ethics to accommodate the use of LAWS?

Methodology

To understand this issue, a qualitative content analysis was conducted to assess the impact of professional military ethics on the implementation of LAWS. A content analysis allows flexibility in collecting data from various types of sources to assess their content relative to the research question. In this case, sources have been selected from across The Framework of the Army Ethic, recent relevant U.S. policy documents, recent international forums on LAWS, existing literature on AWS, and recent literature on AI in defense technologies. For the purposes of this study, relevant journal articles that are rooted in the military ethics of AI/AWS are categorized with 'Just War Tradition' within The Framework of the Army Ethic.

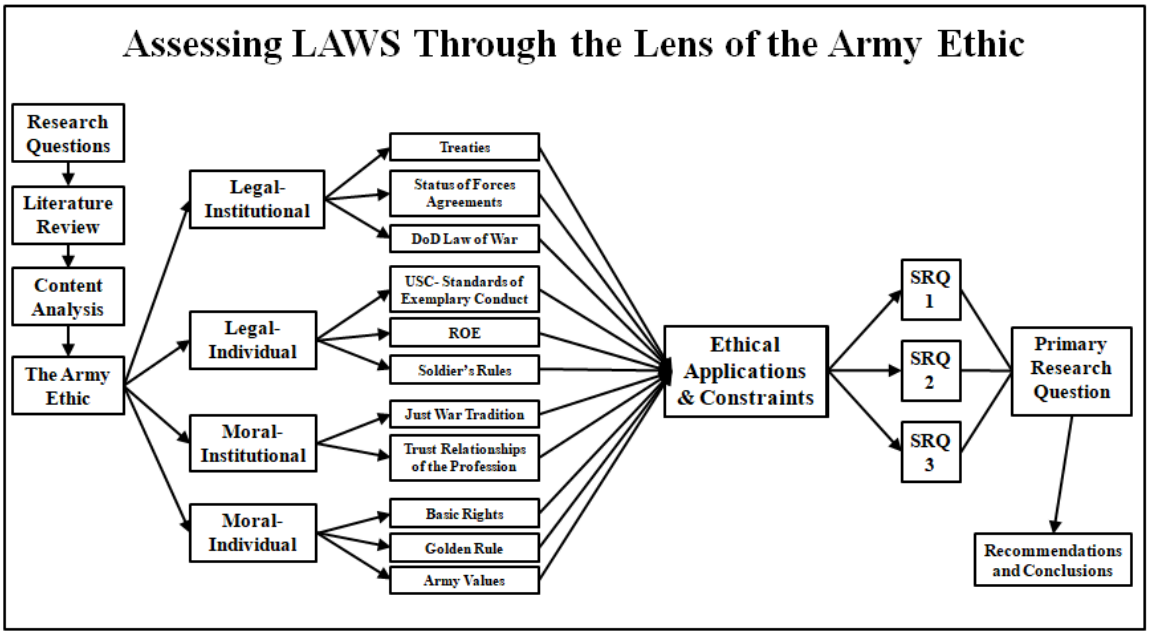

Figure 6. Assessing LAWS through the Lens of the Army Ethic

Source: Created by the author.

As the literature review established in the previous section, there is a significant collection of existing thought, policy, doctrine, and law that is relevant to the ethics of LAWS. In order to clearly contextualize the data, material will be categorized based on the aspects of The Framework for the Army Ethic that it directly addresses. For clarity, several aspects of the Framework are excluded from consideration given their peripheral or indirect influence on the research questions. Once the data is sorted to align with its relevant aspect of the Framework, the arguments will be assessed based on their strength of evidence.

Given the broad range of materials and complex arguments that are ubiquitous in this research area, a content analysis is a useful technique to discern relevant ideas and concepts without becoming overburdened with tangential arguments. While this methodology will not quantify data for statistical analysis, the source materials provide significant context for repeated study. In this research area, the ability to track conceptual thought, policy, doctrine, and law longitudinally provides significant context given that the Army Ethic is by-definition an evolving concept. As technology continues to advance, the understanding of LAWS will also further develop, producing more refined arguments and likely an evolved ethical perspective.

The disadvantages to the use of a context analysis for this study are considerable but have been mitigated by using a significant collection of sources and excluding speculative content- or content that is focused on future concerns rather than grounded in current technology and ethics. Another source of bias in this study is that contemporary source materials are prone to bias from popular opinion that is difficult to discern. While it is easy to identify that science-fiction has absolutely influenced the opinions of society,

it is much more difficult to detect whether their intellectual assertions are rooted in rational assessment of the issues or if they are simply justifying the fears that have manifested from indulging in fiction. The final consideration in this study is that while researcher bias is reduced, most of the contemporary thought on the topic is biased based on the profession of the author. Of note, roboticists, ethicists, computer scientists, lawyers, military professionals, and others have all contributed to the debate on development of AI in defense technology and LAWS. Each of these experts is a product of their education and experience which will inherently bias their perception of the relevant issues.

Conclusion

This chapter focused on clearly defining the process for collecting, sorting, and assessing data with respect to The Framework of the Army Ethic using the model depicted above. This methodology sets the conditions for analysis in the following chapter. The following analysis will expand on the body of evidence discussed in the literature review to set the stage for the concluding chapter.

CHAPTER 4

ANALYSIS

Introduction

Following the methodology discussed in Chapter Three, a survey of 45 LAWS and military ethics related journal articles, books and working papers were evaluated. Using The Framework of the Army Ethic, arguments were sorted as supportive, restrictive, or mixed/neutral with respect to each component of the framework. This chapter will detail this analysis by discussing the implications for each of the framework components and concluding with an overview of the study findings before transitioning to the final conclusions and recommendations in Chapter Five.

Restated Research Questions

Primary Qualitative Research Question

This study attempts to answer the question: How can the United States employ lethal autonomous weapon systems (LAWS) in modern-system warfare, consistent with the professional military ethic of the Army?

Secondary Research Questions

1. In which types of operations are LAWS most ethically appropriate?
2. What changes to current doctrine are needed to account for LAWS?
3. In what circumstances should the military evolve its ethics to accommodate the use of LAWS?

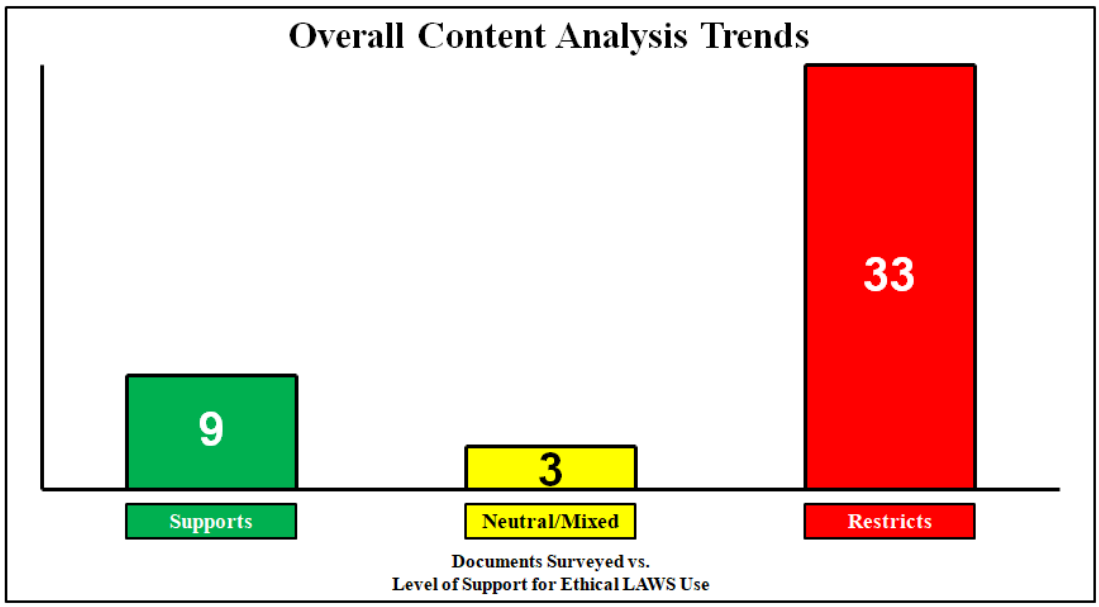

Figure 7. Overall Content Analysis Trends

Source: Created by the author.

The results of the content analysis found fairly clear trends in arguments that were supportive and restrictive of LAWS employment. Of note, there is almost unanimous agreement that under current U.S. Law of War, LAWS are not prohibited and are therefore conceptually legally acceptable. Future operational systems would still need to meet the technical requirements set forth in DoDD 3000.09 and pass operational testing to ensure compliance with the law of war principles. The other area of focus for LAWS advocates was in the technical realm; that LAWS could provide a more humane approach to warfare through reduced human suffering. Human suffering is asserted to be reduced as a result of more precise weapons that limit civilian casualties and also remove human warfighters from the battlefield. The majority of authors that posited supportive technical

arguments for LAWS, often refrained from discussing the potential ethical issues. This is explained by Anderson and Waxman, who argued that the moral issue "is a difficult argument to address, since it stops with a moral principle that one either accepts or does not accept" (Anderson and Waxman 2013, 16). Authors that do not accept the moral principle, generally exclude it from consideration in their articles.

Authors that advocated against LAWS tended to focus on the moral principle, questioned the values implications, and expressed concern over the technical feasibility that the LAWS advocates espoused. These authors largely had greater depth in their discussion of the moral and ethical principles in question. An area of confusion for some LAWS activists is evident in their understanding of the principles described in the law of war. These arguments tended to be peripheral in nature, and the confusion, when present, did not cloud any primary assertions included in the content analysis.

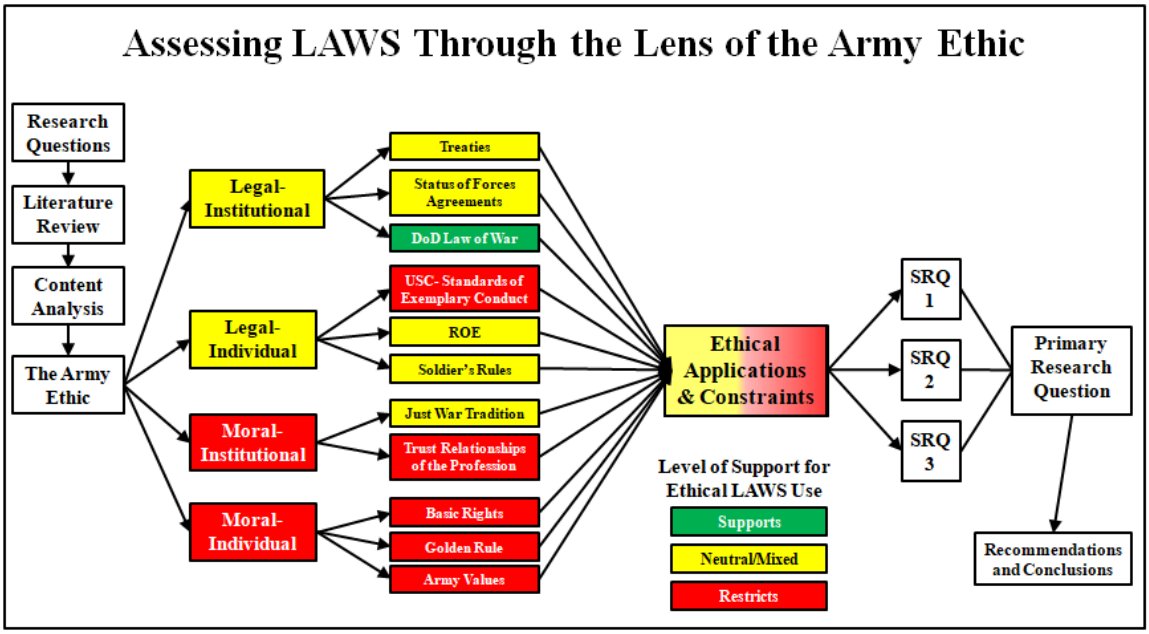

Figure 8. Assessing LAWS through the Lens of the Army Ethic (Levels of Support Shown)

Source: Created by the author.

Findings: Assessment through the Lens of the Army Ethic

The Legal-Institutional aspect of The Framework of the Army Ethic is the most uncomplicated component of this debate, as nearly all experts concede that LAWS meet the standards set forth by these foundational documents. All but the staunchest activists acknowledge that current treaties and laws do not prohibit LAWS *per se*. While it is not technically feasible with current AI capability, it is possible that in the future, AI performance will enable LAWS to act in compliance with the principles set forth in the Law of War: Military Necessity, Distinction, Proportionality, and Unnecessary Suffering/Humanity. The most compelling counter-argument to this point is that while

some states may refine the technology to meet this threshold in the future, other states will knowingly field LAWS without this nuance, which could result in unprecedented atrocities.

Some legal experts also argue that LAWS could violate the Martens Clause of IHL. The Martens Clause, included in the 1977 Protocol I of the Geneva Conventions, states that "in cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience" (ICRC 1979). The key aspect of this argument is that LAWS have garnered overwhelming disapproval in both the general public and expert community (The Future of Life Institute, 2017). The impact of this clause is highly controversial and clearly subjective in nature, with no formal instruction for how to determine if a case violates the public conscience.

§ 3583 USC- Standards of Exemplary Conduct

All commanding officers and others in authority in the Army are required—

(1) to show in themselves a good example of virtue, honor, patriotism, and subordination;
(2) to be vigilant in inspecting the conduct of all persons who are placed under their command;
(3) to guard against and suppress all dissolute and immoral practices, and to correct, according to the laws and regulations of the Army, all persons who are guilty of them; and

Figure 9. § 3583 USC- Standards of Exemplary Conduct

Source: Headquarters, Department of the Army, Army Doctrine Reference Publication 1, *The Army Profession* (Washington, DC: Government Printing Office, 2015), B-6.

In the Legal-Individual component of the framework, the Standards of Exemplary Conduct offers the only consideration of substance. This section specifically calls on officers "to be vigilant in inspecting the conduct of all persons who are placed under their command." Given the inherently unsupervised operations of LAWS, officers employing them would be far from vigilant as the systems would act independently on the battlefield. In reality, LAWS would effectively be their own commander, autonomously selecting new targets as operations evolve. Dr. Heather Roff powerfully explains this dilemma in her 2014 article, *The Strategic Robot Problem*:

> In this situation, we have created not merely a weapons system, but a weapon that is a combatant and a combatant who is the commander. By fielding multiple [LAWS], moreover, we have the frightening proposition that many (or perhaps all) of them will not be able to communicate with each other because of security concerns, and so interoperability becomes mere fiction. The result would be that 'de-conflicting' a battle space is impossible. Manned systems will be unable to communicate with unmanned ones, and [LAWS] will be generating their own military objectives, perhaps in conflict with one another. The most serious challenge, however, is that the creation and fielding of [LAWS] undermines the command and control structure necessary for the prosecution of modern combat. As each [LAWS] becomes its own isolated commander – incommunicado from all others – the framework for establishing legitimate authority over the direction and use of violent force vanishes (Roff 2014, 220).

This style of force employment is clearly misaligned with how the Army currently operates. Even mitigating the risk associated with this style of employment through common techniques (time, space, and altitude), still does not account for the reality that commanders would be diminished in their ability to control actions in their battlespace. While officers are charged with maintaining expertise in the ethical "integration of technology in the conduct of military operations," LAWS are likely outside of this intended scope (HQDA 2016, 5-1).

This arrangement also bypasses the established role of human commanders, resulting in a replacement effect rather than an enhancement. It is also "inconsistent with the perception of the well trained soldier, capable of engaging in human reasoning to navigate the most complex battlefield decisions, as the most valuable and effective weapon system available for a commander to employ" (Corn 2014, 27). With the employment of LAWS, there is neither a well trained and legally commissioned commander, nor experienced soldiers present to consider the complex issues that can arise in combat.

Understanding this relationship is imperative in assessing LAWS on the battlefield. One of the key failings of Arkin's advocacy for LAWS is in his understanding of this issue. He makes two incorrect contextual understanding assertions: (1) "battlefield ethics are more clear-cut and precise than everyday or professional ethics, ameliorating these difficulties somewhat, but not removing them" (Arkin 2009, 94); and, (2) soldiers are trained to be robots (Arkin 2009, xvi). These misunderstandings are curious given that Arkin claims he has over 25 years of experience in military robotics research (Arkin 2009, xiv). Military units train together in combat scenarios to navigate these ethical dilemmas because they are inherently difficult and often have no clear-cut solution.

Delegating authority for the employment of force to a weapon system in this manner also raises the question of responsible command. If commanders employ these weapons without the ability to direct, monitor, or inspect their operations, they are investing a significant amount of trust in the programming within the system. Given that commanders will be unable to train their systems and will also be unable to effectively command and control them, it would be nearly impossible to hold a commander

accountable for the conduct of the weapon. This responsibility gap may be mitigated by more morally-proactive states but certainly has significant potential for abuse by less reliable actors.

Responsible command is discussed in several places in international humanitarian law and the Law of War. The excerpt from the LOW manual below discusses the affirmative duties to take feasible precautions for the protection of civilians and other protected persons and objects:

> The obligation to take feasible precautions is a legal requirement. However, the determination of whether a precaution is feasible involves significant policy, practical, and military judgments, which are committed to the responsible commander to make in good faith based on the available information. In assessing whether the obligation to take feasible precautions has been satisfied after the fact, it will be important to assess the situation that the commander confronted at the time of the decision and not to rely on hindsight (DoD 2016, 194).

With the employment of LAWS in a battlespace, it would be impossible for a human commander to take such precautions. It is also questionable whether an AI system could independently make these judgments given the highly subjective and dynamic nature of what is protected and of military necessity at different points in time during an operation (Cummings 2014, 10).

The U.S. military must seriously consider the impact of this manner of force employment with its trust relationship with the American people. Military leaders have a special responsibility, "under commission from the American people and the U.S. Government, and acting as their moral agent, officers provide overall direction to and leadership of the military in situation by exercising legal command responsibilities over Army units" (Snider 2003b, 6). By abdicating this duty in the employment of LAWS, the Army profession is exposed to serious risk as those outside the military begin to question

why we even maintain robust manned formations when we accept that LAWS can fight independently in our place. While it is obvious to most military professionals, for the vast majority of the American people that do not have a professional understanding of warfighting, this is difficult to justify.

Underlying a potential responsibility gap, is an accountability gap. This accountability gap is widely discussed in the literature with LAWS proponents claiming that commanders would ultimately remain responsible and LAWS opponents claiming that it would be impossible to successfully hold a commander legally accountable. As discussed in the literature review, Ekelhof and Struyk as well as Human Rights Watch provide the most accurate explanation of the accountability gap. The reality with LAWS is that once the system is cleared to act, it is truly impossible to predict how the algorithms will respond to the unlimited possible enemy, civilian, and counter-autonomy variables that it may encounter. Unexpected behavior that occurs as a result of these complex algorithms is referred to as emergent behavior, and is a "virtual certainty" in learning AI systems (Ilachinski 2017, vii). Commanders, programmers, and manufacturers could only be held accountable if they willfully acted or failed to act to prevent an errant killing. So while it is possible to hold individuals accountable during LAWS implementation when behavior is negligent, it is highly unlikely that they would be held accountable for routine system failures or emergent behavior that arises during combat.

Just War Tradition refers to the concepts of *Jus ad Bellum* (the legal justification for the initiation of conflict) and *Jus in Bello* (the legal and moral restrictions in conflicts), and is also affected by the development of LAWS. LAWS are argued to

impact the *Jus ad Bellum* principle of 'last resort' and all three of the *Jus in Bello* principles of distinction, proportionality, and military necessity. LAWS opponents effectively argued that widespread use of these systems would likely reduce the barrier to conflict for states by making limited war cheaper, with less financial and human cost. This also presents an opening for non-state actors to field substantial LAWS elements, creating new non-state threats on an unprecedented scale. LAWS proponents did not effectively address these concerns in the limited literature available.

The *Jus in Bello* principles in question did receive sustained debate from both sides of the argument. The differences in arguments were generally based on the technical feasibility of accomplishing a conceptual LAWS Turing Test to determine effectiveness of discrimination and proportionality in operation. While LAWS advocates conceded that systems could not meet these thresholds with the current state of technology, there is no evidence to suggest that it would be impossible for these systems to meet the testing requirements in the future. This assertion is logically sound, but only addresses technology and not the other associated factors. The opposing argument focuses on the fact that while programmers could theoretically code an algorithm that passes a moral-decision Turing Test using a concept similar to Arkin's 'ethical governor,' the machine would still be a non-moral agent. As previously discussed, "a machine can act morally, by mimicking its programmer, but it cannot be moral" (Johnson and Axinn 2013, 135). The U.N. Human Rights Council Special Rapporteur Christof Heyns spoke to the importance of this differentiation in his 2013 report:

> [A] human being somewhere has to take the decision to initiate lethal force and as a result internalize (or assume responsibility for) the cost of each life lost in hostilities, as part of a deliberative process of human interaction. This applies

even in armed conflict. Delegating this process dehumanizes armed conflict even further and precludes a moment of deliberation in those cases where it may be feasible. Machines lack morality and mortality, and should as a result not have life and death powers over humans. (UN 2013, 17)

U.S Military Core Values

Army	Navy & Marine Corps	Air Force	Coast Guard
Loyalty	Honor	Integrity First	Honor
Duty	Courage	Service Before Self	Respect
Respect	Commitment	Excellence in All We Do	Devotion to Duty
Selfless Service			
Honor			
Integrity			
Personal Courage			

Figure 10. U.S. Military Core Values

Source: Created by the author.

The Moral-Individual component of the framework provides the final and most significant point of contention within the profession with respect to the use of LAWS. The Army Values "are inherent within the moral principles of the Army Ethic and form the basic moral building blocks of an Army Professional's character. They help us judge what is right or wrong in any situation" (HQDA 2015, B-5). The service values of each branch of the military are noted in Figure 10.

A value common to most of the services, countries, U.S. Law of War, and international humanitarian law is honor. Honor is defined by the Army as "a matter of

carrying out, acting, and living the values of respect, duty, loyalty, selfless service, integrity and personal courage" (HQDA 2015, B-5). In Army Doctrine Reference Publication 6-22 *Army Leadership*, "honor requires a person to demonstrate an understanding of what is right" (HQDA 2012, 3-2). The Law of War manual further elaborates that "honor demands a certain amount of fairness in offense and defense and a certain mutual respect between opposing military forces . . . [and it] forbids resort to means, expedients, or conduct that would constitute a breach of trust with the enemy" (DoD 2016, 65-66). The 2017 edition of *The Armed Forces Officer* references Marine Colonel John Allen on the importance of honor, asserting that "war, unconstrained by honor and high moral principle, is quickly reduced to murder, mayhem, and all the basest tendencies of mankind" (Swain and Pierce 2017, 44).

Many feel that employing LAWS against opposing manned formations clearly demonstrates a lack of personal courage and is patently unfair to the soldiers of the opposition as they are the only ones whose lives are at risk in the endeavor. The absence of personal courage also suggests a lack of respect for the lives of the enemy combatants. This scenario is one of many that the laws of war were intended to prevent, as in this situation, opponents of the United States are only encouraged to avoid confronting the U.S. military through ruses, hiding among civilians, and other methods that exploit the law. Succintly summarized, "where there is no human in the loop, there is no one to risk sacrifice, and therefore no honor produced" (Johnson and Axinn 2013, 136).

Summary

The results of the content analysis indicate a strong trend in the literature against the implementation of LAWS. While there is a sound legal argument for their use, there

are remaining ethical and moral considerations to evaluate in determining their acceptability for use by the military profession. In analyzing these concerns through the lens of the Army Ethic, the issues become more thoroughly developed. Of the 11 elements of the Army Ethic that were assessed, only one was supportive, five were neutral or mixed, and five elements were restrictive with respect to LAWS implementation. The implications discerned from this analysis will be applied to the research questions in the following chapter.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Ethical Standards for All Hands

> Those entrusted by our nation with carrying out violence, those entrusted with the lives of our troops, and those entrusted with enormous sums of taxpayer money must set an honorable example in all we do.
>
> I expect every member of the Department to play the ethical midfield. I need you to be aggressive and show initiative without running the ethical sidelines, where even one misstep will have you out of bounds. I want our focus to be on the essence of ethical conduct: doing what is right at all times, regardless of the circumstances or whether anyone is watching.
>
> To ensure each of us is ready to do what is right, without hesitation, when ethical dilemmas arise, we must train and prepare ourselves and our subordinates. Our prior rejection and our choice to live by an ethical code will reinforce what we stand for so we remain morally strong especially in the face of adversity.
>
> Through our example and through coaching of all hands, we will ensure ethical standards are maintained. Never forget, our willingness to take the Oath of Office and to accept the associated responsibilities means that even citizens who have never met us trust us to do the right thing, never abusing our position nor looking the other way when we see something wrong. I am proud to serve alongside you.
>
> —Secretary of Defense James N. Mattis, Message to all DoD Employees

Introduction

The Framework of the Army Ethic served as a solid foundation for analysis of the ethical issues that military leaders must address before implementing lethal autonomous weapon systems (LAWS). With these ethical issues identified, these concerns can be applied to the initial research questions to discern appropriate uses for LAWS in war. This chapter discusses the conclusions with respect to the research questions, recommendations for future operational use, and recommendations for future debate as LAWS technology and policy matures.

Restated Research Questions

Primary Qualitative Research Question

This study answered the question: How can the United States employ lethal autonomous weapons systems in modern-system warfare, consistent with the professional military ethic of the Army?

Secondary Research Questions

1. In which types of operations are LAWS most ethically appropriate?
2. What changes to current doctrine are needed to account for LAWS?
3. In what circumstances should the military evolve its ethics to accommodate the use of LAWS?

Implications for the Army

> Artificial intelligence is the future, not only for Russia, but for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world.
>
> —Russian President Vladimir Putin, quoted in Eric Mack, "Elon Musk: Artificial Intelligence May Spark World War III"

As LAWS proliferate on the battlefield, one can only anticipate that they will be used to fill a more broad range of tasks that are considered dirty (CBRNE), dull, or dangerous to human soldiers. Casualty aversion is already a significant element in military planning, and this preference for protecting soldiers will expand with technology. Logic suggests that over time, with the availability of semi-autonomous systems and LAWS, personal courage will become an antiquated concept. Respect for the enemy will amount to mathematical calculations. Honor will take its place in history next to chivalry.

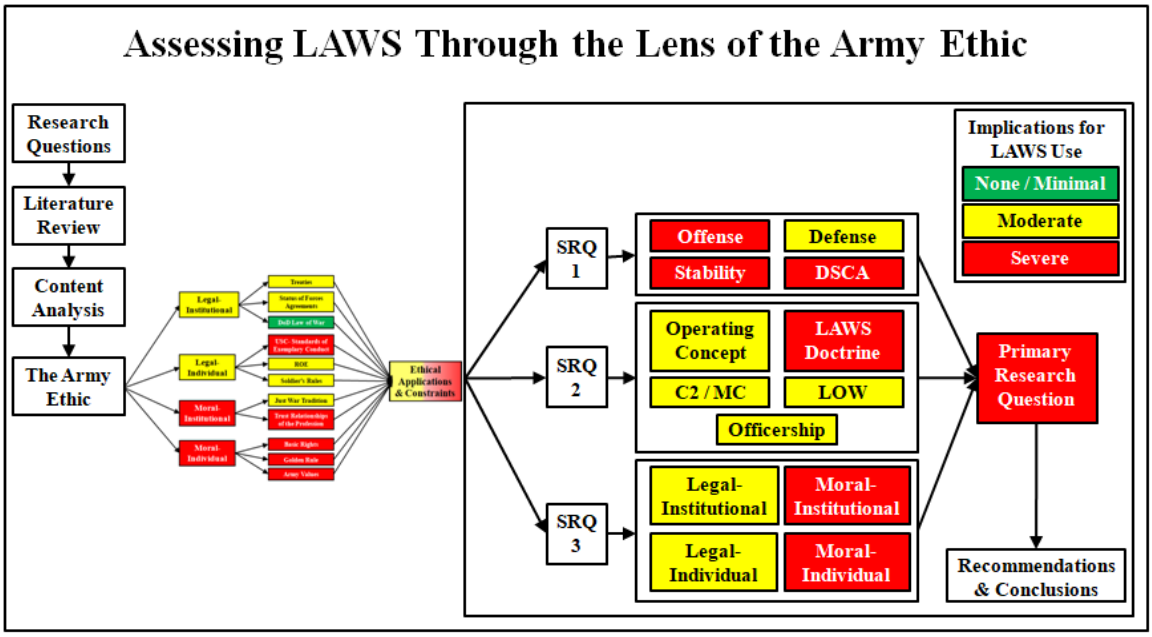

Figure 11. Assessing LAWS through the Lens of the Army Ethic
(Implications for Secondary Research Questions)

Source: Created by the author.

SRQ1: In which types of operations are LAWS most ethically appropriate?

One of the most cited justifications for the rapid development of LAWS is the inevitability of the technology. Despite the glaring ethical challenges with using LAWS on the battlefield, the United States must develop this technology, if only to be used as a deterrent or defensively.

AI enabled systems such as swarm technology, when used in the offense, have the potential to very inexpensively destroy even the most advanced U.S. military equipment. To defeat these threats, defensive LAWS/AI technology can be deployed to protect U.S. forces from automated and autonomous weapons. The U.S. already employs several semi-autonomous defensive weapons such as the MK 15 – Phalanx CIWS. Future aircraft

carriers or command posts may be enabled with defensive drone swarms that serve as a modern-day shield against enemy attacks and can collect intelligence. These technologies could be LAWS, but would be more appropriately used in a semi-autonomous state given their close operation to manned elements that could provide responsible command.

In the offense, LAWS could ethically be used against other robotic systems, even if this style of operations does not necessarily comport with the current U.S. system of warfare. This provision should also be extended to cover attacks against manned LAWS systems that are not under meaningful human control (a LAWS with a redundant human occupant). Deliberately using LAWS to attack known human targets would constitute a dishonorable attack. Using LAWS in this manner would also be unnecessary since a semi-autonomous system could be deployed to attack the target within the bounds of the Army Ethic.

Stability	***Defense Support of Civil Authorities***
Tasks:	***Tasks:***
• Establish civil security • Establish civil control • Restore essential services • Support to governance • Support to economic and infrastructure development • Conduct security cooperation	• Provide support for domestic disasters • Provide support for domestic chemical, biological, radiological, and nuclear incidents • Provide support for domestic civilian law enforcement agencies • Provide other designated support

Figure 12. Tasks in Stability and Defense Support of Civil Authorities

Source: Headquarters, Department of the Army, Army Doctrine Reference Publication 3, *Operations* (Washington, DC: Government Printing Office, 2016), 3-2.

LAWS are not appropriate for use in Stability or Defense Support of Civil Authorities (DSCA) missions. DSCA occurs only within the U.S. and is conducted to

support local and state governments in the event of emergencies. These operations are not conducted against a hostile enemy, and while autonomous systems could provide assistance in several capacities, enabling them with lethal force in the homeland is entirely unnecessary. Using LAWS overseas in stability operations poses many of the same concerns for civilian casualties, making semi-autonomous systems the appropriate choice for this task as well.

SRQ2: What changes to current doctrine are needed to account for LAWS?

DoD Directive 3000.09 directs Secretaries of the Military Departments, the USSOCOM Commander, and the Heads of the Defense Agencies and DoD Field Activities to establish doctrine and tactics, techniques, and procedures (TTPs) for AWS implementation (Carter 2017, 10). Given that this directive does not account for LAWS, additional doctrine updates will be required to account for the significant differences in operation. The breadth of required doctrine changes will be affected by how ubiquitously the systems are integrated into various units and mission types. At a minimum, the Army must address its professional values (ADRP 1), operating concepts (ADRP 3-0), mission command (ADRP 6-0), leadership (FM 6-22), LOW Manual, and account for counter-autonomy in all operations. At present, these manuals all contain language that contra-indicates the use of LAWS, and counter-autonomy is not addressed in doctrine.

TTPs developed to support manned unmanned-team (MUM-T) elements will inherently blend into TTPs for LAWS when they consider the implications of a destroyed manned unit for the unmanned counterpart. They must also account for the potential for automation bias to degrade the meaningful control of human operators that can result in AWS becoming LAWS in-effect.

SRQ3: In what circumstances should the military evolve its ethics to accommodate the use of LAWS?

The ethical dilemma that LAWS present to the Army and national policymakers also provides the opportunity for reflection on our military ethics. Colonel (Ret.) Don Snider pointed out in 2009 that "current Army doctrine, however, does not provide even a construct for examining the Ethic, nor does it analyze how the Ethic changes with society's cultural shifts, evolving wars, or other external shocks" (Snider, Oh, and Toner 2009, x). The Army should use this opportunity to reflect on the profession and how it must evolve or remain steady with its values. The Army must also reconcile the likely inevitability of LAWS on the battlefield and how we can fight with 'control' and 'honor.' Given the special nature of LAWS and AI-enabled weapon systems, the DoD should establish a working group to thoroughly evaluate the totality of the ethical, technical, and strategic considerations, and codify its findings in a public report. This would also facilitate updates to various components of the Army Ethic, in turn creating an incremental evolution to the ethic that accounts for AWS/LAWS.

PRQ: How can the United States employ lethal autonomous weapons systems in modern-system warfare, consistent with the professional military ethic of the Army?

Consistent with the current professional military ethic, LAWS could only be employed in extremely rare circumstances or as a deterrent. SRQ 1 detailed by task-type, which operations LAWS use could be ethically acceptable, but truly under no circumstance is it acceptable at present, given the current doctrine and regulations. As previously discussed and directed by DoDD 3000.09, much of the groundwork has yet to be done to establish policy before these weapons are fielded. It is critical that the

profession holds leaders to account for thoughtful and ethical policy formulation prior to producing these weapons to prevent potential disasters and to ensure that industry is focused on developing the best and most appropriate technologies for our national defense.

Recommendations

> A soldier is sometimes required to put himself in harm's way in order to keep civilians out of harm's way.
>
> —Henry Shue, "Civil Protection and Force Protection"

In previous meetings of the Group of Governmental Experts to the Convention on Certain Conventional Weapons, the majority of states present signaled the need to ban or restrict the development of LAWS. This effort has been largely organized by the International Committee of the Red Cross and Human Rights Watch, generating significant popular support from AI experts and roboticists. These meetings however, failed to produce any substantive agreement on definitions or pathways forward with LAWS (USA 2018, 6).

In preparation for the April 2018 meeting, both the United States and the Russian Federation submitted working papers focused on moving forward with LAWS research and development. The United States' working paper instead focused on the potential humanitarian benefit derived from increased battlefield awareness and reduced harm to civilians without a single reference to the ethical or moral concerns that have been the greatest point of contention in previous meetings. In focusing on previously established potential benefits, the United States is losing an opportunity to lead in this critical debate on the future of warfare.

As stewards of our profession, military officers must contribute to this discussion to inform strategic leaders and help shape policy based on our values so that future opportunities are not also missed. Five recommendations are proposed to address the concerns raised in this paper:

1. The United States should formally propose a framework for understanding autonomy in weapon systems. This framework should be developed so that fully autonomous systems are in a class on their own, separate from semi-autonomous weapons that often cloud the debate.
2. Given that offensive operations against humans using LAWS do not align with the values of the military and have significant second and third-order negative outcomes, they should be formally banned from use in offensive operations. Only weapons under meaningful human control should be offensively employed on the battlefield.
3. The United States should continue to research advanced AI technologies to field defensive LAWS, semi-autonomous weapons, and to conduct counter-autonomous operations.
4. Working groups should be established by each service to further explore ethical challenges or opportunities. These working groups can also use their understanding to begin establishing the training, doctrine, and tactics, techniques, and procedures that the Secretary of Defense has required prior to fielding (Carter 2017, 7-8).

5. ‘Ethical Control’ should be added to the Army Values to reinforce the importance of how we ethically employ our Soldiers and autonomous systems:

Ethical Control

> Know that how we fight matters; exercising discipline in the application of landpower is vital to our success. Ethical control requires a high degree of professional competence and an understanding of the unparalleled capabilities our manned and robotic forces bring to any fight. Soldiers entrusted with these capabilities must use them only within the limits of our doctrine, service values, and the Army Ethic. Ethical control is the underlying principle that separates honorable from illegitimate use of force on the battlefield, allowing us to find moral solutions to diverse problems. (Created by the author)

Recommendations for Future Research

A significant amount of research is currently ongoing in this field in both the unclassified and classified domains as the United States and other military powers seek to understand the benefits of AI in military operations. Most of this research is on the technological feasibility and application of theoretical levels of AI that have yet to be developed. Future research in this area, aside from these ongoing projects, should focus on understanding what the American people and military professionals would find acceptable for AI-enabled systems and LAWS. Future research should also focus on how AWS and LAWS can communicate with manned elements to achieve a collaborative effect rather than a replacement effect. This collaborative aspect of AI systems has yet to mature beyond a concept phase and should take priority over the development of a system such as LAWS that would provide much less utility. Lastly, if one asserts that LAWS are legitimate in taking the lives of their enemies, would they also assert that LAWS could serve as a commander, responsible for the lives and employment of human forces under their command? Studying the extent to which we empower AI systems

could prove fascinating, especially if the technology begins to mature out of its concept state.

Conclusion

> War is a human endeavor—a fundamentally human clash of wills often fought among populations. It is not a mechanical process that can be controlled precisely, or even mostly, by machines, statistics, or laws that cover operations in carefully controlled and predictable environments. Fundamentally, all war is about changing human behavior. It is both a contest of wills and a contest of intellect between two or more sides in a conflict, with each trying to alter the behavior of the other side.
>
> —Headquarters, Department of the Army, ADRP 3, *Operations*

The U.S. Army very clearly calls upon its members to understand and embody the Army Values. In living the Army Values, military professionals must continue to engage and speak out on critical issues, such as the development of LAWS. These weapon systems pose a significant threat to the profession of arms if they become normalized through haphazard use or lack of proactive measures. Where enhanced technology was intended to provide greater accuracy and control once weapons were 'off-the-rails,' enabling weapons to determine their own targets is a regressive measure that draws parallels back to legacy dumb-bombs.

War has, and should remain, a human endeavor with officers and soldiers as moral agents for their citizens. Taking the man out of the loop for the sake of making war more humane is not a sound concept, and attempting to boil combat down to its basest elements for the sake of efficiency is not likely to yield morally sound returns. The United States military already serves as a guiding force in the international military community and should lead in discussing the ethics of these systems with its allies to help foster consensus. As Secretary Mattis stated in his *Ethical Standards for All Hands*

memorandum, we must “be aggressive and show initiative without running the ethical sidelines, where even one misstep will have you out of bounds” (Mattis 2017, 1). Implementing LAWS and AWS before they are thoroughly evaluated and discussed would be running those very sidelines.

APPENDIX A

THE ARMY VALUES (WITH AUTHOR-DEVELOPED ETHICAL CONTROL)

ARMY VALUES (LDERSHIP)

Loyalty.
Bear true faith and allegiance to the U.S. Constitution, the Army, your unit and other Soldiers. Bearing true faith and allegiance is a matter of believing in and devoting yourself to something or someone. A loyal Soldier is one who supports the leadership and stands up for fellow Soldiers. By wearing the uniform of the U.S. Army you are expressing your loyalty. And by doing your share, you show your loyalty to your unit.

Duty.
Fulfill your obligations. Doing your duty means more than carrying out your assigned tasks. Duty means being able to accomplish tasks as part of a team. The work of the U.S. Army is a complex combination of missions, tasks and responsibilities — all in constant motion. Our work entails building one assignment onto another. You fulfill your obligations as a part of your unit every time you resist the temptation to take "shortcuts" that might undermine the integrity of the final product.

Ethical Control.
Know that how we fight matters; exercising discipline in the application of landpower is vital to our success. Ethical control requires a high degree of professional competence and an understanding of the unparalleled capabilities our manned and robotic forces bring to any fight. Soldiers entrusted with these capabilities must use them only within the limits of our doctrine, service values, and the Army Ethic. Ethical control is the underlying principle that separates honorable from illegitimate use of force on the battlefield, allowing us to find moral solutions to diverse problems.

Respect.
Treat people as they should be treated. In the Soldier's Code, we pledge to "treat others with dignity and respect while expecting others to do the same." Respect is what allows us to appreciate the best in other people. Respect is trusting that all people have done their jobs and fulfilled their duty. And self-respect is a vital ingredient with the Army value of respect, which results from knowing you have put forth your best effort. The Army is one team and each of us has something to contribute.

Selfless Service.
Put the welfare of the nation, the Army and your subordinates before your own. Selfless service is larger than just one person. In serving your country, you are doing your duty loyally without thought of recognition or gain. The basic building block of selfless service is the commitment of each team member to go a little further, endure a little longer, and look a little closer to see how he or she can add to the effort.

Honor.
Live up to Army values. The nation's highest military award is The Medal of Honor. This award goes to Soldiers who make honor a matter of daily living — Soldiers who develop the habit of being honorable, and solidify that habit with every value choice they make. Honor is a matter of carrying out, acting, and living the values of respect, duty, loyalty, selfless service, integrity and personal courage in everything you do.

Integrity.
Do what's right, legally and morally. Integrity is a quality you develop by adhering to moral principles. It requires that you do and say nothing that deceives others. As your integrity grows, so does the trust others place in you. The more choices you make based on integrity, the more this highly prized value will affect your relationships with family and friends, and, finally, the fundamental acceptance of yourself.

Personal Courage.
Face fear, danger or adversity (physical or moral). Personal courage has long been associated with our Army. With physical courage, it is a matter of enduring physical duress and at times risking personal safety. Facing moral fear or adversity may be a long, slow process of continuing forward on the right path, especially if taking those actions is not popular with others. You can build your personal courage by daily standing up for and acting upon the things that you know are honorable.

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