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Profession of Arms**
An Argument against Autonomous Lethal Engagements

MICHAEL R. CONTRATTO
Lieutenant Colonel, USAF

Air War College
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The Decline of the Military Ethos and Profession of Arms: An Argument against Autonomous Lethal Engagements

Lt Col Michael R. Contratto, USAF

Throughout history many new weapon technologies have been introduced into combat prior to a full evaluation or understanding of the doctrinal, legal, and ethical implications of their use.¹ Similarly, today's battlespace is witnessing the introduction of numerous robotic systems to conduct many military missions. Thus far these robots still operate with humans directly "in the loop" of the decision process—especially when that loop is part of an offensive kill chain.² The future battlespace, if we allow it, will be quite different. While the exact year is still in doubt, the capability for robotic autonomous lethal engagements will eventually exist and possibly much sooner than many may think.³ Placing worries of "Skynet" achieving consciousness and bands of "Terminators" running amok aside, as military science and sociology fuse, we truly find ourselves on the cusp of a "brave new world" in warfare.⁴

The research question this paper addresses is what are the key military ethical issues of totally removing, other than the initial programming of the autonomous agent, the human in the loop of offensive kill chains? The specifics of how the technology is developed or what form it takes are not germane to this paper.⁵ Definitions are important; within this paper, ALE is the application of lethal force by a robotic or computer system which solely relies upon its own internal

programming and capabilities to conduct and execute all elements of the kill chain.⁶ Programmed with rules of engagement (ROE), laws of armed conflict (LOAC), conventions, and heuristics, an ethical black box within the ALE system independently evaluates each step of the kill chain and decides when and whether to engage an intended target with lethal force. Simply stated, there is no “human in the loop” other than the original manufacturing, programming, and introduction of the system into the combat zone.

For the purposes of framing the discussion and analysis later in the paper, a very futuristic autonomous lethal engagement (ALE) scenario is introduced here. The year is 20XX and as tensions between BadGuyLand and the United States are on the rise, a US remotely piloted aircraft (RPA) conducts a covert operation over a military installation that is home to 10,000 ground combat troops of the potential enemy. Over the base the RPA releases 2,000 lethal nanorobots which bury themselves into the dirt and go into a dormant mode. US intelligence services have gained access to the genetic database of the enemy’s Army soldiers and the nanorobots are programmed with this information which allows them to take a quick DNA sample and validate its discrimination algorithm before taking lethal action. Six months later and for just reasons, the United States formally declares war on BadGuyLand and, as the enemy ground troops mobilize for immediate deployment, activates 1,000 of the nanorobots which complete their mission and kill 1,000 soldiers. The

United States promises more of the same within the next hour which causes BadGuyLand to sue for peace.

My thesis is that while the outcome of offensive ALE may largely be considered amoral (death of a combatant resulting from a cruise missile strike or a robot is really no different), the act itself is contrary to military ethics and detrimental to the military profession and thus should be prohibited. Another key definition to frame the ensuing deconstruction is that of ethics—which can be broadly stated to be “the study of good and evil, of right and wrong, of duty and obligation in human conduct, and the reasoning and choice about them.”⁷ To develop my thesis, three primary analytical filters are used: (1) the traditional concepts of Just War Theory, (2) assignment of moral agency, and (3) the professions of arms and the military ethos. My framework will highlight some of the major debates and issues using the first two filters, assume that legal guidance and sound doctrine can overcome these issues, and then focus on the third filter as the primary argument against ALE. As the analytical foundation is laid throughout the essay, key implications will be raised along with several recommendations.

ALE and Just War Theory

Most ethical analyses of ALE begin with an evaluation against the precepts of Just War Theory. Elements of contemporary just war thought trace their roots to Saint Augustine some 1,600 years ago. Although the addition of increasingly complex technology to the battlespace has at

times challenged the interpretation and application of just war precepts, for the most part the just war body of knowledge has remained relatively consistent. The theory's main components generally include seven *jus ad bellum* considerations (acceptable justifications to use armed force and declare war) and two principle *jus in bello* considerations (acceptable conduct in war).⁸ A literature search of the ethical considerations of ALE in the context of Just War Theory actually reveals much debate, deep thought, and extensive analysis of the issue on the part of science fiction writers, roboticists, philosophers, and the occasional professional military education student.

Jus ad bellum

The seven generally accepted tenants of *jus ad bellum* include the requirement for a just cause, proportionality (good of war aims overrides the general evil the war will cause), a legitimate authority to declare war, a reasonable chance of success in war, right intention, war declared as a last resort, and the goal of a just peace.⁹ At first glance, since *jus ad bellum* is mainly concerned with the decision to go to war, the use of ALE in war would seem to present little direct conflict with any of these requirements. Upon deeper reflection however, several vexing issues quickly surface. With our military establishment increasingly relying upon systems of systems to manage and prosecute warfare, ALE has the potential to leapfrog the entire requirement for a state's legitimate authority to choose when and where the use of military force is

warranted.¹⁰ One does not have to rely on extreme scenarios or rogue computers to envision a chain of events in which an ALE weapon system may conduct an action that could lead to war.¹¹ Even if the ALE followed established ROE and LOAC, the ALE may occur without the legitimate authority's knowledge or approval. And if so, the weapon system would usurp the legitimate authority's other *jus ad bellum* responsibilities and place a nation squarely on the brink of, if not in, war.

In addition to legitimate authority concerns, Peter Asaro represents a group of ALE opponents whose position can be summarized as presenting a *jus ad bellum* argument against ALE because it limits the risk to nations and their soldiers to such an extent that it significantly removes political barriers and lowers the bar for proper authorities to declare and enter war.¹² This nuanced argument maintains that ALE would skew the arithmetic of proportionality such that force may not be used as a last resort.¹³ In other words, the use of ALE has the potential to dramatically reduce risk to combatants and make war less costly in terms of human capital and thus may increase the tendency to enter wars too willingly. In times of conflict, a natural tendency exists to put a greater value on the lives of our soldiers and citizens than the enemy's. If our expected costs of waging war are so low, statesmen may not adequately account for the costs of our adversary and society as a whole in the decision to declare war or use force. An important extension of this logic trail is that risk free war can eliminate the horrors of war and in so

doing become a strong disincentive to seek a lasting *jus in pace* (just peace) in pursuit of *tranquillitas ordinis* (just societies).¹⁴

Such misgivings do have overall merit in an ethical discussion of ALE. However, these discussions do not deductively determine whether the reasons for war or the use of ALE in war may be just or not and as such are somewhat misplaced. While these concerns are important and must be understood by the legitimate authority, the tenets of *jus ad bellum* should stand on their own merit. In fact, arguing that less risk to combatants leads to a greater likelihood of the use of force could be used as a tactic to oppose many improved weapon technologies.¹⁵ The opposing perspective is that from the tip of the phalanx, to a sniper at several hundred meters, to an unmanned aerial system operator sipping coffee at Creech AFB, Nevada—isn't ALE simply the next evolutionary step in the pursuit of risk free war?¹⁶ For the military, the full impact of this question is better evaluated in terms of the overall context of the profession of arms and military ethos rather than *jus ad bellum*.

Regardless, the overarching concern still remains valid; thus two formally stated *jus ad bellum* implications of developing and employing ALE are that its introduction may lead to a greater willingness to declare war or use lethal force to satisfy political objects and its advent has the potential to change the nature and character of war unlike any other technology to date. To address these implications, legal and doctrinal

guidance is needed—guidance that unfortunately does not currently exist.

How we fight our nation's battles is "built upon social, cultural, and ethical norms that are very specific to a time and culture," so ALE represents the deliberate pursuit of a revolutionary jump in warfare.¹⁷ The negative effects of employing ALE on our long term strategic position in the current world environment are difficult to predict. But given recent experience, continuing our conventional dominance on the battlefield through ALE will likely increase the stability/instability paradox we now experience and force our adversaries to fight even more asymmetric and hybrid forms of war with perhaps a greater willingness to acquire and use nuclear, biological, or chemical weapons. Thus if ALE is pursued, its use should be very limited to support near-term, clear-cut, small-scale tactical objectives avoiding mass applications which could compromise long term strategic goals such as establishing a just peace and building the capacity for effective governance in regions where anarchy reigns. Or stated another way, robots can't win hearts and minds nor should we expect our enemies to simply give up.¹⁸

Returning directly to the issue of doctrine, even though several US military-sponsored research projects for developing ALE capabilities exist, doctrinal and legal thought lags far behind.¹⁹ The 2007 DOD Unmanned System Safety Guide included no discussion of the use of autonomous lethal force by robotic systems.²⁰ When questioned if a

newer version was in draft that would address the prospect of ALE, the office of primary responsibility replied “No,” citing a lack of funding, and compelling need and interest expressed by the services or agencies.²¹ Somewhat better, the Air Force’s Unmanned Aircraft Systems Flight Plan 2009–2047 admonishes, “Ethical discussions and policy decisions must take place in the near term in order to guide the development of future UAS [unmanned aircraft systems] capabilities, rather than allowing the development to take its own path apart from this critical guidance.”²² It then states that in the meantime “. . . we must continue to dovetail unmanned and manned capability so that lacking datalink assuredness or the political will to use autonomous strikes, the USAF will still have the ability to hold strategic targets at risk.”²³

If ALE capabilities are pursued, senior military advisors and civilian statesmen will require deeper critical analysis and litmus tests to evaluate the use of robotic lethal force. To this end the United States should spearhead a very broad legal review of ALE technology while simultaneously developing doctrinal guidance that establishes, defines, and limits the acceptable scope of its application. A critical issue to resolve will be determining exactly where to draw the autonomous line. For example, while it would seem clear that we would not “hand over” nuclear missions and responsibilities to an ALE capable system, what other morally high stakes scenarios would fall into the same prohibited category? Putting sound doctrine in place before the advent of ALE

capabilities would be necessary to provide clarity on its proper employment to avoid *jus ad bellum* violations.

Jus in Bello

Jus in bello is primarily concerned with two key criteria—proportionality and discrimination. Proportionality prohibits unnecessary violence and dictates a level of force in war that is proportional to the goals sought.²⁴ Proportionality requires the use of violence calibrated to justice or, more colloquially, you can't use a nuke to eliminate a sniper.²⁵ Additionally, discrimination mandates that noncombatants must not be intentionally killed. Subtler *jus in bello* concepts regarding the principles of double effect and double intent factor into the calculus of the use of force as well.²⁶

The professional community is divided on the question of whether an ALE system could ever satisfy a strict interpretation of proportionality and discrimination criteria. Many argue that it is simply impossible to ethically code a robot's black box with enough moral values and situational awareness to make ethically sound discrimination and proportionality decisions.²⁷ Yet others, championed by Ronald C. Arkin, an ALE proponent conducting DOD sponsored research, claim otherwise. Arkin believes that "ethical governors" can eventually be programmed with the complete LOAC, the Geneva Conventions, and theater specific ROE that would give robots the capability to perform ethically better than humans.²⁸ He confidently states "it is not my belief that unmanned

systems will be able to be perfectly ethical in the battlefield, but I am convinced that they can perform more ethically than human soldiers are capable of.”²⁹ He then uses a 2007 Office of the Surgeon General, US Army Medical Command report citing numerous ethical violations on the Iraqi battlefield to bolster his assertion.³⁰

Imagine then an ALE robotic system that does not get tired, afraid, hungry, or homesick; and does not express feelings of adrenaline fed rage, guilt, hatred, and revenge for killed buddies. The system is programmed without the need or concern for self-defense and self-preservation. These robots don’t draw salary, benefits, or pensions nor incur physical and psychological damage in war. They are more effective, efficient, and less costly to the environment. The logical question becomes if ALE technology could spare our military members from the ravages of war and reduce war crimes, are we not morally obligated to pursue such capability?³¹

While this utopian vision may appeal to many, such grandiose hyperbole, especially in the early development of any new technology, should surely be treated with a healthy dose of skepticism—Murphy will be alive and well. In fact, the disparity of considered opinion on the issue should serve as a forewarning that if ALE technology is employed in combat, its early introduction will come with high risk for failures in discrimination and proportionality calculations. Thus ALE capability development must follow a very slow and incremental crawl, walk, run,

maturation process. Furthermore, the keystone of any ALE system's test and evaluation program would be exhaustive and complicated scenario-based operational evaluations to extensively validate discrimination and proportionality algorithms.³² For the sake of continued argument, assume that an ALE system can satisfy *jus in bello* proportionality and discrimination criteria. What then is the next major ethical hurdle to the employment of ALE?

Moral Agency

The ability to assign moral agency represents the next hurdle. Though not specifically called out in any of the *ad bellum* or *in bello* criteria, society has traditionally assumed that a moral agent exists (or that at least an adequate level of moral agency can be assigned) in the application of lethal force.³³ Although societal and international norms today do accept a great degree of indirectness in the assignment of moral agency while applying lethal force, this acceptance is not without limits. In fact, a lack of direct moral agency can contribute to putting weapon technologies, such as landmines, off limits. Therefore it becomes important to be able to assign moral agency with an acceptable level of directness in two broad ALE situations: (1) the textbook, error free use of ALE; and more importantly, (2) in the event that the robot "misbehaves" and violates some ROE, LOAC, or *jus in bello* principle.

Using a moral agent, act, and outcome framework highlights the ALE dilemma of assigning moral agency. Ethically is there any difference

in the outcome of a successful lethal cruise missile strike launched from several hundred kilometers away or by a robot employing ALE? The enemy is dead in both scenarios (outcome) and with varying degrees of directness, a human was involved in the killing by creating the weapon system and “employing” its capability. Ethically, is there any difference in a slight modification to the scenario where an unintentional cruise missile component failure or the ALE robot’s misapplication of discrimination directly leads to noncombatant deaths? Again the outcome is the same. The two scenarios and examples within each subtly differ and highlight the different aspects of an implicit requirement that a responsible moral agent exists for the actions taken in the conduct of war, especially when something goes wrong or atrocities occur.

Textbook Application

In the first scenario, since a person tasked with adhering to LOAC and ROE remains in the cruise missile kill chain, direct moral agency for the application of lethal force can be assigned (the person who launched the missile). Who then is the moral agent for the ALE robot that correctly applies lethal force—the robot, the commander who employed the system, or the engineer or programmer? Again experts widely disagree. Some claim no one can “justly be held responsible,” thus the general use of ALE is automatically unjust and unethical.³⁴ Others have no qualm assigning responsibility to the robot itself.³⁵ Even if ethically programmed, I agree that the robot is “off the hook” regarding ethical

responsibility. Furthermore, although a high degree of direct moral agency does not exist, it does lie somewhere between the two extremes (no one or the robot) at an Aristotelian golden mean. So, assigning moral agency to the soldier or commander who employed the system (similar to the cruise missile example) would not make ALE unethical in a strict legal sense. The strength of this argument predominantly rests upon the assumption that the ALE robot is capable of applying discrimination and proportionality criteria as well as, if not better than, humans.

War Crime

In the second scenario, if an ALE robot committed what would be considered a war crime, the tougher question becomes who can be held responsible for the resultant atrocities? Combining the legal principles of diminished responsibility and product liability, along with the long held principle of a commander's accountability, I believe wronged parties could achieve due recourse in the event an ALE robot mistakenly killed noncombatants or committed war crimes.³⁶ Outside of the additional consideration of including a degree of contractual liability on the manufacturer, this approach is consistent with how we treat other forms of technology and the principle of the nontransferable nature of accountability on the part of the commander.³⁷ To formally satisfy moral agency questions if ALE algorithms fail, future employment of ALE will also require a thorough legal review to determine the appropriate combination of product liability and diminished responsibility on part of

concerned parties (manufacturer, engineer, programmer, and commander) that supports assigning a legally sufficient level of moral agency.

Let us optimistically assume that future ALE robots possess thoroughly tested and robust *jus in bello* proportionality and discrimination abilities and an international legal review and subsequent codification accepts that sufficient direct moral agency can be assigned to the textbook application of ALE. Let us further assume that legal reviews and international norms accept that a worst case failure of an ALE system leading to innocent deaths is a relatively amoral outcome. An outcome chalked up to the extreme fog and friction of war or to unforeseen and unintended failures such as when a cruise missile component breaks. Should we then vigorously pursue the use of ALE? A slight change in perspective of the assignment of moral agency serves as the key ethical filter to address ALE's fitness for use in an offensive capacity.

The Profession of Arms and Military Ethics

Although international legal review might accept a sufficient level of moral agency to support ALE's general use as well as adequate accountability and recourse for restitution involving war crimes, from the military perspective this should not be the final or even the most important critical evaluation. The key issue remains that other than introducing the ALE system to the battlespace, at no point in the kill

chain does an individual soldier hold the responsibility for the act that requires moral agency. A more appropriate analytical filter for this absolute lack of direct moral agency in committing the act of offensive lethal force resides within the larger context of military ethics and the profession of arms.

Profession of Arms

It is not trite to pose the following foundational questions—would it be considered honorable for the profession of arms to resort to the use of ALE? Does such technology cross the line into unprofessional behavior? If so, what are the implications? Martin Cook asserts that the profession of arms’ foundation does not simply rest upon flashy rhetoric but rather upon a strong moral basis rooted deep within our society. He writes, “Strong aspirations are the foundation of military virtues that preserve and sustain some of the noblest human values: to serve others even at the cost of personal sacrifice, and to discipline one’s mind and body so that it serves a purpose larger than self and the pursuit of pleasure.”³⁸

Similarly others emphasize that the essence of the military profession includes “the capacity to reason to efficacious decisions” of great moral import.³⁹ Our current obligation as a profession is to prepare for and wage the nation’s wars and thus, by extension, our soldiers must be prepared to suffer, fight, kill, and die for their country.⁴⁰ Resorting to the use of ALE begins to chip away at the profession of arms’ moral foundation by freely relinquishing our direct moral agency for war’s most

profound activities. If professions are “quintessentially” human institutions operating in areas “where humanity’s most profound concerns arise” and we willingly relinquish the responsibility for the toughest decisions in our sphere of expertise, what do we say if someone asks, “How can I be a professional when there is no profession?”⁴¹

The answer to and implications of this question are not trivial. Our military is a specialized culture separate from civil society with laws and traditions of our own.⁴² As such our nation and civilian leaders trust us to act as the “moral agent of the American people” and grant us significant independence to do so.⁴³ We are self-forming and organizing with laws derived from and dictated by our nation’s leaders and the US Constitution.

At its core ALE may threaten this separateness and independence, sense of worth and self-esteem, and ultimately our status as a profession. Additionally, the military also requires a degree of moral independence and autonomy to be an effective servant of government. James Burk describes this requirement when he states that “military professions require autonomy, to include moral autonomy, to be competent actors held responsible for what they do.”⁴⁴ He lists this autonomy as “a precondition for responsible obedience” and “on which the moral responsibility of the military profession depends.”⁴⁵ Likewise, Anthony Hartle claims that the most significant aspect of being a

professional is the “existence of a particular moral relationship between the professional and the society within which he or she functions.”⁴⁶

Applying these philosophic strains to ALE, if we freely give away our moral autonomy to robots or computers, we are in danger of giving up a huge chunk of the moral responsibility that secures our existence as a profession and subordinates us to the nation we are sworn to defend and serve. If robots accomplish our most dangerous and near impossible missions what then becomes the role and purpose of the soldier?⁴⁷ In a period when the model of military officership is already undergoing profound change, the use of ALE portends a further outsourcing of traditional warrior roles and responsibilities and will hasten a decline of the military profession.⁴⁸

Military Ethics

Having analyzed ALE in the context of the profession of arms, what does a military ethical filter portend? If we build upon our previous definition of ethics, military ethics becomes “the study of honorable and shameful conduct in the armed service; about decency, discretion, wisdom, and virtue; about reasoned choice and obligation” to self and the profession of arms.⁴⁹ While these obligations apply at all times they are most vital during times of war when we must guard against the desire for just ends overcoming the prohibitions against using unjust means. In other words, “something must exist beyond [success] because successful preparation for or execution of combat can never be the ultimate

consideration in military ethics.”⁵⁰ Acknowledging that there are some things we cannot definitively know the justness of, would the use of ALE be “consistent with our deepest moral sense?”⁵¹ Is the use of ALE, in fact, militarily unethical?

In Dr. Martin Luther King’s letter from a Birmingham jail regarding the unjustness of segregation laws he stated, “To put it in terms of Thomas Aquinas: an unjust law is a human law not rooted in eternal and natural law. Any law that uplifts human personality is just. Any law that degrades human personality is unjust.”⁵² Now replace “law” with “act” in the last two sentences. Would the act of ALE, without any direct human moral agency, distort the soul of the military ethic and damage the profession of arms in the process? I contend yes.

Soldiers are moral agents of the state and throughout history have been the exemplars of numerous prized virtues such as patriotism, valor, and honor. Our most exalted Soldiers have exemplified the cardinal virtue of moral and physical courage. Without exposure to physical risk and making profound decisions in war, the opportunities to exercise moral and physical courage are greatly decreased. Pulling on this moral thread is not the same as saying that the fight against our enemy must always be fair as Gen George Patton succinctly reminded us: “No bastard ever won a war by dying for his country—he won it by making the other poor dumb bastard die for his country.”⁵³

Nor is it a simple romanticization of war. For over two centuries honorable and brave Soldiers, forged in the crucible of fighting our nation's wars, have returned home and served as a key ingredient in our nation's moral stock—a stock that infuses our society and is passed down through generations. Today we are better service members, patriots, and Americans because Airman believed in a cause greater than self and freely took to the skies over Nazi Germany decades ago. While atrocities and war crimes unfortunately still occur, we nevertheless remain a more ethically attuned military because service members today, like generations before us, exercise ethical fitness while facing moral dilemmas at the strategic, operational, and very personal level of war.

Resorting to the use of ALE foreshadows a future decline in military ethics and climate of ethical laziness. At the extremes of ethical laziness lurks a fear that risk free war will create huge physical and psychological disconnects between the exercise of lethal force and those who prosecute it and a lack of empathy for those who it is waged upon.⁵⁴

Finally, Hartle writes that one purpose of professional ethics is to “delineate the moral authority for actions necessary to the professional function but generally impermissible in moral terms” and as such the ethical code “may thus both prohibit and permit various morally significant actions.”⁵⁵ It is partially within this authority that doctors are allowed to prescribe dangerous and addictive drugs, lawyers can conceal facts of crime committed by a client, policeman and fireman make life

and death decisions in the conduct of their duties, and the military fights and kills in the conduct of war. We should be no more eager to give up this weighty responsibility to an autonomous agent than doctors would forgo their responsibility to operate, lawyers to defend, or judges to adjudicate.

The rise of killer robots will inevitably lead to a decrease in the need for traditional military skills and virtues. Soldiers will become too distanced and desensitized both emotionally and physically from war, with a subsequent decline of military ethos, increasing ethical laziness, and lack of self-determined action.⁵⁶ Indeed ALE technologies represent the precipice of desensitization to violence since in a robot war few remain to be desensitized. In this new warfare reality anyone could command killer robots, and the military professional in full regalia might as well be a white-coated, robotics engineer.⁵⁷

Writing on the quest for bloodless war, Robert Mandel states, “from the military’s own standpoint, perhaps the most disturbing prospect emerging from the quest for bloodless war is the potential erosion of the military ethos: the military ethic is built on the principles of self-sacrifice and mission accomplishment; troops are supposed to be willing to die so that civilians do not have to. This warrior code clearly encompasses why soldiers fight, how they fight, what brings them honor, and what brings them shame.”⁵⁸ In summary, it is my position that the use of ALE will result in an abandonment of this long held warrior code. Therefore, the

offensive use of ALE should always keep a human in the loop of the kill chain.

Conclusion

Robotic autonomy is coming to many walks of life sooner than most think. Some of the ethical implications raised bear relevancy for other robotic applications such as autonomous planes, trains, and automobiles. Similarly, doctors and lawyers will soon face equally challenging ethical dilemmas as technology forces their professions to decide if they are willing to relinquish their moral agency to autonomous agents programmed with the knowledge to practice medicine and law. I maintain that relinquishing the moral responsibility for the endeavors that make us most human does not speak well for humanity and thus for the military profession; I believe that offensive ALE is fundamentally detrimental to the ethical conscious and moral basis of the profession of arms and should not be adopted as an accepted use of force. Rather, we should always keep a human in the loop of the offensive kill chain.

Sir John Winthrop Hackett once spoke, “The major service of the military institution to the community of men it serves may well lie neither in the political sphere nor the functional. *It could easily lie within the moral.* The military institution is a mirror of its parent society, reflecting strengths and weaknesses. It can also be a well from which to draw refreshment for a body politic in need of it.”⁵⁹ In the end, our moral

worth is the strongest argument for keeping humans in the loop of the kill chain.

Notes

1. Peter M. Asaro, *How Just Could a Robot War Be?*, 2008, <http://www.peterasaro.org/writing/Asaro%20Just%20Robot%20War.pdf> (accessed 12 October 2009). For example, in World War I advances in submarine warfare witnessed the abandonment of the long-held convention of rescuing the surviving crewmembers of sinking enemy ships. The act of a submarine aiding the remaining survivors became viewed as being “so risky that it would render submarine warfare impractical” and thus fell to the wayside of accepted ethical norms during war. Asaro wrote that German Admiral Karl Doenitz eventually issued the infamous Laconia order in 1942 which strictly forbade German submarines to provide succor to survivors of sinking ships during World War II. After the war’s conclusion, Doenitz was acquitted of war crimes charges on this matter at the Nuremberg trials.

2. Many current defensive systems such as the Patriot missile and other ballistic missile defense systems, the Navy’s Phalanx close-in weapon system for ship protection, or the Army’s counter rocket artillery mortar technology operate in a fully autonomous mode with humans monitoring the loop as a safety trump or only in a fail-safe role. Such systems, whose past failures have presented ethical dilemmas of their own, primarily draw on the inherent right of self-defense. As such, I

consider these systems ethically justified. Their discussion is generally outside the scope of this paper.

3. P. W. Singer, *Wired for War* (London: Penguin Books, 2009), 96–105. Singer describes the impact of Moore’s law which asserts that the number of transistors on an integrated circuit doubles approximately every two years. This trend has continued for more than half a century and if it continues, by 2029 a \$1,000 computer would have the capability to do 20 million billion calculations a second (equivalent to 1,000 brains). Eventually technological progress becomes so extremely rapid that a computational singularity is achieved. The future after singularity becomes qualitatively different and harder to predict. The ideas of artificial intelligence and self awareness for robots are no longer relegated to science fiction. Conservative estimates for achieving singularity range from the year 2030 to 2040.

4. Like the best science fiction novels, philosophers and roboticists are in fact vigorously debating, contemplating, and including *Terminator 2: Judgment Day* scenarios in their ethical evaluations of ALE. Such scenarios are interesting reading and even raise important issues, but are outside the scope of this paper.

5. Those interested in a full review of the current state of robotic warfare technology may wish to review Robert Arkin, *Governing Lethal Behavior in Autonomous Robots* (Boca Raton, FL: Chapman and

Hall/CRC, 2009); Singer, *Wired for War* ; or Armin Krishnan, *Killer Robots* (Burlington, VA: Ashgate Publishing, 2009).

6. Typical elements of the kill chain include target reconnaissance, detection, identification, tracking, decision, and order to attack the target, destruction of the target, assessment, and reporting.

7. Bernard T. Adney quoted in James H. Toner, *True Faith and Allegiance: The Burden of Military Ethics* (Lexington: The University Press of Kentucky, 1995), 9.

8. Paul Christopher, *Ethics of War & Peace*, 3rd ed. (Upper Saddle River, NJ: Pearson Prentice Hall, 2004), 81–98.

9. Ibid. The aim of a just peace is sometimes omitted from just war theorists listing of *jus ad bellum* criteria.

10. On 3 July 1988, the USS *Vincennes* was patrolling the Persian Gulf and operating with its Aegis radar and self-defense system in a semiautonomous mode. When the system mistakenly identified an Iranian Airbus passenger jet as a hostile F-14, fog and friction prevailed and the crew authorized the system to fire. The result was the death of all 290 passengers on board the Airbus and edged the United States precipitously closer to open conflict with Iran. In this historical incident, the ship's weapon system was still not operating in a fully-autonomous mode; however, it does serve as a good example of the dangers of removing human in the loop of the kill chain and ceding more authority to autonomously operating computer systems. Today, an increasingly

wider array of weapon systems has the capacity to operate in completely autonomous modes—without a human directly in the loop but rather functioning in a failsafe role. While these systems are predominantly defensive in nature, such as ballistic missile defense and close-in protection systems, future applications have the potential for purely offensive autonomous action as well.

11. The 1983 movie *WarGames* depicted a young computer whiz who hacked into the government computer that controlled the US nuclear arsenal and ends up playing a game that nearly starts World War III.

12. Asaro, *How Just Could a Robot War Be?*, 4–9. Throughout the essay I use the term Soldier in a generic form. The term equally implies to Sailors, Airman, Marines, and Coastguardsmen as well.

13. Nick Fotion, “Proportionality,” in *Moral Constraints on War*, ed. Bruno Coppieters and Nick Fotion (Lanham, MD: Lexington Books, 2008), 126–27. The principle of proportionality requires some measure of cost/benefit calculation to determine if the use of force is justified. Traditionally, this cost/benefit analysis includes the considerations and viewpoints of both warring factions. Emphasizing this perspective of proportionality, the National Conference of Catholic Bishops preached in a pastoral letter, “The damage to be inflicted and the costs incurred by war must be proportionate to the good expected by taking up arms”

Represented in equation form this definition becomes: Damage inflicted + cost incurred = good expected.

This understanding of the proportionality principle poses some difficult issues for the use of ALE. If the employment of ALE by one warring faction dramatically reduces the cost incurred (or even drives the term to zero) on the left side of the equation, the arithmetic of proportionality at a minimum becomes skewed if not totally invalid. In order to balance out the equation to a zero sum, few would probably argue that the principle of proportionality would permit a warring state to inflict additional damage to “make up” for its own reduction of cost in human capital realized through the use of ALE technology. The logic is extreme but it serves to highlight that proportionality, which already suffers from a lack of clarity in defining what exactly proportional means, is further muddled by the introduction of ALE.

Tangentially to the ALE scenario, in their general discussion of the principle of last resort, Bruno Coppierters, Ruben Apressyan, and Carl Ceulemans write, “Applying the Principle of Last Resort may confront political actors with the difficult choice between the evil of war and the burden of injustice. In some cases, the burden of an unjust peace has to be preferred to the horrors of war.” Coppierters, Apressyan, and Ceulemans, “Last Resort,” in *Moral Constraints on War*, 140. Building on this tough choice dilemma, opponents of ALE would argue that with

robots fighting in place of humans, the evil and horrors of war would diminish (at least for the side with the robots) to such an extent that leaders would be more willing to use force in the pursuit of justice and peace. Pursuing these noble aims prior to fully considering and actively attempting reasonable peaceful alternatives that the principle of last resort requires.

14. Maj Michael A. Guetlein, “Lethal Autonomous Weapons—Ethical and Doctrinal Implications,” Naval War College Research Paper (Newport, RI: Naval War College, February 2005), 14–15. Guetlein quotes Capt James T. Kirk of Star Trek fame. In the 1967 Star Trek episode, *A Taste of Armageddon*, “The crew of the Enterprise visits a planet whose people fight computer simulated wars with a neighboring enemy planet. The crew finds that although the war is fought via computer simulation, the citizens of each planet have to submit to real executions inside 'disintegration booths' based on the results of simulated attacks. The crew of the Enterprise is caught in the middle and is told to submit themselves voluntarily for execution after being 'killed' in an 'enemy attack'.” Capt Kirk bemoans that “they have made this war too easy and until they experience the horrors of war, there will never be any incentive to make peace.” Quoted material from *Wikipedia*, s.v. “A Taste of Armageddon,” http://en.wikipedia.org/wiki/A_Taste_of_Armageddon.

15. During the 1990s the threat of and actual use of Navy Tomahawk cruise missiles and conventional air launched cruise missiles

from B-52s became a common course of action against al-Qaeda and Iraq. Navy and Air Force crews were at little risk during the employment of these weapons which may have increased the willingness to use such force. In the *Transformation of American Airpower*, Benjamin Lambeth echoed this assertion by describing that “cruise-missile diplomacy had instead become the prevailing US pattern, owing to the ability of cruise missiles to deliver punitive messages without risking the lives of any US aircrew.” Benjamin Lambeth, *Transformation of American Airpower* (Ithaca, NY: Cornell University Press, 2000), 216.

16. The move to over-the-horizon “riskless” war waged by remotely operated air, ground, and sea vehicles carries with it many of the same *jus ad bellum* concerns regarding proportionality and last resort. Therefore, even without the development and employment of true ALE technologies, the discussions concerning their use is applicable for remotely operated vehicles.

17. Peter Asaro, online interview by the German Institute for Religion and Peace, 2009, http://www.irf.ac.at/index.php?option=com_content&task=view&id=295&Itemid=22. In a humanistic appeal, Asaro poses many questions. What else could or should we be doing instead with such technology? What values are being promoted and projected by these technologies? Are these the values we want our society to pursue as a whole? Why not use

such technological prowess and pragmatic ingenuity to tackle the underlying social, political, and resource problems?

18. Singer, *Wired for War*, 308–13. Singer interviews several Middle Eastern experts who provide insight into our enemy’s perspective on the current use of unmanned technology. The belief is that defiance in the face of the coldhearted United States and their machines shows one’s heroism in the ongoing struggle, and weakness and cowardice on our part. It can give rise to “great anger” in the region because we conduct war “without dignity” which continues to cause a rift between the US and Islamic world. Mubashar Jawed Akbar, the editor of India’s *Asian Age*, anticipates that a greater use of unmanned systems will motivate attacks on the US homeland when he states, “It will be seen as a sign of American unwillingness to face death. Therefore new ways to hit America will have to be devised. . . .The rest of the world is learning that the only way to defeat America is to bleed her on both ends.” Similarly the director of the Issam Fares Institute of Public Policy and International Affairs at the American University of Beirut predicts terrorists “will find more devious ways to cause panic and harm. They’ll say, ‘If they are going to use these machines, we should get some chemicals and use them.’ Put them in air-conditioning ducts in shopping centers or university dorms. . . . They might go after soft targets, shopping centers, sports stadiums, and so forth.” If we accept these concerns, this raises

the issue that relying on ALE might make it more difficult to satisfy the *jus ad bellum* criterion of a reasonable chance of success in war.

19. Ibid., 191, 386. Given that there traditionally has been little discussion of military ethics in the context of the increasing computing powers and destructive capabilities of future technologies this is not terribly surprising. Singer relays he was somewhat dumbstruck by an absolute lack (not one instance) of discussion on unmanned or robotic systems at a 2006 “Rethinking the US Military Revolution” conference or a 2007 conference of over 100 international law experts in Washington DC discussing “New Battlefields, Old Laws.”

20. Department of Defense, *Unmanned System Safety Guide for DoD Acquisition*, ODUSD (A&T) Systems and Software Engineering Directorate, 27 June 2007.

21. ODUSD office of primary responsibility, e-mail to the author. Similarly, the Department of the Air Force general counsel as well as the Air Force Doctrine Center responded that no one on their staff was actively engaged in critically evaluating the implications of ALE.

22. US Air Force, *Unmanned Aircraft Systems Flight Plan 2009–2047*, 18 May 2009, 41.

23. Ibid., 42.

24. Anthony E. Hartle, *Moral Issues in Military Decision Making*, (Lawrence, University Press of Kansas, 2004), 96–97.

25. Asaro, on-line interview.

26. The principle of double effect generally holds that it is morally permissible to embark on a course of action that may result in evil effects as long as these effects are unintended and not anticipated to be disproportionate to the good effects that are actually intended. Paul Christopher, *Ethics of War & Peace*, 3rd ed. (Upper Saddle River, NJ: Pearson Prentice Hall, 2004), 90–91. Michael Walzer argues that the traditional principle of double effect requires additional criteria to be just. The addition of the principle of double intent involves a mandate for combatants to aggressively and actively pursue precautions to reduce risk to civilians even at the expense of increasing risks to themselves. Michael Walzer, *Just and Unjust Wars*, (New York, Basic Books, 1977), 155–56. Also see Patrick Lin, George Bekey, and Keith Abney, *Autonomous Military Robotics: Risk, Ethics, and Design*, California Polytechnic State University, http://ethics.calpoly.edu/ONR_report.pdf.

27. Asaro, *How Just Could a Robot War Be?*; Robert Sparrow, “Killer Robots,” *Journal of Applied Philosophy* 24, no. 1 (February 2007): 62–77; and Noel Sharkey, “Weapons of Indiscriminate Lethality,” *Deutsche Welle Global Media Forum*, March 2009, <http://www.dw-gmf.de/1982.php> (accessed 11 October 2010). Their writings emphasize this theme.

28. Ronald C. Arkin, *Governing Lethal Behavior: Embedding Ethics in a Hybrid Deliberative/Reactive Robot Architecture* (Atlanta: Georgia Institute of Technology, 2007), 7. Arkin’s research is so in depth that he

even addresses the ability to choose a variety of overall ethical theories to code into your battlefield robot—deontological, utilitarian, or virtue ethics.

29. Ibid.

30. The Surgeon General, US Army Medical Command, Mental Health Advisory Team IV Operation Iraqi Freedom 05–07, 17 November 2006 Final Report listed the following findings:

- Approximately 10 percent of Soldiers and Marines report mistreating noncombatants (damaged/destroyed Iraqi property when not necessary or hit/kicked a noncombatant when not necessary). Soldiers that have high levels of anger, experience high levels of combat, or those who screened positive for a mental health problem were nearly twice as likely to mistreat noncombatants as those who had low levels of anger or combat or screened negative for a mental health problem.
- Only 47 percent of Soldiers and 38 percent of Marines agreed that noncombatants should be treated with dignity and respect.
- 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.
- 17 percent of Soldiers and Marines agreed or strongly agreed that all noncombatants should be treated as insurgents.
- Fewer than 10 percent of Soldiers and Marines reported that their unit modifies the ROE to accomplish the mission.
- 45 percent of Soldiers and 60 percent of Marines did not agree that they would report a fellow Soldier/Marine if he had injured or killed an innocent noncombatant.
- Only 43 percent of Soldiers and 30 percent of Marines agreed they would report a unit member for unnecessarily damaging or destroying private property.

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- Less than half of Soldiers and Marines would report a team member for an unethical behavior.
 - A third of Marines and over a quarter of Soldiers did not agree that their NCOs and Officers made it clear not to mistreat noncombatants.
 - Although they reported receiving ethical training, 28 percent of Soldiers and 31 percent of Marines reported facing ethical situations in which they did not know how to respond.
 - Soldiers and Marines are more likely to report engaging in the mistreatment of Iraqi noncombatants when they are angry, and are twice as likely to engage in unethical behavior in the battlefield as when they have low levels of anger.
 - Combat experience, particularly losing a team member, was related to an increase in ethical violations. Recent allegations of servicemen from the 5th Stryker Brigade charged with unprovoked killings of Afghan civilians indicate the overall ethical climate has not improved. Drew Griffin, "Tapes Describe U.S. Servicemen Killing For Sport in Afghanistan," *CNN*, 27 September 2010, http://articles.cnn.com/2010-09-27/world/afghanistan.sport.murders_1_afghan-civilians-afghan-man-soldiers?_s=PM:WORLD.

31. *US Code, Title 10—Armed Forces*, secs. 3583, 8583, and 5947.

Requirements of Exemplary Conduct establish as a matter of law the commander's responsibility for the moral and ethical stewardship of his or her unit. The fourth of four requirements for commanders states "(4) to take all proper and necessary measures, under laws, regulations, and customs of the Army, to promote and safeguard the morale, the physical well being, and the general welfare of the officers and the enlisted persons under their command or charge.

32. Arkin, *Governing Lethal Behavior in Autonomous Robots*, 155–176. Arkin, among others, proposed an excellent set of scenarios to accomplish this objective. They include Taliban Muster in Cemetery,

Apache Rules the Night, Korean Demilitarized Zone, and Urban Sniper. In the ultimate discrimination test for a human, the movie *Men in Black* (MIB) highlights Agent J's incredible discrimination ability. During his entrance simulation exam to MIB, he correctly shoots a little girl target among three "scary" aliens and then provides his airtight and correct logic as to why he shot the girl. Could a robot perform as well?

33. Sparrow, *Killer Robots*, 67. Sparrow claims that a Kantian and deontological basis which emphasizes the basic respect for human dignity requires that in war we must be able to identify those responsible for deaths.

34. *Ibid.*, 74. Sparrow asserts it is unethical to use ALE because you cannot definitively hold anyone accountable for a robot's actions in the event something goes wrong and war atrocities or crimes occur. In the end a true definition of autonomous implies the only party that can be responsible for the action is the actor them, or itself. He refuses to place this responsibility upon the robot and argues it is too far a stretch to hold a commander responsible. He states that no one can "justly be held responsible" and therefore robots with autonomous lethal capability are unethical to use.

35. John P. Sullins, "When is a Robot a Moral Agent," *International Review of Information Ethics* 6, no. 6 (December 2006), 28. Sullins writes that a robot can be a moral agent if it is significantly autonomous, its behavior is intentional, and it is in a position of responsibility. He

concludes, “If the robot can be seen as autonomous from many points of view, *then the machine is a robust moral agent, possibly approaching or exceeding the moral status of human beings.*” (emphasis added)

36. Lin, Bekey, and Abney, *Autonomous Military Robotics*, 55–59.

37. Nautical Quotations, “On the Collision of Wasp and Hobson,” <http://www.bluewatersailing.com/documents/NauticalQuotations.pdf>.

On 26 April 1952 the aircraft carrier USS *Wasp* and minesweeper USS *Hobson* collided during night maneuvers. The USS *Hobson* was cut in two and sank, killing 176 sailors and injuring 61 more in the process. An editorial in the Wall St. Journal perhaps gave the best explanation for the nontransferable nature of accountability. “It is the tradition that with responsibility goes authority and with them accountability. This accountability is not for the intentions but for the dead. The Captain of a ship, like the captain of a state, is given honor and privileges and trust beyond other men. But let him see the wrong course, let him touch ground, let him bring disaster to his ship or to his men, and he must answer for what he has done. It is cruel, this accountability of good and well intentioned men. But the choice is that or an end to responsibility and finally, as the cruel sea has taught, an end to the confidence and trust in the men who lead, for men will not long trust leaders who feel themselves beyond accountability for what they do.”

38. Martin L. Cook, *The Moral Warrior* (Albany, NY: State University of New York Press, 2004), 41.

39. Don M. Snider, "Dissent and Strategic Leadership of The Military Professions," *Strategic Studies Institute*, February 2008, <http://www.strategicstudiesinstitute.army.mil/pdffiles/pub849.pdf>.

40. Toner, *True Faith and Allegiance*, 49–50.

41. Snider, "Dissent and Strategic Leadership," 12–14.

42. Toner, *True Faith and Allegiance*, 36–37.

43. Don M. Snider quoted in Richard Swain, "Reflection on an Ethic of Officership," *Parameters* 38, no 1 (Spring 2007): 14.

44. James Burk quoted in Snider, "Dissent and Strategic Leadership," 25–26.

45. Ibid. Snider writes that Burk's ideas on moral autonomy are used to contend Samuel Huntington's "functional assertion that loyalty and obedience are the cardinal military virtues."

46. Hartle, *Moral Issues in Military Decision Making*, 28.

47. Swain, "Reflection on an Ethic of Officership," 15.

48. Cook, *The Moral Warrior*, 47. Cook claims that the Westphalian state system and model of military officership are already undergoing a transformation resulting from the changing character of state sovereignty, national interests, and a notion of a global common life. The introduction of ALE would be yet another major component of overall change of the concept of officership.

49. Toner, *True Faith and Allegiance*, 146. Our previous general definition of ethics was "the study of good and evil, of right and wrong, of

duty and obligation in human conduct, and the reasoning and choice about them.”

50. James H. Toner, “Educating for Exemplary Conduct,” *Air and Space Power Journal*, Spring 2006,
<http://www.airpower.maxwell.af.mil/airchronicles/apj/apj06/spr06/toner.html>.

51. Ibid., 6.

52. Dr. Martin Luther King Jr., “Letter from a Birmingham Jail,” African Studies Center, University of Pennsylvania,
http://www.africa.upenn.edu/Articles_Gen/Letter_Birmingham.html.

53. Brainy Quotes, “George S. Patton Quotes,”
http://www.brainyquote.com/quotes/authors/g/george_s_patton_2.html
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54. Krishnan, *Killer Robots*, 138.

55. Hartle, *Moral Issues in Military Decision Making*, 31. Hartle’s two other purposes for professional ethics codes include, “protect[ing] other members of society against abuse of the professional monopoly of expertise” and “defin[ing] the professional as a responsible and trustworthy expert in the service of his client.”

56. Krishnan, *Killer Robots*, 137–38.

57. Ibid., 136.

58. Robert Mandel, *Security, Strategy, and the Quest for Bloodless War* (Boulder, CO: Lynne Rienner Publishers Inc., 2004), 164.

59. Sir John Winthrop Hackett, "The Military in the Service of the State," in *Concepts For Air Force Leadership*, ed. Dr. Richard I. Lester (Maxwell AFB, AL: Air University Press, 2008), 91. (emphasis added)