The art of warfare has evolved significantly over the past three hundred years, from infantrymen with smoothbore rifles in the civil war, tank warfare in World War I and II, and the air campaigns of Vietnam. As we progress into the twenty first century with Operation Iraqi Freedom and Operation Enduring Freedom and as the United States continues to prepare for future conflicts, new technologies continue to infiltrate the battlefield and fighting force. As the machine and artificial intelligence technology becomes increasingly advanced, the implications of their uses are numerous and warrant further investigation.

Robots and artificial intelligence is becoming increasingly prevalent in both the private and public sectors. As a society, we interact with artificial intelligence on a daily basis when we call technical help and support centers, anytime a movie or television show is recommended to us on Hulu Plus or Netflix, and we have even began to trust it with our banking and finances. The proliferation of artificial intelligence into the everyday lives of western civilization has stemmed primarily from military research application of the technology for wartime purposes. However, as technology continues to advance, the military application of artificial intelligence becomes ever more frightening. From artificial intelligence gathering, screening and analyzing military intelligence to robots with onboard brainpower to execute missions at the click of a button, special consideration needs to be paid to the ethicality and responsibility of these systems. As semi and fully autonomous machines with artificial intelligence are relied upon more heavily, giving the drone the autonomy to decide when to engage a target and when to ignore it becomes more and more of a reality each day, and is in fact an ethical practice that warrants consideration within the context of current law of war and rules of engagement.

We must consider the ethicality and moral responsibility regarding the deployment of the technology on the battlefield as well as their place within the laws of war, among others. We will then further investigate the artificial intelligence on drones and its potential for decision making processes on the battlefield and confront the issues that are raised in concerns over A.I and the identification of friendlies, threats, and non-combatants. The development and fielding of these systems is occurring as rapidly as the technology becomes available, resulting in an ever-changing arsenal of assets to forces on the ground, both in and out of the theatre of war. Before we can consider the ethics of semi-autonomous and autonomous machines making their own decisions and the moral standing of those who deploy these machines, it is important to provide a brief historical background of artificial intelligence and its uses in the military.

The idea of artificial intelligence can be traced back to ancient Greece and Egypt, where religious or sacred statues were believed to possess minds that were capable of emotion and deep thought. However, artificial intelligence as we view it today, involving decision making, computers, and algorithms came to light in the 1940's to the 1950's when scientists across multiple disciplines such as psychology, mathematics, and engineering began to consider the ways in which one may create an artificial brain. This thought stems from the discovery that the brain was in fact controlled by electrical impulses, which could be easily replicated by the scientists. Alan Turing, the creator of the Turing test, argued that if a machine could carry on a conversation that was indistinguishable from a conversation with another human being, we could then call the machine an "intelligent" machine (McCorduck, 2004). The 1956 Dartmouth Conference was then proposed by Marvin Minsky, John McCarthy, Claude Shannon, and Nathan Rochester, who asserted that "every

aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it" (McCarthy, Minsky, Rochester, & Shannon, 1955). With the advent of more powerful computers such as IBM's Deep Blue in 1997, these systems have become increasingly progressive, being able to beat world champion chess player, Garry Kasparov, displaying that these machines do in fact have decision making power and are capable of possessing some type of intelligence (McCorduck, 2004). More recently, in 2005, Stanford University engineered a robot with artificial intelligence that was able to drive for over 120 miles on a desert road that it previously had not navigated, eventually winning the DARPA Grand Challenge. As artificial intelligence becomes more capable of decision making, more progressive, and more reliable, the military has also become interested in the potential applications that this technology could offer to them.

One of the first recorded uses of computers and artificial intelligence for military purposes was during World War II when British military intelligence finally decoded the German Enigma machine codes (Din, 1987). Because of the large number of combinations of code, it would have been virtually impossible for the British intelligence to crack the code, or it would have taken much more time than was at hand, however, it was solved by "devising a rudimentary computer to perform sorting, guessing and elimination of tasks which would have required days or years for humans to perform" (Din, 1987). After World War II, artificial intelligence and computers were used by the military, again in intelligence operations that managed massive databases of information regarding the locations of nuclear weapons and being able to attack large and complex input and output functions that are a part of every day military intelligence operations. While computers and artificial intelligence were, and continue to be pervasive in military intelligence operations, it also

became an important aspect of weapons engineering with the invention of smart munitions, and the eventual use of robots with onboard artificial intelligence.

As technology continues to become more and more progressive, we are able to incorporate it not only in intelligence gathering, but also into the weapons we deploy on the battlefield. Taking basic weapons such as 'dumb bombs' and equipping them with computer chips or outfitting the weapons with global positioning system (GPS) kits that allow them to be dropped on a very specific target coordinate with very little error has become the norm in all major conflicts since Vietnam. More recently, unmanned aerial vehicles (UAVs) have been deployed on a large scale during Operation Enduring Freedom, Operation Iraqi Freedom, as well as other areas around the world to conduct surveillance on various areas of interest. While humans thousands of miles away pilot the UAVs, they possess a certain level of artificial intelligence that allows them to operate autonomously once the pilot programs the flight path into the onboard computer. From there, the UAV will fly the mission, gather information through its multiple high powered cameras and sensors, and return to the base from where it originated, all without further input from the pilot. These UAVs have now even began to carry missiles and bombs on them, which allows the pilots to engage targets of opportunity by taking over control of the aircraft and firing the missile or dropping the bomb. This in itself is not necessarily problematic in itself, but special consideration must be made in regards to the next generation of UAVs that are being developed, which will possess a higher level of artificial intelligence than its predecessors and will be given the power to potentially make autonomous decisions on the battlefield in regards to engaging targets and making the distinction of whether or not individuals on the ground are friendly forces, the enemy, or innocent civilians. It is

important to consider this dilemma of whether or not to allow these types of machines with this type of decision making power onto the battlefield and to also consider to what degree we hold these machines accountable for their actions, if at all, or decide if it is is the human component that is accountable, and we must also question the ethicality of deploying these machines on a much wider scope. In doing this, it is important to look at previous works regarding artificial intelligence, autonomous machines, and military uses of these devices.

Literature Review

In an attempt to tackle the large and unanswerable question as to how robots and artificial intelligence should be regarded by others, Gunderson (1968) attempts to describe at what point we assign thoughts and feelings to these agents. In this article, Gunderson compares and contrasts the possibilities of a robots programmed behavior and its autonomous decision making and how these issues would affect the ways in which we interact with these beings. Gunderson argues, "having of pains, emotions, after-images, etc., are all examples of non-problem-solving non-behaviour. They are not potentially well-defined tasks, which hence may be programmable, for they are not tasks at all. Consequently they could never be shown to be absent from an unmasked robot because the robot was merely programmed to do this or that" (Gunderson, 1968). He continues his argument by stating that if a robot has "capacity for pain, emotion, or after-images, will of course greatly effect what the robot could then be programmed to do" (Gunderson, 1968). From this, Gunderson concludes that this would not necessarily constitute a being with no mind, but may constitute one with half a mind that is capable of some basic functions, which are dependent on the input that is programmed into the robot.

When considering the morality of machine ethics, Tonkens (2009) acknowledges that "autonomous machines will perform ethically relevant actions" and because of this "prudence dictates that we design them to act morally" (Tonkens, 2009). Tonkens raises the question of which moral framework would best be implemented within a potentially ethical machine and notes that we must consider if it can be implemented successfully from an engineering standpoint and that consideration should be made to what ethical issues can be left out of the autonomous moral agents (AMA). Tonkens makes a bold statement to suggest that "if there is no way of consistently programming an AMA to follow a certain ethic, then perhaps such an AMA ought not to be built in the first place," noting that if this consistent programming is not possible, it would make creating AMAs "morally dubious" (Tonkens, 2009). In his attempt to apply an ethical code to an AMA, Tonkens employs the use of Kant's deontological, or duty ethics, which he argues, "promises to offer an implementable moral framework for our robots to successfully abide by" (Tonkens, 2009). While it is important to consider the implementation of a moral framework into an AMA, it is equally important to consider the levels of trust we must instill in these agents and the implications that follow.

Buechner and Tavani (2011) examine the issues of trust among artificial agents (AA) by focusing on whether or not "AAs can qualify as rational, autonomous, and (fully) moral agents" and by also questioning to what extent we can hold these AAs accountable for their actions (Buechner & Tavani, 2011). The authors first attempt to define exactly what trust is, which they define as "the notions of normative expectations and of responsibility" (Buechner & Tavani, 2011). They then attempt to apply this notion of trust to AAs and what they call "multi agent systems" (Buechner & Tavani, 2011). The authors

use SPIRE, which stands for Shared Plans Intention Reconciliation Experiment in order to analyze the notion of commitment in these multi agent systems. SPIRE is described as "an experimental system that models an AA's intention reconciliation and commitments in the context of collaborative activities" and was designed by Barbara Grosz, Sarit Kraus, David Sullivan, and Sanmay Das (Buechner & Tavani, 2011). The authors then argue that there is a strong correlation between commitment and trust that SPIRE is able to help further confirm and display. The authors then conclude that we must "question how often an AA must default before trust is broken" and understand that "commitments in a trust relation are broken" and are "an important and unsettled part of moral theory—the larger issue within which 'moral repair' consists" (Buechner & Tavani, 2011). Although framework for the use of AI in the civilian world as well as on the battlefield is necessary in attempt to fully grasp the implications of its use, it is also important to look at the historical context and the roles in which, as one author puts it, crypto-intelligence, and AI played during and immediately after World War II.

Code breaking and "crypto-intelligence" as argued by Geoghegan (2008) "posits an antagonistic encounter between opposing humans and machines as the primary conditions for discerning intelligence and functionality" (Geoghegan, 2008). Geoghegan provides a historical account of both early autonomous agents and the theorists behind them, such as Claude Shannon and Alan Turing. The author argues that Shannon developed "rigorous computational formulas for tracking, codifying, and predicting the patterns of natural human language," in both his wartime and post war report on information technology and transmission. Next, Geoghegan provides the reader with context in regards to Joseph Weizenbaum's ELIZA program in order to raise awareness of more advanced agents. The

conflict that is evident here, as stated by the author, is the fact that the "design often put the human and machine at odds, with the machine surreptitiously misleading human users," which is ultimately concerning when considering the military application of these more autonomous and complex forms of artificial intelligence (Geoghegan, 2008)

In his article titled "Artificial Intelligence: Military Applications," Aziz Akgül offers the definition of artificial intelligence, as said by the Army Science Board (ASB), which defines the term as "A programmable machine exhibits artificial intelligence if it can incorporate abstraction and interpretation into information processing and make decisions at a level of sophistication that would be considered intelligent in humans" (Akgül). The author suggests that AI is intended to deal with problems that humans face on a daily basis, more specifically, "these processes are usually for those which algorithmic solutions do not exist and search is required" (Akgül). He then provides a generic list of potential applications for AI, which consists of language processing, computer vision, expert systems, and problem solving and planning, all of which have some military bearing in one way or another. Akgül notes that AI uses in the military will help deal with "the increasing complexity of modern-day military operations, brought about in great degree by significant advances in the speed and accuracy of sensors and weapons" and the "critical information" that is produced, but often neglected because of lack of manpower (Akgül). Because these types of technologies are available and are predominately developed for military application, certain implications arise in regards to the use of artificial intelligence on the modern battlefield.

Siddiqi (2012) is primarily concerned with the implications that employing autonomous AI in the modern theatre of war, arguing that the use of these drones raises

both philosophical, moral and technical questions that remain to be answered. The author first offers a simple definition of intelligent robot, which he says can be defined "as a mechanical creature which can function autonomously" (Siddiqi, 2012). Siddiqi then suggests that there are three different types of military robots, which he lists and defines as: a) Unmanned Aerial Vehicles (UAV) known as drones, and have been used since Vietnam war, b) Unmanned Ground Vehicles (UGV), that have been used since 1967, and Unmanned Underwater Vehicles (UUV) which have been used since the 1960's (Siddiqi, 2012). The author acknowledges the fact that many of these drones are currently being used on the battlefield with very little human interaction or supervision, where he then raises the question of humans no longer being part of the decision making process in regards to drones. Simultaneously, the author offers figures regarding damage and civilian deaths that were caused by drones that were being operated by humans in order to shed light on the potential consequences and ethical concerns of autonomous decision-making drones. Siddiqi submits Issac Asimov's three ethical rules of robots for further consideration. While the question of the ethical use of artificial intelligence in military drones appears and is a daunting topic to address, many scholars have begun to address the issue from multiple avenues in attempt to come to a conclusion.

Strawser (2010) tackles this ethical dilemma head on and argues that there is in fact "an ethical obligation to use UAVs," however, he states, "there is no need for ethical concern for this weapons system" (Strawser, 2010). The author's argument is based off the premise that "if an agent is pursuing a morally justified yet inherently risky action, then there is a moral imperative to protect this agent if it possible to do so, unless there exists a countervailing good that outweighs the protection of the agent" (Strawser, 2010). In

simpler terms, if an act is morally justified, but dangerous, the use of a drone to protect the agent in danger is acceptable. Along with the moral responsibility to protect an agent from inherent dangers, the author also notes the lesser cost of UAVs and suggests, "Money not spent on a military venture could be allocated towards other important demands of social justice, such as (say) an egalitarian concern for equal opportunity of welfare" and that "efficiency and cost is an important moral issue" (Strawser, 2010). To each counterargument that is available, Strawser offers the reasoning as to how the argument is made, and then posits his response to negate that particular argument. This argument, however, is responded to in an attempt to respond to Strawser's discontent with the asymmetrical warfare argument.

In response to Strawser's argument that UAVs are ethically permissible, and his dismissal of counter arguments such as making the decision to go to war easier and the violation of *jus in bello* principles, Galliot counters that" Strawser's dismissive treatment of at least one of these objections namely, the asymmetry objection is perhaps premature and in danger of overlooking moral considerations that are critical to the justification of armed conflict" (Galliot, 2012). The author suggests that UAVs do introduce a higher level of asymmetry because, unlike traditional manned aerial vehicles, with the UAV, the 'enemy' does not have a human target, but instead the target is essentially a computer with wings. The lack of a human target then, according to Galliot, is what makes the use of UAVs unethical because it creates a higher level of asymmetry on the battlefield. In his example, which is borrowed from Strawser, suggests that with traditional manned aircraft, "a pilot remains in the air; therefore the tribal warrior still has a human to target, regardless of how futile his efforts may be" (Galliot, 2012). In his attempt to provide a counterargument

to Strawser's claim that the use of UAVs should be ethically mandated on the battlefield if the action is a just action, Galliot acknowledges that more questions are raised than are answered, but he effectively provides more valuable insight into the issue of ethicality, UAVs, and autonomous machines.

At this point, we have reviewed a brief history of artificial intelligence and its military uses, beginning with code-cracking computers used by the British to decode the German enigma machines and extending to contemporary warfare with the employment of UAVs for both surveillance and tactical engagement purposes. We have also extensively reviewed prior literature on AI and the implications that it presents in both the civilian and military applications alike, and began to examine prior works that attempt to analyze and debate the ethicality of the use of this technology on the modern battlefield. From here, my aim is to conduct an analysis regarding the ethicality of the UAVs employment using Jeremy Bentham's principle of utility as an ethical framework. However, it is first necessary to discuss the components of Benthamite utilitarianism and further explain the principle.

Benthamite Ethics

Jeremy Bentham is the author of the book *An Introduction to the Principles of Morals and Legislation,* where he first introduces the concept of utility by stating: "Nature has placed mankind under the governance of two sovereign masters, pain and pleasure. It is for them alone to point out what we ought to do… By the principle of utility is meant that principle which approves or disapproves of every action whatsoever according to the tendency it appears to have to augment or diminish the happiness of the party whose interest is in question: or, what is the same thing in other words to promote or to oppose that happiness. I say of every action whatsoever, and therefore not only of every action of a

private individual, but of every measure of government" (Bentham, 2007). In this statement, Bentham provides the backbone of the principle of utility, which suggests that moral conflicts do in fact exist and that they must be solved through reason, that one must give reason for another to be persuaded by and that this particular standard must be universal applicability. Principle of Utility then, is "that principle which approves or disapproves of every action whatsoever, according to the tendency which it appears to have to augment or diminish the happiness of the party whose interest is in question: or, what is the same thing in other words, to promote or to oppose that happiness" (Singer, 1977).

Utility suggests that the worth of an action can be decided by the final outcome of that particular action and that strong consideration should be given to the consequences of the action, making utility an inherently consequentialist ethical principle. In order to weigh these particular pains and pleasures, Bentham offers the idea of hedonistic calculus, which is a way of comparing and contrasting the pains and pleasures that are a result of a given action. Bentham says "pleasures then, and the avoidance of pains, are the ends" and that it is important "to understand their force, which is again, in other words, their value" (Bentham, 1977). With an ethical framework in place, it is important to investigate the agents that are one opposing sides of the dilemma and approach consider their values and interests before applying the principle to analyze the situation and coming to a moral stance on the issue at hand.

The Agents

The discussion above concludes that there is in fact an ethical conflict and a polarized viewpoint when it comes to the ethical employment of semi-autonomous and

autonomous UAVs on the modern battlefield. Those who are in favor of the idea cite several benefits of using the UAVs. These arguments suggest that UAVs provide more safety for troops on the ground and that they make an already inherently risky operation less risky by taking what would traditionally be physical human piloting an aircraft out of harms way. As was discussed above, Strawser argued that these drones provide the warrior on the ground with better protection from the enemy by removing them from the immediate threat and that because of this, it must ethically permissible and nearly essential to use these drones in order to protect the agent that is participating in the risky behavior (Strawser, 2010).

Another argument that is made in favor of the drones is for the protection of civilian lives because the drone can strike with such precision that collateral damage is minimal. Avery Plaw, who is a political science professor at University of Massachusetts conducted a study that concluded, “the best data we have available suggests that the drone program compares favorably with similar operations and contemporary armed conflict more generally” (Shane, 2012). Recent research done by the Bureau of Investigative Journalism in London also notes a drop in civilian deaths because of the increased effectiveness of these drones. Although there is a prevalence of supporters for drone use, many remain skeptical of their use and claim that they actually cause more civilian deaths and collateral damage and create more worries and concerns than they solve.

Agents in opposition to drone use argue that because we are more likely to use drone attacks, civilians are the ones who pay the largest cost in lives. They argue that "We have to see what exactly is happening on the ground, what is happening to the people," and describe instances where innocent civilians are working in their homes when it is hit by a

drone attack, eventually waking up days later with missing limbs (Mauriello, 2012). Opponents who take this stance urge caution when considering drone use and tend to worry that because of its dehumanizing capabilities that drone attacks will become the go-to norm for dealing with conflict, rather than diplomatic proceedings.

Agents on the opposing side of drone use also question the use of drones and raise the question: "Do drones threaten to lower the threshold for lethal violence?" Typically, war has been viewed as a last resort because of the resources that are needed to conduct an operation, but some argue that drones lessen this need of resources and actually make the decision to use lethal force easier to make and is becoming "the default strategy to be used almost anywhere" (Shane, 2012). Because of this relatively lax perspective on deploying drones to conduct missions, Daniel Brunstetter, a political scientist and University of California-Irvine fears that it will become the norm. The thought on the side of those who oppose the strikes is that we need to let policy catch up with the technology, and with technology evolving at the pace it is, this becomes something that is difficult to do. As we look at those who are in favor of the drone use and the opponents, it is important that we not forget those who are being supported by these machines on the ground and rely on the information that they receive from them.

Whether it be intelligence from a video feed that the drone is beaming back to the operator on the ground or direct support of fires, the warriors on the ground are greatly impacted by, and favor the use of drones. Given a hypothetical situation where an Army unit is assigned a recon patrol, which they are instructed not to engage the enemy, the drone can prove to be an invaluable asset. Instead of having to maneuver close to the enemy forces that the unit is ordered to recon, they can deploy a drone outfitted with

sensors and cameras, which will send them a real time video feed of the enemy without requiring the risky action of coming within visual range of the enemy and becoming engaged in a firefight with them.

When considering the ethicality and moral standing regarding the use of semi-autonomous and autonomous drones it is nearly impossible to address all of the reasons that an agent is either for or against the action, but it is important to examine their reasoning before beginning to analyze the issue using an ethical principle. In the next part of this paper, I will attempt to employ utilitarianism as described above to determine the ethicality of using drones

Analysis

Bentham suggests that an action is wrong because it leads to bad outcomes. Contrarily, an action is good because it leads to good outcomes; for instance, using semi-autonomous and autonomous drones to conduct recon on an enemy force is good because it eliminates the need for friendly forces to get too close to the enemy and become engaged, potentially resulting in friendly casualties. Therefore, those in favor of the use of drones are considered, according to the principle of utility, to experience pleasure through the positive outcomes associated with drone use, such as the preservation of life. Because of the nature of utility, consideration must also be given to the potential pains that the warriors on the ground may encounter because of the drone use, such as missing or neglecting valuable information while conducting the recon, which may be something that would not have occurred if the recon element was able to maneuver within eyesight of the enemy unit. A result of this could potentially be an enemy counter attack, causing loss of life, and, as Bentham would suggest, pain to that particular agent. “On most occasions” Bentham

argues, "men in general embrace this principle, without thinking of it: if not for the ordering of their own actions, yet or the trying of their own actions, as well as of those of other men" (Singer, 1977). In this sense, Bentham is saying similar to the way that the warriors on the ground must consider the potential pains and pleasures associated with using the drone to conduct a recon of an enemy element; the advocates of drone use must also consider and weigh the pains and pleasures associated with their advocacy for its use.

Because the principle of utility mandates that consideration must be given to society as a whole, it is also important to think of, and evaluate the pains and pleasures of the drone's advocates. Advocates of the drone's use, much like the warriors who directly benefit from it, are susceptible to the pleasures that accompany removing or limiting the risks to those who are on the ground in the warzone. Limiting collateral damage also arises as a pleasure that the advocates, such as Strawser and Plaw acknowledge, saving the lives of both innocent civilians and protecting their homes from damage because of the precision that accompanies the use of drones to launch lethal attacks. The pains in this case, however, can be related to the potential for misidentification of enemy forces in such examples as the Granai airstrike, which occurred in 2010 and injured or killed at least ninety innocent civilians. While the advocates for the use of drones, such as the warriors on the ground and those in general favor of their use are considered, it is required that the critics of drone use weigh their pains and pleasures before an ethical decision can be made.

When comparing the pains associated with drone use, critics consider the loss of civilian and other innocent lives that result from the misidentification of enemy targets or because of the dehumanization that can be found with using unmanned aircraft, especially when it is semi-autonomous and autonomous in assessing threats. While they concede that

there is pleasure in keeping friendly forces out of harms way or exposing them to less risk, the predominate point of view is protecting innocent civilians, which they argue drones do not do, therefore, increasing the pain associated with their use. Pains that the critics also recognize is the thought that drones have the potential to ease the thought process that goes into deciding whether or not to engage in a conflict. In this case, the pains of drone use outweigh the pleasures that are associated with it because of the civilian lives that are lost and the perceived ease that the critics see in deciding whether or not to engage in a conflict. According to utility then, once the pains and pleasures are weighed, they must be compared with special consideration paid to each agent's moral standing within the dilemma using what Bentham calls *hedonistic calculus.*

Bentham suggested that in order to come to a conclusion, one must first consider the person who is most affected by the particular action and account for the value of each pleasure and pain, then add the pleasures on one side and the pains on the other. Then if the balance was on the side of pleasure, the action was a good tendency and if on the side of pain, a bad tendency. The agent must do this for each agent who is involved in the moral conflict.

For our consideration, we begin with the warriors on the ground, whose pleasures consist of: reducing the risk to themselves and their lives, accomplishing the mission, and removing more humans from the battlefield. The potential pains are: missing information, resulting in a possible enemy attack, causing friendly loss of life and potential for misidentification of civilians as enemy. In this case, the agents must weigh the pros and cons, which, when considering ones self, would side towards pleasure, and therefore a good

tendency. Next, as Bentham discusses, consideration must be given to the advocates of drone use as an attempt is made to weigh their pains and pleasures.

Experiencing similar pleasures as the warriors using the drones, the advocates also side the limiting of risk with pleasure rather than pain, but they also value the reduction of collateral damage that is a result of the precision of drones, their targeting sensors, and their weapons systems. The pains that advocates experience is the potential for misidentification by the drone's sensors, resulting in unnecessary civilian injuries or deaths, however, because of the decreasing rate of misidentification and increasing precision with these weapons systems, the value of the pain may not be as high if the rates stayed steady or increased. Comparing the pains and pleasures that are associated with the advocates would again result in more pleasure than pain, leading to a good tendency.

Finally, we must examine the pains associated with the critics of using drones, which consist of the loss of civilian life and collateral damage, similar to its advocates. Other pains associated with the critics of drone use are the relative lack of consideration that the government can decide to enter a conflict because large numbers of personnel are not required, but simply a button has to be pressed, or a machine programmed. Like the advocates, pleasure is derived from the fact that friendly forces are removed from more dangerous conflict, however, when compared, the advocates may conclude that the multiple pains outweigh the pleasure associated with drone use, and therefore, under the principle of utility, the act would be a bad tendency.

Using Bethamite utilitarianism to examine the pains and pleasures associated with drone use, while concurrently applying the principles of *hedonistic calculus* allows us to analyze the situation and reach an ethical decision as to whether or not drone use is in fact

an ethical act. After weighing the pains and pleasures, along with the reasoning behind them, this principle finds their use to be moral and ethical since the good tendencies outweigh the bad ones. However, this conclusion does not come without its caveats that require discussion and further investigation of the topic from different approaches and angles.

Discussion

Approaching the ethicality of semi-autonomous and autonomous drone usage from an ethical and philosophical standpoint provides insight and facilitates discussion of the issue in hopes of creating better understanding of the technology and in what regards it warrants consideration, however, it should not be the only method use. As noted by Sharkey (2007), "the military urgently needs clear guidelines to ensure that all those involved in the deployment of lethal robots have a chain of responsibility," which rests solely on military leadership and cannot be solved through philosophical and ethical discussion (Sharkey, 2007). In his chapter in *Arms and Artificial Intelligence,* Nikutta (1987) also mentions "the development of the automated battlefield throws interesting light on the relationship between technology and doctrine" that can be "integrated within a complex command, control, communication and intelligence structure," or what he calls C^3I (Nikutta, 1987). Creating this military doctrine is not only important in regards to the ethicality and consideration for these agents in the context of war, but it is also important that a doctrine is created in order to function as a framework of sorts for our engagement with artificial intelligence and AMAs in the civilian sector as well.

It is also important to note the limitations of using utility as an ethical principle to analyze semi and fully autonomous drones in this paper. Under traditional utilitarianism, it

is assumed that "the greatest good for the greatest amount of (sentient) beings" as one of its main tenets, which defines 'good' as some sort of happiness or pleasure (Tonkens, 2009). However, for the purpose of this paper, the scope was broadened to incorporate the idea of 'good' as being beneficial instead of the traditional happiness or pleasure that is associated with utility.

Conclusion

It will continue to be difficult to consider the ethicality of semi-autonomous and autonomous machines and their implications until the philosophical framework is in place, which provides us with a place for these machines to be considered and thought of as fully moral subjects. Therefore, we must continue to reevaluate and refine the status quo and work within the larger context in order to fully develop appropriate doctrine for dealing with AMAs. Until we have ethical framework for semi autonomous drones, such as the ones currently being deployed to Afghanistan, Yemen, and Pakistan, it will continue to be very difficult to develop the subsequent framework for fully autonomous machines. In order to continue the use of drones, we must proceed with caution and seriously consider the moral, ethical, and political implications of their use.

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