

USAWC STRATEGY RESEARCH PROJECT

**A THEORETICAL, LEGAL AND ETHICAL IMPACT OF ROBOTS ON WARFARE**

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## **ABSTRACT**

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Ever since the first human tribe went to war with its neighboring human tribe, warfare has been a human experience. Authors through the ages have captured their observations of this phenomenon into a body of knowledge that we call the Theory of War. As we enter the 21st Century, the advances in robotics are helping to move man further and further away from the battlefield. While some of these advances still have man in the loop, some of these systems are fully automatic and clearly break the paradigm of warfare being "composed of violence, hatred, and enmity". While the technological work on Robotics is progressing at break-neck speed, the work being done on evaluating the impact of Robots on the Theory of War on the Law of War and the ethical issues are not keeping pace. This project examines some of these robotic advances, which in the very near future has the potential to remove man from the battlefield for the side that has these technologies. This paper evaluates an impact on the Theory of War and looks at some Legal and ethical dilemmas that robots will create.



## A THEORETICAL, LEGAL AND ETHICAL IMPACT OF ROBOTS ON WARFARE

...(You) may fly over a land forever; you may bomb it, atomize it, pulverize it and wipe it clean of life – but if you desire to defend it, protect, and keep it for civilization, you must do this on the ground, the way the Roman legions did, by putting your young men in the mud.

—T.R. Fehrenbach<sup>1</sup>

Ever since the first human tribe went to war with its neighboring tribe, warfare has been a human experience. As each tribe tried to gain an advantage over their adversary, they used technological advances to allow them to be more protected and to inflict more damage on their adversary. These advances in technology have allowed mankind to create more separation from the conflict. But, the technology alone is not enough; as man tried to fight more effectively, he sought a better understanding of the art of waging war. Authors captured their observations of this phenomenon into a body of knowledge that we call the Theory of War. This attempt at understanding the overall Theory led to advances in strategy and operational concepts. It was not advances in technology alone that led to revolutionary change in warfare, but it was how people responded to those advances in technology which created revolutions in military affairs.<sup>2</sup> However, even with all of these technological advances T.R. Fehrenbach notes in his classic book on the Korean War that man was still the fundamental and unchanging fixture on the battlefield.

Early in the 21st Century, advances in robotics are helping move human participants further and further away from the conflict. The large scale introduction of robots on the battlefield will change the nature of combat more than any other technological innovation to date<sup>3</sup> because it will ultimately remove man from the battlefield. The pursuit of robotics for the battlefield is moving at breakneck speed. This has occurred because the introduction of unmanned vehicles fits well with the modern American intolerance for casualties by substituting technology for human beings.<sup>4</sup> These technological advances though do not automatically come with complete solutions. As Steven Metz points out in *Parameters*, “the potential for effective battlefield robots raises a whole series of strategic, operational, and ethical issues.”<sup>5</sup>

### The Challenge Facing Use Today

In the National Defense Act of 2001 the U.S. Congress, obviously impressed by the potential of robots saving lives on the battlefield, established the requirement for one third of the ground vehicles and one third of the deep-strike aircraft in the military to be robotic within the decade.<sup>6</sup> Today the Department of Defense (DoD) is pressing hard to meet this requirement and

to accelerate the fielding of robots. In its 2006 Report to Congress, DoD projected that the total of current and future investments in Robotic vehicles over the fiscal year periods 2006 to 2012 will approach \$1.7 Billion.<sup>7</sup> This type of investment allowed DoD to deploy over 4,000 unmanned ground vehicles in Iraq by the end of 2006.<sup>8</sup>

The history of warfare tells us that every new technology leap, whether it was the English Longbow, the tank, or the atomic bomb, outraced existing strategy and doctrine for its employment.<sup>9</sup> This appears to be the case with the push for rapid technological advances in robotics. As an instructor of the Joint Military Robotics Course at the United States Army War College pointed out in the 2005 After Action Review, “(he was) disappointed in the lack of experts and documents concerning robotics in the area of evolving doctrines, law of war, ethics and strategic implications.”<sup>10</sup> The current development of robots is too focused on the individual system at the tactical level.<sup>11</sup> The purpose of this paper is to start the debate on the strategic issues concerning the introduction of robots on the battlefield and its impact on the Theory of War, the Law of War, and the ethics of conducting war.

In order to do this, this paper will establish a sense of urgency for the importance of looking at how to best use this technology. To do this it must first describe the expected employment of robots on the battlefield and the appropriate methods of controlling them. It will then use a historical example of how a larger military was overwhelmed by another adversary because they failed to fully synchronize technological change with strategic concepts. We will then look at one way that robots will impact the Theory of War, and then assess how that impact on the Theory of War will impact the Law and ethics of Warfare, with the understanding that before we start developing strategy and doctrine for the use of robots we must understand what is legally and ethically required. We will conclude by summarizing our initial assessment of the impact on the theory, law and ethics of warfare, and challenge others to continue this debate in order to ensure that we have adequately explored the full impact of robotics on the not so distant battlefield.

### Robot Uses

In order to understand the battlefield impact of robots, we must first look at what we mean by robots, and their current and potential employment. In the FY 2005 Joint Robotics Master Plan, DoD defines a robot as “a machine or device that works automatically or operates by remote control.”<sup>12</sup> There are fundamentally three modes of operating robotic systems.<sup>13</sup> They can be fully autonomous, which means they completely execute their mission without human interface. They can be semi-autonomous or supervised autonomous, which means they need

human control during critical portions of the operation. Finally, they can be operated teleoptically or remotely controlled by humans throughout the length of the mission.<sup>14</sup> Currently, most robots are teleoptically or remotely controlled, but technology is quickly making robots more and more autonomous.

There are many advantages to using robots on the battlefield. First, and perhaps most importantly it removes the human operator from the conflict, thereby lowering the possibility of injury, death or capture.<sup>15</sup> Secondly, with increasing personnel costs, shrinking populations of military aged men, and the changing geopolitical environment it is more challenging to deploy soldiers on the battlefield.<sup>16</sup> Third, robots can operate in areas that humans can not, such as contaminated areas or places where brilliant or smart munitions have been employed.<sup>17</sup> Fourth, robotic devices are smaller, lighter and less expensive because they do not carry or protect human occupants.<sup>18</sup> Fifth, they are more survivable because they are smaller.<sup>19</sup> Sixth, robots can be sent on high risk or “suicide” missions that would not have been considered before.<sup>20</sup> Seventh, they will be more maneuverable because they can go faster and do maneuvers that the human body would not be able to handle.<sup>21</sup> Eighth, near misses and suppressive fire will not affect performance like it would to humans.<sup>22</sup> Ninth, they do not have bodily functions and therefore do not have to stop to eat, sleep or use the bathroom.<sup>23</sup> Lastly, for robots which must be teleoptically controlled, it does not take an operator of soldier capability. Any one who can work the controls can operate the robot just as well as a 25 year old athlete, making the pool of people able to conduct warfare far larger.<sup>24</sup>

These are not just possibilities in the future. Robots are here and currently serving in many roles around the globe. In June of 2006, General Charles Cartwright, the Commander of US Strategic Command said, “By the end of September, we’ll have over 10,000 different ground robots in Iraq and Afghanistan.”<sup>25</sup> They are being used to dig up<sup>26</sup> and disable bombs<sup>27</sup>. They are thrown through windows and used to search for enemy forces.<sup>28</sup> Armed Talons can be mounted with various weapon systems and have actually been used in Afghanistan to search caves for Al Qaeda forces.<sup>29</sup> In October 2005, five completely autonomous ground vehicles navigated a 131.6 mile course over difficult terrain in less than 10 hours. The significance of this was that previously no vehicles had been able to complete the course.<sup>30</sup> By April 2006, the Army was testing a 6.5 ton vehicle called the Crusher capable of autonomously driving itself through tough terrain and overcoming obstacles such as ditches and boulders.<sup>31</sup>

In the air, Predator unmanned aerial vehicles (UAV) have “established an excellent track record in the War on (Islamist) Terror both as a strike aircraft and surveillance platform.”<sup>32</sup> A fully computerized robotic aircraft called the X-45A has engaged and destroyed pop-up targets

and evaded anti-aircraft missiles in the California desert.<sup>33</sup> On the ground Robots are being used to guard a naval air station near San Diego, California.<sup>34</sup>

Robots are clearly not a futuristic capability, they are here now. As Gordon Johnson, the Unmanned Effects Team Leader for US Joint Forces Command Project Alpha puts it, "Across the Department of Defense, people don't have the big picture. They don't understand how close we really are to being able to implement these technologies in some sort of cohesive force to achieve the desired effects."<sup>35</sup> Clearly, if we can create a battlefield which removes man from his historical location, we will have revolutionized warfare as we know it.

### Historical Failure to Predict Impact of Technological Change

History is replete with multiple examples of countries who failed to properly recognize a military revolution and exploit the impact of technology. In his 2006 book, *War Made New*, Max Boot gives 12 examples in history of what happens when a national military organization doesn't fully integrate technological advances and properly anticipate a military technology revolution. For the purposes of this paper we will only focus on the Fall of France in 1940, even though any of the other examples would serve the same purpose.

On 10 May 1940, Germany attacked France with a force that was outnumbered by the combined forces of Britain, France, Belgium, and Holland.<sup>36</sup> In fact, the Chief of the German General Staff, General Ludwig Beck had pointed out in May of 1938 that the French Army was "the strongest in Europe".<sup>37</sup> The French had the best tanks in the world<sup>38</sup> and the allies had an overall advantage in the number of divisions, tanks, aircraft, and artillery pieces.<sup>39</sup> Yet in six short weeks, Germany defeated Holland, Belgium, and France and drove the British force into the sea at Dunkirk. The Germans suffered 150,000 casualties while the allies suffered over 2.2 million.<sup>40</sup> What could explain how this happened?

The Germans had used their intellect<sup>41</sup> and fully considered the strategic advantage gained by synchronizing the technology of the tank, airplane, and radio and combining the storm troop tactics of 1918 with the use of the Indirect Approach.<sup>42</sup> This combination of technology, organization, tactics and doctrine allowed the Germans to execute with such speed that it made it look like the Germans belonged "to an entirely different period of human history."<sup>43</sup> The French applied the tank and the airplane as singular systems. They employed the tanks as infantry and artillery support weapons.<sup>44</sup> They did not consider the strategic impact of combining these technological advances. Mired in outdated doctrine, they failed to see and understand the military power that emerging technology could achieve when combined with changes in doctrine and strategy.

Max Boot points out five major themes that emerge from his analysis of history. First, technology alone does not create an over riding advantage. The synchronization of many variables such as tactics, organization, training, leadership, and other things are necessary to optimize the increase in military power. Secondly, countries who take advantage of technology revolutions have been history's winners, but those who failed to were quickly marginalized. Third, even if a military force figures out the combination of advances necessary to fully exploit an advance in technology, it must understand the limitations of the advantage and not squander it away on unachievable tasks. Fourth, even if a country gets it right, the advantage is not indefinite, as others will copy their success. Finally, the rate at which these revolutions are occurring is speeding up.<sup>45</sup>

As we review this list above, we can clearly see that we are falling into the same trap as those leading nations in history who failed to properly prepare for future strategies. Just like the French leading up to World War II, we are only looking at the tactical employment of robots and not exploring the strategic impact. We must anticipate that others will look at the full impact. Just as Hitler went from having none of the technological advances in 1933 to having conquered almost all of Europe by June of 1940, a worthy adversary could quickly purchase the technological advances provided by robots. If that adversary recognizes the potential changes in the application of the Theory of War and makes the changes necessary at the strategic level, they could affect the balance of power, just as demonstrated throughout history.

#### Importance of Starting with the Theory of War

Carl von Clausewitz believed that there were certain laws and principles of warfare but that they tended to exist at the tactical level. The closer one got to the strategic level the more one needed to understand theory or the Art of War.<sup>46</sup> Peter Paret describes Clausewitz's thoughts on theory as:

Theory must be comprehensive, that is, it must be able to accommodate all aspects of its subject, whether of the present or of other times. It must be based on the constants or absolutes of its subject, not on the phenomena that may be temporary, even if currently these phenomena seem to dominate war.<sup>47</sup>

This is the trap that many nations have fallen into. By only looking at the technological advances they look at the tactical impact, which is incomplete and short sighted.

#### Potential Impact of Robots on the "Theory of War"

While it is beyond the scope of this paper to fully assess the potential impact of robots on the entire body of knowledge known as the "Theory of War", it is important to understand that

robots will function in every dimension of combat - air, land, sea, space and information. Therefore, it is vital that the United States military conducts a full analysis of the potential impact of robotic systems in every military dimension in order to fully comprehend the strategic and doctrinal implications. An example of an area where the introduction of robots will have an impact on all dimensions of the battlefield is an analysis of Clausewitz's overall theory of War and specifically the "remarkable trinity" of war.

Clausewitz defines the main characteristics of war in terms of the social and political world, identifying the key elements in war as "danger, physical and mental effort, psychological factors, and the many impediments to carrying out one's intentions."<sup>48</sup> These key elements "always make war a remarkable trinity – composed of primordial violence, hatred, and enmity, which are to be regarded as a blind natural force; of the play of chance and probability within which the creative spirit is free to roam; and of its element of subordination, as an instrument of policy, which makes it subject to reason alone."<sup>49</sup> These three things he goes on to label as the people, the commander, and the government. He states that the

passions that are to be kindled in war must already be inherent in the people; the scope which the play of courage and talent will enjoy in the realm of probability and chance depends on the particular character of the commander and the army; but the political aims are the business of government alone.<sup>50</sup>

Clausewitz states that these three items are deep rooted in their subjects, and any theory which ignores one of them or seeks to fix an arbitrary relationship between them is a totally useless theory. "Our task therefore is to develop a theory that maintains a balance between these three tendencies, like an object suspended between three magnets." The introduction of robots on the battlefield upsets the definition of these three variables and the balance between them.

As previously mentioned, one of the main reasons for the integration of robotics was the unwillingness of the American people to accept the casualties that are inflicted in modern lethal wars. The removal of human fighters from the danger of the conflict removes the need and diminishes the desire and passions, because it no longer directly involves sons and daughters. Whether humans are completely removed from combat by the use of autonomous robots, or they are removed from immediate danger by radio or teleoptically controlled robots, the effect is the same: war ceases being personal; it quits being conducted at the human level; it becomes more of a video game than a deadly act. As Fred Reed from the Washington Times pointed out the "public is less likely to care how many cheap motorized 'soldiers' are destroyed".<sup>51</sup> This affects the interest and involvement of one of the legs of the trinity and the necessary balance Clausewitz described.

The second way that robots affect the trinity is that it removes many of the human frailties which cause “friction” within the military. As Gordon Johnson from the Joint Forces Command said, "They don't get hungry. They're not afraid. They don't forget their orders. They don't care if the guy next to them has just been shot. Will they do a better job than humans? Yes."<sup>52</sup> Clausewitz points out that it is “friction” which makes war difficult. “Countless minor incidents - the kind you can never really foresee - combine to lower the general level of performance.”<sup>53</sup> This friction is caused by all of the individuals involved in the action. The combined effect of all individual shortcomings creates a “tremendous friction, which cannot, as in mechanics, be reduced to a few points...”<sup>54</sup> Using robots can substantially reduce friction. One example is that robots don't miss when shooting. In tests, the Special Weapons Observation Reconnaissance Detection System (SWORDS), a robotic vehicle was able to hit a bulls eye target at 2,000 meters<sup>55</sup> and have hit a nickel sized target 70 out of 70 times at 328 yards<sup>56</sup>. This system is now in Iraq. Clausewitz states that a good general is necessary to overcome friction. The need to motivate soldiers to overcome adversity and pay attention to detail will be gone. The need to ensure that the robots do as they told will be gone. Therefore, the introduction of robots on one side will have a significant impact on the second leg of the trinity because the commanders will not have to be as good at motivating their soldiers. They will only have to focus on operations, not on the human element of conflict. It will be much easier for one side to do well because there will be less friction and therefore their commanders do not need to be as good.

On the third leg of the trinity, (the government) the use of robots will have a significant impact on whether a nation determines to go to war. If you look at all of the advantages of robots presented earlier, the reduction of casualties makes warfare ‘cheaper’. The political motive for going to war determines “both the political objective and amount of effort it requires.”<sup>57</sup> If the government does not see a huge amount of cost in human lives to secure a political objective, then war becomes ‘cheap’. Clausewitz goes on to say that “the value ...must determine the sacrifices to be made for it in magnitude and also in duration.” The less a political objective is believed to cost, the more likely a government will be willing to risk going to war. This will lead to more conflicts as governments will be able to use their ‘cheap’ army to get more involved in other pursuits. This idea is not just found in the military or in history but rather in the modern media. As the Washington Times pointed out in 2005 “the downside is that unmanned armament may make it easier for governments to engage in military adventurism. To the extent that war can be made cheap and bloodless for one side, less reason will be required for going to war.”<sup>58</sup>

The other potential impact that robots could have is that war may no longer be dominated by nations alone. Traditionally modern war has been conducted by nation states because the power of a country was often related to its size of population. If war no longer requires people, and robots are able to conduct war or acts of war on a large scale, then governments will no longer be needed to conduct war. Non-state actors with plenty of money, access to the technology and a few controllers will be able to take on an entire nation, particularly one which is not as technologically advanced.

To summarize this section, the introduction of robots on the battlefield will significantly impact the way future war is conducted. Removing man from the conflict changes the necessity for the people of a country to support the conflict. In fact, a few controllers with autonomous or near autonomous robotic capability could fight major conflicts virtually risk free. The points of friction which existed in combat are reduced because robots do not have the human frailties; therefore great motivational leadership is not required for success. Finally, robots will make it easier for governments to go to war because the 'cost' will not be as high. The introduction of robots will potentially mean more conflict, not less. The summation of the impact of robots on the battlefield is that people and governments will no longer be constrained from warfare by the loss of human life on their side. The Law of War will now become the major influencing factor in limiting war.

### Impact on the Law of War

In the Law of War there are two terms which help define the body of law, *Jus Ad Bellum* and *Jus in Bello*. *Jus ad bellum* has to do with whether or not it is just to launch a particular war and is often called Just War Theory. *Jus in bello* deals with the morality of actually waging war.<sup>59</sup> We will first look at *jus ad bellum*.

DoD defines the Law of War as being "that part of international law that regulates the conduct of armed hostilities."<sup>60</sup> It usually includes both customary international law and international treaty law.<sup>61</sup> The commonly held current principles of Just War are: "having a just cause, being declared by a proper authority, possessing right intention, having a reasonable chance of success, and the end being proportional to the means."<sup>62</sup> These conditions and their definitions seem to be very broad, and potentially would not restrict a super power from defining them in such a way to expand the definition of what would be considered a Just War. Looking at the international treaty side of Just War, the United Nations Charter states that "all members shall refrain in their international relations from the threat or use of force against the territorial

integrity or political independence of any state.”<sup>63</sup> There are only two exceptions permitted. The first is in the right of self defense<sup>64</sup> and the second is when authorized by the Security Council.<sup>65</sup>

Recently, in Kosovo and in Operation Iraqi Freedom we saw an expansion of Just War under the UN Charter. NATO conducted war on a sovereign state specifically to protect the human rights of citizens of that state. The UN Charter does not have a justification for intervening into the domestic affairs of a sovereign state for humanitarian reasons.<sup>66</sup> Yet NATO attacked Serbian forces and the world looked the other way. In Operation Iraqi Freedom, the United States led a coalition attack in a pre-emptive strike to rid Iraq of weapons of mass destruction. In the UN Charter there is no provision for a so called pre-emptive self defense attack. These two examples show how powerful nations can justify going to war and are not inhibited by the accepted definition of Just War. Since the military use of robots has the potential to make governments more likely to go to war and *jus ad bellum* is flexible enough to allow more wars, one of the major impacts of robots on the battlefield is the potential for more wars.

Robots will also have an impact on the Law of War under *jus ad bello*. Gordon Johnson, the Unmanned Effects team leader of the robotics effort at Joint Forces Command says, “The lawyers tell me there are no prohibitions against making life-or-death decisions.”<sup>67</sup> While this statement is technically correct, it is also very misleading and rather cavalier. The word “robot” is not found in International Law of War, at least not yet. Established law tends to be reactionary.<sup>68</sup> They tend to look for precedence in similar cases and try to apply the same rules to the new situation. So while Mr Johnson’s statement is literally correct, the impact of robots must be assessed against all articles of the law of war in order to fully understand its impact. We will look specifically at Distinction and Proportionality.<sup>69</sup> These are two areas that have been identified as having particular concern for robots on the battlefield.<sup>70</sup>

The legal definition for Distinction is found in Article 48 of Protocol I of the Geneva Convention, which states that:

In order to ensure respect for and protection of the civilian population and civilian objects, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives.<sup>71</sup>

This article clearly states that the parties in conflict must distinguish between combatants and non-combatants, and that they can only direct their operations against military objectives. Therefore robots must be able to distinguish in order to be used legally on the battlefield. As noted in the Research Paper, “Legal Implications of the Uninhabited Combat Aerial Vehicle”, the

fully autonomous mode is the one which provides the most legal problems because the robot itself is making the decision to fire. In the other modes of operation (semi-autonomous and remote controlled) man is in the loop and actually makes the decision to fire.<sup>72</sup> This will stay that way until we can be sure that robots can reach this level of distinction.

Proportionality is discussed in Article 51 of Protocol I of the Geneva Convention, which prohibits “an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.”<sup>73</sup> This requirement, which is often called the principle of proportionality, states that the amount of damage to civilian personnel or their property not be excessive as compared to the direct military advantage gained. Again, the answer on how to overcome this problem is to keep man in the loop. But what happens under either one of these two provisions if something goes wrong during Robotic operations? Who is legally held responsible?<sup>74</sup>

Integrating robotic systems with humans is not just a problem for the military, but a legal problem which our society must be prepared to handle. As an example, Dr. Ronald Arkin (a professor at Georgia Tech) has raised the issue that autonomous cars on the highway will create a significant issue which must be addressed. He states that while autonomous cars will probably be much safer than human driven cars, the mixture of human operated vehicles and autonomous vehicles will be very difficult.<sup>75</sup> Dr. Alexander Knott, from DARPA in a presentation at the Army War College states the solution to this problem is that robots and humans should not mingle.<sup>76</sup> Integration would be an error. The problem with this logic is that the French General Staff said the same thing in 1939 concerning tanks and aircraft.

This is a huge legal question, which does not go away by simply separating man and robot. Man must stay in the loop until we can overcome the issues of distinction and proportionality. Richard G Epstein in his fiction book, “The Case of the Killer Robot” wrestles with the idea of blame when a robot malfunctions and people die.<sup>77</sup> Is it the operator, the programmer or the company that built them? The book is a great study in pointing out the shortage of law in robotics, and is being used as an ethical study in many computer courses throughout the country. Clearly the liability issue must be solved before robots can have a big impact on the battlefield.

### Impact on Ethics

Even if the use of robots on the battlefield does not violate the Law of War, there is great discussion in the academic and entertainment world over the ethical use of robots in a combat

role, which is having a huge impact on what we as a society will allow robots to do. The theme of androids becoming killers is not new, and the past portrayal has tainted the argument. In fact, the word robot (robota means forced labor in Czech) comes from a 1921 Czech play by Karel Capek<sup>78</sup> entitled “Rossum’s Universal Robots”.<sup>79</sup> In this play the automatons rebel against humans and wipe out the entire human race. This is not a singular event. Hollywood has continually portrayed robots and computers as rebelling and destroying their civilian masters. In “Terminator” robots not only are engaged in destroying man kind but they actually send a robot back in time to kill the leader of the rebellion while he is a child. In “Star Wars” George Lucas has an entire cyborg army trying to wipe out the rebellion.

This popular entertainment theme of artificially intelligent beings becoming like Frankenstein and rebelling and killing their masters was noted over and over again by Isaac Asimov, the famous Science Fiction writer.<sup>80</sup> This portrayal led him to invent his “Three Laws of Robotics” to counteract this fear of robotics. First introduced in his short story “Runaround” in 1942, these laws were to permeate his writing and shaped the thoughts of much of the science fiction readers of the last two generations. The Laws are:

- A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
- A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.<sup>81</sup>

These laws were at the intellectual heart of the recent Will Smith blockbuster called “I Robot”. These laws are also embedded in the mentality of many scientists today and keeps them from participating in any robotic project which could have a military application. An example of this is Yoshiyuki Sankai, the world leading cyborg exoskeleton creator who refused to meet with US military officials concerning his advances in cyborg technology.<sup>82</sup>

But it is not scientists alone who struggle with the idea of armed robots. As Robert Finkelstein and Steven Shaker point out in their book, *Unmanned Vehicle Systems: Military and Civil Robots for the 21<sup>st</sup> Century and Beyond*, “The biggest battle that the military, as well as much of the civilian world, will face during the next century will pitch men against robots.” He points out that some scholars, social scientists, and politicians are very critical of the trend of robots replacing man. He notes that many people distrust robots and that they are concerned that robots will run “amok”, eventually dominating humanity.<sup>83</sup> This ethical debate must be

solved before we will be able to fully understand how we will integrate robots into the battlefield of the future.

The other player in the ethical debate is the media. While the use of robots may actually meet the legal definition of the Law, the media has the ability to take the dictionary definition and make it seem unjust. An example would be the idea of proportionality presented earlier in this paper. The dictionary definition of proportional is “properly related in size or other measurable characteristics.”<sup>84</sup> Using a robot, which appears to be undefeatable, will be very damaging to the public image and the media will portray it as unjust. In a legal study for the University of California, it was noted that public reaction to the War in Kosovo was that the war appeared to be a video game and not a real war. According to the report, “apparently only more allied deaths could have made the war real, for a war without victims does not seem like a real war.”<sup>85</sup> Peter Singer, director of the 21<sup>st</sup> Century Defense Initiative at the Brookings Institute says when talking about the introduction of robots on the battlefield by the US, “How the use of those (robots) will be reported on al-Jazeera will be interesting to see.” He believes this is a public debate we need to have before we introduce killer robots on the battlefield.<sup>86</sup>

Our media, both official and unofficial is already fully engaged in the debate. A simple Google search looking for “Ethics of I Robot” or “Killer Robots” will demonstrate clearly to anyone that the battle lines have already been drawn; and if the US military is going to win this debate it must get involved. This last summer, the Department of Defense awarded a contract to Professor Ron Arkin to do a study outlining an approach for both investigating and implementing an ethical basis for the deployment of lethality in autonomous robotic systems.<sup>87</sup> As noted earlier in this paper, the horse is already out of the barn. The United States has manned robots engaging and killing people in Afghanistan and Iraq. We can not afford to lose the debate on the ethics of using robots because we are not the only country working on military robots.

The importance of winning this debate is that we can not allow our development of robotics to be artificially limited by ethical dilemmas that are based on fear and artificial Hollywood portrayals of robots run amok. We have others who will fully develop robots to their fullest potential. Other societies, governments or non-state actors will not feel constrained by our ethical dilemma and will use the robots to gain an advantage. As pointed out at the beginning of this paper, there are many advantages to using robots on the battlefield. If we as a society lose the debate on the ethical use of robots in combat, we open the window for a potential adversary who does not have the same ethical dilemma to use them against us. This

was the exact same ethical dilemma which allowed the English using the “unethical” English Longbow to crush the much heralded French knights in the battle of Agincourt in 1415.<sup>88</sup>

### Other Nations Are Developing Robots

Around the globe there are 32 countries known to be working on the development of unmanned systems.<sup>89</sup> In its annual report to Congress, DoD stated that Canada, South Korea, Japan, Australia, Germany and the United Kingdom are currently working on robotic research. Their research was focused on “perception, integration of robotic systems, man-machine interfacing and planning, artificial intelligence for robotic systems and platform related technologies such as weaponization.”<sup>90</sup> Some of them even pass us in the level of sophistication.

The South Korean military reported that they would have an unmanned fixed style border guard system in place by the end of 2006. This system would be able to detect moving targets at distances of 4 kilometers in the day and 2 kilometers at night.<sup>91</sup> It will have the ability to detect intruders, give warnings, and provide suppressive fire.<sup>92</sup> They also have supposedly deployed two robotic rifle sniper systems into Arbil, Iraq.<sup>93</sup>

Israel is using nanotechnology to develop a bionic hornet. The hornet would be able to navigate through narrow alleyways and attack otherwise unreachable enemies. They are also working gloves which give the user bionic strength.<sup>94</sup> These only account for those countries which are friendly to us. It does not count the ones who would prefer to not let us know they are working on this type of technology.

The significance of other countries and possibly other actors seeking robotic advances is that we can not afford to not look at the full impact of robotic systems across the entire spectrum of the battlefield. We must look at and consider the full impact that robots will have across the Theory of War. We must be prepared for the ways that robots will affect the Law of Warfare and be prepared for the full consequences of robots on the battlefield. We must look at and account for the ethical dilemmas that robots will present. Our people will demand that we maintain the highest ethical levels of conduct but we must also be prepared for an adversary who does not feel constrained by the same ethical limitations.

### Conclusion

The purpose of this paper was to create a sense of urgency in looking at the complete potential strategic impact of robots on the battlefield. Currently we are only looking at the tactical employment of each system as it becomes available. Man has always been an integral part of the battlefield, but the introduction of robotics will lower the vulnerability of the side which

has them to hostile fire and casualties. As the technology gets better, it will even lead to man being replaced on the battlefield. This will completely revolutionize conflict.

By looking at Clausewitz's Trinity of War, we have shown that robots will significantly increase the potential for future conflicts. First, they will remove the need for the people on the robotic side to be directly involved. Secondly, the leadership on the side with robots will not have to be as good because the use of robots will lower the amount of friction necessary for good leadership to overcome. Thirdly and most importantly, governments will be less constrained from entering into conflicts because the loss of their own citizens will not be a direct effect of the conflict. Robotic armies will be able to be sent into situations where we as a nation feel that a wrong must be corrected but also a situation that we would not be willing to risk our own citizens.

A review of the Law of Warfare showed us that this increase in conflicts will not be constrained by the current definition. Our recent history has shown how the definition of Just War has expanded to include intervention for humanitarian reasons and pre-emptive self defense. It is not hard to believe that future politicians will be able to continue to expand the definition of Just War as their "need" to intervene increased.

The important impact that the Law of Warfare will have on the use of robotics is the need to meet the criteria of distinction and proportionality. We must ensure that the command and control systems we employ meet these standards. As we push forward with our use of robots on the battlefield we must ensure that we do not field systems which can not distinguish combatants from non-combatants. We must insure that the effects of the robots are proportional to the military advantage, which their use will gain us. By ensuring that we meet the legal requirements we will be seen as using the technology in an ethical manner and gain the upper hand when it comes to winning the ethical debate on the use of robots in conflict.

While Hollywood and academia have already entered into the debate on limiting the uses of robots for combat, the DoD must ensure that it does not allow the debate to be decided before it enters the discussion. If the military loses the debate, it could cause the U.S. to fail to consider all the effects of an adversary who does not feel constrained by this ethical dilemma. All parties must engage now in this debate to ensure that the concept is given full consideration before our society makes a decision based upon fear of the unknown rather than based upon scientific fact. We can not afford to ignore the possible impact that the loss of such a debate would have. We are not the only ones creating military robotic devices. If others who have access to the technology do not feel constrained, then we will find ourselves at a major disadvantage.

Just as in other times throughout history, we stand at the door of a potential leap in military affairs. This paper was only able to look at a singular aspect of the impact of robots on the battlefield. The United States Government must conduct a complete assessment of how robots will revolutionize armed conflict. Historically, the nations that were able to envision the complete impact of technology and make the synchronized transition in theory, strategy, and tactics were able to significantly change the balance of power in their time. For the other nations like France in 1940, who could only see the tactical changes, they were quickly defeated.

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