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The Ethics of Killer Applications: Why Is It So Hard To Talk About Morality When It Comes to New Military Technology?

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ABSTRACT *We live in a world of rapidly advancing, revolutionary technologies that are not just reshaping our world and wars, but also creating a host of ethical questions that must be dealt with. But in trying to answer them, we must also explore why exactly is it so hard to have effective discussions about ethics, technology, and war in the first place? This article delves into the all-too-rarely discussed underlying issues that challenge the field of ethics when it comes to talking about war, weapons, and moral conduct. These issues include the difficulty of communicating across fields; the complexity of real world dilemmas versus the seminar room and laboratory; the magnified role that money and funding sources play in shaping not just who gets to talk, but what they research; cross-cultural differences; the growing role of geographic and temporal distance issues; suspicion of the actual value of law and ethics in a harsh realm like war; and a growing suspicion of science itself. If we hope better to address our growing ethical concerns, we must face up to these underlying issues as well.*

KEY WORDS: robotics, military robotics, ethics, Moore's Law, Predator, Reaper

Introduction

We live in a world of 'killer applications.'

It used to be in history that every so often a new technology would come along and change the rules of the game. These were technologies like the printing press, gunpowder, the steam engine, or the atomic bomb. Indeed, such technologies were so rare in history that many other ones were oversold as being 'revolutionary,' when they actually were far from it, such as the Rumsfeld Pentagon's infatuation with 'network-centric warfare.'

What is different today, though, is the incredible pace of technologies' emergence. It used to be that an entire generation would go by without one technologic breakthrough that altered the way people fought, worked, communicated, or played. By the so-called "age of invention" in the late

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1800s, they were coming one every decade or so. Today, with the ever-accelerating pace of technologic development (best illustrated by Moore's Law, the finding that microchips – and related developments in computers – have doubled in their power and capability every 18 months or so), wave after wave of new inventions and technologies that are literally rewriting the rules of the game are bursting onto the scene with an ever increasing pace. From robotic planes that strike targets 7,000 miles away from their human operators to 'synthetic life,' man-made cells assembled from DNA born out of laboratory chemicals, these astounding technologies grab today's headlines with such regularity that we have become almost numb to their historic importance.

Looking forward, the range of technologies that are already at the point of prototyping are dazzling in their potential impact, both in war and beyond. Directed energy weapons (aka Lasers), the proliferation of precision guided weapons ('smart' IEDs), nanotech and microbotics (*The Diamond Age*), bio-agents and genetic weaponry (DNA bombs), chemical and hardware enhancements to the human body (*IronMan* meets *Captain America*), autonomous armed robots (*Terminators*), electromagnetic pulse weaponry (*The Day After*, *Ocean's 11*), and space weaponry (*Star Wars*) all may seem straight from the realm of science fiction, but are on track to be deployable well before most of us have paid off our mortgages.

What makes such technologies true 'Killer Applications' was that they rock an existing understanding or arrangement back to its fundamentals. A prototypical example from the field of business is how the iPod device changed the way people bought music. That is, what makes a new development a 'killer app' is not merely the incredible, science fiction-like capabilities it might offer, but the hard questions it forces us to ask.

The most difficult of these questions are not about what is possible that was unimaginable before. Rather, the more challenging and perhaps more important questions are about what is proper. True killer apps raise issues of right and wrong which we did not have to think about before.

These issues of ethics are not just fascinating; the disputes they raise can often have immense consequences to foreign affairs and international security. The science fiction of a submarine being used to attack shipping (Jules Verne), for example, not only became reality, but dispute over the right and wrong of it was what drew the United States into World War I, ultimately leading to its superpower rise. Similarly, H. G. Wells' concept of an 'atomic bomb,' which inspired the real world scientists of the Manhattan Project, helped keep the Cold War cold, but continues to haunt the world today.

Why are these questions of ethics and technology so difficult, especially in the realm of war? Why is it that we are both 'giants' as General Omar Bradley once put it, when it comes to the technology of battle, but at the same time 'ethical infants?' As he remarked in a speech on the eve of Armistice Day in November 1948: 'The world has achieved brilliance without wisdom, power without conscience. Ours is a world of nuclear giants and ethical infants. We know more about war than we know about peace, more about killing than we know about living' (Bradley 1948). To my mind, this comes down to seven key

factors, or 'sins' so to speak, that make it so difficult to talk about the ethical ramifications of emerging technology in war.

The Disconnect of the Fields

My background is in the social sciences, rather than in engineering or natural science, which means many in those fields would joke I have no background in the Sciences. Going from my own academic field into another can, on occasion, be like crossing into a foreign land. What is simple in one field can be viewed as incredibly dense and expert in another. Whenever we cross fields or disciplines, the paths and norms of behavior that are familiar become confusing; even the very language and words we have to use become exclusionary.

Take the field of cyber-security, which literally has a language of zeros and ones, but also encompasses very complex issues of law and ethics. Recently, one of the virtual world companies discovered that an individual had come up with a very sophisticated program for stealing virtual currency from the accounts of users in the virtual world and then transferring it into real money abroad. The company documented the hacking effort and then reached out to the Federal Bureau of Investigation (FBI) to explore the legal means for responding. The FBI agent first met with then asked, 'So, um, this is on the Internet right?'[1]

This same sort of issue is a particular one for discussions of ethics and the sciences especially in war. As scary as someone trained in the fields of law, politics, philosophy or ethics might find a discussion of the design parameters of MQ-X unmanned combat air system, the scientists or engineers behind that design might find entering the discussions of the ethical dilemmas with people who are trained to do so equally daunting. As one robotics professor I interviewed put it, 'Having discussions about ethics is very difficult because it requires me to put on a philosopher's hat, which I don't have.'[2]

The result is that we often steer away from such discussions and stay within our own worlds. A good example of this comes from a survey conducted of the top 25 stakeholders in the robotics field, as identified by the Association of Unmanned Vehicles and Systems International (the field's professional trade group). When asked whether they foresaw 'any social, ethical, or moral problems' that the continued development of unmanned systems might bring, 60 percent answered with a simple 'No.'[3]

Frankly, if we continue with this ostrich attitude, both the policy and ethical discussions will be uninformed, or even worse, guided by those who do not have scientific fact on their side. And, in turn, scientists and engineers with real world ethical issues will be abandoned.

Consider the following series of questions:

- From whom is it ethical to take research and development money? From whom should one refuse to accept funding?
- What attributes should one design into a new technology, such as its weaponization, autonomy or intelligence? What attributes should be limited or avoided?

- What organizations and individuals should be allowed to buy and use the technology? Who should not?
- What type of training or licensing should the users have?
- When someone is harmed as a result of the technology's actions, who is responsible? How is this determined?
- Who should own the wealth of information the technology gathers about the world around them? Who should not?

These are all examples of real questions emerging in the robotics field that are not so much about the technology as the ethics. Most importantly, ethics without accountability is empty, so each of these questions also has potential legal ramifications. But, if a young robotics graduate student wanted to do the ethical thing in answering these questions, he or she would have no code to turn to for guidance, the way, for example, a young doctor or medical researcher would in their field.

This is perhaps to be expected, as robotics is a much newer field than medicine. The key is not whether there is a gap, which is to be expected in any cutting-edge field, but what is being done to fill this gap. For example, the scientists working in the Human Genome Project set aside 5 percent of their annual budget to push discussions on the 'ethical, legal, and social implications' of their work (Moore 2002). The result is not that we have solved these tough issues related to the field of genetics. But we are certainly far better equipped to handle these debates, with the tenor and content of the discussion far past some of the inanity that dominated the project's early years.

Yet very few other fields are doing something similar. Indeed, more common is the sort of troubling attitude perhaps best illustrated by an email I once received after a talk at a leading engineering school. A professor wrote to chastise me for 'troubling' his students 'by asking them to think about the ethics of their work.' Both Socrates and Asimov are likely chuckling.

Applied Ethics: The Revenge of the Real World

Technology is often described as a way to reduce war's costs, passions, and thus its crimes. The poet John Donne, for example, claimed that in 1621 how the invention of better cannons would mean that wars would 'come to a quicker ends than heretofore, and the great expence of bloud is avoyed' (Dunlap 1999: 5).

Almost 400 years later, we still hear similar discussions when it comes to a variety of technologic efforts. *The Economist* and *Discovery Magazine* both recently covered attempts to create an 'ethical governor,' essentially software that weapons might be programmed with to make them act ethically in war, even more morally than their human masters. As Ron Arkin, a professor of computer science at Georgia Tech, who is working on such a project observes: 'Ultimately these systems could have more information to make wiser decisions than a human could make. Some robots are already stronger, faster and smarter than humans. We want to do better than people, to ultimately save more lives' (Bland 2009).

It is a noble sentiment, but also one that ignores the seamy underside of war, which may be becoming even darker in the twenty-first century. My own past books, for example, looked at the emergence of a global private military industry and the growing role of money and greed in war, and then at the sad reality of child soldiers; contrary to our idealized visions of war and who fights it, one of every ten combatants today is a child.

When we own up to the reality of war, rather than how we wish it, we see the double-edged sword of technology. We see that, for example, while human enhancements research is taking us beyond the prior limitations of the human body, those resulting biological enhancements do not take us past our all too human limitations and the inherent flaws – or original sins – that have also characterized us, such as our capacity for arrogance, greed, and hate. Similarly, just as a fork can be a tool for eating as well as plucking out eyeballs, we recognize that a non-lethal weapon can chase away Somali pirates, but also can be used by Japanese fisherman to chase away environmentalists protesting their illegal slaughter of endangered whales.

Too frequently discussions of new technologies assume that the 'fog of war has been lifted' (as the technophile thinkers who once surrounded Donald Rumsfeld argued) by either the perfection of our technology or the perfection of our souls. Instead, war in the twenty-first century shares the same qualities with past centuries: it is a mess, and maybe even more of a complicated mess.

So, for example, when someone asserts confidently that new war technologies will lead to less bloodshed or greater compliance with established moral principles, we should check such sentiments with a look through a different, dirtier lens. While scientists might note the fact that such promises often prove empty (the ethical generator for example, remains a 'black box' all design concept, but no reality), we should also recognize that even if such fantasies were to come true, we would still have problems.

For example, an enduring aspect of war is that regardless of how novel and advanced the technology, the enemy still has a vote. Making all this even more difficult today is that contemporary terrorist and insurgent groups are doing all they can to take advantage of the very laws they are supposed to follow. Charles J. Dunlap, Jr. has described this tactic of deliberately violating the Geneva Conventions that divide soldier from civilian as fighting a form of 'lawfare'. In Somalia, for example, fighters would fire at US soldiers from behind non-combatants. One Ranger recalled how a gunman shot at him with an AK-47 that was propped between the legs of two kneeling women, while four children sat on the shooter's back. The Somali warrior had literally created for himself a living suit of non-combatant armor (Edwards 2005: 288). Another example in the Kosovo War was a tank that was parked in a school yard, while another was a tank that drove through a town on an ethnic cleansing mission with women and children riding on top. In the 2006 Lebanon War civilians were blackmailed by Hizballah into launching remote-controlled rockets on their farms to rain down on Israeli cities.

Ethicists and lawyers could fill pages arguing back and forth when one should use force in response to such scenarios. To argue that the problem is going to be easily solved with some imaginary, yet un-invented artificial

intelligence is a bit of a stretch. That is, even if we could invent a system that always followed the Geneva Conventions, in the mess of modern war, the problem is that applying them is just not a simple zero versus one proposition in terms of programming language. The laws themselves are often unclear about what to do, and even more so, under siege by the people supposed to follow them. In short, in the harsh reality of war, there are no silver bullet-technologic solutions for ethics.

The Dirty Role of Money

Whether it is a research laboratory, think-tank seminar room, or congressional hearing room, there is one topic that is generally considered impolite to talk too much about: Money. Yet there is perhaps no more important factor in determining who gets to talk, who does not, what gets worked on, and what does not.

My own experience perhaps can illustrate. Last year I was invited by the US Naval Academy's Stockdale Center for Ethical Leadership to give the annual ethics lecture to the student body about some of the questions that robotics was raising for warfighters. A day before the event, the center received an angry letter, expressing shock that it would invite such an 'evil,' 'unethical' person to corrupt the young minds of future leaders and arguing that it should dis-invite me.

The writer of the letter was the chief executive officer (CEO) of a private military firm, whose employees had been identified in several US military reports as being involved in the abuses at Abu Ghraib prison, one of the worst scandals in American history. But I had apparently done something far worse than billing the taxpayer for acts of abuse for which soldiers would later be court-martialed, but contractors would escape accountability because of a gap in the law. I had argued in an editorial piece that the contractors of this CEO's multi-billion dollar firm should be held to the same standards as those in uniform, and that the government should 'investigate the issue, bring people to justice, and ensure that lessons are learned so that the same mistakes are not repeated' (Singer 2004).

Normally, such a letter would be ignored, or the rich irony of it would merely prompt laughter. But the administrators of the center had to take it seriously for the sole reason that he was a wealthy individual that the school had previously been cultivating as a donor. Money, as we know, has a right to talk louder in our world than perhaps it should. Or, as the American writer Napoleon Hill might have commented about my CEO friend, 'Money without brains is always dangerous.'

I have a deep respect for how the Stockdale Center responded to this threat. The center did not let money shut down conversation, but instead investigated the situation and decided there was no merit to silencing my talk on ethics simply because a millionaire was upset. We all know that many other places would not have responded the same.

My point here in reflecting on this incident is not to rehash old academic war stories, but that I wonder what lessons the very first American

conservatives might have for us. The authors of the *Federalist Papers,* who helped craft and defend the US Constitution, warned about the role of any private interests not responsive to the general interests of a broadly defined citizenry.[4] Among the Founding Fathers' worries for the vitality of democracy was that, when private interests move into the public realm and the airing of public views on public policy is stifled, governments tend to make policies that do not match the public interest.

I think this is something to keep in mind when we reflect on the issues of ethics and technology, which of course also touch on vast amounts of money sloshing about. How do we handle discussions that call into question multi-million dollar interests versus those that do not? Who has a louder bully pulpit?

This issue of money does not just shape the public debate, but goes all the way down to the individual decisions that a scientist or researcher working on such emerging technologies has to wrestle with. Benjamin Kuipers, a computer scientist at the University of Texas perhaps best described this real world dilemma that we often do not reflect upon:

> DARPA [Defense Advanced Projects Agency] and ONR [Office of Naval Research] and other DOD [Department of Defense] agencies support quite a lot of research that I think is valuable and virtuous. However, there is a slippery slope that I have seen in the careers of a number of colleagues. You start work on a project that is completely fine. Then, when renewal time comes, and you have students depending on you for support, your program officer says that they can continue to fund the same work, but now you need to phrase the proposal using an example in a military setting. Same research, but just use different language to talk about it. OK. Then, when the time comes for the next renewal, the pure research money is running a bit low, but they can still support your lab, if you can work on some applications that are really needed by the military. OK. Then, for the next round, you need to make regular visits to the military commanders, convincing them that your innovation will really help them in the field. And so on. By the end of a decade or two, you have become a different person from the one you were previously. You look back on your younger self, shake your head, and think, 'How naïve'. (as quoted in Singer 2009: 172–173)

The same sort of financial pressures, either positive or negative, also happen outside the laboratory. Those who study in such areas as ethics or policy often similarly depend on some sort of financial support from foundations or donors. The more money such a donor has, the more likely they are able to get people to research the questions they want, in the way they want them answered, and the more likely that their agenda will be advanced.

Indeed, this issue of money and bias can prove to be a problem even when a donor is guided by the loftiest ideals of charity. A good illustration of this comes from a meeting with a representative of one of the world's leading foundations for academic research about a potential initiative that would look at ways to establish global norms in cyber-security. They explained how their foundation thought the topic was interesting, but that their board 'had not yet decided whether cyber issues were important or not'. They felt that they would be in a position to decide whether cyber-security was an important issue in 'about three or four years.'[5]

While science works on the cutting-edge, donors to the social sciences and ethics tend to want to sponsor what is already established (with the irony that they are least often there at the point in time when their support might have the most impact). The sad truth is that if you are an ethics or policy researcher seeking funding, which, in turn, can be crucial in determining such things as whether you get tenure or not, you are better off starting new projects on old problems, rather than new projects on new problems.

Your Ethics Are Not My Ethics

One of the most important ripple effects of a technology in terms of its impact on foreign policy takes place when culture encounters ethics. This issue is playing out right now in the vastly different perceptions of unmanned aerial systems inside America and 7,000 miles away, where they are actually being used daily in war. While we use such adjectives as 'efficient' and 'costless' and 'cutting edge' to describe the Predator in our media, a vastly different story is being told in places like Lebanon, where the leading newspaper editor there called them 'cruel and cowardly' or in Pakistan, where 'drone' has become a colloquial word in Urdu and rock songs have lyrics that talk about America not fighting with honor. This issue of narrative, of differing realities when it comes to talking about the exact same technology, is hugely important, to the overall 'war of ideas' that we are fighting against radical groups and their own propaganda and recruiting efforts. It helps explain how painstaking efforts to act with precision emerge on the other side of the world through a cloud of anger and misperceptions.

But this issue of perception is something that goes beyond just drone strikes. We live in a diverse world and as *Star Trek* creator Gene Roddenberry put it, 'If man is to survive, he will have learned to take a delight in the essential differences between men and between cultures. He will learn that differences in ideas and attitudes are a delight, part of life's exciting variety, not something to fear.'[6]

Yet we must also acknowledge that that these differing cultural understandings can have a huge impact, creating differing perceptions of what is ethical or not.

We see this greatly illustrated with the differing perceptions of robotics in East and West. In Western culture, going back to its very first mention in the play *RUR* in 1921, the robot is consistently portrayed as the mechanical servant that wises up and then rises up. The technology is portrayed as its something heartless to be scared of. Yet, the very same technology is consistently viewed exactly opposite in Asian culture, going back to first mention in post-World War II anime comics as *Astro Boy* in which the robot is consistently the ethical hero, rather than the would-be Terminator to be feared. 'The machine is a friend of humans in Japan. A robot is a friend, basically,' tells Shuji Hasimoto, a robotics professor at Waseda University in Tokyo (Jacob 2006: 7).

This difference is not just something that comes out of popular culture. As opposed to the strict Western division between living and dead, the

traditional Japanese religion of Shintoism holds that both animate and inanimate objects, from rocks to trees to robots, have a spirit or soul just like a person. Thus, to endow a robot with a soul is not a logical leap in either fiction or reality. Indeed, in many Japanese factories, robots are given Shinto rites and treated like members of the staff (Hornyak 2006).

The result is that popular attitudes over what is acceptable or not when it comes to this technology and how to use it diverge widely. In Asia, 'companion' robots for the elderly or babysitter robots for children are marketed with little controversy. By contrast, Rodney Brooks, an Massachusetts Institute of Technology professor and Chief Technical Officer of iRobot, explains that the concepts would not work in the US, for the simple reason that Americans find them 'too artificial and icky' (Singer 2009: 168).

One can see similar differences in perceptions, influenced by culture in a wide variety of emerging areas, from work in genetics, enhancements, and even what were once cutting edge but are now quite normal human medical treatments – normal, that is, only in some societies. The Japanese, for example, may love their robotics but are often quite horrified by organ transplants, to the extent that the very first heart transplant doctor in Japan was prosecuted for murder.[7]

The same cultural attitudes flow out and influence what different cultures think is acceptable in war or not. The issue of arming an autonomous weapons system is hugely controversial; controversial, that is, to Western minds. By contrast, in South Korea, it is not. The country's military forces sent two robotic sniper rifles to Iraq in April 2004, with little public debate. Indeed, Samsung not only manufactures the Autonomous Sentry Gun, a 5.5 millimeter machine gun with two cameras (infrared and zooming) and pattern-recognition software processors that can identify, classify, and destroy moving human targets from 1.25 miles away, but even made a promotional commercial extolling it, set to jazzy music.

This issue of differing senses of right and wrong behavior can even spark conflict. Much of the recent dispute in cyber-security between the US and China, especially as it relates to the Google incident, is woven within different cultural attitudes towards privacy and individual rights. Similarly, US State Department officials like Hillary Clinton often make a point to extol the power of 'social networking.' They fail to realize that others describe the West's very same push for it as its own form of cyber-warfare.

The Distance Problem

Our codes of law and our sense of ethics have long focused on our intent and actions. Take this quote from Aristotle: 'We do not act rightly because we have virtue or excellence, but rather we have those because we have acted rightly.'[8]

The challenge of this new wave of technologies is that the concepts of virtuous intent and action are being modulated in ways that Aristotle, and even the Geneva Conventions, crafted several thousand years later, did not imagine. Advancements used to be distinguished by the increase they created in a weapon's power, range, or capacity. The World War II era B-24 bomber,

for example, was an improvement over the B-17 because it could carry a greater number of bombs over a greater distance. Similarly today, the MQ-9 unmanned Reaper plane is an improvement over the MQ-1 Predator because it can carry a greater number of bombs over a greater distance. But there is one more fundamental difference: The Reaper drone is smarter. That is, the newer technology can do much more on its own; take off and land autonomously, fly out mission way-points without human intervention, and carry targeting software that even allows it not only to pick out small details (such as footprints in a field), but also to start to make sense of them (such as backtracking the footprints to their point of origin).[9]

Such improvements present dilemmas for which our prevailing laws of war, best exemplified by the 1949 Geneva Conventions, may not be fully prepared. In essence, our new technology does not remove human intent and human action, but it can move that human role geographically and chronologically. Decisions now made thousands of miles away, or even years ago, may have great relevance to the actions of a machine (or to its inactions) in the here and now. This does not mean that there is no ability to talk about ethics or apply the law, but rather that this aspect of distancing makes it far more complex and difficult, especially in fields that very much focus on the role of the 'commander on the scene' and concepts of individual intent and responsibility for one's actions.

The Conventions date from the middle of the twentieth century; the year they came out, the average American home cost $7,400, and the most notable invention was the 45rpm record player. But while there is little chance of the global cooperation emerging for them to be updated and ratified anytime soon, technology is guaranteed to advance. Under what is known as Moore's Law, for instance, the computing power and capacity of microchips (and thus the many devices like computers that use them) has essentially doubled every 18 months of so, while continually going down by similar measures in price. If Moore's Law holds true over the next 25 years, the way it has over the last 40, our technologies will be a billion times more powerful in their computing. Indeed, even if we see just 1 percent of the improvement we have experienced historically, our technology will be a mere 10,000,000 times more powerful than today.

This may be the most challenging part of the distance dilemma, that while our understanding of law and ethics moves at a glacial pace, technology moves at an exponential pace. Thus, the distance between them grows further and further.

The Suspicion of Ethics

In the spring of 2010 I had the honor of sharing a panel with two US military Judge Advocate General officers at a session hosted by the Institute for Ethics and Public Affairs at Old Dominion University, Norfolk, Virginia. The session's focus was to be on the ethical questions of using new robotic technologies in war. However when a person in the audience stood up and

asked a more fundamental question of the three of us, 'What would you tell a mother who has lost her son to one of these terrorists in Iraq as to why we should even care about something like ethics or the laws of war? Why should we even bother?'

The question took the discussion to a whole deeper level. For all the discussion in academic journals and seminar rooms, many people wonder about something far more fundamental: why do we even care about trying to figure out right from wrong in a realm like war where so much wrong happens?

It is a difficult issue and cuts to the heart of why we even care about ethics and morality to begin with in any human endeavor. Linked to the specific realm of war, two factors carry weight in my mind. First, the son was a 'serviceman' and that is a powerful term. It meant he was not fighting out of anger or hate, but serving something beyond. When he joined the US military, he took an oath to serve the Constitution and respect the laws, including those of war. It is this notion of service, this sense of ideals, that is why we honor servicemen and women, and even more so it is the essence of what distinguishes them from their foes. I think they serve on the side of right, not just because they are my countrymen, but because the other side does not respect the laws of war, and thus is the equivalent of barbarians, which is how historically we have viewed those who willfully violate the law.[10] This sense of service is not just why we fight, but is why our way of fighting can be made just.

The second factor is something we do not like to talk about in issues of ethics, but very much matters in war: raw self-interest (something we may try to sugarcoat by terming it as 'pragmatism'). Rather than it being an advantage to break the laws of war, the facts show something different. In the history of war, the side that has fought with a sense of ethics, respected the laws, and fought as 'professionals,' has tended to win more often than those that do not. That is, in the historic record of over 5,000 years of war, professionals, almost always triumph over those who are willing to behave like barbarians. Indeed, this distinction was found to be a key event in Iraq, where that son was killed. Even though the US forces in Al-Anbar province were far more alien to the local society than the members of Al-Qaeda, and many in the media complained that our forces were stymied by a webwork of laws and lawyers, we won in the end for this very reason. These extremists, these twenty-first century barbarians, carried the seeds of their own downfall, by the very fact that they were wanton with violence and our forces were not. Eventually this was what persuaded the local tribes to turn on them, which was the actual key to the victory in the 'surge.'

But while this may be the case, the narrative that ethics is only a hindrance remains powerful and popular. Those who care about ethics must acknowledge they face a basic problem of convincing folks both inside and outside the military that ethics is worthwhile, not just because to be selfless is morally praiseworthy, but also because we are self-interested and want to win.

Beware of Magic

When the warriors of the Hehe tribe in Tanzania surrounded a single German colonist in 1891, they seemingly had little to worry about. But he had strong magic, a box that spat out bullets (what we call the 'machine gun'). Armed with such seemingly mystical power, he killed almost 1,000 spear-armed warriors (Ellis 1986: 89).

As English physicist and science fiction author Arthur C. Clarke famously put it, 'Any sufficiently advanced technology is indistinguishable from magic.'[11] And in no realm is this truer than in war, where we do not just merely view advanced technology sometimes as magical, we also fear it for that very reason. We fear what we do not understand.

While we might think such times have past, the problem of technology's magical side continues to bedevil us even in the twenty-first century, perhaps even more so as technology truly performs magical feats, even while large parts of the world live their lives no differently than they did centuries past. For instance, an official with the US military's Joint Special Operations Command recounted a meeting with elders in the tribal region of Pakistan, the area where Al-Qaeda leaders were reputed to be hiding out, and the site of more than 175 drone strikes in the last few years. One of the elders was enamored of the sweet-tasting bread that was served to them at the meeting. He, however, went on to tell how the Americans had to be working with forces of 'evil,' because of the way that their enemies were being killed from afar, in a way that was almost inexplicable. 'They must have the power of the devil behind them.'

As the official recounted with a wry chuckle, 'You have a guy who's never eaten a cookie before. Of course, he's going to see a drone as like the devil, like black magic.'[12] Again, the elder felt we were doing something evil not because of civilian casualties or the like, but for the very reason that he did not understand. As Marian Anderson once put it, 'Fear is a disease that eats away at logic.'[13]

But this suspicion of advancement is not just limited to distant, tribal regions. It is something that is increasingly playing out here in the US, and is harming our ability to have effective discussions on policy and ethics in the twenty-first century. We are seeing what CNN (Cable News Network) has characterized as a growing American 'fear of science' or what writer Michael Specter explored in his book, *Denialism*. As Specter puts it, the problem now when it comes to discussions that involve the intersection of science and public policy is that, 'when people don't like facts, they ignore them.'[14]

We see this in all sorts of areas, from the widespread fear of vaccines, to the useless trust placed in the multibillion industry of dietary supplements, to the climate change debate. Indeed, a major political party nominated for Vice President of the United States a person who described the scientific method as 'snake oil.'[15] But we should not be too hard on them, they are simply reflections of a populace in which 11 percent of Americans cling to the belief that Elvis really is still alive, and 18 percent that the Inquisition did have it right and the Sun revolves around the Earth.

Our challenge is thus often not only to make sure the policymaker and public understand the ethical issues of emerging technologies, but that they also basically accept the scientific principles underlying those technologies as well.

Conclusions

These challenges are certainly daunting, but by no means do they imply that any discussion of ethics, morality, and technology is hopeless, and that there is no way to think, speak, and act ethically when it comes to emerging technologies in war. Rather it is the very opposite. The difficulty makes the project all the more important and the efforts to solve them all the more worthy.

Rather our success or failure in navigating the moral dilemmas of a world of killer apps will depend on recognizing that these very problems are part and parcel of the discussion. We must own up to these challenges, face them, and overcome them. Otherwise we will continue to spin in circles. And we had better act soon. For the thread that runs through all of this is how the fast-moving pace of technology and change is making it harder for our all too human institutions, including those of ethics and law, to keep pace.

Notes

[1] Author interview with Linden Laboratory executive, 27 March 2010.
[2] Author interview with Prof. Illah Nourbakhsh, 31 October 2006.
[3] Survey released at AUVSI-San Diego, 27 October 2009, conducted by Kendall Haven.
[4] See especially Federalist Papers #10 and #51, available for download at http://avalon.law.yale.edu/subject_menus/fed.asp; Internet.
[5] Author meeting with Foundation grant officer, 13 April 2010.
[6] Quotation of *Star Trek* creator and producer, Eugene W. Roddenberry recorded in Santa Barbara, CA (1971): http://memory-alpha.org/wiki/Template:Gene_Roddenberry_quotes. [Accessed 26 October 2010].
[7] For more information see Lock 2002. The next transplant in Japan was not performed until 30 years later; see also http://news.bbc.co.uk/2/hi/health/287880.stm.
[8] From *Nicomachean Ethics,* Book II, 4.
[9] For more on this, see Singer 2009: ch. 5.
[10] For more on this, see Peters 1994.
[11] This is known widely as 'Clarke's Third Law,' after Arthur C. Clarke, 'Profiles of the Future' (1961): see, e.g., http://www.quotationspage.com/quotes/Arthur_C._Clarke/; Internet [accessed 26 October 2010].
[12] Author interview with JSOC official, 10 March 2009.
[13] See, e.g., http://quotationsbook.com/quote/14686/; Internet [accessed 26 October 2010].
[14] See http://articles.cnn.com/2010-04-13/opinion/specter.denying.science_1_organic-food-genetically-supplements?_s=PM:OPINION; Internet [accessed 26 October 2010]; see also Specter 2009.
[15] See, e.g., http://www.cbsnews.com/stories/2010/02/09/politics/main6189211.shtml; Internet [accessed 26 October 2010].

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Biography

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