Interview with Peter W. Singer*

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Peter W. Singer is Director of the 21st Century Defense Initiative at the Brookings Institution in Washington, D.C. He is the author of three award winning books, Corporate Warriors: The Rise of the Privatized Military Industry, Children at War, *and* Wired for War: The Robotics Revolution and Conflict in the 21st Century.[1] *He has served as a consultant with groups that range from the US military and FBI to human rights organizations.*

In this interview, Peter Singer explains to what extent and how new technologies change the way we think about going to war and the way we conduct war, as well as how they will impact the work of humanitarian actors. He shares his vision for the future, analyzing both the ethical and legal challenges that access to new advanced technologies poses and the opportunities it offers.

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Tell us a bit about your personal background. How and why did you come to work on this topic?

As I write in the opening of my book *Wired for War*, when I think back on my childhood it is a mix of playing with the bits and pieces of my family's military history combined with science fiction. Like a lot of other little boys, if I picked up a stick, within a couple of seconds that stick was transformed either into a machine gun that I was going to defend the neighbourhood against the Nazis with, or it was a light sabre I was going to use to defeat Darth Vader. I remember taking my grandfather's old medals and pinning them to my pyjamas, and taking a model of the jet that my uncle had flown in Vietnam and using it to protect Legoland. But

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then, also like a lot of other kids, there are artefacts of science fiction that are all around those memories so, yes, I might have been wearing my grandfather's old World War II medals on my pyjamas, but I was jumping into a bed that had Star Wars sheets.

The writer John Keegan once said in his book *Six Armies in Normandy*,[2] 'I grew up in this milieu of military history and war, it is not polite to say so, but this is a reality.' And I think that there was something in this. Now, I need to be very clear. My experience was then shaped by later connections to the real side of war. I remember going to Bosnia as part of a UN research team, and going into Mostar and seeing how the pictures in my grandfather's old books had seemingly come to life. The old pictures in my grandfather's book, however, did not come with the smell, with the feeling and emotions in the air amidst real war . . . When you read a book, you do not have to think about where to step next to avoid landmines, or try to walk where the locals walk to avoid stepping on one.

So my point here is that one shaping force for me was the historicized, fictionalized side of war that many of us grow up with and which was then tempered by real world experiences. The other shaping force is that I am an academic who works on public policy issues, and I have continually been struck by the disconnect between how we think the world works and how it actually works. This has been a hallmark of my own studies.

For example, when I was in Bosnia, I came across an American company that was working as a private military contractor. This concept did not exist in our studies of war and politics back then, and yet there was the company. When I proposed to write a dissertation on the concept, a professor at Harvard said I should quit graduate school and instead become a screenwriter, having thought about exploring such a silly, fictional idea. That dissertation became my book *Corporate Warriors*, and we have seen all the issues that have arisen since then from non-state (corporate) actors' involvement in the battlefield.

Similarly, while doing research on private militaries, I came to examine the case in West Africa, where we saw a kind of war that no one thought should exist. On one hand, there was a government hiring a private company to serve as its military, and on the other side a corporate force fighting against a rebel force that was primarily made up of abducted children. Neither side fit the model of how we understood war, and yet there they were. That became the basis of the next book I wrote, *Children at War*. Again, I had a similar experience with one professor who said that she did not believe the child soldiers even existed. Today, of course, this notion sounds silly, but in the early 1990s people thought that way.

My most recent book linked back to this notion of exploring new actors, but also tried to open people's eyes to what is happening. In it, I look at robotics and

1   See Peter W. Singer, *Corporate Warriors: The Rise of the Privatized Military Industry*, updated edn, Cornell University Press, New York, 2007; *Children at War*, University of California Press, Berkeley C.A., 2006; and *Wired for War: The Robotics Revolution and Conflict in the 21st Century*, Penguin Books, New York, 2009.
2   See John Keegan, *Six Armies in Normandy: From D-Day to the Liberation of Paris; June 6–Aug. 5, 1944*, revised edn, Penguin Books, New York, 1994.

all the very real implications that it has had on combat and the political and ethical issues beyond the battlefield. I have already had experiences with it similar to those that I had with the dissertation and first book. People, both those in the senior defence leadership who were themselves not aware that their militaries were using the technology *and* those in humanitarian organizations who still see robotics as science fiction technology, have a response to it that has a tint of 'too little, too late'.

What are these new technologies bringing to the battlefields? What do robotics change in the way we see war today?

There is this notion – sometimes within the defence establishment – of a 'revolutionary technology', and we frequently misunderstand the idea. A revolutionary technology is a game-changing technology on a historic level. It is technology like gunpowder, or the steam engine, or the atomic bomb.

Now, let me be very clear. These technologies do not solve all the problems of war. Too often they are discussed as if they were silver-bullet solutions. Donald Rumsfeld, for instance, talked about how computer network technology might 'lift the fog of war'. We also frequently see new technology described in the same way in the humanitarian community, that is, as if it might make war safer or cleaner. And this is nothing new. The poet John Donne predicted in 1621 that cannons would mean that wars would 'come to quicker ends than heretofore, and the great expense of blood is avoided'.[3] We have seen how better cannon did not make war less bloody, or less expensive. And views have not changed today, when many now talk about robots as if they will solve the ethical issues of war.

Revolutionary technologies are game-changers, not because they solve all problems, but because they force new questions upon us that a generation earlier people did not imagine we would be asking ourselves, or our respective organizations or nations. Some of these questions are questions of what was possible a generation ago versus what is possible today.

Just recently, I was speaking with a two-star general about the capability of being able to watch what's happening across the battlefield up close and personal, but with a plane that's flown from 7,000 miles away. He never even imagined he'd be able to have that capability when he was a younger officer, and now he's commanding an entire force with that capability. We see that opening up of new possibilities on the humanitarian side, and the idea that non-governmental organizations (NGOs) might have the very same capability to watch and document crimes without sending people into harm's way.

However, revolutionary technologies also come with questions of what is proper, questions that were never imagined previously; issues of right and wrong that were never explored previously. A commander today may be able to watch what is happening on the battlefield from 7,000 miles away, but what does that mean for his unit structure, the tactics he uses, the doctrine he uses, when and where he utilizes force, and under what rules and conditions? In the same way that the

3   John Donne, Sermon CXVII, Preached at St. Paul's upon Christmas Day, 1621, John 2:8.

capability of a humanitarian organization watching an atrocity from afar may be a real capability, watching a battlefield from afar also raises questions on everything from obligation of those watching to respond, to whether the notion of 'costless war' also applies to costless humanitarian operations, and whether with the potential to lower the risk to humanitarian workers just by watching from afar, there is also a cheapening of the life of those on the ground.

I am of the opinion that certain technologies are game-changers, and robotics is in that category. When I interviewed people in the field for what they thought the historical parallels were to robotics today, their answers were illustrative. The engineers said unmanned systems, or robotics, are like the horseless carriage in 1910. Even the terms used to describe them – 'horseless' carriage and 'unmanned' system – demonstrate that we still like to wrap our heads around what something is *not*, rather than what it is. If we choose to draw a parallel between the horseless carriage and robotics, we can also see how robotics may end up impacting our society, the conduct of war, and issues of law. There was no such thing as 'traffic laws', for example, before the horseless carriage.

The parallel that others – like Bill Gates, the founder of Microsoft, for instance – draw is with the computer around 1980. The computer in 1980 was a big bulky device, which could only perform a limited set of functions. It was developed by the military and the military was the main customer for it and researcher on it. Today, computers are so ubiquitous that we do not even call them computers anymore. I drive a car with over 100 computers in it. Again, if we choose to use that parallel, we need to consider all the implications of entering the information age. Who, back in 1980, would have thought that a computer would be capable of leading to things like cyber warfare, or deep challenges to personal privacy?

The final parallel, which some of the scientists worry about, is with the atomic bomb, in the 1940s. The parallel, they say, is that much like nuclear physics in the 1940s, robotics and artificial intelligence are today such a cutting-edge field that all the best minds are drawn to it. If, as a scientist, you wanted to work on what was important in the 1940s you were drawn towards nuclear physics. Today, you are drawn towards robotics and artificial intelligence. But scientists, as well as others, also worry about what all of that means.

Scientists today worry about an equivalent of what played out with the people behind *the Manhattan Project*,[4] where they created a game-changing technology (the atomic bomb), and then asked 'What just happened?' It is deeply ironic that many of the same people who built the atomic bomb went on to create the modern arms control movement. But the genie was already out of the bottle. And there are obvious parallels here to robotics, too. Only, in this case, the genie literally may get up and walk out of the bottle.

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4   Editor's note: 'Manhattan Project' is the code name of a secret US government research and development project that built the first atomic bomb during the Second World War.

In your book, you write that war is nevertheless still waged by humans on humans' behalf. It is also still about human suffering, about loss of human lives and consequences for human beings. What will robotics change in the way we think about going to war or about the way we conduct war?

Robotics is having an impact on the psychology and the politics of war. But no matter the technology, war is a human endeavour. And that holds true now even with this advanced technology. The technology is shaping how we, in the public, and especially our leaders, look at and interpret war, and decide when it makes sense and when it does not, and what its likely or real costs are.

Where I think we see this impact most today is in the connection amongst the technology of robotics and democracies and war. No longer, in most democracies, is there conscription. We do not have declarations of war any more. The last time, for example, the US Congress formally declared war was in 1942, against the minor members of the Axis powers. We do not buy war bonds, or pay war taxes any more. During the Second World War, for example, the US public personally bought, that is personally invested in, over $180 billion worth of war bonds. In fact, people were so invested in the war effort that if one raised over $200,000, one got to name your own ship. In the past ten years of war, by comparison, the US public bought zero dollars' worth of war bonds, and instead of a war tax, the richest 4 per cent received a tax break. And now we have a technology that enables us to carry out acts of what we previously would have thought of as war, without having to wrestle with some of the potential political costs of sending a son or daughter into harm's way.

So the barriers to war in our societies were already lowering before this technology came along. This new technology, though, may take those barriers to the ground. This is not just a notion of political theory. It relates to our oldest ideals of how democracies are better, more honourable, more thoughtful when it comes to war. It relates to the connection between the public and its wars. We can see this in a variety of operations right now. For instance, there have been more than 350 air strikes conducted into Pakistan that were not voted on by Congress. Such strikes are not conducted by the US military, but by covert intelligence operations, and lack the level of transparency and accountability that a military engagement would have. So an operation can amount to roughly eight times the scale of the opening round of the Kosovo war, and yet no one conceives of it as a 'war'. Now, let me be clear: I actually agree with the goal of many of these operations. But I am concerned about the technology's impact on how we talk about it and thus conceptualize and authorize it.

But we are also now seeing this trend – and I think this is a real game-changer – having an impact also on *overt* military operations. The Libya campaign is a great illustration of that. The authorization for the overt use of force by the US military was shaped by the War Powers resolution, which recognizes that sometimes there are emergencies and that the President needs to be able to deploy forces. But the resolution says that, within 60 days, Congressional approval must be obtained. This resolution is a post-Vietnam law, developed to ensure no more incidents like

the Gulf of Tonkin. But, when it got to the 60-day mark, the response from the Executive Branch was: 'We do not need authorization because it no longer involves risk to American servicemen or the threat thereof.' Essentially, the argument was that because people were no longer going into harm's way, the rules of that law no longer needed to be followed.

Yet we were still doing something that we used to think of as war. We were still blowing up things and people. That is, by that point, the operation had shifted to using unmanned systems, and after that 60-day mark, 146 air strikes using Predator/Reaper class systems were conducted, including the very last one that got Gaddafi. Now, again, let me be clear: I actually agreed with that operation; I had no sympathy for Gaddafi. But my concern is that we wanted to do something that we traditionally would have called a war, and yet the manner in which the various branches of government and the estates beyond them – the media, the public – thought about it was fundamentally different. We are setting enormous precedents without reflection on where they take us in the future.

In other words, we are saying that we do not have to go through the old ways of authorizing actions, because we now have this new technology. This changes the way we think of war. In a democracy, we used to think of war both as people going into harm's way and as bad things happening on the battleground. Now, technology has allowed us to disentangle the two, or at least led us to think that we can disentangle the two. This changes how we deliberate on war.

This does not just apply to unmanned systems and robotics. It also carries over to many other new technologies. Cyber is a good illustration of this. Militaries are able to engage in acts that might have previously been interpreted as war, but do not consider those acts as acts of war, either because they do not involve people in harm's way, or they are so fast moving – or actually so slow moving, to include some kinds of digital sabotage – that they do not fit the traditional understanding of war.

Does your statement also apply to the way non-state armed actors engage in war today? On the one hand, one could say that today not many non-state armed actors have sufficient resources to deploy drones and launch over 300 attacks over the course of several months. On the other hand, one could also say that the proliferation of new technologies is 'democratizing' warfare by making weaponry available to everyone. What do you see as emerging trends for the future?

First, we are definitely seeing a lowering of the barriers to war, not just for states, but for a wider variety of actors. This is not just with the most sophisticated technology. The AK-47 is a good illustration of that – a relatively simple technology could be a big advancement in that a child soldier using an AK-47 suddenly had the firepower of a Napoleon-era regiment. He may not be as professional, but he can create as much chaos, death, and destruction around him, all because of an AK-47 that he could learn how to use within thirty minutes. So the 'democratization' of war is not necessarily dependent only on the availability of high-end technology, but simply on technology that everyone can access.

Second, today we are definitely seeing a wide range of actors with access to new advanced technology, particularly as it becomes cheaper and simpler to use. On the non-state actors' side, just for robotics, the users already range from militants and quasi-terrorist groups to criminal groups, quasi-vigilante groups also known as border militias, media organizations, and even real estate agents. They have all started to use robotics, and when the point is reached where a microdrone can be flown using an iPhone application – which is possible now – then suddenly a lot of people can use it.

The same applies to computer technologies and cyber capabilities. However, we must not overstate the risks and fears, which is something that has really hit the cyber side with the accompanying hype to discussions of cyber terrorism. We have not yet seen the first successful cases of grand terrorism using cyber means, or successful cases of grand military operations. One reason for that – particularly on the terrorism side – is that the conduct of an effective cyber operation, to use the example of Stuxnet, does not just involve having expertise in cyber; it involves having a fairly significant and capable intelligence effort, combined with expertise in a number of different areas.

Take the example of Stuxnet. It was not just about cracking into an Iranian computer network, but it was also about specifically designing a fairly sophisticated piece of malware, targeting specific Siemens-made systems operating in that specific nuclear facility. The questions of how these systems operate, how many of them there are, and how to best crack them are only answered by a combination of intelligence and engineering expertise. A lot of different expertise came together. This is neither something that a couple of 14-year olds sipping Red Bull can do, nor is it something that a couple of would-be terrorists hiding out in an apartment in Hamburg will be able to figure out.

So, I am afraid that sometimes hysteria and hype can drive us in areas that maybe do not deserve our utmost attention, be it in policy circles or among humanitarian practitioners.

Let us continue our discussion on lowering the costs of war down to the ground. If one looks at the US in terms of the global projection of force, the US can decide to take action if another country is 'unable or unwilling' to act against a threat to the US. The use of drone strikes in Pakistan, Yemen, and Somalia has been explained with this reasoning. What if another country were to say that the US is 'unable or unwilling'?

A real challenge facing the humanitarian community when in talking about these 'drone strikes' is the conflation the tactics and the technology. Let us use the case of the US strike in Yemen that got Al Awlaki – a particularly heated case because it involved a US citizen. Was it the fact that it was a drone that carried out the strike that upset the humanitarian community, or was it the strike itself? That is, when we complain about 'drone strikes', what if we had used a manned F-16 rather than MQ9 Reaper? Are you now okay with it? Of course not. Technology shapes the politics around it and the decisions that are made, but some of the legal questions do

not turn on that technology itself. It will usually be the action itself and how we weigh it that determines whether an act is legal or not.

Similarly, there can be a conflation between the use of the technology in declared war zones and the use of technology outside declared war zones. For example, we are sometimes asked about the US military use of these systems, but questioner will really be asking about 'drone strikes' in Pakistan. The US military use of systems is not that problematic from a humanitarian law perspective. It takes place within war zones, within a fairly transparent chain of command. There is a system of accountability that reacts when things go wrong, there are reporting mechanisms, and a legal system that can deal with it.

More importantly, the targeting questions are a lot easier in a transparent war zone. For me, the big key is that action, rather than identity, is the driving force. One does not have to know someone's name for them to be a viable target in a war zone. If a sniper shooting at you, whether you think it is Albert or Ahmed behind the gun, it does not matter – the act of them shooting does. But when you cross the border to, say, Pakistan, and the engagement is moved out of a military system and support of troops on the ground that involves a clear chain of command, the military justice system, and the operation being run out of a civilian intelligence process, and where the targeting is based not on action, but more on perceived identity and likely threat, that is when it gets problematic.

So, the different rules under which you operate, in everything from your authorization of the actions to the legal consequences for mistakes (or, frankly no legal consequences as in the actual practice), are fundamentally different when the operation using robotics drones moves from being a military one in a warzone to a covert one across the border. Now some will say this is not the way it should be, but of course that is the difference between 'should' and 'is'.

Can new technologies benefit the humanitarian community?

For the humanitarian world, just as for the military, there are parallel potentials and problems arising from new technologies. Technology is giving humanitarians capabilities that they did not imagine they would have a generation ago, but is also creating questions for the humanitarian community that it did not imagine it would be addressing a generation ago; for instance, capabilities to detect and document war crimes in a way that was never dreamed of. The ability today for someone to get away with the world not knowing that they are committing genocide is very slim.

Similarly, big and small organizations alike have the ability to document, respond to natural disasters, and find where people are when they need help. Compare the responses to the 2004 tsunami and to the 2010 earthquake in Haiti – just a couple of years after the tsunami, humanitarian organizations were able to share information on where people were, and what kind of help they needed, using Twitter, crisis maps, and drones. These capabilities are amazing.

At the same time, deep questions that we did not have before arise: what kind of capability should a non-governmental humanitarian actor have? Should it have its own air force-like equivalent? Under what rules and regulations does it

operate? Issues of privacy, of ownership and management of information, etc., also need to be addressed. And, most importantly, in some instances there are false hopes involved, again parallel to the military vision that some have of robotics as a silver-bullet technological solution. Some, for instance, argue that having drones deployed to Sudan or Syria to monitor war crimes there would stop them. But we already know that there are bad things happening in Darfur and Damascus. Now there is a slightly better picture of those things. It might help create more Twitter posts, but does it actually mean the reality on the ground is altered?

Essentially, think of it this way: Henry Dunant did not imagine a world in which the ICRC would be weighing its thoughts on flying machines that had no people inside them, that crossed borders to drop rockets that fired with precision such that they always hit where there is a light amplified beam. The organization during his time was not even ready to wrestle with things such as undersea boats. So the questions that the organization will be weighing in on today and in the future are very different.

What kind of humanitarian consequences can arise from these new technologies?

A big challenge in how we talk about the humanitarian consequences is disentangling the technology of today from the technology that is looming.

For instance, some people claim that drones cannot take prisoners. Well, during the 1991 Gulf War, there was a Pioneer drone used by the US Navy for targeting for naval gunfire. The Iraqis figured out that every time this loud little propeller plane flew above them, in a couple of minutes all hell would break loose. The drone was scouting for a Second World War era battleship that fired 16-inch cannon shells that level everything within the radius of a football field. So the Iraqis worked out that this little drone was bad news when it came near them, and so a a group of them, the next time it flew over, took off their uniforms and waved white T-shirts. It's the first case in history of people surrendering to a robot.

My point is that this episode happened in 1991. Remote technology, such as the Pioneer and much of robotics, still today has a man in the loop. And yet they already have massive consequences, even though they are the first generation of this technology. We do not have to wait for fully autonomous technology in some imaginary 'Terminator world' for robotics to have an impact on when and where we go to war. It is already happening now in Pakistan and Libya. But often, we either conflate or ignore even more important questions as the technology gains more and more autonomy and intelligence. Currently, the questions revolve around the use of drones in non-war zones, and around the element of remoteness of such strikes, and how that affects civilian casualties.

However, we are moving into the debate on systems that make increasingly autonomous decisions; the point of human interface with such machines is not in the midst of battle, but rather in the days, weeks, or even years prior to it when someone programmes the system. For instance, we already have target-acquisition software, and we already have planes that not only can take off and land on their

own, but can fly for certain parts of the mission on their own. In the future, there may be an autonomous system that can turn a 50-calibre machine gun into, in effect, a sniper rifle.

Our current artificial intelligence, though, cannot effectively distinguish between an apple and a tomato. Any two-year-old boy can distinguish between them. Let us also look at emotional intelligence. A computer looks at an 80-year-old woman in a wheelchair the exact same way it looks at a T-80 tank. They are both just zeros and ones. So there are parts of the human experience of war that may be shifted or changed or moved as technology that is increasingly more capable evolves.

And again, just as it was for me when I went around to humanitarian organizations interviewing them for my book four years ago, and none of them were ready or willing to talk about technologies like the Predator, the same phenomenon is playing out right now with the current development of technology. The humanitarian community is *ex post* reacting to things that already exist and are being used. And thus its impact will be less because of that, because the community did not weigh in until it was already behind the curve. The next technology is already coming along.

And it is hard blame them – there is really so much else going on in the world that it would seem like a waste of time to think about robotics. Then again, the technology we talk about today is not at all theoretical: it is not being developed in some secret desert labs that no one knows about. It exists, and we can read about it in *Wired* magazine[5] or watch it on the news, and yet we are behind it. Certainly, there is classified work in various areas, but so much of the work is out in the open. I am working on a project right now in which the goal is to identify the looming game-changing technologies, in other words, what are the technologies that are where the Predator was in 1995. And let us not forget that the Predator was openly flown in 1995. It was not secret.

What can international civil society – and the humanitarian community in particular – do to better respond to the challenges you mention? How can we be one step ahead?

I wrote an article called 'The ethics of killer apps: why is it so hard to talk about science, ethics and war'.[6] In it, I work through a series of challenges that we face today when we talk about new technology, and one of the biggest challenges I identified is that we do not integrate well across fields. We stay within our own field of expertise, surrounded by people who think like us, use our language, and write and read journals only in our field, and we reward each other on that basis.

The result is that crossing these fields is a lot like crossing, literally, national cultural borders. If you speak the language of humanitarian law, and you go into the

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5   Available at: http://www.wired.com/magazine/ (last visited June 2012).
6   Peter W. Singer, 'The ethics of killer apps: why is it so hard to talk about science, ethics and war', in *Journal of Military Ethics*, Vol. 9, No. 4, 2010, pp. 299–312.

world of science, it is as if everybody is speaking Finnish. In turn, when the scientist tries to read, write, or talk to someone in the humanitarian law field, it is as if everybody is speaking Portuguese to them. And it is not just the languages that are different – there is a fundamental inability to understand. The bottom line of this is that – as one of my interviewees put it – a scientist would rarely engage in a philosophical discussion on the development of new technologies because that would require him to 'wear the hat of a philosopher', and he 'does not own that hat'. In turn, one can now read tonnes of articles in the international law community on issues such as drones that are written by someone who has never seen a drone, nor never even tried to talk to someone who has flown them, designed them, or operated them. So we have these disconnects, which I think are the biggest problem.

For the project that I mentioned earlier, we are actually going out and interviewing top scientists, military lab directors, futurologists, people who work at places like Google and the like, and basically asking them the question: what are the new technologies that will shape the future? Are these technologies going to be like the AK-47, that everybody will have, or like the atomic bomb, which very few actors can acquire? The next question is how will the military use these weapons. What are the uses in high-end, state-oriented conflicts, and what are the uses in non-state, low-end insurgency type of conflicts? How might someone use these technologies against you, and what are the vulnerabilities of these technologies? The final part of this project is gathering the ethicists, the philosophers, the humanitarian lawyers, the religious leaders, and the media and saying: here are the technologies the scientists think are coming; here are the ways the military's thinking about using them; what is your take on this? The idea is to try, at an earlier stage, to ask the questions that we know are looming. That, to me, is the best way to go about it, rather than waiting until after the fact to engage in the discussion. Prepare yourself.

Another part of the challenge for the humanitarian community is, much like any other field, we focus only on a certain part of the big questions we want to tackle and are often not judicious in our efforts. For instance, during my research on child soldiers I found that an oddly large percentage of the discourse around child soldiers focused on the practice of Western militaries of recruiting of 17-and-a-half-year olds, something that involved a couple of hundred people who were not abducted from their homes. One would read the reports, which would cover this problem with at least the same depth and focus and energy as the problem of tens of thousands of children 12-years-and-under being abducted from their homes, shot up with brown-brown, and forced to burn down a village. Both were wrong practices, in my mind, but obviously the second is worse and should receive more of our limited resources. If we are to have effect and to spin-up energy around an issue, we have to know clearly where we really want to put our efforts.

Today, we can see this with weapons and technology discussions. Blinding lasers were the target of much discourse at a point in time when their impact did not match the extent of the discourse. Again, let me be clear, I am not saying these efforts are not worthy, but they need to be made with an awareness of how the international humanitarian community can best use its resources, and where the maximum impact will be.

I fear that we sometimes trend towards issues that either sound sexy or are more likely to draw media attention (and, thus, donor attention), but they might not have the same impact as other less well-publicized issues. For instance, in the 1990s there was a higher per capita percentage of humanitarian workers in the Balkans than there was in places in Africa where there was as much – or more – trouble. Today we see the same phenomenon in technology activism, and that concerns me.

In your research, do you see a differentiation in terms of the ethical approach to uses of technology? Do the ethical processes that would need to be considered before we deploy new technologies differ in different contexts around the world (e.g. China, Russia, India)?

Absolutely, because people are shaped by their psychology and their culture this is another big impact on what we think is the right or wrong of these technologies. A good example of this is attitudes towards robotics. In the West, the robot, from the very start, has always been the mechanical servant that wised up and then 'rised up'. Literally, the word is taken from the Czech word for 'servitude', and first used in a 1920s play called *R.U.R: Rossum's Universal Robots* in which these new mechanical servants, called 'robota', become smart and take over the world. That narrative of the robot as evil and ready to take over has continued today throughout our science fiction, but also in our policy world. You know, a picture of a machine-gun-armed robot, even if it is a completely remotely operated system, is still something spooky to us.

In Asia, by comparison, the robot – in science fiction and beyond – has been looked at differently. In Japan, for example, after the end of the Second World War the robot emerged in their sci-fi and was not the bad guy, but rather almost always the good guy. The robot is the humanitarian actor. *Astro Boy* is an example. There are parallel certain notions in religion and culture. In Shintoism, for example, unlike in the West, a rock has a soul, a stream has a soul, and a robot has a soul. The result is that we see very different attitudes towards robotics in different cultures, and different comfort levels about using them in the home. We do not have babysitter robots in the West today. We do not see marketization of elderly companion robots. But they have them in Japan. In South Korea, Samsung not only made a machine-gun-armed robot, but actually created a TV commercial around how cool it was that they had built a machine-gun-armed robot. Can you imagine Apple celebrating itself in the West with a TV commercial advertising that they have created a machine-gun-armed robot?

Are robots actually able to behave ethically? Can robots improve the respect for the law of war in the field, or do you see their deployment as a threat?

We want an easy yes or no answer, or in robotic terms, a zero or one framing of the issues. And yet I think that actually illustrates exactly why we will not see the ethical

problems solved by robotics. At the end of the day, neither war nor ethics is a realm of just zeros and ones, even with the most sophisticated robotics.

We are already seeing capability enhancements that will allow us to observe or respect international law or, even more importantly, catch people violating it, in a way that we could not previously imagine. I will use a US military example, told to me by an officer in Iraq. They had an unmanned aerial system flying overhead while they were conducting a ground operation. They captured an insurgent and he was in an alley way, and a soldier was guarding him; the soldier looked one way down the street, looked the other way, saw no one watching, and gave the detainee a good swift boot to the head. But he did not factor in the drone. Everyone in the command centre was watching via the plane overhead. And the commander talked about how everyone in the command centre then turned and looked at him, wondering what he was going to do about it. Previously, documentation of this case of prisoner abuse would have been impossible, and instead now everyone sees it and looks at the commander for the 'what next'? He punished the guy.

Another scenario that illustrates the advantage of these technologies is robots that can substitute for soldiers in urban settings. Soldiers in these operations have to burst into a room, and within literally milliseconds decide whether the people inside are civilians or enemies. Is that man is holding an AK-47 or a camera, or is that child really holding rifle or a broom? They know that if they get it wrong in those milliseconds, they might die. So a lot of mistakes happen. Compare this with sending robots in instead: they can detect the people, look at them, and they get it wrong, they can wait to shoot. If the people shoot first, so what? No one dies. This is the strong potential advantage of these technologies.

But let me be very clear, many people take these notions too far and argue that technology will be the silver-bullet ethical solution. Our souls are not perfect, neither are our machines. So we should not talk about technology that does not yet exist as if it is real. So it is said, we could put an 'ethical governor' on technology and it would solve the problems. Ask to see the design of the ethical governor. It is what we call, on the military side, vapourware. There is hardware, software, and vapourware. It literally does not exist.

But even if it did exist, it is still not a silver bullet. Let us imagine that we could create a software package that would implement the Geneva Conventions. The reality is that this still would not be enough in modern war. We've still got two problems. First, the fact that the Geneva Conventions do not turn into an easy language of yes or no in all situations, particularly in modern conflict. Second, we have actors that are engaging in what we call 'lawfare', who know the laws of war, and deliberately violate the laws of war.

So I use these real world examples to illustrate the problem of thinking that technology will solve wars and the dilemmas of war. Even assuming the technology is created, what would it tell you to do when you have a sniper shooting at you with two women sitting in front of him and four kids lying on top of him as a real world sniper did in Somalia? A sniper who had given himself a living suit of non-combatant armour. Shoot or not shoot? What would it tell you when it saw a tank conducting ethnic cleansing with kids riding on top of it? What would it tell you to

do with an ambulance that moves both wounded soldiers and civilians, and munitions? What would it tell you to do to a civilian who is being blackmailed into firing rockets from his farm? He is firing the rockets into a civilian city, but if he does not he will be killed by the local militant group. These are all real world cases from recent conflicts. We could spend hours and hours arguing about it – the pages of this journal would be filled with articles about what the law does and does not say, and all the lawyers would have a great time arguing about what to do in those types situations. So to think the dilemmas of conflict are somehow easily resolvable by a software package that does not yet exist is not sound.

And, of course, in war the enemy has a vote. That is, as there are more and more advanced machines, people will become more and more advanced in figuring ways around them. I give this anecdote – it's a great one. There is an unmanned ground vehicle that mounts a machine gun. I was speaking with a group of US Marines about it, not just the incredible advanced nature of it, but also the other side's potential reactions. And we talked about the fact that the most effective counter against it was not some super-secret counter-technology. Rather, it was a six year old armed with a can of spray paint, because that child creates an incredible dilemma.

You either shoot a six year old, who is technically unarmed, because he has a can of spray paint, or you allow a six year old to walk up to your system and defeat it. He just sprays the visual sensors. One of the marines in the audience yelled out: 'Well, we'll just upload a non-lethal weapon, and taser that little guy. I said, 'Well, that's interesting, that is actually a pretty humanitarian answer.' Except there is still a problem. You have given a humanitarian response; you have come up with a solution around it. But you still actually have multiple problems.

The first problem is: what is the likely cost of the upgrade package? One of the Marines, half jokingly, commented that with our acquisition system, it would likely cost a couple of million. Okay, so you are now fighting an investment war between a 50-cent can of spray point and you are responding with multimillion-dollar upgrades. That is unsustainable. The other side has immediately won simply because of using that unlawful tactic, by sending a kid out to fight for them. Second, even if you take this 'non-lethal' route it is still going to be bad news. When the video goes viral, of a robot tasering a six year old, I think it is still going to be bad press, and will still reverberate. My point is this: you can have very advanced technology, but you cannot get rid of the ethical and legal dilemmas that encompass battlefield tactics and strategies.

We seem to be somehow fascinated with robots – military and humanitarian actors alike. Where will this fascination take us in the future?

Well, you can answer this with the meta-challenge and then the meta-question. The meta-challenge is essentially this: technology is advancing at an exponential pace. In the IT world, it is following, effectively, Moore's Law: it is doubling itself every 18 months. The non-military example of this would be the iPhone that you gave your kid that seemed so incredibly advanced and powerful last year is outdated this year.

We see the battlefield version of that: the entire US Army that my father served in had less computing power at its disposal than is encompassed within a single greeting card that opens up and plays a little song. And yet our political policy and legal and ethical communities do not move at an exponential pace; they move at a fairly glacial pace. So the disconnect between the two is getting greater and greater; we are falling further and further behind. So this is the meta-challenge.

The meta-question that robotics provoke is this: we distinguish ourselves as a species because of our creativity; we are the only species that created fire, that created rockets that took us to the moon, that created art, that created literature, that created laws and ethics. That is what distinguishes us as a species. And now we are creating not just incredible machine technology, but a potential new species, maybe in our image, maybe not. But if we are honest with ourselves, the reason that we are creating this technology is not just about advancement in a positive way, it is that age-old human story of trying to figure out how to kill one another better. So the title of my book, *Wired for War*, was a play on words. The bottom-line question is: is it our machines that are wired for war, or is it us humans that are actually the ones wired for war?