Killer Robots: Why the US should Lead the Ban

Denise Garcia

Northeastern University

Abstract

Killer robots are systems that can choose targets without further human intervention. The US should take the lead at the United Nations in creating specific new global norms and clarify expectations and universally agreed behavior. The US is the only country in a strong enough position to take the lead to stop a technology that will mean the loss of humanity in decisions of war and peace. The time to act is now before unpredictable proliferation occurs. A preventive ban on offensive killer robots is the vital first step in setting a principled limit to killing-yielding automation and is a critical tool in the effort to regulate other robotics and nascent technology that could destabilize international peace and security. The potential for fully autonomous weapons systems to be advantageous is unpromising. Fully autonomous weapons systems do not appear to offer military advantages for modern warfare that would be compliant with international law. Four branches of international law require attention here, and examined together, they serve as a foundational bedrock that has historically been used to constrain violence in war: the law of state responsibility, the law on the use of force, international humanitarian law and human rights law.

In the Terminator movies,[1] fully autonomous robots wage war against humanity. While the creation of 'Terminators' does not appear imminent, offensive 'Terminator style' autonomous robots that are programed with the ability to decide who to kill may soon no longer be confined to the realm of Hollywood movies and sci-fi literature. This 'Rise of the Machines' raises a host of questions, from technical and programing matters, to diplomatic issues, to moral concerns. The question before the international community is should killer robots be empowered to kill without human control? (Sharkey, 2011)

Drones are yesterday's news. Existing armed unmanned combat aerial vehicles are precursors to lethal autonomous robotics, colloquially known as 'killer robots'. Killer robots are systems that, once programed and activated, can choose targets without further human intervention ('human out of the loop') (Kreps and Kaag, 2012). It appears that militaries have begun to believe that autonomous systems are their best option for the future. For example, the US Department of Defense's Unmanned Systems Integrated Roadmap FY2011–2036 envisages a gradual reduction on the degree of human control over the unmanned parts of the force structure (US Department of Defense, 2013). Despite the apparent move to embrace such weapons, the US should take the lead at the United Nations (UN) in drafting a new agreement that will both create specific new global norms and clarify expectations and universally agreed behavior. The US is the only country in a strong enough position to take

the lead to stop a technology that will mean the loss of humanity in decisions of war and peace. The time to act is now before unpredictable proliferation occurs. Countries met for the first time at the UN in Geneva in May 2014 to discuss this pressing matter and agreed to continue talks throughout 2014–2015. The US should tell the world it is time to maintain humanity in charge of peace and security and take a bold step by leading the creation of a new international treaty that will preventively ban killer robots.

It is not a hypothetical question. The technology is nearly here. The US and many other countries are working to develop killer robots, and might be able to do so in the not so distant future. Different prototypes are already in place. Examples may include unmanned aerial vehicles and other conventional weapons systems but also humanoid Terminator-style robots, and nano robots. Commonly agreed rules on the development or use of killer robots are required and a preventive prohibition on killer robots has become a pressing concern.

The US, China, Russia, Israel, the UK, and 50 other states have created plans to further develop autonomous arsenals. As the Terminator movies suggest, these weapons raise numerous ethical concerns. Proliferation of existing advanced weaponry is occurring fast and is driven preponderantly by commercial interest instead of a deliberate calculation of the potential risks (Asaro, 2012). China is progressing towards the creation of unmanned autonomous systems faster than anyone else and their

military has several research centers dedicated to such systems.

Several existing precursors to fully autonomous robots are currently deployed in several countries. The Samsung Techwin security surveillance guard robots – deployed in the demilitarized zone between North Korea and South Korea – can detect targets through infrared sensors and even though operated by humans, already have an automatic feature. The Northrop Grumman X-47B unmanned combat air system demonstrator is expected to enter active naval service by 2019. The flight path is preprogramed and its operations are monitored by a mission operator. Successful surrogate testing aboard the aircraft carrier *USS Dwight D. Eisenhower* has already occurred. Israel is developing the Harop, an armed drone that can autonomously select targets with an electro-optical sensor after loitering for hours. Britain's £185 million Taranis, a remotely piloted combat drone built by BAE Systems, was successfully tested and is a precursor to unmanned combat vehicles.

Another developing trend in the use of autonomous technology is the effort to create autonomous robot polices. Several countries are working developing such technology (Sharkey, 2008). Israel's Viper and Guardium robots already possess some autonomous functions that enable them to watch borders and traverse cities without a pilot. Russia has a local law-reciting robot that can record offenses with cameras and order drinkers to take their alcohol out of public spaces. The UK is adopting micro-drones for surveillance, as is Japan, which has its 'Reborg-Q' for improving patrolling in public, enclosed spaces. China is developing new tools such as the 'Dragon Guard X3', which was inaugurated at the 2008 Olympics, and the 'Police Humanoid'. South Korea has dedicated $33.9 million dollars for the development of a robot police force. Last, the US is beginning to use unmanned aircraft to monitor its domestic population and is already deploying the 'Taser X 26', by IRobot, that uses a compressed nitrogen shoot dart.

The US and other countries are taking an unnecessarily dangerous and uncertain road, the scientists at the International Committee for Robot Arms Control (ICRAC) have stated that 'mindless killer robots must be stopped' before it is too late. They warn that tragedies created by killer robots may result from failed software interactions or coding errors, malfunctions, communications breakdown, or jamming and cyber-attacks. What if due to malfunctions and coding miscalculations, a swarm of robots destroys Paris? Who is to blame for this tragic loss for humanity? Robots will have no capacity to recognize humanity's treasures, signals of neutrality, or the sanctity of many places and spaces throughout the planet.

Humans: 'out of the loop'

There are critical moral concerns regarding killer robots that cannot be answered satisfactorily. Should robots be permitted to decide who to kill and then carry out the decision? If not, should the technology to produce killer robots be pursued at all? A preventive ban on offensive killer robots is the vital first step in setting a principled limit to killing-yielding automation and is a critical tool in the effort to regulate other robotics and nascent technology that could destabilize international peace and security.

It seems reckless to argue against a preventive ban on killer robots. When operational, such weapons may impinge upon the ability to protect civilian populations during peace and war, which is a primary objective of all responsible nations. Some governments and analysts say that existing international law is sufficient in providing a regulating framework regarding the deployment of automated machines in warfare, especially international humanitarian law (IHL) and the laws of war. IHL has not been sufficient to address the complexity of changed warfare that has occurred in the last decades, let alone in the coming years (Foy, 2013). It has not been able to adequately define who is a combatant, or who a legitimate target should be in a world with no established armies and mushrooming nonstate armed groups and terrorist cells. Additionally, robots cannot be deemed responsible for violations against the right to life and international law in general, making prosecution of war crimes nearly impossible.

The use of killer robots during hostilities will only magnify these pre-existing dilemmas. Therefore, to say that existing international law frameworks will suffice appears complacent about a not-so-distant future that will bring perils that we can prevent now.

One appeal regarding killer robots is the idea that they will reduce casualties (and thus reduce the political costs of going to war for democracies) and improve deep mission capability. The pace of battle and conduct of hostilities are also happening quicker with no drawn-out use of force authorization procedures. The convoluted workings of accountability in democracies are being discounted by nontransparent ways of carrying out warfare operations miles away. IHL mandates that decisions on targets to attack during hostilities have to be proportional *vis-à-vis* the military utility of an attack to avoid indiscriminate damage and killings. The central question of proportionality, which includes the very decision to apply lethal force, is likely unworkable in robots, according to the scientists at ICRAC.

The hard decisions of proportionality have to be weighed in dynamic environments that require highly qualitative and subjective knowledge. IHL demands that actors take precaution *vis-à-vis* the innocent lives that may be lost in any attack. The rule of proportionality thus rests upon the notion that belligerents can exercise restraint in the face of highly uncertain environments. Questions regarding when an attack meets the

requirements of proportionality are likely to abound in contemporary warfare environments.

How will a robot be able to decide if it is proportional to attack a target when the attack will also result in the likely killing of children who are next door in a school? Nonbelligerents are blackmailed into terrorist activists or coerced into situations where they may be considered combatants. Will robots be able to ascertain such subtleties and discern? Should humans not be on the loop to oversee and override bad decisions?

It is probable that situational awareness can be programed into a robot to a certain extent (Anderson and Waxman, 2012), but discernment, compassion, and considerations of what is just and reasonable are the last strongholds of humanity in war. This humanity will be lost when killer robots become operational. Last, accountability and compensation are the virtues that counterweigh injustices that occur during conflict. This last bastion may also be lost with killer robots. What does meaningful human involvement mean? The answer is: a human selects the target and authorizes the attack and chooses and overrides action alternatives as the operation evolves. Human emotion remains one of the best safeguards against the killing of civilians, and is a central constraint on barbarity.

Why robots cannot be trusted

The operational hazards are unpredictable. Robots will not be able to make complex battlefield decisions like humans. We have no idea how robots will react in combat situations and do not want to unleash a war between robots. Robots can be very effective killing machines; however, it is impractical to give them the power to make battlefield decisions. They are unable to make the sorts of decisions humans are supposed to make.

The potential for fully autonomous weapons systems to be advantageous is unpromising. Fully autonomous weapons systems do not appear to offer military advantages for modern warfare that would be compliant with international law. The kinds of urban environments and highly dense population centers where conflict occurs make it complicated for a robot to be able to be fully programed to abide by the many rules set by international law that limit the conduct of warfare. For example, Nils Melzer defines targeted killings as 'the use of lethal force with the use of some sort of weapon that involves intent, premeditation, and deliberation to kill as part of a selected policy, directed at selected individuals not under the physical custody of the executor who has to be a subject attributable to international law (Melzer, 2010). Targeted killing is only lawful when it is aimed at a 'combatant' or 'fighter' or, in the case of a civilian, only for such time as the person 'directly participates in hostilities

(Alson, 2011). Who is a fighter or who is aiding and abetting during hostilities, or who is doing it in a direct way are very hard to ascertain in current conflict environments. Robots will unlikely be able to discern emotions, continued engagement, who is wounded, or who is vulnerable (children, the impaired and seniors).

The larger question within the debate on the lawfulness of targeted killings resides in what P. W. Singer calls 'the conflation of the tactics and the technology' (Singer, 2009). Are people concerned about the technology (armed drones) that is being used in places the US is not at war with or about the tactics (targeted killings)?[12] The latter seems to be the answer however the perception of the results is aggravated by the fact that the technology (armed drones) promotes a 'neutralizing' distance between the executor and the victim. In the case of killer robots, there will be no conflation because the robot will decide on the tactics as well. Will this be more acceptable or make matters worse? Again the latter seems to be the answer (Jefferson, 1958).

IHL has played a continuous role in prohibiting and restricting new and existing weapons throughout history. Chiefly, IHL has established rules governing determination of the proportionality of the use of force during hostilities in order to avoid indiscriminate attacks. The hard decisions of proportionality have to be weighed in dynamic environments that require highly qualitative and subjective knowledge. IHL instructs on the centrality of taking precaution vis-à-vis the lives that may be lost. The rule of proportionality thus rests upon the notion that belligerents must exercise restraint in the face of highly uncertain environments.

We cannot say a robot can never make complex decisions. Just because they cannot now does not mean they will not be able to do so in the future.; but that they eventually might be able to is actually part of the reason why they should not be developed at all. What could be scarier than a robot that can make complex decisions about who it wants to kill? Who would want to face Arnold Schwarzenegger's Terminator in combat? Killer robots are not drones, with killer robots, humans are fully 'out of the loop'.

Humanity should not concede to machines' decisions regarding life and death. Different countries will have dissimilar computer programs, that when interacting with each other, may be erratic. Haphazard interfaces and exchanges and the likely secret nature of the programing, may lead to accidental conflicts that could quickly escalate between computer systems without a human making a decision. 'Signal jamming' and hacking are also real risks. Remote controlled weapon systems (such as the current drones) depend on constant real-time control by a human operator via communication systems involving cyberspace. This makes such systems vulnerable to cyber-attacks, malware, hi-jacking etc. Some would argue

that an advantage of autonomous systems is that they will no longer depend on real-time control by humans, and ideally will be able to operate independently from communication networks and cyberspace (Marchant et al., 2011). This would reduce the vulnerability of unmanned systems to cyber-attack. However, if a killer robot is successfully hacked, the results will be unpredictable as humans will have no chance to intervene and correct problems and glitches that may arise from interactions among multiple systems.

Who would want to be killed by a robot?

Four branches of international law require attention here, and examined together, they serve as a foundational bedrock that has historically been used to constrain violence in war: the law of state responsibility, the law on the use of force, IHL, and human rights law (HRL) (Melzer, 2013). As they are (usually) currently conducted, drone strikes violate all of these branches of international law and are thus unlawful under international law. Again, if the use of drones serves as an indicator of how killer robots will be employed, there is great peril to global peace and security and to the edifice of international law. States agreed not to use force without UN permission (or for defensive purposes) when they ratified the UN Charter. The norm against the use of force in international relations has been paramount in ensuring global security. Killer robots will likely make this norm easily breakable as it will be unproblematic to attack without incurring casualties, thus reducing the political costs of going to war.

IHL has evolved, and continues to evolve, to wrestle with the difficulties surrounding the killing of one human being by another in combat to ensure that restraint is used and to guarantee responsibility for an action is known (attribution). Who will be responsible in the case of killer robots? And more importantly: will it be right and lawful to have a robot taking the life of a human being?

The primacy of HRL rests on the protection of the right to life (Heyns, 2013). The UN Special Rapporteur Christof Heyns stresses the preeminence of the right to life. Indiscriminate and arbitrary killings (targeted killings) are unlawful through both treaty and customary law and therefore represent a consolidated international norm. Central to the determination of an action's legality is the International Covenant on Civil and Political Rights, article 6, enshrining the right to life, and article 4 (2) assures its nonderogability (Heys, 2013). According to the International Court of Justice, even if a means of war does not violate international law, it may still breach the dictates of public conscience through what is known as the 'Martens Clause' that recommends states evaluate the moral and ethical repercussions of new technologies (Kreps

and Kaag, 2012). The Martens Clause sets a long-standing and influential normative imperative whereupon states' actions should be driven by ethical and moral concerns (ICJ, 1996). States' responsibility to protect the right to life alone is a powerful platform for a preventive global ban on killer robots.

Efforts to ban: fastest moving issue on the UN agenda

The Campaign to Stop Killer Robots is the fastest-growing international campaign of its type ever. The case of preventively prohibiting killer robots has a great deal in common with previous efforts to ban particular weapons or classes of weapons. However, what makes this case unique is that progress towards a ban is moving faster than any other previous disarmament diplomacy case.

One reason the movement to ban killer robots is moving so rapidly is that: 'The race to stop killer robots reflects the degree to which the public views such a development with horror and revulsion,' according to Human Rights Watch Steve Goose (HRW, 2012). Driving this sentiment are two inherent problems of accountability. One is the government's accountability to the American public, which has been kept 'out of the loop' regarding decisions to invest billions of dollars in this killing technology. The other is the absence of accountability inherent in autonomous killer robots. This is the first time a weapon system will have either no one or too many people to be held accountable for mistakes. Who will be deemed responsible for actions that will go wrong? The inventors, the manufacturers, the software programmers, the officials who released the robots to kill are some of the eligible guilty parties.

It is ethically problematic to develop a weapon system without a clear chain of accountability. It seems to me that culpability would have to be ascribed to one or more parties and I simply do not think this would be doable as it would be hard for parties to 'buy into' being culpable.

Other moral riddles make the movement towards a ban to be taking place so fast. Killer robots will make war easier to pursue. War becomes easier to declare the greater the distance between the attackers and the attacked, as the risk to the attacker is lowered. The adoption of automation in warfare means bringing down established thresholds for violence and the use of force, which have been carefully built by international law since the founding of the UN.

Robert Sparrow argues: 'using machines to kill distant others, where no human person takes even a moment to consider their demise, robs warfare of what little humanity it possesses (Sparrow, 2007). If no one can be held accountable for what robots do, it is unethical to deploy

them. Human dignity requires that humans should always be in the loop in matters of life and death.

IHL demands that all acts taken in war have 'attributability'. Drone technology demonstrates that the distance between the beholder of the use of force is far removed from where it is deployed. Killer robots would increase this distancing and detachment. This could make attribution even harder.

The US: why the leader in killer robot technology should act swiftly to create a ban

A shared collective stop is needed and should be founded on the gains for national security of pre-emptive action. The scientists at ICRAC and the UN Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions who also reported on Lethal Autonomous Robots Christof Heyns argue that the need for prevention instead of reaction is a moral imperative. In the case of killer robots, they may surely have many interesting benefits in the 'battlefield,' but they will have a disintegrating effect on the commonly agreed rules of international law, most of these the US helped to build.

Why should the US take the lead in organizing a ban on killer robots? The US is at a privileged pivotal moment where it has the edge in the development of a technology that is not yet operational. Practically, rapid proliferation will put the US at risk just as much as everyone else.

It must capitalize on this before proliferation occurs. In the end, such weapons will proliferate, they always do, and that is why the US needs to ban them now. At the moment the US is militarily unrivaled, but such weapons could shift the battlefield advantage away from the US. An additional severe problem is going to be how to control killer robots' use once many states and nonstate actors have them. The prospect of acquisition of such weaponry by nonstate actors is very real and they could be used to terrorize entire populations.

Ominously, there is no transparent discussion or public oversight regarding research into autonomous weapons systems in the US or in any other country. Why forgo billions of dollars on a questionable technology that threatens to destabilize US national security and global security? Since the beginning of the armed drones program, US taxpayers have invested $11.8 billion dollars and the Department of Defense has spent $6 billion annually on the research and development of unmanned systems.

The need for a champion state

The US stands to gain a great deal of lost moral legitimacy from preventively banning killer robots. Rapid proliferation means that these weapons will not provide a durable comparative advantage, so it gives up little. The US can stop malicious use of these systems by leading a ban, as has occurred with chemical or biological weapons. The US is pursuing killer robots because it can. This pursuit is not based on any well-considered military justification but just a bureaucracy run amok.

With the hits the US has taken to its international standing it could really use an astounding win. And this is not just any win; it is a win for all of humanity that will show that the US cares about preventing civilian casualties and unimaginable tragedies and works to promote human rights, particularly the right to life.

Historically, several states have embraced efforts to prohibit superfluous and unnecessary armaments. In my research, I have found that individual states can become champions of such causes and unleash real progress in disarmament diplomacy. This occurs when states become invested in changing a prevailing widespread behavior and are able to build momentum and galvanize action influencing others to do the same.

Recently, champion states have helped create extraordinary new international treaties: two prohibiting two classes of superfluous arms – landmines and cluster munitions – and another that created the first conventional arms transfers treaty. The 1997 treaty prohibiting mines and the 2008 one that banned cluster munitions were success stories because they prohibited weapons that harmed civilians indiscriminately. These treaties' successful implementation in the last decades has made real difference to human security worldwide. The 2013 Arms Trade Treaty, the first global legal agreement on the transfer of conventional arms is a significant first step to imprinting more transparency and accountability in the unruly trade of arms (Garcia, 2011; Rodine-Hardy, 2013). The presence of an 'epistemic community' – a group of scientists and activists with common scientific and professional language and views that are able to generate credible information – is a powerful tool for mobilizing attention towards action (Garcia, 2006). In the case of autonomous weapons, ICRAC serves such a purpose. The launch of a transnational campaign is another key element to summon awareness at several levels of diplomatic and global action. The Stop Killer Robots Campaign is in place and is attracting unprecedented response.

The US would be the right candidate to become a champion state for a ban. The US considers itself a nation with high moral values, and leading a ban would additionally benefit its national security. The US has led in the creation of some of the cornerstones of existing international law and is well placed to lead the way towards prohibiting the great indignity of allowing machines to decide who to kill. This noble goal would enhance the US's standing and prestige. It would help it to regain some of its lost luster and moral clout. In this

highly interconnected world, these are qualities that may indirectly augment national security.

The US is the most powerful nation in the world both economically and militarily. Therefore the US has the diplomatic resources to advance a ban quickly; this is particularly true due to both its standing on the UN Security Council and worldwide alliances. Killer robots technology will add an unnecessary element of indeterminacy and uncertainty to both a defense policy looking at cutting costs and a foreign policy struggling to maintain a meaningful footprint in a shifting global power landscape.

There is a small window of opportunity for the US to stop the automation of killing-yielding warfare before mass proliferation occurs. Autonomous weapons will spread not only to other states but also to hostile nonstate actors, or tyrants. If drone proliferation serves as a gage of how proliferation of fully autonomous weapons will proliferate, then there is great cause for worry. According to the US Government Accountability Office 2012 report (Heyns, 2010), a total of 76 countries have some form of drone and 16 countries possess armed drones: the US, UK, Sweden, Italy, Israel, France, Germany, Saudi Arabia, UAE, Iran, Russia, China, Lebanon, Taiwan, India and Pakistan.

Killer robots are an unreasonable idea but could become an unacceptable reality. The time for global action to stop the spread of this precarious and perilous killing-yielding technology is now and the US is perfectly positioned to keep humanity 'in the loop' and to do so at the UN.

Notes

1. An abbreviated version of this article was published in a different form as: 'The Case Against Killer Robots – Why the US Should Ban Them' *Foreign Affairs*, May 2014 [online]. Available from: http://www.foreignaffairs.com/articles/141407/denise-garcia/the-case-against-killer-robots [Accessed 28 June 2014].

References

Anderson, K. and Waxman, M. C. (2012) 'Law and ethics for robot soldiers', *Policy Review*, (April). Columbia Public Law Research Paper No. 12–313.

Alston, P. (2010) 'Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, Addendum, Study on Targeted Killings, UN Doc. A/HRC/ 14/24/Add.6' (28 May). New York: UN.

Alston, P. (2011) 'The CIA and Targeted Killings Beyond Borders' New York University Public Law and Legal Theory Working Papers. Paper 303. New York: New York University Scool of Law.

Asaro, P. (2012) 'On banning autonomous weapon systems: human rights, automation, and the dehumanization of lethal decision-making', *International Review of the Red Cross* (summer) (Special Issue on New Technologies and Warfare), 94 (886), 687–709.

US Department of Defense (2013) Unmanned Systems Integrated Road Map FY2011-2036, p. 50. Available from: http://publicintelligence. net/dod-unmanned-systems-integrated-road mapfy2011-2036 [Accessed 28 June 2014].

Foy, J. G. (2013) 'Autonomous Weapons Systems: Taking the Human Out of International Humanitarian Law' [online]. Available from: http://ssrn.com/abstract=2290995 [Accessed 7 April 2014].

Anderson, K. and Waxman, M. C. (2012) 'Law and ethics for robot soldiers', *Policy Review*, 28 April.

Garcia, D. (2011) *Disarmament Diplomacy and Human Security – Regimes, Norms, and Moral Progress in International Relations*. London and New York: Routledge.

Garcia, D. (2006) *Small Arms and Security – New Emerging International Norms*. London and New York: Routledge.

Heyns, C. (2013) 'Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions', UN Doc. A/HRC/23/47, Geneva: United Nations. p. 17.

Human Rights Watch (2012) Losing Humanity: The Case Against Killer Robots, p. 2 [online]. Available from: http://www.hrw.org/reports/2012/11/19/losing-humanity-0 [Accessed 14 May 2014].

ICJ (1996) Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons, 8 July.

International Review of the Red Cross (2012) *Special Issue on New Technologies and Warfare*, 94 (886).

Kreps, S. E. and Kaag, J. (2012) 'The Use of Unmanned Aerial Vehicles in Contemporary Conflict: A Legal and Ethical Analysis' (March 15). Available from: http://ssrn.com/abstract=2023202 [Accessed 14 May 2014].

Kretzmer, D. (2005) Targeted Killing of Suspected Terrorists: Extra-Judicial Executions or Legitimate Means of Defence?, *European Journal of International Law* 16, 171–212.

Marchant, G., Allenby, B., Arkin, R. C., Barrett, E. T., Borenstein, J., Gaudet, L. M., Kittrie, O. F. et al. (2011) 'International governance of autonomous military robots' *Columbia Science and Technology Law Review*, 12 (272).

Melzer, N. (2010) *Targeted Killing in International Law*, New York: Oxford University Press, 524 pages.

Melzer, N. (2013) 'Human rights implications of the usage of drones and unmanned robots in warfare' Study for the European Parliament's Subcommittee on Human Rights [online]. Available from: http://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/410220/EXPO-DROI_ET(2013)410220_EN.pdf [Accessed 14 May 2014].

Jefferson, T. (1958) '*Letter from Thomas Jefferson to James Madison (Aug. 28, 1789)*', in J. P. Boyd (ed.), 15 The Papers of Thomas Jefferson 367. Princeton, NJ: Princeton University Press.

Rodine-Hardy, K. (2013) *Global Markets and Government Regulation in Telecommunications*. NY: Cambridge University.

Sharkey, N. (2011) Automating Warfare: lessons learned from the drones. Available from: http://www.alfredoroma.it/wp-content/uploads/2012/05/Automated-warfare-Noel-Sharkey.pdf [Accessed 14 May 2014].

Sharkey, N. (2008) 'Grounds for Discrimination: Autonomous Robot Weapons' RUSI Defence Systems (Oct) pp. 88–89 [online]. Available from: http://rusi.org/downloads/assets/23sharkey.pdf [Accessed 14 May 2014].

Sharkey, N. (2011) Automating Warfare: lessons learned from the drones. Available from: http://www.alfredoroma.it/wp-content/uploads/2012/05/Automated-warfare-Noel-Sharkey.pdf [Accessed 7 April 2014].

Singer, P. (2009) *Wired for War*. New York: Penguin Group (USA) Incorporated.

Sparrow, R. (2007) 'Killer Robots', *Journal of Applied Philosophy* 24 (1); 62–77.

US Department of Defense (2013) Unmanned Systems Integrated Road Map FY2011-2036, p. 50 [online]. Available from: http://publicintelligence.net/dod-unmanned-systems-integrated-roadmap-fy2011-2036 [Accessed 7 April 2014].

Author Information

Denise Garcia, is the Sadeleer Research Faculty and associate professor in the Department of Political Science and the International Affairs program at Northeastern University. Her articles have appeared in *Foreign Affairs*, *Third World Quarterly*, *Global Policy Journal*, *International Relations*, *International Studies Perspectives*, the *African Security Review*, and elsewhere.

She is a member of the Academic Council of the UN, ICRAC, the Arms Control Association and the Global South Unit for Mediation.