

Of Witches and Robots: The Diverse Challenges of Responding to Unlawful Killings in the Twenty-first Century

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I. Introduction

*F*rom its relatively modest beginnings in 1945, the universal human rights regime has come a very long way. Few if any of those who drafted the apparently unthreatening, but nonetheless foundational, provisions of the United Nations Charter dealing with human rights would have imagined that less than seventy years later the Security Council would have taken action in relation to serious human rights violations in a significant range of countries, that governments would have established an International Criminal Court, or that there would be a wide range of mechanisms that regularly and routinely hold states to account for their human rights performance across a very wide range of issues. This is not, however, to suggest that many of the most egregious human rights problems have been radically ameliorated. They clearly have not. The subjugation of women is a continuing phenomenon in a great many societies, and gender equality remains an unachieved goal even in the most developed economies. Racial discrimination is a constant and forms of ethnic and religious discrimination continue to be both inventive and invidious. Hunger, the denial of basic health care, and access to decent housing are problems that persist on a vast scale around the world. In addition, torture, disappearances, and unlawful killings continue to take place in the majority of states.

The purpose of this article is not to celebrate the institutional and other achievements of the international human rights regime, nor is it

to decry the terrible ills that persist side by side with these apparent achievements. Instead, the goal is to provide a better understanding of the ways in which the regime has developed and to illustrate some of the principal challenges that are emerging at the end of the first decade of the twenty-first century.

The lens that I use in this article to examine these issues is the challenge, long ago accepted as an urgent and pressing one by the international community, of seeking to respond effectively to and finally eliminating *extrajudicial executions*, or killings which by definition are unlawful under the relevant bodies of international law. This term covers many phenomena. They range from killings by government agents like the police or military in violation of either human rights or international humanitarian law; through official tolerance or encouragement of death squads, paramilitaries, or other private killers; to the failure to investigate, prosecute, or punish crimes such as the killing of women alleged to have brought dishonor to their families through breaking certain social conventions—so-called “honor killings.”¹

It is precisely because of the breadth of the practices involved that I have chosen to focus on two separate phenomena that might be thought to lie at different ends of the spectrum of types of extrajudicial executions. They are the killing of those deemed to be “witches,” a problem that arises almost entirely in traditional societies, and the killing of targeted individuals by means of unmanned robotic weapons, a phenomenon which is rapidly becoming ever more feasible as a result of technological developments. Each of these practices raises a host of fascinating questions in its own right, but by comparing and contrasting some of the problems they highlight, it is possible to get a general sense of the type of challenges the international human rights regime confronts as it seeks to implement one of the most fundamental of all of the internationally recognized human rights: the right to life.

The essay begins in Part II by looking at both the nature and the extent of the problem of extrajudicial execution of individuals, usually women and sometimes children, who are accused of being witches, most commonly by neighbors or even family members. Part III traces the emergence of robotic technologies and examines their potential to use lethal force against human targets without direct human involvement in the decision-making processes. Consideration is then given to a number of specific concerns to which these developments give rise and to the possibility of encouraging policy-makers to take steps to minimize the potential use of such weapons for carrying out extrajudi-

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cial executions. Finally, Part IV seeks to draw some conclusions for the international human rights regime as a whole from the juxtaposition of these two very different case studies.

II. Witches

Reports from a surprisingly large number of countries in different regions of the world indicate that the intentional killing of individuals labeled as witches remains a significant and very troubling phenomenon. Such killings are by no means a thing of the past, as those familiar with the better-known historical examples from European or American history might suggest. Before giving an indication of some of the countries in which such problems are not infrequent, it is appropriate to recount the circumstances under which I was first forced to confront the horror and the complexity of this problem.

The town of Paoua, in the northwest of the Central African Republic (CAR), is locally known as the birthplace of a former president of the republic, but in recent years it has become something of a ghost town. Because it is far from Bangui, the national capital, it is generally neglected by the central government. In fact, the area outside the city center is largely at the mercy of bandits. It is also located very close to the border with Chad, making it subject to cross-border incursions by military elements fighting one or the other of the governments, thus ensuring a significant military presence. I visited on behalf of the United Nations in February 2008 to investigate unlawful killings. I was looking into killings attributed to the bandits and the President's Republican Guard. There was no shortage of allegations and gruesome stories of arbitrary killings.

Early one morning, the head of one of the local communities came to see me and opened up a whole new dimension of the problem. She pleaded with me to do something about a major problem, which up until then had been largely invisible. It involved the killing of a number of women who had been alleged by their neighbors to be witches. Even more distressing was the fact that the killings had been carried out by the army in response to requests by the villagers. Her allegations were corroborated by other sources and the local police chief subsequently acknowledged other cases involving the killing of witches. As UNICEF subsequently reported: "Hundreds, or even thousands, of children and elderly people—women in particular—have been accused of being witches in CAR. Belief in witchcraft is widespread in the region...."²

As I sat down to write a report on these incidents, and to identify the appropriate legal and policy responses to them, I was confronted with a range of questions that were not so easy to answer. At one level, there was little complexity. The simple fact was that individuals had been killed, not on the grounds that they had violated a particular state law, and certainly not after having undergone any sort of legal process that might have given them the chance to defend themselves against the allegations directed at them. There could be no justification for such arbitrary killing, unsanctioned by law. There were, of course, factual issues that needed to be clarified, such as whether, as alleged, the military had received financial rewards for undertaking these killings, but that would only make the situation worse rather than changing the basic problem. Another complication was that the government forces apparently had no monopoly on such killings since the main rebel group active in the country, the *Armée pour la Restauration de la République et la Démocratie*, was also accused of carrying out such acts. Ironically, it had been suggested to me that when they killed individuals, such as the head of the town of Badama who was accused of being a sorcerer and killed in August 2007, it was done as part of a larger effort on their part to fill in the law-and-order vacuum left by the relative absence of the central government authorities from the northwest of the country.

The more difficult question concerned the type of recommendations that should be made to the government of the CAR. For a start, the Criminal Code actually provided that a person convicted of “witchcraft” (*charlatinsme* and *sorcellerie*) could face capital punishment, a prison sentence, or a fine.³ I was not able to identify any recent cases in which the death penalty had been applied, but it was reported to be common for individuals accused of such offences to be arrested, tried, convicted, and imprisoned on the basis of spurious evidence.

From this brief description of the issues, two straightforward recommendations emerged. The first was to strengthen fair trial procedures so as to ensure that no one is convicted on the basis of flimsy evidence, but that still left open the question of whether there should be any such offence as witchcraft in the first place. The second was to eliminate the death penalty for this offence. Unless the offence involved an act of intentional murder, the imposition of the death penalty would be illegal under international law, which requires the list of capital offences to be restricted to those involving the “most serious crimes.”

It was also not difficult to recommend that the killing of witches should be prosecuted like any other murder, and that other violent acts against such individuals should also be prosecuted. Yet this still leaves open the question of whether or not to criminalize acts of witchcraft themselves. The concern was expressed that a legal system that fails to proscribe harmful acts carried out by individuals against others, even if done under the guise or rubric of magic, would lose credibility and leave many individuals feeling very vulnerable to being victimized by witches, who would in turn enjoy immunity from prosecution. Several other arguments can be invoked in favor of criminalization. One is that local customs and traditions should be reflected in national law, rather than being repudiated. This approach might be seen as vindicating the right to take part in the cultural life of the community, a right that has long been recognized in international law.⁴ Another is that the role of criminal law is to protect citizens against acts of violence, which should include those carried out by occult means. Another is that the failure of criminal law to address such acts leads inevitably to vigilantism, as individuals are forced to take the law into their own hands in order to achieve what is popularly considered to be a just and fair result.

Yet the arguments on the other side of the balance sheet are even more powerful. The criminalization of witchcraft by the state reinforces the social stigmatization of those accused of it. Indeed, the proscription of witchcraft tends to lead vigilantes, soldiers, and rebels alike to view the killing of suspected witches as legitimate. It is, moreover, a crime that lends itself all too readily to the persecution and victimization of women and children in particular. The biggest problem of all is the ultimately very subjective nature of the crime and the impossibility of identifying objective criteria against which alleged acts of witchcraft can be measured by a court of law. The “facts” upon which allegations of witchcraft are likely to be based will generally be subjective, imprecise, and highly manipulable. As one observer has expressed it, “[m]ethods that traditional healers use to detect the secret practice of sorcery necessarily involve supernatural practices whose logic is opaque to observers.”⁵ Taking account of these considerations, I recommended that a clear and immediate message should be sent by the government by amending the Penal Code to abolish the crime of witchcraft.

In subsequent visits to Kenya and the Democratic Republic of the Congo (DRC), the problem turned out to be both widespread and chronic in those countries as well. In May 2008, it was reported that

eight women and three men in the Kenyan district of Kisii, aged between 80 and 96, had been accused of witchcraft and dragged out of their houses and burned alive.⁶ A similar incident, reported to have occurred in March 2009 and involving the killing of five persons, was reported through a video on YouTube.⁷ It is also clear from a range of sources that these incidents are just one example of a phenomenon that is relatively common in certain parts of Kenya. In the Democratic Republic of the Congo, the main manifestation of the problem affects children rather than adults.⁸ It has been reported that tens of thousands of children who have been abandoned or driven out of their homes and are forced to live on the streets of Kinshasa and other major cities are especially vulnerable to witchcraft accusations. UNICEF has estimated that there are 50,000 street children in the DRC. In addition, “as many as 70 percent of the street children they worked with claimed to have been accused of witchcraft.”⁹

Unsurprisingly, this phenomenon is most prevalent in poverty-stricken communities that lack access to education and social services, and the victims are often individuals with physical or mental disabilities who are perceived to have “brought defects” into a family or community. UNICEF reported that at least twelve accused child witches were killed in three provinces (Orientale, Maniema and Katanga) from September 2008 to early October 2009, mostly by their own family members. Other sources have reported violence against women in particular, in contexts in which vulnerable members of the community are blamed for misfortunes, such as the loss of a job or illness.¹⁰

In 2010, UNICEF reported a major increase in accusations of witchcraft against children in a range of African countries including Angola, Benin, Cameroon, and Nigeria, in addition to Kenya and the Democratic Republic of the Congo. Those accused were expelled from their homes, often attacked and beaten, and sometimes killed. The report identified three different categories of children who were particularly susceptible to such abuse: (1) those who were orphaned, suffered from a physical or psychological disability, had an illness such as epilepsy, or whose behavior was considered abnormal; (2) children who were subject to abnormal births, including a premature or otherwise unusual birth such as conjoined twins, etc.; and (3) albino children whose body organs are believed to have magic powers.¹¹ While traditional healers are often involved in the victimization of such children, recent reports also emphasize the growing role of churches and cults that encourage exorcism of “evil spirits.”¹² While there are no reliable statistics for

what remains a dramatically under-reported phenomenon, my own estimate, based on visits to several of the key concerned countries in Africa and reports published in relation to a range of other countries, is that thousands of so-called witches, overwhelmingly women and children, are killed each year in Africa alone.

Furthermore, the problem is by no means confined to Africa.¹³ Many other examples might be given, but it will suffice for present purposes to mention a case from Saudi Arabia, which seems emblematic of the problems involved in the criminalization of witchcraft. Fawzah Falih Muhammad Ali was sentenced to death in 2006 for the offences of witchcraft, recourse to supernatural beings, and slaughtering animals. In an analysis of the case, Human Rights Watch noted that the crime of witchcraft is not defined in Saudi law and that in order to find the defendant guilty the court had relied upon reports of events which, by definition, could not be causally linked to the defendant. The events included one instance in which a man was said to have become impotent after being bewitched, and another in which “a divorced woman reportedly returned to her ex-husband during the month predicted by the witch.” The proceedings are also alleged to have violated a range of due process requirements, thus resulting in an unfair trial.¹⁴

This case study of witchcraft and the killing of those alleged to be its practitioners serves to illustrate a number of challenges to international law. First, unlike violations of human rights that involve cross-border activities or give rise to consequences that have an international dimension, the murder of witches can be characterized as primarily a domestic problem without necessary international ramifications. This raises the question of the conditions under which the international community should intervene in relation to practices or problems that are essentially within the domestic affairs of a state. But international law, especially operating on the basis of treaties which have now been very widely ratified, provides a solid foundation upon which the international community as a whole, and even other states, can express concern over any alleged violations that have occurred.

The second challenge concerns violations that are attributed not to governments, which clearly are bound by international standards, but to non-state actors that, by definition, cannot sign on to human rights treaties and should, in principle, be accountable only to the national government. In many, although certainly not all, of the instances in which witches have been killed, there is no direct government involvement. Rather, it is private actors, often in isolated communities, who

carry out the killings. Many other types of extrajudicial executions are carried out directly by the police or military or other governmental agents, and in such cases the responsibility of the state is not in question and the means by which accountability can be sought is through the application of the normal rules of international law relating to state responsibility. But the process is different where private actors are involved and there is no obvious state dimension. In those situations, international law has achieved a major breakthrough by holding the relevant governments liable in situations in which they have not shown "due diligence" in carrying out their own obligations to investigate, prosecute, and punish those who commit such crimes. Thus, in many witchcraft situations, the claim can reasonably be made that the state has become responsible for the fate of the witches because of its failure to punish the perpetrators and the fact that the victimization and killings continue largely unabated.

Third, there is generally an important cultural dimension to incidents involving the killing of witches, which is not the case in relation to the type of killings addressed in the second half of this article. In other words, witchcraft-related killings may seek to be justified on the basis of local traditions which attach legitimacy and importance to the role of traditional faith healers and which also sanction the punishment of those who are deemed to have used their spiritual powers to achieve evil ends. In such circumstances, it might be argued that outsiders should not interfere in complex matters involving culture and tradition, and that the local community should have a free hand to determine the most appropriate response. This raises the controversial question of cultural relativism, the implications of which go far beyond the limited confines of the present article. Suffice it to say that even in relation to what appear to be clear-cut violations of national and international standards, there may well be issues of sensitivity to cultural contexts and traditions which will have a significant impact on the way in which the international community can best tackle the problem.

The example of witchcraft killings thus helps to illustrate a number of the challenges that confront the international human rights regime more broadly. It also serves as a contrast in various respects to the type of challenges that emerge from the very different (but nonetheless related) problem of how to respond to targeted killings undertaken through the use of robotic technologies.

III. Robotic Technologies

A. Introduction

The forerunners to the robotic killers of the future are today's unmanned aerial vehicles, or drones, as they are commonly known. Since at least 2002, but with dramatically increased frequency over the past year or more, these vehicles have been used to carry out targeted killings. In doing so, civilians have also been killed, although the estimates of their numbers range from a figure of forty or so, suggested in unattributed briefings by Central Intelligence Agency officials, to many hundreds, according to civil society groups. While most of the controversy attaches to killings by the United States in the border regions of Pakistan and Afghanistan, more than forty countries already have drone technology. Some of these, including China, France, India, Israel, Russia, Turkey, and the United Kingdom, either have or are seeking drones capable of shooting laser-guided missiles weighing as much as 500 pounds in total.¹⁵ On "Defense Industry Day," August 22, 2010, the Iranian president unveiled a new drone with a range of 1,000 kilometers (620 miles) and capable of carrying four cruise missiles.¹⁶ He referred to the drone as a "messenger of honour and human generosity and a saviour of mankind," but warned ominously that it can also be "a messenger of death for enemies of mankind."¹⁷

As I grappled with the problem of the legality under international law of developments that seem almost certain to involve a dramatically increasing use of drones to carry out targeted killings of individuals, I was also forced to confront an even more complex set of issues. In the foreseeable future, the technology will exist to create robots capable of targeting and killing without the need for direct human control or authorization. The question is how should international law deal with such developments? Are they matters that should be left to the discretion of the states concerned or do existing laws and ethical standards already provide an adequate framework? Should the law adopt a different approach to killings such as these, carried out in accordance with procedures established under national law and with clinical precision, as opposed to killings of an arbitrary nature in settings where no law seems to count in any meaningful sense?

B. The Relevance of Human Rights

Over the last decade, the number and type of unmanned or robotic systems developed for and deployed in armed conflict and law enforcement contexts has grown at an astonishing pace. The speed, reach, capabilities, and automation of robotic systems are all rapidly increasing. Unmanned technologies already in use or in later stages of development—including unmanned airplanes, helicopters, and aquatic and ground vehicles—can be controlled remotely to carry out a wide array of tasks: surveillance, reconnaissance, checkpoint security, neutralization of an improvised explosive device, biological or chemical weapon sensing, removal of debris, search and rescue, street patrols, and more. They can also be equipped with weapons to be used against targets or in self-defense. Some of these technologies are semi-automated, and can, for example, land, take-off, fly, or patrol without human control. Robotic sentries, including towers equipped with surveillance capacity and machine guns, are in use at the borders of some countries. In the foreseeable future, the technology will exist to create robots capable of targeting and killing with minimal human involvement or without the need for direct human control or authorization.

Some of this technology is either unambiguously beneficial or can be used to clearly positive effect, including, most importantly, saving the lives of civilians and limiting military personnel casualties. However, the rapid growth of these technologies, especially those with lethal capacities and those with decreased levels of human control, raise serious concerns that have been almost entirely unexamined by human rights or humanitarian actors, although some military lawyers, philosophers, ethicists, and roboticists have begun to do so.¹⁸ The general lack of international attention to this issue is understandable. Other humanitarian or human rights issues—disastrous floods in Pakistan, killing and sexual violence in the Democratic Republic of the Congo, or gang killings in Mexico—seem far more immediately pressing, and resources, time, and staffing capacities in the U.N., NGOs, and think tanks are always stretched. In addition, anything that smacks of science fiction seems more at home in an Asimov novel or Terminator film rather than in a human rights report.

Various factors explain why the human rights community continues to see advances in robotics as an exotic topic that does not need to be addressed until the relevant technologies are actually in use. First, much of the information about these developments remains confined

to military research establishments and specialist scientific literature. Second, understanding the technologies requires expertise beyond that of most human rights experts. Third, the attractions of greater use of robotic technologies greatly overshadow, in the public mind, the potential disadvantages. And finally, there is a North-South dimension in that the Global North has the money and the technical know-how to develop the technologies, while many of the negative consequences of their use will fall much more heavily on poorer countries in the Global South.

The analysis that follows is predicated on two principal assumptions: (1) the new robotic technologies have very important ramifications in terms of the right to life and the fight against extrajudicial executions, and they raise issues that need to be addressed *now* rather than later; and (2) although a large part of the research and technological innovation currently being undertaken is driven by military and related concerns, there is no inherent reason why human rights and humanitarian law considerations cannot be proactively factored in to the design and operationalization of the new technologies. But this will not happen unless and until the human rights community presses the key public and private actors to make sure it does. Because the human rights dimensions cannot be addressed in isolation, there is an urgent need to address the legal, political, ethical, and moral implications of the development of lethal robotic technologies.

C. Trends in the Development of Lethal Robotic Technology

While the use of lethal robots in the context of war is not unprecedented,¹⁹ their development and use has dramatically increased since the September 11, 2001 attacks, the Afghanistan and Iraq conflicts, and the enormous growth in military research and development that the conflicts precipitated. Military experts have noted that the two conflicts are serving as real-time laboratories of “extraordinary development” for “robotic warfare.”²⁰

The primary user of this technology is the United States. Between 2000 and 2008, the number of U.S. unmanned aircraft systems increased from less than fifty to over 6,000.²¹ Similarly, the number of unmanned ground vehicles deployed by the U.S. Department of Defense increased from less than 100 in 2001 to nearly 4,400 by 2007.²² Other states, including Canada, Germany, Australia, France, the United Kingdom, Israel,

and South Korea, have also developed or are developing unmanned systems.²³

Presently, the robotic weapons technologies most in use are systems that are remotely, but directly, operated by a human being. A well-known example is the “BomBot,” a vehicle which can be driven by remote control to an improvised explosive device (IED), drop an explosive charge on the IED, and then be driven away before the charge is detonated.²⁴ Another example is the Special Weapons Observation Reconnaissance Detection System (SWORDS) and its successor, the Modular Advanced Armed Robotic System (MAARS). SWORDS is a small robot that can be mounted with almost any weapon that weighs less than 300 pounds, including machine guns, rifles, grenade launchers, and rocket launchers, and can travel in a variety of terrains.²⁵ It can be operated by remote control and video cameras from up to two miles away, and be used for street patrols and checkpoint security as well as to guard posts. MAARS is similar, but can carry more powerful weapons and can also be mounted with less-than-lethal weapons such as tear gas.²⁶

The level of automation that generally exists in currently deployed systems is limited to the ability of, for example, an unmanned combat aerial vehicle or a laser-guided bomb to be programmed to take-off and navigate or de-ice by itself, or with only human monitoring (as opposed to control). In June 2010, trials were held in which helicopters carried out fully autonomous flights.²⁷ Sentry systems also exist, which can patrol automatically around a sensitive storage facility or a base. The Mobile Detection Assessment and Response System (MDARS), for instance, is a small “robotic patrol force on wheels designed to relieve personnel of the repetitive and sometimes dangerous task of patrolling exterior areas” and can “autonomously [perform] random patrols.”²⁸ For currently existing systems that have lethal capability, the choice of target and the decision to fire the weapon is made by human beings, and it is a human being who actually fires the weapon, albeit by remote control. With such weapons systems, there is, in military terminology, a “man in the loop,” so that the determination to use lethal force, as with any other kind of weapon, lies with the operator and the chain of command. Examples of such semi-automated weapons systems currently in use include Predator and Reaper drones,²⁹ deployed in the conflicts in Iraq and Afghanistan by the United States and the United Kingdom, and Israeli Harpy drones. Systems that would replace this generation of technology include the Sky Warrior, an unmanned aircraft system

capable of taking off and landing automatically, with the capacity to carry and fire four Hellfire missiles.³⁰

“Swarm” technologies are also being developed to enable a small number of military personnel to control a large number of machines remotely. One system under development envisions that a single operator will monitor a group of semi-autonomous aerial robotic weapons systems through a wireless network that connects each robot to the others and to the operator. Each robot within a “swarm” would fly autonomously to a designated area, “and will ‘detect’ threats and targets through the use of artificial intelligence (AI), sensory information and image processing.”³¹ Robotic technology is also becoming faster and more capable of increasingly rapid response. Military strategic documents predict the development of technology that speeds up the time needed for machines to respond to a perceived threat with lethal force “to micro or nanoseconds...Increasingly humans will no longer be ‘in the loop’ but rather ‘on the loop’—monitoring the execution of certain decisions.”³² The speed of the envisioned technology would be enhanced by networking among unmanned machines which would be able to “perceive and act” faster than humans can.

To date, armed robotic systems operating on any more than a semi-automated basis have not been used against targets. Some states’ military representatives indicate that humans will, for the foreseeable future, remain in the loop on any decisions to use lethal force.³³ The U.S. Department of Defense, for example, has stated that: “For a significant period into the future, the decision to pull the trigger or launch a missile from an unmanned system will not be fully automated,” but notes that “[m]any aspects of the firing sequence will,” even if the final “decision to fire will not likely be fully automated until legal, rules of engagement, and safety concerns have all been thoroughly examined and resolved.”³⁴ However, some roboticists note that the “advent of autonomous lethal robotic systems is well underway and it is a simple matter of time before autonomous engagements of targets are present on the battlefield.”³⁵ A number of countries are already reportedly deploying or developing systems with the capacity to take humans out of the lethal decision-making loop. For example:

- Since approximately 2007, Israel has deployed remote-controlled 7.62 mm machine-guns mounted on watch-towers every few hundred yards along its border with Gaza as part of its “Sentry Tech” weapons system, also known as “Spot and Shoot” or in Hebrew, “Roeh-Yoreh” (Sees-Fires).³⁶ This “robotic sniper” system locates

potential targets through sensors and transmits information to an operations command center where a soldier can locate and track the target and shoot to kill.³⁷ Dozens of alleged terrorists have been shot with the Sentry Tech system.³⁸ The first reported killing of an individual with Sentry Tech appears to have taken place during Operation Cast Lead in December 2008.³⁹ Two alleged terrorists were killed using the system in December 2009,⁴⁰ and another person was killed and four injured by Sentry Tech in March 2010; according to media accounts it is unclear whether the dead and injured were farmers or gunmen.⁴¹ Future plans envision a “closed loop” system, in which no human intervention would be required in the identification, targeting, and kill process.⁴²

- South Korea has developed the SGR-1, an unmanned gun tower. Beginning in July 2010, it is performing sentry duty on an experimental basis in the demilitarized zone between North and South Korea.⁴³ The SGR-1 uses heat and motion detectors and pattern recognition algorithms to sense possible intruders; it can alert remotely-located command center operators who can use the SGR-1’s audio and video communications system to assess the threat and make the decision to fire the robot’s 5.5 millimeter machine gun.⁴⁴ Media accounts indicate that although the decision to use lethal force is made by human commanders now, the robot has been equipped with the capacity to fire on its own.⁴⁵

Such automated technologies are becoming increasingly sophisticated, and artificial intelligence reasoning and decision-making abilities are actively being researched and receive significant funding. States’ militaries and defense industry developers are working to develop “fully autonomous capability” such that “technological advances in artificial intelligence will enable [unmanned aerial vehicles] to make and execute complex decisions,” including the identification of human targets and the ability to kill them.⁴⁶ A 2003 U.S. Joint Forces Command commissioned study reportedly predicted the development of “artificial intelligence and automatic target recognition [that] will give robots the ability to hunt down and kill the enemy with limited human supervision by 2015.”⁴⁷ Among the envisioned uses for fully automated weapons systems are: “non-lethal through lethal crowd control, dismantled offensive operations, and armed reconnaissance and assault operations.”⁴⁸ One already developed ground robot, the Guardian UGV, is a high-speed vehicle that can be weaponized and

used for combat support as well as border patrols and other security missions, such as perimeter security at airports and power plants.⁴⁹

D. Concerns

Although robotic or unmanned weapons technology has developed at an astonishing rate, the public debate over the legal, ethical, and moral issues arising from its use is at a very early stage, and very little consideration has been given to the international legal framework necessary for dealing with the resulting issues.

There are many possible advantages flowing from the use of existing and developing technologies.⁵⁰ They may be able to act as “force multipliers,” greatly expanding the capacity or reach of a military, and robots may be sacrificed or sent into hazardous situations too risky for human soldiers. They may be less economically costly than deploying humans. And indeed, their destruction does not result in the ending of irreplaceable human life. In the words of a U.S. government report, “[m]ore and more robots are being destroyed or damaged in combat instead of Servicemen and women being killed or wounded, and this is the preferred outcome.”⁵¹ Robots may be able to use lethal force more conservatively than humans (because they “do not need to have self-preservation as a foremost drive”⁵²), and their actions and responses may be faster, based on information processed from more sources, and more accurate, enabling them to reduce collateral damage and other errors made by humans. They may also be able to avoid mistakes or harms resulting from human emotions or states, such as fear, tiredness, and the desire for revenge. And to the extent that machines are equipped with the ability to record operations and monitor compliance with legal requirements, they may increase military transparency and accountability.

These hypothetical advantages, however, may not necessarily be reflected in the design or programming of actual technologies. And the reality, to date, is that technological developments have far outpaced even discussions of the humanitarian and human rights implications of the deployment of lethal robotic technologies. The following concerns are among those that require in-depth examination:⁵³

1. Definitions

The lack of a uniform set of definitions of key terms such as “autonomous,” “autonomy,” or “robots” constitutes a significant obstacle to addressing the legal and ethical ramifications of these technologies. Uses of these terms vary significantly among the militaries of different nation-states, as well as among defense industry personnel, academics, and civilians.⁵⁴ Confusion can result, for example, from differences over whether “autonomous” describes the ability of a machine to act in accordance with moral and ethical reasoning ability, or whether it might simply refer to the ability to take action independent of human control (e.g., a programmed drone that can take off and land without human direction, or a thermometer that registers temperatures).⁵⁵ As the international community begins to debate robotic technologies, it will need to at least seek a shared understanding of the systems and their characteristics.

2. International and Criminal Responsibility

One of the most important issues flowing from increased automation is the question of responsibility for civilian casualties or other harms or violations of the laws of war. As I have analyzed at length elsewhere,⁵⁶ international human rights and humanitarian law, as applied in the context of armed conflict or law enforcement, set standards that are designed to protect or minimize harm to civilians, and set limits on the use of force by states’ militaries, police, or other armed forces. When these limits are violated, states may be internationally responsible for the wrongs committed, and officials or others may bear individual criminal responsibility. Both the international human rights and humanitarian law frameworks are predicated on the fundamental premise that they bind states and individuals, and seek to hold them to account. When robots are operated by remote control and the ultimate decision to use lethal force is made by humans, individual and command responsibility for any resulting harms is generally readily determinable.

However, as automation increases, the frameworks of state and individual responsibility become increasingly difficult to apply. Who is responsible if a robot kills civilians in violation of applicable international law—the programmer who designed the program governing the robot’s actions, any military officials who may have approved the

programming, a human commander assigned responsibility for that robot, a soldier who might have exercised oversight but opted not to do so? What if the killing is attributed to a malfunction of some sort? Is the government that deployed the robot responsible, or the principal engineer or manufacturer, or the individual who bore ultimate responsibility for programming, or someone else? What level of supervision does a human need to exercise over a robot in order to be responsible for its actions? Are circumstances conceivable in which robots could legitimately be programmed to act in violation of the relevant international law, or conversely, could they be programmed to automatically override instructions that they consider, under the circumstances, to be a violation of that law? Are there situations in which it would be appropriate to conclude that no individual should be held accountable despite the clear fact that unlawful actions have led to civilian or other deaths?

Some argue that robots should never be fully autonomous, that it would be unethical to permit robots to autonomously kill, because no human would clearly be responsible and the entire framework of accountability would break down. Others, such as Ronald Arkin, argue that it will be possible to design ethical systems of responsibility.⁵⁷ In his view, robots could be better ethical decision-makers than humans because they lack emotion and fear. In addition, they could be programmed to ensure compliance with humanitarian law standards and applicable rules of engagement. Still others respond that such thinking is predicated on unproven assumptions about the nature of rules and how robots may be programmed to understand them, and that it underestimates the extent to which value systems and ethics inform the application of the rules in ways that robots cannot replicate.⁵⁸ In order to understand how to apportion responsibility for violations of the law, say some ethicists, more research needs to be done both to understand how and why humans themselves decide to follow the law and ethical rules, as well as the extent to which robotic programming mimics or differs from human decision-making.

To the extent that unmanned systems are not being designed to support investigation, they raise additional transparency and accountability concerns. Perhaps most troublingly from an international law perspective, some have indicated that, “unmanned systems are not designed to support investigation. They do not archive information.” They leave open the possibility of “soldiers pointing to the machine, declaring, ‘I’m not responsible—the machine is.’”⁵⁹ In order to comport

with the international law obligation of a state to provide accountability for the use of lethal force, any unmanned weapons system, regardless of the degree of automation, must not hinder—and indeed should facilitate—the state’s ability to investigate wrongful conduct.

3. Safeguards and Standards for Deployment

Another significant problem concerns the ability of robots to comply with human rights and humanitarian law, and the standards relevant to programming and the development of technology for deployment. What standards or testing must be conducted before armed machines are able to conduct crowd control, patrol in civilian populated areas, or be enabled to decide to target an alleged combatant? While any kind of technology has the potential to malfunction and result in lethal error, the particular concern with the rapid development of robotic weapons is whether (and the extent to which) technical safeguards are built into the systems to prevent the inadvertent or otherwise wrongful or mistaken use of lethal force. What programming or other technical safeguards have been and should be put in place to ensure that the precautions required by international humanitarian law are taken? What programming safeguards would international humanitarian law require?

Troublingly, military and civilian experts acknowledge that robotic development in general is being driven by the defense industry, and “[f]ew systems in the field have been subjected to rigorous or standardized testing or experimentation.”⁶⁰ The U.S. military, for instance, admits that in the interests of saving military lives in the conflicts in Iraq and Afghanistan, robotic systems may be deployed without the requisite testing for whether those systems are in fact reliable.⁶¹

In the context of armed conflict generally, and especially in urban areas, military personnel often have difficulty discriminating between those who may be lawfully targeted (combatants or those directly participating in hostilities) and civilians, who may not. Such decision-making requires the exercise of judgment, sometimes in rapidly changing circumstances and in a context that is not readily amenable to categorization as to whether the applicable legal requirements of necessity and proportionality are met and whether all appropriate precautions have been taken. It is not clear what criteria would be used to determine if a robot is ever capable of making such decisions in the manner required, or how to evaluate the programs that might purport to have inte-

grated all such considerations into a given set of instructions to guide a robotic technology.

In addition, there is the concern that the development of lethal capacity has outpaced the development of safeguards against technical or communications error. For example, military strategic planning documents caution that it “may be technically feasible” for unmanned aerial systems (UAS) to have nuclear strike capability before safeguards are developed for the systems, and that “[e]thical discussions and policy decisions must take place in the near term in order to guide the development of future UAS capabilities, rather than allowing the development to take its own path.”⁶²

There are also questions about how and when the benefits of speedy processing of intelligence and other data is outweighed by the risks posed by hasty decision-making. Man-on-the-loop systems, for instance, raise the concern that technology is being developed that is beyond the human capacity to supervise effectively and in accordance with applicable law. With respect to swarm technologies, some research has found that human operators’ performance levels are reduced by an average of 50 percent when they control even two unmanned aircraft systems at a time.⁶³ The research suggests that the possibility of lethal error rises as humans play a “supervisory” role over a larger number of machines. Unless adequate precautions are taken and built into systems, the likelihood increases that mistakes will be made which will amount to clear violations of the applicable laws.

A related concern is what safeguards should or must be put in place to prevent ultimate human control of robots from being circumvented, and what safeguards can be implemented to prevent lethal robots from being hacked or used by, for example, insurgent or terrorist groups.

4. Civilian Support

An important political consideration is whether the widespread use of robots in civilian settings, such as for law enforcement in cities or in counter-insurgency operations, would alienate the very populations they were meant to assist. Over-reliance on technology increases the risk that policymakers and commanders will focus on the relatively easy use of armed or lethal tactics to the detriment of all the other elements necessary to end a conflict—including winning hearts and minds—and that policymakers will overestimate the ability of new technologies to achieve sustainable peace. In addition, while robots

may have the benefit of not acting based on emotion, they also do not have the kind of sympathy, remorse, or empathy that often appropriately tempers and informs the conduct of fighters and their commanders.

5. Use of Force Threshold and Jus ad Bellum Considerations

To the extent that decisions about whether to go to war are limited by the prospect of loss of life of military personnel and the high economic cost of warfare, robotic armies may make it easier for policymakers to choose to enter into an armed conflict, increasing the potential for violating *jus ad bellum* requirements. This may be particularly the case when the other side lacks the same level of technology. Similarly, within the context of armed conflict, insofar as robots are remotely controlled by humans who are themselves in no physical danger, there is the concern that an operator's location far from the battlefield will encourage a "Playstation" mentality to fighting and killing. The threshold at which, for example, drone operators would be willing to use force could potentially decrease. Thus, the international community should consider whether and when reduced risk to a state's armed forces resulting from the extensive use of robotic technologies might unacceptably increase the risk to civilian populations on the opposing side.

To summarize, in relation to the development and use of robotic technologies, especially those with the potential to be used in warfare, there is a pressing need to give more sustained consideration to the legal, ethical, and moral challenges that are likely to emerge. Particular attention should be given to identify ways in which proactive steps can be taken to ensure that such technologies are optimized in terms of their capacity to promote more effective compliance with international human rights and humanitarian law.

One way forward would be for the United Nations Secretary-General to convene a group consisting of military and civilian representatives from states, leading authorities in human rights and humanitarian law, applied philosophers and ethicists, scientists, and weapons developers to advise on measures and guidelines designed to promote that goal. In that context, consideration could be given to requiring that any unmanned or robotic weapons system have the same—or better—safety standards as comparable manned systems. Guidelines should be considered in terms of requiring tests to ensure minimum stan-

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dards of reliability and performance before new lethal technologies are deployed. In the design of new technologies, efforts should also be made to promote the inclusion of recording systems and other ways to facilitate effective investigation of instances in which it is alleged that the weapon has been used in violation of the applicable law. In addition, such a group could address the need for greater definitional uniformity in relation to the types of technology being developed, the need for empirical studies to better understand the human rights implications of the technologies, and the fundamental question of whether lethal force should ever be permitted to be fully automated.

IV. Conclusion

While the differences between the two case studies of extrajudicial executions considered in this article—the killing of witches and targeted killings by robotic technologies—are certainly significant, the key point for present purposes concerns the similarity between the two when viewed from the perspective of the international human rights regime. The norms reflected therein clearly aim to protect the right to life of all individuals in times of peace, and to protect the lives of civilians and non-combatants in times of armed conflict. Although those goals have been accepted in one form or another by all governments in the world, this does not mean that the move from broad normative acceptance to compliance in practice is easy or straightforward. Indeed, the paired example of witches and robots illustrates very clearly the principal challenges that consistently arise in response to endeavors to promote respect for these abstract norms in concrete situations.

Governments and their supporters, whether in response to allegations of using new technologies to carry out targeted killings or of not taking adequate action in response to the killing of witches, are likely to resort to defensive strategies that are remarkably similar. Often, the first step will be to assert that the issue in question is a matter exclusively for the sovereign decision-making authority of the state and thus not a legitimate matter for international concern. Despite its regular and predictable invocation by governments that are subject to criticism, this argument is rarely taken seriously, even by other governments. Human rights are now widely accepted as matters of legitimate concern for all governments and the international community as a whole.

This argument thus gives way to a second step, which is to argue that while the basic norm (in this case the right not to be arbitrarily

deprived of one's life) is entirely accepted, its agreed upon interpretation does not extend so far as to clearly and unequivocally cover the particular practices being challenged. At the same time, a claim to the moral high ground will be asserted by calling for new norms to govern the relevant problem.⁶⁴

The third response will be that national law and institutions are adequate to deal with the matter. Thus, for example, the government of the Central African Republic might point to the fact that, under its criminal code, a person convicted of witchcraft can face capital punishment, a prison sentence, or a fine. And the government of the Democratic Republic of the Congo might draw attention to the constitutional prohibition of parental abandonment of children for alleged sorcery, as well as to the 2009 Child Protection Law, which provides for a prison sentence for any adult, including parents, who accuse children of witchcraft. Similarly, the United States government will draw attention to its detailed standards governing the conduct of the military and combine this with a commitment to ensure that everything possible is done to ensure compliance with relevant international standards. The problem, of course, will often be in the implementation of such standards in practice, rather than with the law on the books.

The fourth standard response by governments is to contest the facts and claim that the allegations cannot be proved. While this latter approach raises empirical rather than normative issues, it highlights one of the most difficult challenges for the international human rights regime, which is to meet even a fairly basic burden of proof in relation to complex allegations.

This array of responses to alleged unlawful killings also brings into clear relief the main challenges that the regime faces. In essence, they are threefold. The first is the creation of public awareness of the issues, followed by more sustained reflection both by civil society and governments on the best approaches to be adopted in order to give effect to the human rights commitment. The second is to ensure the constant normative development of the basic standards so that their significance and implications in specific contexts are better understood and their content is elaborated and expanded upon to enable them to deal with new issues and problems. Third, and in some ways the most important because of its role in relation to the first two, is to develop institutional arrangements at the international level to both facilitate the normative evolution of the standards and to promote compliance by states and other actors with the norms. ●

Notes

1. See Nigel S. Rodley and Matt Pollard, *The Treatment of Prisoners under International Law*. 3rd ed. (Oxford: Oxford University Press, 2009), chap. 6.
2. Rebecca Bannor-Addae, "Scapegoating the Most Vulnerable in the Central African Republic," (12 May 2009), available online at unicef.org/protection/car_49658.html.
3. Criminal Code of the Central African Republic, Article 162, 162 *bis*.
4. United Nations General Assembly, "International Covenant on Economic, Social and Cultural Rights," Article 15 (UNHCR, 1996).
5. Nelso Tebbe, "Witchcraft and Statecraft: Liberal Democracy in Africa," *Georgetown Law Journal* 96, Issue 1 (2007): 234.
6. "Witches' Burnt to Death in Kenya," *BBC News* (21 May 2008), available online at news.bbc.co.uk/2/hi/africa/7413268.stm.
7. Online at inewsit.com/video/gallery/Five-people-suspected-to-be-witchcrafts-were-brutally-murdered-in-kisii-Nyamataro-Village.
8. See Human Rights Watch, "What Future? Street Children in the Democratic Republic of Congo" (UNHCR, 2006), pp. 47–49.
9. See U.S. Department of State, "2009 Human Rights Report: Democratic Republic of the Congo" (11 March 2010), available online at state.gov/g/drl/rls/hrrpt/2009/af/135947.htm.
10. Philip Alston, U.N. Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, "Report on the Democratic Republic of the Congo," U.N. Doc. A/HRC/14/24/Add. 3 (12 February 2010), p. 19, para. 88–91.
11. Aleksandra Cimpric, *Children Accused of Witchcraft: An Anthropological Study of Contemporary Practices in Africa* (Dakar: UNICEF Office for West and Central Africa, 2010).
12. *Op cit.*, para. 90; and Human Rights Watch 2006, note 8, pp. 48–49 ("Each week in the DRC, hundreds of children are accused of sorcery and endure abuse at the hands of their accusers—normally extended family members but, increasingly, self-proclaimed prophets or pastors as well").
13. For a brief overview, see Philip Alston, "Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions," U.N. Doc. A/HRC/11/2 (27 May 2009), pp. 15–21.
14. Christoph Wilcke, Human Rights Watch, "Letter to HRH King Abdullah bin Abd al-'Aziz Al Saud on 'Witchcraft' Case" (13 February 2008), available online at hrw.org/legacy/english/docs/2008/02/13/saudia18046.htm.
15. Philip Alston, Report of the U.N. Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, "Study on Targeted Killings," U.N. Doc. A/HRC/14/24/Add. 6 (26 May 2010).
16. William Yong and Robert F. Worth, "Iran's President Unveils New Long-Range Drone Aircraft," *The New York Times* (22 August 2010), available online at nytimes.com/2010/08/23/world/middleeast/23iran.html.
17. "Iran Unveils First Bomber Drone," *BBC News* (22 August 2010), available online at bbc.co.uk/news/world-middle-east-11052023.
18. See, e.g., Zachary Tumin, Tad Oelstrom, Art Fritzson, and Jerry Mechling, Summary of Harvard Executive Session of June 2008, "Unmanned and Robotic Warfare: Issues,

Options And Futures," online at lnwprogram.org/publicfiles/download/Future-of-Unmanned+and+Robotic+Warfare?file_id=505283 ("2008 Harvard Session"), p. 14; Ronald Arkin, *Governing Lethal Behaviour in Autonomous Robots* (Chapman and Hall/CRC: 2009); Peter Asaro, "How Just Could a Robot War Be?," in *Current Issues in Computing and Philosophy*, edited by Philip Brey, Adam Briggie, and Katinka Waelbers (2009); William H. Boothby, *Weapons and the Law of Armed Conflict* (Oxford: Oxford University Press, 2009); Jason Borenstein, "The Ethics of Autonomous Military Robots," *Studies in Ethics, Law and Technology* 2, Issue 1 (2008), available online at bepress.com/selt/vol2/iss1/art2; Charles J. Dunlap, Jr., "Technology: Recomplicating Moral Life for the Nation's Defenders," *Parameters: U.S. Army War College Quarterly* 24 (U.S. Army War College, 1999): 24–53; Noel Sharkey, "Automated Killers and the Computing Profession," *Computer Journal* (2007): 122–124; Noel Sharkey, "Death Strikes from the Sky: The Calculus of Proportionality," *IEEE Technology and Society* 28 (2009): 16–19; Robert Sparrow, "Robotic Weapons and the Future of War," in *New Wars and New Soldiers: Military Ethics in the Contemporary World*, edited by Jessica Wolfendale and Paolo Tripodi (Ashgate Publishing Co., April 2011); Robert Sparrow, "Predators or Plowshares? Arms Control of Robotic Weapons," *IEEE [Institute of Electrical and Electronics Engineers] Technology and Society* 25 (2009); Patrick Lin, George Bekey, and Keith Abney, *Autonomous Military Robotics: Risk, Ethics, and Design* (2008), available online at ethics.calpoly.edu/ONR_report.pdf (report prepared for and sponsored by the U.S. Department of the Navy).

19. As long ago as World War II, for example, Germany used bombs attached to tank treads, which were detonated by remote control, while the U.S. used radio-piloted bomber aircraft packed with explosives. See Steve Featherstone, "The Coming Robot Army," *Harpers* (February 2007); and P. W. Singer, *Wired for War: The Robotics Revolution and Conflict of the 21st Century* (Penguin Press, 2009), pp. 46–65 (discussing historical development of unmanned or robotics technology).

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21. U.S. Government Accountability Office, Report to the Subcommittee on Air and Land Forces, Committee on Armed Services, House of Representatives, "Unmanned Aircraft Systems: Additional Actions Needed to Improve Management and Integration of DOD Efforts to Support Warfighter Needs" (November 2008), p. 7, available online at gao.gov/new.items/d09175.pdf.

22. U.S. Department of Defense, Report to Congress, "Development and Utilization of Robotics and Unmanned Ground Vehicles" (October 2006), available online at jointrobotics.com/Activities/congressdocs/UGV%20Congressional%20Report%20-%20Final%20%28October%202006%29.pdf. U.S. law requires that by 2015 one-third of U.S. operational ground combat vehicles be unmanned (see p. 45). Office of the Secretary of Defense, "Unmanned Systems Roadmap 2007–2032" (2007), available online at auvac.org/research/publications/files/2007/unmanned_systems_roadmap_2007-2032.pdf. For fiscal year 2010, the U.S. Department of Defense sought a budget of US \$5.4 billion for unmanned systems (including systems for use on land, in the air, and at sea), an increase of 37.5 percent over the past two years. "Pentagon's Unmanned Systems Spending Tops \$5.4 billion in FY2010," *Defense Update* (14 June 2009), available online at defenseupdate.com/newscast/0609/news/pentagon_uas_140609.html.

23. See U.S. Department of Defense, "Development and Utilization of Robotics and Unmanned Ground Vehicles," p. 47, which describes research and development activi-

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ties “directed towards developing military capabilities for robotics and unmanned ground vehicles (UGVs)” of U.S. allies.

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26. *Ibid.*; see also Seth Porges, “Real Life Transformer Could Be First Robot to Fire in Combat,” *Popular Mechanics* (1 October 2009), available online at popularmechanics.com/technology/military/4230309.

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28. “MDARS—21st Century Robotic Sentry System,” General Dynamics Robotics Systems, online at gdrs.com/about/profile/pdfs/0206MDARSBrochure.pdf.

29. U.S. Air Force, “United States Air Force Unmanned Aircraft Systems Flight Plan 2009–2047” (18 May 2009), p. 26, available online at fas.org/irp/program/collect/uas_2009.pdf.

30. See descriptions at General Atomics Aeronautical, online at ga-asi.com/products/aircraft/er-mp-uas.php; Defense Update, Sky Warrior Goes into Production to Equip U.S. Army ER/MP Program (9 July 2010), online at defence-update.net/wordpress/20100709_sky_warrior_lrip.html.

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33. British Air Marshal Steve Hillier sees “an enduring requirement for a human in the loop for decision making. When you get to attack, you need someone to exercise judgment.” See Craig Hoyle, “Farnborough: U.S. Unmanned Vehicles,” *Flight International Magazine* (13 July 2010), online at flightglobal.com/articles/2010/07/13/344077/farnborough-uk-unmanned-air-vehicles.html.

34. U.S. Department of Defense, “FY 2009–2034 Unmanned Systems Integrated Roadmap” (6 April 2009), p. 10, available online at jointrobotics.com/documents/library/UMS%20Integrated%20Roadmap%202009.pdf.

35. Ronald C. Arkin, Alan R. Wager, and Brittany Duncan, “Responsibility and Lethality for Unmanned Systems: Ethical Pre-mission Responsibility Advisement,” GUVU Technical Report GIT-GVU-09-01, GUVU Center, Georgia Institute of Technology, 2009.

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43. Kim Deok-hyun, "Army Tests Machine-Gun Sentry Robots in DMZ," *Yonhap News Agency* (13 July 2010), available online at english.yonhapnews.co.kr/national/2010/07/13/14/0301000000AEN20100713007800315F.HTML.
44. *Ibid.*; Jon Rabirow, "Machine Gun-Toting Robots Deployed on DMZ," *Stars and Stripes* (12 July 2010), available online at stripes.com/news/pacific/korea/machine-gun-toting-robots-deployed-on-dmz-1.110809.
45. Sofge 2009.
46. "Unmanned Aircraft Systems Flight Plan 2009–2047," p. 50.
47. Steve Featherstone, "The Coming Robot Army," *Harpers* (February 2007), available at <http://www.wesjones.com/robot.htm>.
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49. GNIUS Unmanned Ground Systems, Guardian UGV, described online at g-nius.co.il/unmanned-ground-systems/guardium-ugv.html and defense-update.com/products/g/guardium.htm.
50. For more discussion of these arguments, see Ronald Arkin, *Governing Lethal Behaviour in Autonomous Robots* (2009); and Abney 2008.
51. U.S. Dept of Defense, Report to Congress, "Development and Utilization of Robotics and Unmanned Ground Vehicles" (October 2006), p. 9, available online at ndia.org/Divisions/Divisions/Robotics/Documents/Content/ContentGroups/Divisions1/Robotics/JGRE_UGV_FY06_Congressional_Report.pdf. See also, "FY 2009–2034 Unmanned Systems Integrated Roadmap."
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54. "The rapid, at times almost chaotic, development of [unmanned aircraft systems ("UAS")] over the last 10 years has led to a range of terminology appearing in both military and civilian environments. As a result, some legacy terminology has become obsolete, while differing national viewpoints have made it difficult to achieve standardisation on new terms...Similarly, Unmanned Aircraft (UA)-related concepts such as *autonomous*

and *automated* suffer from widely differing definitions, even within the UK...All of these areas have the potential to cause confusion or misunderstanding when unmanned aircraft issues are discussed between military, industrial and academic audiences." U.K. Ministry of Defence, Joint Doctrine Note 3/10, "Unmanned Aircraft Systems: Terminology, Definitions and Classification" (March 2010), available online at mod.uk/NR/rdonlyres/FBC33DD1-C111-4ABD-9518-A255FE8FCC5B/0/JDN310Amendedweb28May10.pdf. See also, Abney 2008 and Singer 2009, p. 67 (defining "robot").

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57. Arkin et al. 2009, "Responsibility and Lethality for Unmanned Systems"; and Ronald C. Arkin, Patrick Ulam, and Brittany Duncan, "An Ethical Governor for Constraining Lethal Action in an Autonomous System," GVU Technical Report GIT-GVU-09-02, GVU Center, Georgia Institute of Technology, 2009.

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59. Tumin et al. 2008, p. 8.

60. *Ibid.*, p. 2.

61. U.S. Department of Defense, "FY 2009–2034 Unmanned Systems Integrated Roadmap" (2009): "The current commitment of combat forces has seen a number of unmanned systems fielded quickly without the establishment of the required reliability and maintainability infrastructure that normally would be established prior to and during the fielding of a system. This was justifiably done as a conscious decision to save Warfighter's lives at the risk of reliability and maintainability issues with the equipment fielded" (pp. 39–40).

62. U.S. Air Force, "Unmanned Aircraft Systems Flight Plan 2009–2047" (2009), p. 41.

63. P. W. Singer, "Robots at War: The New Battlefield," *Wilson Quarterly* (Winter 2009); see also, Jessie Y. C. Chen, Ellen C. Haas, Krishna Pillalamari, and Catherine N. Jacobsen, "Human-Robot Interface: Issues in Operator Performance, Interface Design, and Technologies," U.S. Army Research Laboratory, ARL-TR-3834 (July 2006), available online at dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA451379 (discussing research findings on benefits and drawbacks of automation).

64. See, for example, "Comments to Sri Lanka's Lessons Learnt and Reconciliation Commission" by a former senior government diplomat, addressing the question of alleged violations committed by the Sri Lankan army in its fight against the Liberation Tigers of Tamil Eelam:

The primary purpose of International Humanitarian Law is the protection of civilians, and we have been exposed to a terrorist group who have used child soldiers unconscionably; who have used civilians as human shields and who have used suicide bombers to cause mindless destruction of property and the deaths of

thousands of innocent civilians. How does a conventional Army of a nation state pursue a conflict with that kind of combatant? The rules of war as they exist today do not cater for that situation... [Sri Lanka should promote the convening of] a diplomatic conference to discuss the formulation of a new protocol with regard to combat with non state actors.

Jayantha Dhanapala, "Official Transcript of LLRC Oral Submission by Mr. Jayantha Dhanapala" (2010), available online at groundviews.org/2010/09/01/official-transcript-of-llrc-oral-submission-by-mr-jayantha-dhanapala/, pp. 3–4. Similarly, see Daphné Richemond-Barak, "Nonstate Actors in Armed Conflicts: Issues of Distinction and Reciprocity," in *New Battlefields/Old Laws: From the Hague Convention to Asymmetric Warfare*, edited by William Banks (2010). (An Israeli scholar calling for a "more expansive understanding" of the concept of a "combatant" in IHL, which would have the effect of removing civilian status protection from a wide range of non-state actors, and proposing that a state should not be bound by all of humanitarian law in relation to a non-state party that the former considers to be repeatedly violating IHL.)