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The Weaponization of Increasingly Autonomous Technologies:

Considering Ethics and Social Values

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The United Nations Institute for Disarmament Research (UNIDIR)—an autonomous institute within the United Nations—conducts research on disarmament and security. UNIDIR is based in Geneva, Switzerland, the centre for bilateral and multilateral disarmament and non-proliferation negotiations, and home of the Conference on Disarmament. The Institute explores current issues pertaining to the variety of existing and future armaments, as well as global diplomacy and local tensions and conflicts. Working with researchers, diplomats, government officials, NGOs and other institutions since 1980, UNIDIR acts as a bridge between the research community and governments. UNIDIR's activities are funded by contributions from governments and donor foundations.

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The Weaponization of Increasingly Autonomous Technologies:[1] Considering Ethics and Social Values

Discussions on the weaponization of increasingly autonomous technologies most often focus on technical aspects of the weapon being considered, potential military missions and legality. This UNIDIR paper highlights some of the ethical and social issues that arise from—and underlie—this discussion. It suggests that far from being extraneous to the policy debate on the weaponization of increasingly autonomous technologies, ethics and social values are close to the core of this discussion. Although legal and technical discussions may produce information about possible technological trajectories, future applications and rules, they will not necessarily produce the insights, wisdom and prudence needed for sound policy that will serve national and international interests. This short paper is aimed at encouraging reflection on different ways that ethics, broadly construed to include social or cultural values, might influence consideration of the weaponization of increasingly autonomous technologies. This is the third in a series of UNIDIR papers on the weaponization of increasing autonomous technologies.[2] [3]

Is explicit consideration of ethics essential for policy discussions about increasingly autonomous technologies?

In an ideal world, ethics is a primary foundation of law and public policy. Where law and policy are unclear it can be useful to return to "first principles" or basic ethical values to help clarify law and policy and to help illuminate the best path forward. Turning an ethical lens on a difficult subject can help us to focus on norms that should apply to human behaviour and the world we desire to inhabit together.

1 UNIDIR has purposefully chosen to use the word "technologies" in order to encompass the broadest relevant categorization. In this paper, this categorization includes robots, machines, weapons and weapon systems.

2 Previous UNIDIR papers address "Framing Discussions on the Weaponization of Increasingly Autonomous Technologies (May 2014) and "Meaningful Human Control" (November 2014). For more information about UNIDIR's project "The Weaponization of Increasingly Autonomous Technologies", see www.unidir.org/programmes/security-and-society/the-weaponization-of-increasingly-autonomous-technologiesimplications-for-security-and-arms-control.

3 UNIDIR would like to acknowledge the thoughtful contributions of the participants in a November 2014 expert meeting (Peter Asaro, John Borrie, Neil Davison, Kristian Hammond, Peter Herby, Patrick Lin, George Lucas, Lisa Rudnick, WSP Sidhu, Alexandre Vautravers, Jeroen van den Hoven and Kerstin Vignard) as well as those who offered substantive comments on this paper. UNIDIR would also like to acknowledge the thoughtful contributions of those experts and interviewees who have requested to remain unnamed. The views expressed in this paper are the sole responsibility of UNIDIR.

For instance, killing is generally regarded as bad, and this moral principle has been codified by diverse societies in laws against murder. If there is controversy about the application of that law—such as whether it prohibits killing in self-defence or killing the unarmed, animals, and even future artificial intellects—ethical reflection can help settle the issue by illuminating the underlying principles: that is, why exactly is it bad to kill something, and whether those principles apply to these new cases that current law does not explicitly address.

Not everything that is generally considered unethical is necessarily illegal, such as lying or adultery. As a result ethics can also supplement law in our understanding of how we ought to conduct ourselves. Likewise, some laws can be unethical, such as those that permit slavery, and ethics can help make the argument for changing those laws. Some laws are also incomplete or still evolving, because they did not contemplate novel circumstances, such as those raised by new technologies.

The risks of not addressing ethics in autonomy policy discussions

In the face of complex national and global challenges, and conflicting opinion among experts, policymakers sometimes turn to ethicists and philosophers for clarity and a broader perspective on the issues at hand. In science and technology, governments have set up ethics panels on issues as diverse as cloning, stem cell research, microbiology, energy policy, and nuclear security, to name but a few. Corporations also engage with ethicists to ensure that they can consider a wider range of perspectives than is available from a purely technological or economically driven approach.[4] In doing this, companies can consider the ethical and social implications of their decisions in what may be uncharted territory in legal and policy terms. While engineers, roboticists and others might determine whether something is technologically possible or economically feasible, an ethical lens helps us consider whether something is aligned with our values, ideals and moral codes.

Policymakers must be responsive to the social values and ethical precepts of the societies in which they are based, even though these values may evolve rapidly. Consider the recent changes in many societies on the perception of interracial and same-sex marriages, euthanasia, and marijuana use. At the same time, rapid developments in science and technology often outpace thoughtful deliberation on the benefits, uncertainties and risks that these changes bring.

Choosing to side-line ethical considerations is a risky strategy for policymakers. For example, ethical concerns regarding the treatment of prisoners in the “war on terror” have influenced global perceptions of national identity, led to the recalculation of security policies, and even became a factor in elections.

Increasingly, both corporations and policymakers need to demonstrate that they have done their “moral math” by anticipating potential harmful consequences and negative reactions. At the level of self-interest, ethics can “bite back” in the form of lost elections and wasted investment. This can have both financial and opportunity costs when advanced projects must be cancelled and reparations paid for misguided ventures. Approaching a topic with an ethical lens can help to highlight some of the unintended or otherwise unforeseen consequences, both good and harmful, of pursuing a particular option or path.

4 For example Google has composed an ethics board for its work on artificial intelligence, and the auto industry is increasingly engaging ethicists to help guide development of self-driving vehicles.

Ethical considerations are particularly pertinent when considering the weaponization of increasingly autonomous technologies: these developments could move warfare into a realm where existing norms, legal frameworks and concepts of agent, responsibility and accountability are challenged—and some would say inadequate. Some consider that the implications for security, the responsible use of force, protection of civilians, and human dignity itself, are particularly grave and potentially irreversible. These dilemmas are unlikely to be resolved through technical or legal discussions alone.

Ethical concerns are at the foundations of both the International Humanitarian Law (IHL) and International Human Rights Law discussions on increasingly autonomous technologies.[5] In some ways, it is the ethical concerns that connect these discussions. Where some see this overlap as an opportunity for cross-disciplinary dialogue, others fear an unwelcome "blending" of two distinct areas of concern, policy and practice.

Issues to consider:

- What are the political and financial risks of not addressing the ethical dimension of the weaponization of increasingly autonomous technologies?
- Do these risks look different in the short-term, when there are a limited number of States expressing interest, than in the longer term, as these technologies become more widely accessible to a range of actors?

Whose ethics?

Ethical and value-based approaches to complex issues are often claimed to be too subjective to be the basis for international discourse or policymaking. However, it should be recognized that although various ethical approaches may have different starting points and frameworks, they can converge on the same conclusion for a given issue. For example, two major approaches in ethics are *consequential ethics*, which finds moral justification in the consequences of an act, and *deontological ethics*, which identifies an act as right or wrong because of the nature of the act itself. Each approach may find acts like torture to be immoral, but for different reasons: the consequentialist because of its effect on society and its repercussions, and the deontologist due to the inherent violation of fundamental principles of human rights, dignity, and respect for persons of torture itself. Diverse ethical approaches to an issue should not therefore be considered an impediment to discussion, as they are not necessarily mutually exclusive.

In addition, beliefs about technology vary by culture, shaped in part by factors such as national technical capacities and aspirations, availability of human labour, and religious beliefs.[6]

Yet despite these different approaches to both ethics and technology, discussions about ethics and social values allow for an inclusive exchange—all states and cultures have both perspectives to share and a stake in the outcome. The normative, value-driven frameworks evolved by human civilisations can inform responsible decision-making in the face of the

5 See, for example, Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, A/HRC/23/47, 9 April 2013, page 17, para 94; Human Rights Watch and the Harvard International Human Rights Clinic, *Shaking the Foundations: The Human Rights Implications of Killer Robots*, 2014; and the International Committee of the Red Cross, "Report of the Expert Meeting on Autonomous Weapon Systems", 26–28 March 2014, pp. 92–93.

6 While most Western cultures believe that inanimate objects lack a soul, others believe that even objects have a spirit.

significant changes that increasingly autonomous systems represent in relation to decisions to use violent force.

Issues to consider:

- Is an ethical "convergence" needed to arrive at national or international policy responses to highly autonomous weapon systems?
- Are different cultural beliefs about ethics and technology adequately represented in the current conversation?
- Might different societies and cultures, as well as distinct groups within them, have different ethical concerns about the weaponization of increasingly autonomous technologies? If so, how can these be brought explicitly into the policy discussion?

Ethical concerns at the foundation of International Humanitarian Law and International Human Rights Law

Ethics generally concern fundamental, widely accepted (and sometimes nearly universal) principles of human practice and guidelines for human behaviour. Many of these are enshrined in legal documents, such as treaties, conventions, and IHL instruments. For this reason, it can be challenging to "untangle" the legal and ethical concerns surrounding increasingly autonomous technologies, as they are inherently linked. This section will address some of the more tightly linked legal–ethical concerns. Yet there are reasons to consider ethics beyond how they inform legal discussions, as will be explored later in the paper.

The weaponization of increasingly autonomous technologies requires consideration under IHL, International Human Rights Law, as well as relevant national law. As these bodies of law have at their foundations ethical and moral considerations, is it necessary or even desirable to further consider ethical questions? To put it another way, have ethics "already been taken into account"?

As noted earlier, not everything unethical is illegal, and vice versa. Consideration of ethical issues takes us beyond whether a given weapon is legally acceptable (can we use it?) to whether it is morally acceptable (should we use it?). Some argue that there might be a moral obligation to use autonomous weapons if their use could **reduce or eliminate harm**. Others argue that, even if a future autonomous system were able to function in a manner fully compliant with IHL, consideration of the "**public conscience**" (for example as to whether it is acceptable that human life—even a legitimate military target—be taken in the absence of any human intent),[7] and the related question of whether the absence of human intent in the taking of human life is an **affront to human dignity**[8] are left unresolved. Such questions can only be answered on the basis of ethics and social values.

Issues to consider:

- Should ethical considerations be used solely to inform the legal debate or do they raise questions that must be addressed independently of legal considerations? And if the latter, which fora would be appropriate for their consideration?

7 The question of intent is explored in the UNIDIR paper "The Weaponization of Increasingly Autonomous Technologies: Considering how Meaningful Human Control might move the discussion forward", November 2014, www.unidir.org/files/publications/pdfs/considering-how-meaningful-human-control-might-move-the-discussion-forward-en-615.pdf.

8 Heyns, op cit.

- Is there a risk that if the ethical dimensions are not adequately or satisfactorily addressed in security and disarmament fora, the issue might be taken forward in other fora more receptive to these concerns?

Reducing harm through the use of autonomous weapons

Some have argued that if a future autonomous weapon were technically capable of respecting legal rules as well as or better than a human operator,[9] the use of such a system would be not only legally permissible and acceptable, but perhaps be an ethical imperative.[10] Although one can imagine that highly autonomous weapons may function indiscriminately or cause disproportionate harm, it is also conceivable that other uses could reduce or eliminate harm. For example, using an autonomous weapon to ensure the release of hostages without loss of life would serve a positive moral purpose. Or while a soldier might be forced to make a lethal defensive decision, an autonomous system might be in a position to incapacitate instead of kill or be programmed not to "prioritize their own continued existence".[11]

Anderson and Waxman make an additional connection to how the perception of acceptability of autonomous technologies in general will change over time—and could have implications on the moral acceptability of autonomous weapons: "A world that comes, if it does, to accept self-driving autonomous cars is likely to be one in which people expect those technologies to be applied to weapons and the battlefield, precisely because it regards them as better (and indeed might find morally objectionable the failure to use them)."[12]

Issue to consider:

- If such a weapon or technology were available would one have a moral obligation to use it rather than alternatives that might put human life at greater risk?

The dictates of public conscience

International Humanitarian Law, governing both the conduct of hostilities and the choice of weapons, has long recognized a role for the "dictates of the public conscience" which affords protections that go beyond the legal texts of this body of law. The so-called "Martens Clause", most recently reaffirmed as a legal principle in the 1977 Protocol I Additional to the Geneva Conventions, states: "In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience"[13]. In its 1996 Advisory Opinion on nuclear weapons the International Court of Justice stated that this principle

9 Some experts in artificial intelligence claim that the view that these systems will not reach the sophistication of human judgment are likely to be proven wrong in the not too distant future and that judgments for or against autonomous technologies solely on the basis of capacity are not likely to be sustainable over time.

10 See P. Lin et al., op. cit., p. 53, which states that autonomous military robotics could "be more effective in preventing unintended deaths" and thus jus in bello "would permit or even demand" their use.

11 P. Lin et al., *Autonomous Military Robotics: Risks, Ethics and Design*, prepared for the US Department of Navy, Office of Naval Research, 20 December 2008, version 1.0.9, p. 52.

12 K. Anderson and M. Waxman, "Law and Ethics for Autonomous Weapon Systems: Why a Ban Won't work and How the Laws of War Can", Hoover Institution Stanford University, 2013, p. 16, emphasis added. For a detailed analysis of the benefits and challenges of creating "ethical military robots", see for example, R. C. Arkin, *Governing Lethal Behaviour in Autonomous Robots*, 2009, Chapman and Hall.

13 Additional Protocol I Additional to the 1949 Geneva Conventions, 1977, Article 1, para 2.

of law "has proved to be an effective means of addressing the rapid evolution of military technology".[14]

Although some may regard the dictates of the public conscience as a difficult concept to operationalize, it has arguably been an important force in the prohibition of a number of weapons including poison gas in 1925, blinding laser weapons in 1995 and anti-personnel landmines in 1997. Its citation by the International Court of Justice suggests that it is also a constraint on the use of nuclear weapons. The Martens Clause makes clear *inter alia* that the absence of a specific legal prohibition on a weapon does not necessarily make it legal and that there are other ethical protections beyond written law that must be taken into account.

It has been argued that the public conscience should not simply be equated with public opinion (which can be manipulated or change rapidly).[15] Instead, public conscience is seen to entail a moral element or a moral obligation to take a position on the issue at hand. In the view of one expert "the best place to look for emerging norms and the dictates of public conscience are in the public forums in which states and individuals attempt to grapple with and articulate that conscience"[16].

There are at least three areas that may offer insight on where potentially emergent norms of public conscience regarding fully autonomous weapons could be found: one in the form of an **opinion** survey; a second in the form of **civil society positioning**; and the third through the **articulation of a principle** (meaningful human control) through which such weapons may be addressed.

There is little data on public opinion on autonomous weapons. The most widely cited study, a 2013 University of Massachusetts survey of 1,000 Americans over the age of 18 revealed that 55% oppose (39% strongly oppose) the use of fully autonomous weapons.[17] While this provides some preliminary evidence that there is a tendency within the American public to reject fully autonomous weapons, it tells us nothing about whether this is an informed or reflective judgment, nor about how public conscience is developing in other countries. For policymakers to have a fuller understanding of the public conscience, more data is needed. Conducting these sorts of surveys in a variety of cultures and contexts would be a welcome step.

A second indicator of public concern are the international movements that have coalesced around this issue, such as the International Committee for Robot Arms Control and the Campaign to Stop Killer Robots. In explaining its rationale for a ban, the Campaign explicitly cites ethical considerations: "Allowing life or death decisions to be made by machines crosses a fundamental moral line. Autonomous robots would lack human judgment and the ability to understand context." It also raises the concern that "replacing human troops with machines could make the decision to go to war easier, which would shift the burden of armed conflict further onto civilians"[18].

14 International Court of Justice, Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons, 1996, para 78.

15 See for example P. Asaro, "Jus nascendi, Robotic Weapons and the Martens Clause", in R. Calo et al. (eds), *Robot Law*, Edward Elgar Publishing, forthcoming 2015.

16 Ibid.

17 Of those who did not oppose such weapons only 10% "strongly" favoured them and 16% "somewhat" favoured them. University of Massachusetts survey of US public opinion on autonomous weapons conducted by Dr Charli Carpenter, see www.whiteoliphaunt.com/duckofminerva/wp-content/uploads/2013/06/UMass-Survey_Public-Opinion-on-Autonomous-Weapons.pdf.

18 www.stopkillerrobots.org.

A third indicator of an emerging public conscience is the notion of "meaningful human control". At the May 2014 Convention on Certain Conventional Weapons (CCW) informal meeting of experts on Lethal Autonomous Weapon Systems, many of the 76 participating states stressed that the notion of meaningful human control could be useful in addressing the issue of autonomy. Some stated explicitly that weapon systems lacking meaningful human control were unacceptable. Although this concept has not yet been defined[19] and more work is needed to understand whether and how it might be operationalized, its resonance in international discourse suggests that it could be indicative of an emerging norm.

Issues to consider:

- Can responsible public policy regarding the weaponization of increasingly autonomous technologies be made without a fuller understanding of the public conscience?
- What efforts are underway or needed to determine what informed public conscience exists in this field?
- Is there a link between the "dictates of public conscience" and the notion of meaningful human control? Many states have publicly embraced the idea of meaningful human control yet readily admit that the nascent concept is vague. Should this in itself be considered an expression of public conscience?

Human dignity: the fundamental issue?

Perhaps at the core of the concerns raised about fully autonomous weapons, there is something less definitive than law and even less quantifiable than the dictates of public conscience. This something might be described as an instinctual revulsion against the idea of machines "deciding" to kill humans.

In other terms, this revulsion might be considered a reaction to a potential violation of human dignity, which is considered a core principle of International Human Rights Law. This principle is enshrined in the preamble to the 1948 Universal Declaration of Human Rights in the following terms: 'recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world'.

In his report on Lethal Autonomous Robotics (LARs) to the UN Human Rights Council Special Rapporteur Christof Heyns addressed the issue of human dignity in the following terms: "[A] human being somewhere has to take the decision to initiate lethal force and as a result internalize (or assume responsibility for) the cost of each life lost in hostilities, as part of a deliberative process of human interaction. … Delegating this process dehumanizes armed conflict even further and precludes a moment of deliberation in those cases where it may be feasible. Machines lack morality and mortality, and should as a result not have life and death powers over humans."[20]

19 For an overview of the concept of Meaningful Human Control, see UNIDIR, "Considering how Meaningful Human Control might move the discussion forward", op cit. See also Article 36, "Structuring Debate on Autonomous Weapon Systems" and "Key Areas for Debate on Autonomous Weapon Systems", available at www.article36.org/wp-content/uploads/2013/11/Autonomous-weapons-memo-for-CCW.pdf and www.article36.org/wp-content/uploads/2014/05/A36-CCW-May-2014.pdf. For an alternative approach, see M. Horowitz and P. Scharre, "Meaningful Human Control in Weapon Systems: A Primer", Center for a New American Security, March 2015.

20 Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, A/HRC/23/47, 9 April 2013, page 17, para 94.

Heyns describes the question of human dignity as an "overriding consideration" even were lethal autonomous systems able to fully respect the rules of IHL and only target combatants. He concludes that if they are deemed not to respect human dignity "no other consideration can justify the deployment of LARs, no matter the level of technical competence at which they operate. While the argument was made earlier that the deployment of LARs could lead to a vacuum of legal responsibility, the point here is that they could likewise imply a vacuum of moral responsibility."[21]

Popular culture also suggests there is a deep aversion to the possibility that human lives could be extinguished or otherwise harmed as the result of a decision by a machine without any human intent involved. Books, films and games are often dismissed in discussions about autonomous weapons as "mere science fiction" or "sensationalist", but their enduring popularity indicates the instinctive unease felt by many. In such a world, would human persons be reduced to objects whose destiny is to be determined not by themselves, or even collectively with other humans, but by an inanimate object? It must be asked what meaning human dignity would have in such a context.

This negative response to a perceived threat to human dignity might also be described as a reaction to something repugnant. This factor is known to have influenced policy decisions to prohibit or not deploy such weapons as bullets that explode within the human body, bayonets with serrated edges, flamethrowers, neutron bombs and blinding laser weapons. Feelings of abhorrence or revulsion also underlie the prohibition of weapons "of a nature to cause superfluous injury or unnecessary suffering" and may also play a role in mobilization of the public conscience as described in the previous section.

Issues to consider:

- Is human dignity ultimately what is at stake in the debate over autonomous weapon systems?
- If human dignity is threatened by the use of fully autonomous weapons should this be an overriding consideration supporting a norm against the development and use of such systems?

The wider relevance and implications of ethics beyond the legal discussion

Emotions, decision-making and ethics

There is a wealth of scientific research showing that human beings are not rational creatures that happen to have emotions, but emotional creatures capable of rationality. Emotions including anger, remorse, trust, apprehension and fear, as well as feelings evoked by the situation (e.g. crisis, calm, threat, urgency, security) provide context for decision-making. Psycho-behavioural studies have suggested that persons devoid of normal emotional responses, for example following Traumatic Brain Injury, have difficulties with problem solving and judgment: sometimes this is characterised by having difficulty recognizing when there is a problem or difficulty changing their way of thinking (i.e. demonstrating flexibility). As one neuroscientist has observed, "When emotion is entirely left out of the reasoning picture, as happens in certain neurological conditions, reason turns out to be even more flawed than when emotion plays bad tricks on our decisions".[22] Human judgment is also influenced by the evolved social values of the society within

21 Ibid, page 17, para 93.
22 A. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain*, Penguin, 1994, p. xii.

which an individual is operating, which will in turn influence the range of acts considered acceptable.

At the same time it is important to recognize that emotional states such as fear, disorientation, confusion, anger and the desire for revenge can and do lead to poor decisions. Proponents of increasingly autonomous technologies claim that this is where autonomous technologies will have a significant advantage over human combatants.[23] Decisions made in the "heat of battle" by combatants and officers may not always be the right ones. In these cases legal and disciplinary systems exist to hold humans accountable for their actions.

Our understanding of neuroscience—including the role of emotions in decision-making—is constantly evolving. This, in combination with the fact that autonomous technologies today fall far short of human-like cognation, means that it is impossible to compare potential decision-making by autonomous systems with human decision-making. What is clear, however, is that evidence shows that emotions play a critical role in human reasoning and decision-making and therefore decisions taken by humans are qualitatively different than those taken by a machine.

Issues to consider:

- When it comes to decisions to intentionally end a life, is there an ethical basis for favouring human over machine decisions?
- To what extent are claims about the advantages or disadvantages of human versus machine decision-making evidence based and to what extent are they conjecture?
- When considering whether machines might take "better" decisions than humans, which criteria are being applied? Speed? Judgment? Flexibility and adaptability? The ability to be unemotional? Or something else?

Ethical considerations on invulnerability and asymmetry

The deployment of highly autonomous weapon systems would be a further extension of historic trends to increase the distance between the attacker and the target. As in the past, less vulnerable, technologically superior forces would oversee the deployment of their weapons against opponents who in many cases would not be able to respond in kind. In this regard, the deployment of autonomous weapon systems would not represent a novelty.

Yet attempts to create invulnerability, from the "Maginot Line" established by France prior to the Second World War to the US "Star Wars" missile defence system proposed in 1983, have proven unfeasible. Historically, the impulse is not to let invulnerability—or even the announced intention to pursue invulnerability—of one's opponent stand. The unintended but recurrent result of the creation of invulnerability can be instability or armed conflict. Thus the attempt to achieve invulnerability can undermine values associated with stability.

The response to technological superiority, as numerous exemples throughout history suggest, is to attack vulnerable points of one's opponent. The use of kamikaze aircraft loaded with explosives by Japanese forces in the Second World War is said to have been

23 According to roboticist R. Arkin, "Unmanned robotic systems can be designed without emotions that cloud their judgement or result in anger and frustration with ongoing battlefield events." R. Arkin, "The Case for Ethical Autonomy in Unmanned Systems", *Journal of Military Ethics*, vol. 9, Issue 4, pp. 332–341, available at www.cc.gatech.edu/ai/robot-lab/online-publications/Arkin_ethical_autonomous_systems_final.pdf.

a tactic of last resort; a response to the superior air speeds of allied forces and their capacity to fly at high altitudes. The use of suicide bombers in a range of contemporary conflicts has also been attributed to the same dialectic of action and reaction between technically superior and weaker opponents.

In commenting on the potential consequences of fully autonomous weapons, one military commentator offered a sobering analysis of the asymmetric risks to a technically more advanced society: "In the age of cyber attacks and terrorism, we need to look for policies that seek to further insulate our non-combatants rather than serve them up as the only viable targets for our enemies to attack … My friends and I signed up so that our enemies will fight us instead of our families. And I worry that if humans don't fight our wars, we'll have more wars and our families will be the enemy's primary targets."[24]

The attempt to reduce or eliminate vulnerability in warfare is not new and the asymmetric dialectic it creates is fairly predictable. The specific concern here is whether the weaponization of increasingly autonomous technologies is likely to exacerbate or considerably worsen counter-attacks on vulnerable populations. If the foreseeable or likely response to the use of increasingly autonomous weapon systems will take the form of asymmetric response via attacks on vulnerable persons, then the risks may be borne more by civilian populations than by professional military personnel who are likely to be better protected and therefore less exposed.

Issues to consider:

- What weight should be given in policymaking regarding the likely asymmetric reactions to the use of autonomous weapon systems?
- In a highly asymmetric conflict, does the technologically superior party have any moral responsibility for the consequences if the weaker opponent responds by targeting vulnerable populations?
- Does a sense of invulnerability decrease one's willingness to negotiate and increase the willingness to use force and therefore the probability or frequency of warfare? If so, what are the ethical implications of this posture?

Disruption of social values: courage in the face of risk

Warfare has always been a human endeavour. In a sort of careful balance, societies have permitted a particular class (warriors/soldiers) to take human life—an act otherwise forbidden or tightly regulated within society—in exchange for protection or conquest. This right most often came with responsibility for correct conduct of warfare and protection of the vulnerable, at least the vulnerable within one's own group. The role of the warrior was respected in part due to the risk undertaken and courage demonstrated by the warrior class. Honour and courage are broadly considered to be among the highest military values in a wide variety of cultures and societies.

The deployment of increasingly autonomous technologies would remove at least some of the notion of courage in both the conduct and perception of warfare. We have already seen the notion of courage and bravery be questioned in relation to remotely piloted vehicles. Consider the 2014 decision by US Defence Secretary Hagel to not issue a medal to honour drone pilots following the protests of veterans, service members and some

24 US Marine Lieutenant Brendan Mills, published at http://foreignpolicy.com/2013/06/18/rosas-dystopia-the-moral-downside-of-coming-autonomous-weapons-systems/.

Members of Congress as it would have ranked above some of the decorations awarded to troops wounded or killed in battle. Also, attacks by unmanned aerial vehicles have been called "cowardly" by a spectrum of critics—from the Taliban to the opinion pages of international newspapers—who point to the unwillingness to risk one's troops in combat as proof thereof.

Issues to consider:

- To what extent is the perceived legitimacy of violence by armed forces linked to courage and risk—in the attacker's perspective? In the perspective of the attacked?
- Might the introduction of these technologies have foreseeable, but possibly undesirable, impacts on valued social structures and groups, such as the military?
- Were increasingly autonomous technologies to continue to reduce the role of the human soldier, would this further undermine the concepts of military bravery and valour?[25]

Conclusion

We are confronted with a situation where ethical arguments are advanced for both pursuing and prohibiting the weaponization of increasingly autonomous technologies. Policymakers have the challenging task ahead of weighing competing ethical considerations. Is there a moral obligation to use a weapon if it can reduce overall harm? Or is the threat to human dignity posed by autonomous weapons the overriding ethical concern?

It is here that we see the most divergence in the ethical arguments articulated by the arms control and human rights communities. Much more cross-disciplinary discussion is necessary in order to raise awareness of the valid concerns of both communities and then to generate shared understandings of what is ultimately at stake in discussions on the weaponization of increasingly autonomous technologies.

Ethics inform the response to the fundamental yet challenging questions of how to organize society and, in the words of the UN Charter, "to live together in peace with one another." While there are a variety of possible answers to such questions, the questions themselves (and the concerns they force us to consider) are nearly universal. They are most valuable in guiding our thinking about the ultimate social impact of our actions.

Issues to consider:

- What fundamental and widely accepted ethical principles, as enshrined in foundational documents, such as the UN Charter and the Universal Declaration of Human Rights, are impacted or threatened by the weaponization of increasingly autonomous technologies?
- Given the range of fundamental ethical issues that are at stake, is "wait and see" an acceptable moral stance? As a first step, is it necessary to coalesce around or reaffirm "first principles" in order to construct responsible policy on the weaponization of increasingly autonomous technologies?

25 For further reading, see R. Sparrow, "Drones, Courage, and Military Culture", in G. Lucas (ed.), *The Routledge Handbook of Military Ethics*, Routledge, 2015, pp. 380–94.

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