

# DEADLY

## Decisions ♦

8 objections  
to  
killer robots

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This is a publication of PAX. PAX is a founder of the Campaign to Stop Killer Robots. For more information, visit our website: [www.paxforpeace.nl](http://www.paxforpeace.nl) or [www.stopkillerrobots.org](http://www.stopkillerrobots.org)

**About PAX, formerly known as IKV Pax Christi**

PAX stands for peace. Together with people in conflict areas and critical citizens in the Netherlands, we work on a dignified, democratic and peaceful society, everywhere in the world.

Peace requires courage. The courage to believe that peace is possible, to row against the tide, to speak out and to carry on no matter what. Everyone in the world can contribute to peace, but that takes courage. The courage to praise peace, to shout it from the rooftops and to write it on the walls. The courage to call politicians to accountability and to look beyond your own boundaries. The courage to address people and to invite them to take part, regardless of their background.

PAX brings people together who have the courage to stand for peace. We work together with people in conflict areas, visit politicians and combine efforts with committed citizens.

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First, you had **human beings**  
without machines.

Then you had human beings  
with **machines**.

And finally you have machines  
**without** human beings.

**John Pike** (2005)



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# Introduction

## The Issue

Rapid developments in technology increase the use of unmanned systems in warfare dramatically. Robots and unmanned systems have been seen as valuable in previous conflicts. Although these current systems are still remotely operated by a human, they do in a way relieve soldiers from the horrors of combat. The desire of states to gain military advantage means that the number of these systems is increasing and so are their capabilities. In the past decade, technology is advancing at an increased rate, particularly in the field of computing and electronics, resulting in a number of automated systems. There is a clear trend of machines taking the place of humans on the battlefield. *“It’s [the use of unmanned autonomous systems] going to change the fundamental equation of war. First, you had human beings without machines. Then you had human beings with machines. And finally you have machines without human beings”*.<sup>1</sup>

Many experts predict autonomous weapon systems will become the norm in the next 20 years.<sup>2</sup> According to some military and robotics experts, fully autonomous weapon systems (FAWs) that select and engage targets without any human intervention could be developed soon. In November 2012 the U.S. Department of Defense published its first public policy on autonomous weapon systems. This policy states that autonomous systems will only be used to deliver non-lethal force, unless otherwise decided by department officials.<sup>3</sup> At present, states and military officials claim that a human will always be involved when a weapon system will deliver lethal force.<sup>4</sup> However, the rapid advances in technology show that the capability to deploy lethal autonomous machines is on its way.

Some fixed-base automatic defensive weapons are already in use. For instance, the Israeli Iron Dome and the U.S. Phalanx Close-In-Weapons System are designed to detect incoming threats, such as missiles and rockets, and to respond automatically to neutralize the threat. Although human oversight is minimal, if it exists at all, these weapon systems are not yet fully autonomous. Often, they operate in a structured

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1 Reed, F. (2005) *Robotic Warfare Drawing Nearer*. Washington Times. <http://www.washingtontimes.com/news/2005/feb/9/20050209-113147-1910r/?page=all> (09-02-2005). Quote made by John Pike from GlobalSecurity.org, an organization based in Washington D.C. that focuses on innovative approaches to emerging security challenges.

2 Thurnher, J.S. (2013) *Autonomous Weapon Systems Brief by Lt. Col. Jeffrey S. Thurnher: Legal Implications of AWS*. <https://www.youtube.com/watch?v=muQFmY8HvUA>

3 U.S. Department of Defense (2012) *Directive 3000.09*. <http://www.dtic.mil/whs/directives/corres/pdf/300009p.pdf>

4 See: U.S. DoD Directive 3000.09 and U.K. Joint Doctrine Note 2/11.

environment, such as the SGR-A1, which is a sentry robot deployed in the demilitarized zone between North and South Korea. However, more recent developments have resulted in the U.K. Taranis and the U.S. X-47B. Both are autonomous intercontinental combat aircrafts that are commissioned to fly with greater autonomy than existing drones. Taranis and X-47B are currently undergoing testing and have not been weaponized yet, but both would presumably be designed to launch attacks against humans as well as material.<sup>5</sup>

Potential advantages that are often anticipated with the development of autonomous weapons are a decrease in necessary manpower, a reduction of risks to one's own soldiers, and a shorter response time. According to the 2011 U.S. Unmanned Systems Integrated Roadmap – a Department of Defense vision for the continuing development, fielding, and employment of unmanned systems technologies – “*autonomy reduces the human workload required to operate systems, enables the optimization of the human role in the system, and allows human decision making to focus on points where it is most needed.*” The roadmap continues to state that autonomy could also enable operations beyond the reach of external control or where such control is extremely limited (such as in caves, under water, or in areas with enemy jamming).<sup>6</sup>

### The research question

However, the potential deployment of fully autonomous weapons also raises serious ethical, legal, moral, technical, policy and other concerns. In May 2011 PAX published a report on drones that also covered the issue of fully autonomous weapons<sup>7</sup> and, more recently, the *Clingendael* magazine on international relations, the *Internationale Spectator*, published a PAX article that stressed the importance of discussions on killer robots at the international as well as the national level.<sup>8</sup> In November 2012 Human Rights Watch and the Harvard Law School International Human Rights Clinic issued the report “Losing Humanity” that steered the global discussion.<sup>9</sup> Many other organizations, such as the International Committee of Robot Arms Control (ICRAC) and the U.K.-based non-governmental organization (NGO) Article 36, have been writing extensively on the issue as well.<sup>10</sup> Consequently, PAX co-founded the Campaign to Stop Killer Robots that was officially launched in London in

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5 Human Rights Watch and Harvard Law School International Human Rights Clinic (2012) *Losing Humanity – the Case Against Killer Robots*. p. 13-17.

6 U.S. Department of Defense. (2011) *Unmanned Systems Integrated Roadmap, FY2011-2036*. <http://www.defenseinnovationmarketplace.mil/resources/UnmannedSystemsIntegratedRoadmapFY2011.pdf>, p. 45.

7 Oudes, C. & Zwijnenburg, W. (2011) *Does Unmanned Make Unacceptable?*

8 Struyk, M. & Ekelhof, M. (2013) *Robotisering van het leger een reëel gevaar*. In: de *Internationale Spectator*, 67, 11, p. 72-77.

9 Human Rights Watch and Harvard Law School International Human Rights Clinic (2012) *Losing Humanity – the Case Against Killer Robots*.

10 ICRAC is an international committee of experts in robotics technology, robot ethics and other fields concerned about the pressing dangers that military robots pose to peace and international security and to civilians in war. For more information on ICRAC see: [www.icrac.net](http://www.icrac.net). Article 36 is a not-for-profit organization working to prevent the unintended, unnecessary or unacceptable harm caused by certain weapons. For more information on Article 36 see: [www.article36.org](http://www.article36.org).



April 2013. This global campaign calls for a comprehensive, pre-emptive ban on the development, production, and use of fully autonomous weapons.<sup>11</sup> The campaign seeks to prohibit taking humans out of the loop with respect to targeting and attack decisions on the battlefield. In other words, when it comes to decisions about life or death, meaningful human intervention and control should always take place.

In this policy paper, PAX outlines legal, strategic, and policy concerns about the possible development and use of FAWs. But the overarching concern is an ethical one: could the use of FAWs be considered ethical or not? In May 2013 United Nations (UN) Special Rapporteur on extrajudicial, summary or arbitrary executions Professor Christof Heyns presented his report on Lethal Autonomous Robotics (LARs) to the Human Rights Council in Geneva and is calling for a moratorium.<sup>12</sup> The urgency of the central question in the policy paper of PAX is thoroughly formulated by Heyns:

Even if it is assumed that LARs [Lethal Autonomous Robotics] could comply with the requirements of IHL [international humanitarian law], and it can be proven that on average and in the aggregate they will save lives, the question has to be asked whether it is not inherently wrong to let autonomous machines decide who and when to kill. [...] If the answer is negative, no other consideration can justify the deployment of LARs, no matter the level of technical competence at which they operate.

In order to answer this question this paper will consider the eight most pressing concerns, which will be divided in three categories. First, we will examine the consequences of the development and use of fully autonomous weapons. Which questions deserve priority and how could fully autonomous weapons influence democratic institutions and the decision to go to war? Second, we will analyze questions concerning the use of these weapons on the battlefield. The third and final focus of this paper will be on the ramifications of the use of fully autonomous weapons. For instance, what consequences could their deployment have not only on civilians and organizations in the attacked state in terms of retaliation and lasting peace in the region, but also in terms of proliferation? These questions, along with other pending concerns, will be analyzed in this report, which concludes with a set of recommendations.

### Definitions and Terminology

Definitions and terminology of fully autonomous weapon systems are hotly debated. Some refer to these systems as killer robots (KRs), while others call them lethal

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11 Aforementioned organizations such as HRW, PAX, ICRC and Article 36 are all members of the steering committee of the Campaign to Stop Killer Robots. For more information about the campaign see: [www.stopkillerrobots.org](http://www.stopkillerrobots.org)

12 Heyns, C. (2013) *Report of the Special Rapporteur on extrajudicial summary or arbitrary executions, Christof Heyns*. [http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47\\_en.pdf](http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47_en.pdf)

autonomous robotics (LARs), robotic weapons or autonomous weapons (AWs), or a combination thereof. This report refers to these systems as fully autonomous weapons or fully autonomous weapon systems (FAWs).

FAWs are weapons that can select and engage targets without human intervention. These are weapons where the human is effectively out of the loop, meaning that there is no (or very limited) meaningful human control. Instead of relying on human decisions FAWs would act on the basis of computer programs. This means that the weapon systems will act on pre-programmed algorithms instead of human intelligence and human judgment. This does not mean that the weapon systems are programmed to follow a pre-determined path and prosecute a pre-determined attack. Instead, FAWs search and engage targets using a computer program that enables independent selection of a target without human intervention. The use of this technology in armed conflict poses a fundamental challenge to the laws of armed conflict that may well prove impossible and could pose a grave threat to civilians. As science fiction author and professor of biochemistry Isaac Asimov puts it, *“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.”*<sup>13</sup>

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13 Asimov, I. And Shulman, J. (1988) *Isaac Asimov's Book of Science and Nature Questions*. New York, Weidenfeld, p. 281.

# **Top 8 objections**

# 1. Killing without a heart

*"When my country wants to call it a bloodless battlefield, I feel enraged, I feel righteous indignation, at the twisting words."*

– Jody Williams<sup>14</sup>

Throughout history war has been perceived as a large-scale duel between equals. Although the methods and means change constantly and “equal” no longer entails “evenly-matched,” the deployment of killer robots to do the killing for us is a game-changing development. Whereas many advances such as gunpowder, the steam engine, and the cannon changed the way war is fought, FAW technology is the first that will change the very identity of who is fighting it.

Currently, weapons still have a human decision-maker in the loop. Even the technologically advanced drones have a human in the loop, meaning that the final decision to use lethal force is not made by the machine but by a person or by several people. However, by sending killer robots into warzones we put our full trust into autonomous killing machines. A human is no longer involved in the decision to use force and the killer robot can take targeting decisions fully autonomously. According to Peter Singer, one of the world’s leading experts on changes in 21<sup>st</sup> century warfare, “*human’s 5,000-year-old monopoly over the fighting of war is over.*”<sup>15</sup> This changes warfare completely.

According to Armin Krishnan, a political scientist specialized in defense, international security, and intelligence, “*An action so serious in its consequences should not be left to mindless machines.*”<sup>16</sup> Most people would agree with that. Whenever PAX speaks about the issue, the primary reaction is confusion, almost always followed by serious shock. Generally, the public’s reaction is one of disbelief or horror and no one has ever replied that the idea of machines that were going to be given the power to kill was an attractive one. But how do we explain these feelings of revulsion towards autonomous killing? One can rationalize this trend towards autonomous killing and look at this development from many angles, but there is a general feeling that killing without meaningful human intervention is inherently abhorrent. A survey conducted by Charli Carpenter of the University of Massachusetts Department of Political Science concluded that the majority of the U.S. respondents oppose autonomous killer robots.<sup>17</sup> This spontaneous feeling of disgust is

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14 Nobel Peace Prize Laureate Jody Williams at the launch of the Campaign to Stop Killer Robots in London, 2013.

15 Singer, P.W. (2009) *Wired for War*. New York, Penguin Press, p. 194.

16 Krishnan, A. (2009) *Killer Robots*. Farnham, Ashgate Publishing Limited, p. 130.

17 Carpenter, C. (2013) *US Public Opinion on Autonomous Weapons*.

[http://www.whiteoliphaunt.com/duckofminerva/wp-content/uploads/2013/06/UMass-Survey\\_Public-Opinion-on-Autonomous-Weapons\\_May2013.pdf](http://www.whiteoliphaunt.com/duckofminerva/wp-content/uploads/2013/06/UMass-Survey_Public-Opinion-on-Autonomous-Weapons_May2013.pdf), p. 1.

not only felt by the general public, but also by defence specialists who reject the idea of FAWs.<sup>18</sup>

This is particularly interesting in light of the Martens Clause which requires that, even in cases not covered by specific international agreements, means of warfare must be evaluated according to the “*principles of humanity*” and the “*dictates of the public conscience*”. The Martens Clause indicates that the laws of armed conflict, in addition to being a legal code, also provide a moral code. Therefore, whenever a method of means of war is so strongly disapproved of by citizens, it should be considered a violation of international law to pursue them.

According to UN Special Rapporteur Heyns our moral objection against FAWs may flow from the fact that decisions over life and death in armed conflict require compassion and intuition. He states that, “*Humans – while they are fallible – at least might possess these qualities, whereas robots definitely do not.*”<sup>19</sup> Some argue that emotions are human shortcomings in conflict scenarios and, hence, robots will not act out of revenge, panic, anger, spite, prejudice or fear unless they are specifically programmed to do so. However, FAWs can very well be used out of anger or revenge by their commander. In this, FAWs are no different from any other weapon. More importantly, emotions can also function as one of the major restraints of cruelty in warfare. This includes soldiers deserting when the state commands to them to kill civilians (consider, for example, Syria) as well as the instinctive aversion experienced by soldiers to the taking of life.<sup>20</sup> By outsourcing decisions about life and death to machines, we will not only lose sight of the gravity of acts of war, we may also lose morality and respect for our adversaries. As long as war remains a human endeavor, human involvement and judgment should never be absent in the decision to use force.

**FAWs are by nature unethical. War is about human suffering, the loss of human lives, and consequences for human beings. Killing with machines is the ultimate demoralization of war. Even in the hell of war we find humanity, and that must remain so.**

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18 Of all the groups surveyed by Charli Carpenter, the highest level of disapproval came from the respondents with a military status.

19 Heyns, C. (2013) *Report of the Special Rapporteur on extrajudicial summary or arbitrary executions, Christof Heyns*. [http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47\\_en.pdf](http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47_en.pdf), p. 10.

20 In his thesis Lieutenant Colonel Dave Grossman explains that humans possess the innate reluctance to kill their own kind and the vast majority of soldiers are loath to kill in battle. See: Grossman, D. (1995) *On Killing: The Psychological Cost of Learning to Kill in War and Society*. New York, E-Reads.

## 2. Lowering the threshold

*"I believe that one of the strongest moral aversions to the development of robotic soldiers stems from the fear that they will make it easier for leaders to take an unwilling nation into war."*

– Peter Asaro<sup>21</sup>

Technological advances have continuously increased the distance between soldiers and their enemy, from the use of crossbows and cannons to the development of military uses for airplanes. One of the main purposes of these technologies is that they can shift risks away from a nation's own soldiers. Every military force has the ethical obligation to minimize the risk of injury to its own forces.<sup>22</sup> However, distancing the soldier from the action can simultaneously lower the threshold to go to war.

By being physically removed from the action, humans could become more detached from decisions to kill. A study in the psychology of killing shows that the absence of a psychological effect of combat can lower, or even neutralize, a soldier's inhibition to kill.<sup>23</sup> Whereas generally the psychological cost of killing in combat is significant, when soldiers are further removed from the battlefield, such as the case with bomber and missile crews, this psychological cost seems to decline. Although it is true that any technological advancement (e.g. airplanes, logistical improvements, better communication) can limit the risks to a nation's soldiers and civilians, in the case of killer robots it seems to appear that the military risk will disappear completely. One of America's political thinkers, Michael Walzer, writes that *"even if the target is very important, and the number of innocent people threatened relatively small, they [the military] must risk soldiers before they kill civilians"*.<sup>24</sup>

This ever-increasing detachment from war can be felt not only by the combatants and officials, but also by the wider public. Citizens are also more detached from the war that is being fought in their name as war will no longer be part of their daily lives. No loved ones in body bags will return to the nation. Consequently, there will be no grieving families, no broadcasts counting the soldiers who died while defending their country and no veterans

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21 Peter Asaro is a philosopher of science, technology and media, co-founder of ICRAC and assistant professor at the New School University in New York. Asaro, P. (2008) How Just Could a Robot War Be? <http://peterasaro.org/writing/Asaro%20Just%20Robot%20War.pdf>, p. 7.

22 Kahn, P.W. (2002) *The Paradox of Riskless Warfare*. In: Faculty Scholarship Series, paper 326, p. 2.

23 Grossman, D. (1996) *On Killing: The Psychological Cost of Learning to Kill in War and Society*, New York, Back Bay Books, p. 108.

24 Walzer, M. (1992) *Just and Unjust Wars: A Moral Argument With Historical Illustrations*. New York, HarperCollins, p. 157.

suffering from post-traumatic stress disorder (PTSD) and severe depression. The aim of granting full autonomy to robots may well be saving lives, but by doing so, it will affect the way the public views and perceives war. Society is an intimate participant in war too, because the public's perception of events on distant battlefields creates pressure on elected leaders.<sup>25</sup> However, the increasing level of autonomy is turning the public into passive observers of their country at war. We may become intolerant of casualties among soldiers, but also among civilians, because we tend to embrace technology that alleviates our concerns.<sup>26</sup>

It is not only body bags that have a vital role in understanding warfare; soldiers and journalists sharing stories of war also shape public opinion. Journalists report the war back home and returning soldiers bring the war back with them by sharing their experiences with their loved ones, communities, or the media. They are a living account of the war happening miles and miles away; their psychological trauma and/or physical injuries make them living testimonies of the horrors of war. Although these stories and injuries are terrifying and brutal, they are the reality of conflict and they lift the fog of war. Both are major inhibitors of the use of force because they can cost politicians their votes. The wars in Vietnam and Iraq have proven that point. FAWs significantly remove political barriers and lower the bar for authorities to declare and enter war.<sup>27</sup> Not only will it be easier for a government to enter war, but also to stay at war or keep acts of war in the dark. If the cost to own troops is lower it may even cause an extension of the war.

As we transfer lethal decision-making in warfare from humans to machines, we also change our social landscape far from the battlefield.<sup>28</sup> In democratic societies, parliaments enhance checks and balances that allow the people to influence decision-making in national politics. However, by granting full autonomy to machines, this could reduce the counter-balance in democratic societies because entering into war and conflict would require less debate.

The perceived benefits of FAWs (such as less risks for the military, more precise target capabilities, and less financial costs) may give politicians the idea that autonomous weapons are a risk-free means of warfare. Perceived technological benefits could be augmented and the use of FAWs glorified. Consequently, deploying such weapon systems loses controversy with the result that there will be less checks and balances of the parliament concerning governmental decisions to use force. But if the parliament

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25 Singer, P.W. (2009) *Wired for War*. New York, Penguin Press, p. 317.

26 Guettein, M.A. (2005) *Lethal Autonomous Weapons – Ethical and Doctrinal Implications*. p. 17.

27 Contratto, M.R. (2011) *The Decline of the Military Ethos and Profession of Arms: an Argument Against Autonomous Lethal Engagements*, p. 4. And Asaro, P. M. (2008) *How Just Could a Robot War Be?* <http://peterasaro.org/writing/Asaro%20Just%20Robot%20War.pdf>, p. 4-9.

28 *Ibid.*

will not check and balance the government's power, then who will? According to novelist and Information Technology professional Daniel Suarez, FAWs “*may risk recentralizing power into very few hands, possibly reversing a five-century trend toward democracy. The tools we use in war change the social landscape. Autonomous robotic weapons are such a tool, except that by requiring very few people to go to war, they risk recentralizing power into very few hands.*”<sup>29</sup>

**FAWs will lower the threshold of going to war. Removing soldiers from the battlefield may lessen the terrible cost of war, but in so doing, it will also distance the public from experiencing war, giving politicians more space in deciding when and how to go to war. Once deployed, FAWs will make democratic control of war more difficult.**

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29 Daniel Suarez is a science-fiction novelist and IT professional. Suarez, D. (2013). *TED – Daniel Suarez: Robots mogen niet beslissen over leven en dood*. [http://www.ted.com/talks/daniel\\_suarez\\_the\\_kill\\_decision\\_shouldn\\_t\\_belong\\_to\\_a\\_robot.html](http://www.ted.com/talks/daniel_suarez_the_kill_decision_shouldn_t_belong_to_a_robot.html)



### 3. Distinction

*“A computer looks at an 80-year-old woman in a wheelchair the exact same way it looks at a T-80 tank. They are both just zeros and ones.”<sup>30</sup>*

– Peter Singer

Whereas the battlefield used to be the place where states fought each other, technological advances are moving soldiers further and further away from this area. Instead of taking place in remote areas, conflict is drawn to populated areas. One of the reasons for this is that weaker parties (often non-state actors) realized that their enemy needed to be drawn away from the conventional battlefield where it had an overwhelming advantage.<sup>31</sup> Instead of traditional state-to-state warfare, unconventional warfare is on the rise.

Not only have the battlefield and tactics changed, but so have the parties conducting the war. In addition to states represented by organized armies with men in uniform, war is also fought with and between insurgent groups. Often, insurgents hide under the civilian population, making it nearly impossible for military troops to isolate combatants from large non-combatant communities.

In line with the aforementioned developments, military technologies are becoming more and more advanced and precise, so militaries can deploy them in populated areas to engage hidden targets. However, in doing so, they lower the threshold to use force in populated areas.

The combination of these three trends has created a counter-insurgency environment where the civilian population has become an inextricable part of the battlefield at precisely the same time that the soldier is becoming increasingly protected from the threats and dangers of war.<sup>32</sup> Deploying FAWs would further fortify this trend by reducing risks for military, yet without reducing the risks for civilians. PAX believes that it is highly unlikely that FAWs can be designed in a way that they would be able to

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30 Peter Singer is a political scientist and one of the world's leading experts on changes in 21st century warfare. Singer, P.W. (2012) *Interview with Peter W. Singer*. In: *International Review of the Red Cross*, 94, 886, p. 476.

31 Mégret, F. (2011-2012) *War and the Vanishing Battlefield*. In: *Loyola University Chicago International Law Review*, 9, 1, p. 145.

32 Johnson, R. (2010) *Doing More with More: The Ethics of Counterinsurgency*. <http://isme.tamu.edu/ISME10/isme10.html> and Strawser, B.J. (2013) *Killing by Remote Control*. Oxford, Oxford University Press, p. 155.

comply with international humanitarian law better than humans can.<sup>33</sup> Let us examine the principle of distinction.

According to articles 48, 51, and 52 of the Additional Protocol I to the Geneva Conventions, all parties to a conflict shall at all times distinguish between civilians and combatants as well as between civilian objects and military objectives and, accordingly, only direct their operations against military objectives.<sup>34</sup> Although this principle seems unequivocal, it poses one of the greatest obstacles for fully autonomous weapons to comply with international humanitarian law. The changing nature of armed conflict – from state-to-state warfare to insurgency and other unconventional wars where combatants blend in with the civilian population – makes it increasingly difficult to discriminate between military and civilian objects, and combatants and non-combatants. In these dynamic circumstances it is necessary that autonomous robots have the ability to understand both the context in which they operate (situational awareness) as well as underlying human intentions that create this context; two qualities that they commonly lack. The computational systems embedded in FAWs will not understand humans in the way that is needed in conflict scenarios. They will not be able to replace the judgment of an experienced human commander. The International Committee of the Red Cross states that *“the development of a truly autonomous weapon system that can implement IHL represents a monumental programming challenge that may well prove impossible.”*<sup>35</sup> Or as roboticist, expert in artificial intelligence and co-founder of ICRAC Noel Sharkey puts it, *“they [vision systems]*

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33 Views differ on this. Arkin has speculated that machines may be as good as humans at discrimination within the next 20 years. See: Arkin, R. (2009) *Governing Lethal Behavior in Autonomous Robots*. Boca Raton, Taylor & Francis Group. However, as Sharkey stated *“even if machines had adequate sensing mechanisms to detect the difference between civilians and uniform-wearing military, they would still be missing battlefield awareness or common sense reasoning to assist in discrimination decisions. We may move towards having some limited sensory and visual discrimination in certain narrowly constrained circumstances within the next fifty years. However, I suspect that human-level discrimination with adequate common sense reasoning and battlefield awareness may be computationally intractable. At this point we cannot rely on machines ever having the independent facility to operate on this principle of distinction as well as human soldiers can. There is no evidence or research results to suggest otherwise.”* See: Sharkey, N. (2012) *The Evitability of Autonomous Robot Warfare*. In: International Review of the Red Cross, 94, 886, p. 789.

34 Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, <http://www.icrc.org/ihl.nsf/7c4d08d9b287a42141256739003e636b/f6c8b9fee14a77fdc125641e0052b079>

35 International Committee of the Red Cross. (2011) *International Humanitarian Law and the challenges of contemporary armed conflicts*. <http://www.icrc.org/eng/assets/files/red-cross-crescent-movement/31st-international-conference/31-int-conference-ihl-challenges-report-11-5-1-2-en.pdf>, p. 40.

can just about tell the difference between a human and a car, but they cannot tell the difference between a dog standing on its legs or a statue and a human.”<sup>36</sup>

**FAWs cannot be programmed in such a way that they will be able to make sound decisions about who is a combatant and who is a civilian. Currently, their mechanical manner of intelligence makes it impossible to apply the rule of distinction.**

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36 Noel Sharkey during a parliamentary briefing in London in April 2013. According to Sharkey, the vision systems of these robots are very limited. All that is available to robots are sensors such as cameras, infrared sensors, sonars, lasers, temperature sensors and ladars, etc. They may be able to tell whether something is human, but not much else. There are certain labs with systems that can tell someone’s facial expression or that can recognize faces, but they do not work on real-time moving people. Source: Sharkey, N. (2008) *Grounds for Discrimination: Autonomous Robot Weapons*. In: RUSI Defence Systems. <http://www.rusi.org/downloads/assets/23sharkey.pdf>

## 4. Proportionality

*"It is humans, not machines, who devised the laws of war and it is humans, not machines, who will understand them and the rationale for applying them."*

– Noel Sharkey<sup>37</sup>

Let us continue with another fundamental principle of international law: the principle of proportionality. The principle of proportionality is codified in article 51 (5) (b) of the Additional Protocol I and repeated in article 57. The requirement that an attack needs to be proportionate basically means that harm to civilians and civilian objects must not be excessive relative to the expected military gain. More specifically, even if a weapon meets the test of distinction, any use of a weapon must also involve evaluation that sets the anticipated military advantage to be gained against the anticipated civilian harm. The principle of proportionality is one of the most complex rules of international humanitarian law. Michael Schmitt, professor at the U.S. Naval War College, states, "*While the rule is easily stated, there is no question that proportionality is among the most difficult of LOIAC [law of international armed conflict] norms to apply.*"<sup>38</sup> In practice, the proportionality analysis is too highly contextual to allow it to be reduced to a simple formula, such as three dead children per one low-level terrorist. Circumstances in conflict scenarios are subject to constant change. A slight change in events – for example, a soldier approaching with or without his hands up to either attack or surrender – could completely alter the circumstances and, as a result, change the legally expected response. Therefore, the proportionality analysis requires a case-by-case approach and a thorough and often complex analysis of the context, motives and intention of the actors. Given the fact that there is no clear metric to what the principle of proportionality requires and every attack needs to be reviewed on an individual basis, it is difficult to imagine how to develop sufficient software coding in order to frame robot behavior. It seems impossible to pre-program a robot to handle the very large, perhaps infinite, number of scenarios it might face on the battlefield.

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37 Noel Sharkey is Professor of Artificial Intelligence and Robotics Professor of Public Engagement at the University of Sheffield and co-founder of ICRAAC. Sharkey, N. (2012). *The Evitability of Autonomous Robot Warfare*. In: *International Review of the Red Cross*, 94, 886, p. 796.

38 Schmitt, M. (2006) *Fault Lines in the Law of Attack*. In: *Testing the Boundaries of International Humanitarian Law*, Breau, Susan & Jachec-Neale, Agnieszka, eds, p. 293.

Moreover, proportionality is widely understood to involve human judgment, a quality that robots inherently lack. The International Criminal Tribunal for the former Yugoslavia, for instance, relies on the “*reasonable person*” standard. The International Committee of the Red Cross (ICRC) refers to the interpretation as being a matter of both “*common sense*” and “*good faith*”.<sup>39</sup> Given the current level of technological development, it is difficult to determine whether robots will ever be capable of making the highly relational and contextual assessment necessary to weigh the proportionality of an attack.

**As it is already extremely complex to weigh military gain and human suffering in war situations, machines without meaningful human intervention will be incapable of applying the rule of proportionality.**

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39 International Committee of the Red Cross. *Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 8 June 1977. Commentary – Precautions in attack. <http://www.icrc.org/ihl.nsf/COM/470-750073?OpenDocument>

## 5. Accountability gap

*“While technology enables us to delegate a number of tasks, and even sometimes to avoid making mistakes, it in no way allows us to delegate our moral and legal responsibility to comply with the applicable rules of law.”*

– Vincent Bernard<sup>40</sup>

One of the problems caused by autonomous robots is that they create an important amount of uncertainty relating to their behavior. If one nation’s autonomous robots were to fight other autonomous robots, you could not foresee what would happen – that is the reality of computer science.<sup>41</sup> No state will tell an enemy state what their computational attack algorithm is. This means that, with the complexity of contemporary conflicts, the result is unpredictable. *“The robots could just start to slaughter humans. They could easily trigger an unintentional war by attacking a target nobody had commanded them to attack,”* explains Noel Sharkey.<sup>42</sup> Given the challenges FAWs present, it seems inevitable that they will make mistakes that may very well result in the deaths of innocent people. But if FAWs are replacing the role of humans in warfare, then to whom do we assign blame and punishment for misconduct and unauthorized harms caused by them? In other words, who will be held responsible for the actions of a robot? The robot itself, the programmer, the manufacturer, or the commander?

### The robot

To say of an agent that it is autonomous is to say that its actions originate in that agent, so when an agent acts autonomously, it is not possible to hold anyone else responsible for its actions.<sup>43</sup> However, this becomes problematic when the agent is a FAW. A machine cannot be sentenced like humans can be sentenced. *“We could threaten to switch it off but that would be like telling your washing machine that if it does not remove stains properly you*

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40 Vincent Bernard is the Editor in Chief of the International Review of the Red Cross. Bernard, V. (2012). *Editorial: Science cannot be placed above its consequences*. In: International Review of the Red Cross, 94, 886, p. 464.

41 Tholl, M. (2013). *The line between robots and humans is becoming very blurry*. In: The European. - In his own paper on proliferation Sharkey notes: *“Imagine two or more complex algorithms interacting on high-speed armed robots. Without any knowledge of the other algorithms, there is no way to tell what would happen. They might just crash into one another or into the ground, or they might end up unleashing their destructive power in completely the wrong place. The point is that software algorithms on autonomous armed drones spiraling out of control is something to be very seriously concerned about.”* Sharkey, N. (2011). *Automation and Proliferation of Military Drones and the Protection of Civilians*. In: Journal of Law, Innovation and Technology, 3, 2.

42 Tholl, M. (2013). *The line between robots and humans is becoming very blurry*. In: The European. <http://www.theeuropean-magazine.com/noel-sharkey/7135-humanitys-robotic-future>

43 Sparrow, R. (2007) *Killer Robots*. In: Journal of Applied Philosophy, 24, 1, p. 65.

*will break its door off,”* points Noel Sharkey out.<sup>44</sup> It would also not be satisfying for the victims for a machine to be “punished”. Furthermore, sentencing a machine could amount to giving the military a *carte blanche* because any responsibility could be transferred to the weapon system.<sup>45</sup> The military will no longer have to be cautious about ordering the deployment of FAWs. In other words, we might lose the deterrent effect and any identifiable accountability. Alternative options for accountability then become the programmer, the manufacturer, or the commander.

### The programmer

A FAW is programmed by many different people. As a result, in the end there is not one single developer or programmer. One could argue that it is the case with almost every single product, but for FAWs this is more complex and this phenomena has a stronger impact. As Patrick Lin of California Polytechnic State University writes, “*Programs with million of lines of code are written by teams of programmers, none of whom knows the entire program.*”<sup>46</sup> Consequently, no individual can predict the effect of a given command with absolute certainty, since portions of large programs may interact in unexpected, untested, and unintended ways. The increasing complexity of contemporary battlefields makes it extremely difficult, if not impossible, to predict all possible scenarios. In addition to humans, one nation’s FAWs could also engage with other autonomous robots, creating unforeseeable situations. Unpredictability in the behavior of complex robots is a major source of concern, especially if robots are to operate in unstructured environments, rather than in the carefully-structured domain of a factory.<sup>47</sup>

### The manufacturer

FAWs are complex systems that are often combined out of a multitude of components. Hence, many producers will work on a part of the final product. The final assembler of the robot may be held responsible for making any mistakes in assembling the robot, but they can neither control nor predict the actions of the robot so they cannot be held accountable for any misconduct. It might even be the case that the FAW is composed of different components (hardware and software) working together from different locations (imagine a satellite, a computer and a weapon working together).<sup>48</sup>

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44 Sharkey, N. (2010). *Saying 'No!' to Lethal Autonomous Targeting*, In: Journal of Military Ethics, 9, 4, p. 380.

45 Already we see examples of transferring the blame to machines. In December 2013 Yemeni security officials stated that a U.S. drone slammed into a convoy of vehicles travelling to a wedding party in central Yemen killing at least 13 people. A military official said initial information indicated that the drone mistook the wedding party for an al-Qaeda convoy. Al-Haj, A. (2013) *Officials: U.S. drone strike kills 13 in Yemen*. In: the Washington Post. [http://www.washingtonpost.com/world/officials-us-drone-strike-kills-13-in-yemen/2013/12/12/3b070f0a-6375-11e3-91b3-f2bb96304e34\\_story.html?tid=auto\\_complete](http://www.washingtonpost.com/world/officials-us-drone-strike-kills-13-in-yemen/2013/12/12/3b070f0a-6375-11e3-91b3-f2bb96304e34_story.html?tid=auto_complete) (13-12-2013).

46 Lin, P. et.al. (2009) *Robots in War: Issues and Risk and Ethics*. p. 54.

47 *Ibid.*

48 Article 36 (2013) *The Road Ahead for Autonomous Weapons*. <http://www.article36.org/weapons-review/the-road-ahead-for-autonomous-weapons/>

Also, there are many reasons why the robot can malfunction; for instance, it can be hacked, damaged or misused. It is easy for a manufacturer to make clear any limitations of the robot to the buyer, making it extremely difficult to hold them criminally liable for the robot's actions.<sup>49</sup> According to Robert Sparrow, PhD Monash University and co-founder of ICRAAC, to hold the programmers or manufacturers responsible for the actions of their creation, once it is autonomous, “*would be analogous to holding parents responsible for the actions of their children once they have left their care.*”<sup>50</sup>

### **The commander**

The “fully autonomous” in FAWs means that there is no longer a significant role for the commanding officers. If fully autonomous weapon systems will be capable of selecting targets and delivering force without any human input or interaction, this would imply that no commander is directly instructing them. A killer robot is guided by a computer algorithm. An algorithm cannot be tested for every circumstance and can go wrong in many ways. A computer can also be jammed, hacked or spoofed by the enemy or hacked in the industrial supply chain.<sup>51</sup> This makes such systems unpredictable and not under sufficient control of a commander.

Overall, the use of new technologies in warfare could make it more complex to attribute accountability for violations of international humanitarian law for two main reasons. First, the number of people involved in the building, acquisition, and use of machines augments in the case of new technological advancements, thereby complicating the chain of responsibility. Second, the technical difficulties make it more difficult to identify those responsible for any violations of international humanitarian law committed by a FAW.<sup>52</sup> Hence, PAX believes that the use of FAWs would lead to an accountability vacuum that would render any responsibility mechanism impossible to implement.

**FAWs complicate the chain of responsibility. This leads to an accountability vacuum that makes it impossible to hold anyone sufficiently accountable for violations of international law incurred by a FAW.**

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49 Sparrow, R. (2007) *Killer Robots*. In: *Journal of Applied Philosophy*, 24, 1, p. 69.

50 *Ibid.*, p. 70.

51 U.S. Department of Defense (2012) *Directive 3000.09*, p.14.  
<http://www.dtic.mil/whs/directives/corres/pdf/300009p.pdf>

52 Bernard, V. (2012) *Editorial*. In: *International Review of the Red Cross*, 94, 886, p. 464.



# 6 The lack of transparency

*“The desire of states to achieve military advantage, and of companies to achieve commercial gain, all bear against flexibility and transparency.”*

– Thomas Nash and Richard Moyes<sup>53</sup>

The issue of transparency can be divided into two different categories, development and deployment. There are procedures that focus upon legal review of weapons at the stages of *development*, but transparency about *deployment* of weapons is also encouraged. Carrying out legal reviews of new weapons, methods and means of warfare is of particular importance today in light of the rapid development of new technologies.<sup>54</sup> Whereas, currently, all weapons still have a human in the loop, FAWs will not. Hence, no soldiers will return from the battlefield with stories of their and their comrades’ deeds. Also, the weapon system itself will have the capability to operate anonymously and execute clandestine missions. Checking up on these systems when the responsibility chain is so highly complicated seems almost impossible and hinders discussion and (democratic) monitoring. Therefore, transparency about the development and deployment of FAWs would be even more important.

## Transparency about development

States should review new and modified weapons for their compliance with international law. This rule is codified in article 36 of Additional Protocol I to the Geneva Conventions, which states:

In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.

The purpose of this article is to prevent states from developing inhumane weapons. Although not all states have ratified Additional Protocol I, the requirement that the legality of all new weapons, means and methods of warfare be systematically

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53 Thomas Nash is Director of the U.K.-based NGO Article 36 and Richard Moyes is a Managing Partner at Article 36. Nash, T., Moyes, R. et.al. (2012) *The roles of civil society in the development of standards around new weapons and other technologies of warfare*. In: *International Review of the Red Cross*, 94, 866, p. 767.

54 International Committee of the Red Cross (2006) *A Guide to the Legal Review of New Weapons, Means and Methods of Warfare*. [http://www.icrc.org/eng/assets/files/other/icrc\\_002\\_0902.pdf](http://www.icrc.org/eng/assets/files/other/icrc_002_0902.pdf), p. 933.

assessed is arguably one that applies to all states, regardless of whether they are party to the Protocol.<sup>55</sup> Only a limited number of states have put in place mechanisms to conduct legal reviews of new weapons.<sup>56</sup> The United States is one notable example of a state that, although it is not party to Additional Protocol I, carries out legal reviews.<sup>57</sup> Article 36 neither states how the legal review needs to be conducted nor requires states to make public their weapon reviews.<sup>58</sup> Therefore, it is extremely difficult to promote transparency or to hold states accountable for developing inhumane weapons, in particular regarding dual-use technologies. One example is the case of the MQ1-Predator UCAV. The U.S. legal office that needs to review each new weapon (Judge Advocate General, or JAG) first passed the Predator for surveillance missions. After it was armed with Hellfire missiles, the office said that because it had already separately passed both the Predator and Hellfire missiles, their combination did not require a new review.<sup>59</sup>

A more recent example is the X-47B. The X-47B performs autonomous take-off and landing from aircraft carriers. These developments could be the first steps towards an FAW; however, the autonomous launching and landing of the drone is not something in itself that should be prohibited by international law. One of the main problems is that FAWs are not a weapon system until they are armed. This could mean that researchers and developers of these algorithms and weapons systems could continue their work on FAWs without providing any transparency until the very final stages of development: the weaponization.

### Transparency about deployment

Limited or no transparency about the deployment of FAWs would concentrate too much power in too few unseen hands.<sup>60</sup> Drone strikes in Pakistan, for instance, are clandestine operations. For a long time, the CIA did not even acknowledge that the drone program existed. The Asia Times refers to the drone strikes in Pakistan as “*the most public ‘secret’ war of modern times*”<sup>61</sup>. As a result of this secrecy and concealment, information about attacks and their legality under international law are extremely limited and, overall, very inconsistent.

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55 *Ibid.*

56 *Ibid.*, p. 934. Only Australia, Belgium, Sweden, the United States and the Netherlands have put in place procedures or mechanisms to assess the legality of new weapons. France and the United Kingdom have indicated to the ICRC that they carry out legal reviews pursuant to Ministry of Defence instructions, but these have not been made available.

57 U.S. Department of Defense (1974) *Review of Legality of Weapons under International Law*; U.S. Department of Air Force. (1994) Weapons Review. among with other directives.

58 Nash, T., Moyes, R. et al. (2012) *The roles of civil society in the development of standards around new weapons and other technologies of warfare*. In: *International Review of the Red Cross*, 94, 866, p. 781.

59 Sharkey, N. (2008). *Cassandra or False Prophet of Doom: AI Robots and War*. In: IEEE Computer Society, p. 17. And Canning, J.S. et al. (2004). *A Concept for the Operation of Armed Autonomous Systems on the Battlefield*.

60 Suarez, D. (2013). TED – Daniel Suarez: *Robots mogen niet beslissen over leven en dood*. [http://www.ted.com/talks/daniel\\_suarez\\_the\\_kill\\_decision\\_shouldn\\_t\\_belong\\_to\\_a\\_robot.html](http://www.ted.com/talks/daniel_suarez_the_kill_decision_shouldn_t_belong_to_a_robot.html)

61 Turse, N. *Drone surge: Today, tomorrow and 2047*. In: Asia Times. [http://www.atimes.com/atimes/South\\_Asia/LA26Df01.html](http://www.atimes.com/atimes/South_Asia/LA26Df01.html) (26-01-2010).

Drone strikes are hardly covert or deniable, but technological progress will soon lead to FAWs that could be the size of an insect or even a grain of sand, and could autonomously identify and kill their targets (or tag individuals and guide weapons to them).<sup>62</sup> Contrary to drone attacks, these attacks are easily deniable and prone to be (mis)used in anonymous attacks. Also, given the lack of transparency and consistency of information in drone warfare, it would be hard to imagine that governments and their officials would be open and transparent about the use and impact of FAWs.

**The development and deployment of FAWs will not be in compliance with the necessary level of transparency required for meaningful accountability.**

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62 Krishnan, A. (2009). *Killer Robots*. Farnham, Ashgate Publishing Limited, p. 149.

# 7. Unanticipated consequences

*"Sometimes, the more you protect your force, the less secure you may be."*

– U.S. Department of the Army<sup>63</sup>

Killer robots will terrify local populations and, possibly, cause hatred among them. But besides the effects experienced by the population of the attacked state, the use of FAWs could also be counter-productive and endanger civilians of the state using FAWs. First, we look at the fear and hatred they might cause amongst the population of the state where they will be deployed, and then we examine possible dangers for civilians in the states that deployed them.

## Fear

History is filled with all sorts of tactics in which methods and means of warfare are meant to create some sort of psychological effect. This ranges from particularly tall soldiers with peaked hats to make them look taller, to the loudspeakers around the city of Fallujah that broadcasted the sinister laughter of the alien from the Predator movie in order to spook insurgents.<sup>64</sup> However, such tactics do not limit their psychological effects to combatants. In September 2012 the Stanford Law School published a report called "Living Under Drones" with firsthand testimonies about the negative impacts that U.S. policies are having on civilians living in areas where drones are deployed. It stated that drone strike policies cause considerable and under-accounted-for harm to the daily lives of ordinary civilians, beyond death and physical injury.<sup>65</sup> The continuous presence of drones terrorizes men, women, and children, giving rise to anxiety and psychological trauma among civilian communities.<sup>66</sup>

The Stanford Law School is not the only one to send a strong message concerning the psychological effects of unmanned vehicles. A team from Foster-Miller, the military robotics manufacturer, stated that *"the psychological effects will be significant"*.<sup>67</sup> And Army Staff Sergeant Scott Smith says that *"without even having to fire the weapons [...] it's total*

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63 U.S. Department of the Army (2006). *Counterinsurgency Field Manual No. 3-24*, p. 1-27.

64 Singer, P.W. (2009). *Wired for War*. New York, Penguin Press, p. 303.

65 International Human Rights and Conflict Resolution Clinic at Stanford Law School and Global Justice Clinic at NYU School of Law. (2012). *Living Under Drones: Death, Injury, and Trauma to Civilians from US Drone Practices in Pakistan*. <http://www.livingunderdrones.org/report/>, p. vii.

66 *Ibid.*

67 Singer quotes them in his book 'Wired for War', p. 298.

*shock and awe.*<sup>68</sup> If this is the emotional impact of remotely piloted vehicles, then try to imagine the impact of fully autonomous killer robots. Whereas our recent drones still have a human in the loop, killer robots will function fully autonomously. Also, whereas drones are mostly remotely piloted aerial vehicles, killer robots will likely take any form – Aerial Vehicles, Ground Vehicles and Underwater Vehicles – making them capable of emerging from any and all directions. Nonetheless, the fears instigated by these types of tactics do not come without a price.

## Hatred

The fact that humans are no longer physically present at the time of an attack makes the killing seem particularly unfair and cowardly. Using FAWs instead of humans in wars indicates unwillingness to sacrifice and a tendency to treat the opponent as an object rather than as a human being demanding respect. As Krishnan notes, *“Robots can never ‘win hearts and minds’ and would likely indicate to the protected population that the intervening nation does not view the mission as very important, certainly not important enough to risk its own peoples’ lives.”*<sup>69</sup> Hence, deploying FAWs could cause stronger hatred among the population of the targeted state towards the attacking state. The increasingly entrenched moral outrage works against the attacking state’s interests. They risk contributing to a world of persistent conflict as being physically present in the country at war will prove vital in creating political solutions and boots on the ground will likely contribute to sustainable peace after hostilities cease. According to a report by Jefferson Morley, anger over U.S. drone attacks has helped destabilize Yemen as well. When these attacks began in December 2009 Al-Qaida had 200 to 300 members and controlled no territory. Now it has *“more than 1,000 members”* and *“controls towns, administers courts, collects taxed, and generally, acts like the government.”*<sup>70</sup>

## Possible impact on deploying states

Often, conflicts between non-state actors and states are asymmetric because one side depends on highly technical weapons while the other side does not. Unfortunately, overwhelming superiority of the one party could drive adversaries to seek asymmetrical advantages. They often cannot compete on the basis of pure military power, but they can cause real damage by using irregular and immoral means of warfare. Under these circumstances, a technically disadvantaged party may see benefits in engaging in terrorism. Or as Christopher Coker, Professor of International Relations at the London School of Economics and Political Science, puts it, *“[the nation’s] attempt to make war more humane for its own soldiers and the viewers back home is making it increasingly*

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68 Singer quotes him in his book ‘Wired for War’, p. 298.

69 Krishnan, A. (2009). *Killer Robots*. Farnham, Ashgate Publishing Limited, p. 127.

70 Morley, J. (2012). *Hatred: What drones sow*. In: Salon. [http://www.salon.com/2012/06/12/hatred\\_what\\_drones\\_sow/](http://www.salon.com/2012/06/12/hatred_what_drones_sow/) (11-11-2012).

*vulnerable to the kind of asymmetric strategies we saw [...] on September 11, 2001.*<sup>71</sup>

Non-state actors play a vital role in modern warfare. Although there is a huge technological gap between high-tech militaries and non-state actors, there is a constant intellectual battle going on between them.<sup>72</sup> Both parties constantly adapt. Technically superior states use sophisticated weapons and, in response, non-state actors always try to outsmart them. In Iraq, a U.S. soldier discovered that insurgents had been able to capture one of their robots and used it against them.<sup>73</sup> But capturing robots and using them against an adversary is not the only way to counter technological superiority. Technology can also render a party weak, because the increasing use of technology leaves a party vulnerable for cyber (and other computer-steered or data-based) attacks.<sup>74</sup> Data powers high-tech societies, making citizens of high-tech societies more visible to machines than any people in history.<sup>75</sup>

In conclusion, PAX is of the opinion that the deployment of FAWs could endanger civilians in states with high-tech militaries in two ways. First, FAWs create fear and fuel hatred which could consequently cause the attacked to respond with disproportionate means targeting the enemy's civilians. Second, the immense use of data of high-tech societies makes citizens of that society more visible to machines and thereby more vulnerable to attacks. Hence, although FAWs may be pursued in order to gain a military advantage upon adversaries, these systems also put a high-level risk upon civilians of the deploying state.

**FAWs will terrify local populations in nations where they will be deployed and, possibly, cause stronger hatred and further destabilization. At the same time, the increased use of data by high-tech societies deploying FAWs exposes their civilians and makes them more vulnerable to possible counter attacks.**

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71 Coker, C. (2002) *Waging War Without Warriors*. Colorado, Lynne Rienner Publishers, p. 62.

72 Peter Singer quotes Foster-Miller in his book 'Wired for War', p. 218.

73 Singer, P.W. (2009) *Wired for War*. New York, Penguin Press, p. 219.

74 It should be noted here that, according to Peter Singer, this is not something "that a couple of 14-year olds sipping Red Bull can do" and neither "is it something that a couple of would-be terrorists hiding out in an apartment in Hamburg will be able to figure out". Singer, P.W. (2012) *Interview with Peter W. Singer*. In: *International Review of the Red Cross*, 94, 886, p. 471.

75 Suarez, D. (2013) TED – *Daniel Suarez: Robots mogen niet beslissen over leven en dood*. [http://www.ted.com/talks/daniel\\_suarez\\_the\\_kill\\_decision\\_shouldn\\_t\\_belong\\_to\\_a\\_robot.html](http://www.ted.com/talks/daniel_suarez_the_kill_decision_shouldn_t_belong_to_a_robot.html)

## 8. The problem called proliferation

*“What happens when another country sees what we’ve been doing, realizes it’s not that hard, and begins to pursue it too but doesn’t have the same moral structure we do? You will see a number of countries around the world begin to develop this technology on their own, but possibly without the same level of safeguards that we might build in. We soon could be facing our own distorted image on the battlefield.”*

– John Canning<sup>76</sup>

History shows that developments in military technology, from crossbows to drones, give the inventing side a temporary military advantage. Although FAWs require high-level skills in the development of robotic weapons and their algorithms, their proliferation to other states would most likely be inevitable.

Proponents of FAWs argue that if *“we do not exploit technology, someone else will.”*<sup>77</sup> One of the main arguments of governments in favor of developing FAWs is to stay ahead of their enemies. According to some, it is just a matter of time until other nations possess the capability to produce FAWs and gain the perceived technological advantage.<sup>78</sup> Or, as Giulio Douhet puts it, *“Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.”*<sup>79</sup> For this reason states are particularly reluctant to ban FAWs at this stage. As the world saw with the development, production, and possession of nuclear weapons, only when more states have them will the same states be open for a treaty. In particular, possessors will be interested in a treaty that closes the door for other states to acquire or use them. The major concern is that very sophisticated technology could become commercially available to rogue states, private organizations and dangerous individuals. For instance, Hezbollah used an Iranian-supplied armed unmanned aerial vehicle (UAV) to attack an Israeli ship in 2006.<sup>80</sup>

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76 John Canning is chief engineer at the US Naval Surface Warfare Center in Virginia. Canning, J.S. (2002) *A Definitive Work on Factors Impacting the Arming of Unmanned Vehicles, report NSWCDD/TR-05/36 P.*

77 Guettein, M.A. (2005) *Lethal Autonomous Weapons – Ethical and Doctrinal Implications*, p. 14.

78 *Ibid.*

79 Douhet, G. (1921) *The Command of the Air*.

80 Hendawi, H. (2006) *Israel: Hezbollah Drone Attacks Warship*. In: The Washington Post. <http://www.washingtonpost.com/wp-dyn/content/article/2006/07/14/AR2006071401786.html> (14-7-2006).

It is not surprising that such widespread and cheap (according to Noel Sharkey, FAWs could cost as little as £250<sup>81</sup>) technology will also be available to rogue states and organizations. Consequently, FAWs may at some point be used by a variety of state and non-state actors. However, it should be noted that these latter versions of FAWs are likely to be very primitive, such as a robotic sentry gun that opens fire on any person that comes near it.<sup>82</sup> The level of intelligence that is needed for military FAWs is much more complex and, hence, beyond the capabilities of rogue states and malevolent individuals and terrorist groups. Nevertheless, once FAWs are developed, it is not extremely difficult to copy them.<sup>83</sup> If FAWs were to be developed, produced, and used by states, these systems would proliferate widely. It should be noted here, too, that these systems would at some point also fight each other, and with the wide variety of unknown algorithms the consequences would be unpredictable and most likely devastating. This would result in an overall threat to society not only from state governments but also from non-state actors such as insurgents and terrorist organizations. Unfortunately, the proliferation of weapons is an extremely difficult cycle to break.<sup>84</sup> Therefore, PAX believes FAWs should never be developed in the first place and a comprehensive and pre-emptive ban should be put in place before it is too late.

**FAWs are relatively cheap and easy to copy. If they are produced and used, they would proliferate widely under states and non-state actors. They would interact with other FAWs and their effects would be unpredictable and most likely devastating.**

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81 Krishnan, A. (2009) *Killer Robots*. Farnham, Ashgate Publishing Limited, p. 147.

82 *Ibid.*

83 Sharkey, N. (2010) *Saying 'No!' to Lethal Autonomous Targeting*, In: *Journal of Military Ethics*, 9, 4, p. 381.

84 Lin, P. et. al. (2008) *Autonomous Military Robotics. Risk, Ethics, and Design*. [http://ethics.calpoly.edu/ONR\\_report.pdf](http://ethics.calpoly.edu/ONR_report.pdf), p. 82.



# Recommendations

## Response to the issue by states and UN agencies

It is encouraging to see how quickly states reacted to the call by NGOs that there is an urgent need to address this issue. Only seven months after the Stop Killer Robots Campaign was launched in London, the Convention on Conventional Weapons (CCW) adopted on 15 November 2013 a mandate to discuss the issue.

The meeting decided that the Chairperson [Mr. Jean-Hugues Simon-Michel, Ambassador of France] will convene in 2014 a four-day informal Meeting of Experts, from 13 to 16 May 2014, to discuss the questions related to emerging technologies in the area of lethal autonomous weapons systems. He will, under his own responsibility, submit a report to the 2014 Meeting of High Contracting Parties to the Convention, objectively reflecting the discussions held.<sup>85</sup>

PAX welcomes this decision and hopes the CCW (as well as other UN forums) will discuss the issue thoroughly and adopt a mandate to negotiate a treaty as soon as possible.

It is also encouraging to see how other UN agencies and the UN Secretary-General stated their concerns. The report from the UN Secretary-General on Protection of Civilians in Armed Conflict (2013) states:

In the future, these concerns, and others, may apply also to the use of autonomous weapons systems, or what are known as 'killer robots', which, once activated, can select and engage targets and operate in dynamic and changing environments without further human intervention. Important concerns have been raised as to the ability of such systems to operate in accordance with international humanitarian and human rights law. Their potential use provokes other questions of great importance: is it morally acceptable to delegate decisions about the use of lethal force to such systems? If their use results in a war crime or serious human rights violation, who would be legally responsible? If responsibility cannot be determined as required by international law, is it legal or ethical to deploy such systems? Although autonomous weapons systems as described herein have not yet been deployed and the extent of their development as a military technology remains unclear, discussion of such

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85 Convention on Conventional Weapons (2013). *Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects*. <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/ccw/MSP-2013/Documents/draftreport.pdf>

questions must begin immediately and not once the technology has been developed and proliferated. It must also be inclusive and allow for full engagement by United Nations actors, ICRC [International Committee of the Red Cross] and civil society.<sup>86</sup>

And the UN Office of the High Commissioner for Human Rights (OHCHR) gave the following statement on International Human Rights Day (10 December 2013):

But we have also seen how new technologies are facilitating the violation of human rights, with chilling 21st Century efficiency. [...] So-called 'Killer robots' – autonomous weapons systems that can select and hit a target without human intervention – are no longer science fiction, but a reality. Their likely future deployment poses deeply troubling ethical and legal questions. Continued vigilance is needed to ensure that new technologies advance rather than destroy human rights. No matter the scale of these changes, existing international human rights law and international humanitarian law governing the conduct of armed conflict remain applicable. States must ensure that they are applied."<sup>87</sup>

### Recommendations

The Campaign to Stop Killer Robots was established to provide a coordinated civil society response to the multiple challenges that fully autonomous weapons pose to humanity. In line with the Campaign to Stop Killer Robots, PAX calls for a pre-emptive and comprehensive ban on the development, production, and use of fully autonomous weapons. This should be achieved through new international law as well as through national laws and other measures.

### States should therefore:

- Engage in a diplomatic process leading to a comprehensive ban on the development, production, and use of fully autonomous weapons;
- Install a moratorium on at least the research, testing, production, assembly, transfer, acquisition, deployment, and use of fully autonomous weapons before a legally binding international treaty is negotiated; and
- Develop national policies on fully autonomous weapons and start to discuss and develop language on concepts such as “meaningful human control”.

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86 United Nations Security Council (2013). *Report of the Secretary-General on the protection of civilians in armed conflict*. p. 7. [http://www.un.org/ga/search/view\\_doc.asp?symbol=S/2013/689](http://www.un.org/ga/search/view_doc.asp?symbol=S/2013/689)

87 United Nations Office of the High Commissioner for Human Rights (2013) *A 20-20 Human Rights Vision Statement by the UN High Commissioner for Human Rights Navi Pillay for Human Rights Day, 10 December 2013*. <http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=14074&LangID=E>



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