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Editorial

Von Veronika Bock

Robots on the trigger – while that sounds like science fiction, the fact is that around sixty countries and armies are currently working on such lethal autonomous systems. They evaluate the available data in fractions of a second, enabling them to decide accurately when and where to fire. Nothing can distract them. Human failings are no longer a source of error, and precise warfare using combat robots reduces collateral damage. This trend and the associated capabilities raise many questions as well as ethical concerns.

Can soldiers really be replaced? Are algorithm-equipped autonomous weapons systems actually capable of taking over highly complex decision processes in all kinds of deployment scenarios? Doesn't responsible decision-making require a conscience? Self-reflection and empathy are key to making ethical judgments and decisions. Can these human abilities be translated even approximately into artificial intelligence?

The debate surrounding fully autonomous weapons systems is an example which shows that issues in military ethics, far from being aloof from reality, arise directly from the lives and experiences of the military and, for example, from the challenges which accompany asymmetric wars and conflicts, and technological advancements in warfare.

A second basic point emerges from this debate, namely that military ethics should be an interdisciplinary subject. The military question and military expertise, the international law

perspective, the moral philosophical or even theological point of view, as well as current findings from the empirical sciences – such as psychology and political science – should be investigated and examined so as to enable an adequate response to current challenges, and avoid being one-sided or myopic.

Finally, the debate should be international, and contentious – as demonstrated by the articles in our first military ethics e-journal, “Ethics and Armed Forces – Controversies in Military Ethics & Security Policy”.

The intention of the e-journal is to make subject matter and content from zebis training and podium events available in essay style to an interested international audience, and so – in keeping with the role of zebis as an innovative church-affiliated educational organization – to promote and stimulate debate on current topics in military ethics.

I would like to thank everybody who has contributed to this edition – the renowned authors, the co-editors and especially the zebis editorial team.



Veronika Bock
Director of zebis

Lethal Autonomous Systems and the Plight of the Non-combatant

By Ronald C. Arkin

It seems a safe assumption, unfortunately, that humanity will persist in conducting warfare, as evidenced over all recorded history. New technology has historically made killing more efficient, for example with the invention of the longbow, artillery, armored vehicles, aircraft carriers, or nuclear weapons. Many view that each of these new technologies has produced a *Revolution in Military Affairs* (RMA), as they have fundamentally changed the ways in which war is waged. Many now consider robotics technology a potentially new RMA, especially as we move towards more and more autonomous¹ systems in the battlefield.

Robotic systems are now widely present in the modern battlefield, providing intelligence gathering, surveillance, reconnaissance, target acquisition, designation and engagement capabilities. Limited autonomy is also present or under development in many systems as well, ranging from the *Phalanx* system “capable of autonomously performing its own search, detect, evaluation, track, engage and kill assessment functions”², *fire-and-forget* munitions, loitering torpedoes, and intelligent antisubmarine or anti-tank mines among numerous other examples. Continued advances in autonomy will result in changes involving tactics, precision, and just perhaps, if done correctly, a reduction in atrocities as outlined in research conducted at the *Georgia Tech Mobile Robot Laboratory* (GT-MRL)³. This paper asserts that it may be possible to ultimately

create intelligent autonomous robotic military systems that are capable of reducing civilian casualties and property damage when compared to the performance of human warfighters. Thus, it is a contention that calling for an outright ban on this technology is premature, as some groups already are doing⁴. Nonetheless, if this technology is to be deployed, then restricted, careful and graded introduction into the battlefield of lethal autonomous systems must be standard policy as opposed to haphazard deployments, which I believe is consistent with existing *International Humanitarian Law* (IHL).

Multiple potential benefits of intelligent war machines have already been declared by the military, including: a reduction in friendly casualties; force multiplication; expanding the battlespace; extending the warfighter's reach; the ability to respond faster given the pressure of an ever increasing battlefield tempo; and greater precision due to persistent stare (constant video surveillance that enables more time for decision making and more eyes on target). This argues for the inevitability of development and deployment of lethal autonomous systems from a military efficiency and economic standpoint, unless limited by IHL. It must be noted that past and present trends in human behavior in the battlefield regarding adhering to legal and ethical requirements are questionable at best. Unfortunately, humanity has a rather dismal record in ethical behavior

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in the battlefield. Potential explanations for the persistence of war crimes include⁵: high friendly losses leading to a tendency to seek revenge; high turnover in the chain of command leading to weakened leadership; dehumanisation of the enemy through the use of derogatory names and epithets; poorly trained or inexperienced troops; no clearly defined enemy; unclear orders where intent of the order may be interpreted incorrectly as unlawful; youth and immaturity of troops; external pressure, e.g., for a need to produce a high body count of the enemy; and pleasure from power of killing or an overwhelming sense of frustration. There is clear room for improvement and autonomous systems may help address some of these problems.

Robotics technology, suitably deployed, may assist with the plight of the innocent non-combatant caught in the battlefield. If used without suitable precautions, however, it could potentially exacerbate the already existing violations by human soldiers. While I have the utmost respect for our young men and women warfighters, they are placed into conditions in modern warfare under which no human being was ever designed to function. In such a context, expecting a strict adherence to the *Laws of War* (LOW) seems unreasonable and unattainable by a significant number of soldiers⁶. Battlefield atrocities have been present since the beginnings of warfare, and despite the introduction of the IHL over the last 150 years or so, these tendencies persist and are well documented,⁷ even more so in the days of CNN and the Internet.

“Armies, armed groups, political and religious movements have been killing civilians since

time immemorial”.⁸ “Atrocity ... is the most repulsive aspect of war, and that which resides within man and permits him to perform these acts is the most repulsive aspect of mankind”.⁹ The dangers of abuse of unmanned robotic systems in war, such as the *Predator* and *Reaper* drones, are well documented; they occur even when a human operator is directly in charge.¹⁰

Given this, questions then arise regarding if and how these new robotic systems can conform as well as, or better than, our soldiers with respect to adherence to the existing IHL. If achievable, this would result in a reduction in collateral damage, i.e., non-combatant casualties and damage to civilian property, which translates into saving innocent lives. If achievable this could result in a moral requirement necessitating the use of these systems. Research conducted in our laboratory¹¹ focuses on this issue directly from a design perspective. No claim is made that our research provides a fieldable solution to the problem, far from it. Rather these are baby steps towards achieving such a goal, including the development of a prototype proof-of-concept system tested in simulation. Indeed, there may be far better approaches than the one we currently employ, if the research community can focus on the plight of the non-combatant and how technology may possibly ameliorate the situation.

As robots are already faster, stronger, and in certain cases (e.g., *Deep Blue*, *Watson*¹²) smarter than humans, is it really that difficult to believe they will be able to ultimately treat us more humanely in the battlefield than we do each other, given the persistent existence of

atrocious behaviors by a significant subset of human warfighters?

Why technology can lead to a reduction in casualties on the battlefield

Is there any cause for optimism that this form of technology can lead to a reduction in non-combatant deaths and casualties? I believe so, for the following reasons.

- The ability to act conservatively: i. e., they do not need to protect themselves in cases of low certainty of target identification. Autonomous armed robotic vehicles do not need to have self-preservation as a foremost drive, if at all. They can be used in a self-sacrificing manner if needed and appropriate without reservation by a commanding officer. There is no need for a 'shoot first, ask questions later' approach, but rather a 'first-do-no-harm' strategy can be utilized instead. They can truly assume risk on behalf of the non-combatant, something that soldiers are schooled in, but which some have difficulty achieving in practice.
- The eventual development and use of a broad range of robotic sensors better equipped for battlefield observations than humans currently possess. This includes ongoing technological advances in electro-optics, synthetic aperture or wall penetrating radars, acoustics, and seismic sensing, to name but a few. There is reason to believe in the future that robotic systems will be able to pierce the fog of war more effectively than humans ever could.
- Unmanned robotic systems can be designed without emotions that cloud their judgment or result in anger and frustration with ongoing battlefield events. In addition, 'Fear and hysteria are always latent in combat, often real, and they press us toward fearful measures and criminal behavior'¹³. Autonomous agents need not suffer similarly.
- Avoidance of the human psychological problem of 'scenario fulfilment' is possible. This phenomenon leads to distortion or neglect of contradictory information in stressful situations, where humans use new incoming information in ways that only fit their pre-existing belief patterns. Robots need not be vulnerable to such patterns of premature cognitive closure. Such failings are believed to have led to the downing of an Iranian airliner by the USS Vincennes in 1988.¹⁴
- Intelligent electronic systems can integrate more information from more sources far faster before responding with lethal force than a human possibly could in real-time. These data can arise from multiple remote sensors and intelligence (including human) sources, as part of the Army's network-centric warfare concept and the concurrent development of the *Global Information Grid*. "Military systems (including weapons) now on the horizon will be too fast, too small, too numerous and will create an environment too complex for humans to direct"¹⁵.

- When working in a team of combined human soldiers and autonomous systems as an organic asset, they have the potential capability of independently and objectively monitoring ethical behavior in the battlefield by all parties, providing evidence and reporting infractions that might be observed. This presence alone might possibly lead to a reduction in human ethical infractions.

Addressing some of the counter-arguments

But there are many counterarguments as well. These include the challenge of establishing responsibility for war crimes involving autonomous weaponry, the potential lowering of the threshold for entry into war, the military's possible reluctance to give robots the right to refuse an order, proliferation, effects on squad cohesion, the winning of hearts and minds, cybersecurity, proliferation, and mission creep.

There are good answers to these concerns I believe, and are discussed elsewhere in my writings¹⁶. If the baseline criteria becomes outperforming humans in the battlefield with respect to adherence to IHL (without mission performance erosion), I consider this to be ultimately attainable, especially under situational conditions where bounded morality [narrow, highly situation-specific conditions] applies¹⁷, but not soon and not easily. The full moral faculties of humans need not be reproduced to attain to this standard. There are profound technological challenges to be resolved, such as effective in situ target discrimination and recognition of the status of those otherwise hors de combat, among many others. But if a warfighting robot can eventually

exceed human performance with respect to IHL adherence, that then equates to a saving of non-combatant lives, and thus is a humanitarian effort. Indeed if this is achievable, there may even exist a moral imperative for its use, due to a resulting reduction in collateral damage, similar to the moral imperative *Human Rights Watch* has stated with respect to precision guided munitions when used in urban settings¹⁸. This seems contradictory to their call for an outright ban on lethal autonomous robots¹⁹ before determining via research if indeed better protection for non-combatants could be afforded.

Let us not stifle research in the area or accede to the fears that Hollywood and science fiction in general foist upon us. By merely stating these systems cannot be created to perform properly and ethically does not make it true. If that were so, we would not have supersonic aircraft, space stations, submarines, self-driving cars and the like. I see no fundamental scientific barriers to the creation of intelligent robotic systems that can outperform humans with respect to moral behavior. The use and deployment of ethical autonomous robotic systems is not a short-term goal for use in current conflict, typically counterinsurgency operations, but rather will take considerable time and effort to realize in the context of interstate warfare and situational context involving bounded morality.

A plea for the non-combatant

How can we meaningfully reduce human atrocities on the modern battlefield? Why is there persistent failure and perennial commission of war crimes despite efforts to eliminate them through legislation and advances in

training? Can technology help solve this problem? I believe that simply being human is the weakest point in the *kill chain*, i. e., our biology works against us in complying with IHL. Also the oft-repeated statement that “war is an inherently human endeavor” misses the point, as then atrocities are also an inherently human endeavor, and to eliminate them we need to perhaps look to other forms of intelligent autonomous decision-making in the conduct of war. Battlefield tempo is now outpacing the warfighter's ability to be able to make sound rational decisions in the heat of combat. Nonetheless, I must make clear the obvious statement that peace is unequivocally preferable to warfare in all cases, so this argument only applies when human restraint fails once again, leading us back to the battlefield.

While we must not let fear and ignorance rule our decisions regarding policy towards these new weapons systems, we nonetheless must proceed cautiously and judiciously. It is true that this emerging technology can lead us into many different futures, some dystopian. It is crucially important that we do not rush headlong into the design, development, and deployment of these systems without thoroughly examining their consequences on all parties: friendly forces, enemy combatants, civilians, and society in general. This can only be done through reasoned discussion of the issues associated with this new technology. Toward that end, I support the call for a moratorium to ensure that such technology meets international standards before being considered for deployment as exemplified by the recent report from the United Nations Special Rapporteur on extrajudicial, summary, or arbitrary

executions.²⁰ In addition, the United States Department of Defense has recently issued a directive²¹ restricting the development and deployment of certain classes of lethal robots, which appears tantamount to a quasi-moratorium.

Is it not our responsibility as scientists and citizens to look for effective ways to reduce man's inhumanity to man through technology? Where is this more evident than in the battlefield? Research in ethical military robotics can and should be applied toward achieving this end. The advent of these systems, if done properly, could possibly yield a greater adherence to the laws of war by robotic systems than from using soldiers of flesh and blood alone. While I am not averse to the outright banning of lethal autonomous systems in the battlefield, if these systems were properly inculcated with a moral ability to adhere to the laws of war and rules of engagement while ensuring that they are used in narrow bounded military situations as adjuncts to human warfighters, I believe they could outperform human soldiers with respect to conformance to IHL. The end product then could be, despite the fact that these systems could not ever be expected to be perfectly ethical, a saving of non-combatant lives and property when compared to human warfighters' behavior.

This is obviously a controversial assertion, and I have often stated that the discussion my research engenders on this subject is as important as the research itself. We must continue to examine the development and deployment of lethal autonomous systems in forums such as the United Nations and the International Committee of the Red Cross to ensure

that the internationally agreed upon standards regarding the way in which war is waged are adhered to as this technology proceeds forward. If we ignore this, we do so at our own peril.

The way forward?

It clearly appears that the use of lethality by autonomous systems is inevitable, perhaps unless outlawed by international law – but even then enforcement seems challenging. But as stated earlier, these systems already exist: the *Patriot* missile system, the *Phalanx* system on *Aegis* class cruisers, anti-tank mines, and *fire-and-forget* loitering munitions all serve as examples. A call for a ban on these autonomous systems may have as much success as trying to ban artillery, cruise missiles, or aircraft bombing and other forms of stand-off weaponry (even the crossbow was banned by Pope Innocent II in 1139²²). A better strategy perhaps is to try and control its uses and deployments, which existing IHL appears at least at first glance to adequately cover, rather than a call for an outright ban, which seems unenforceable even if enacted.

The horse is out of the barn. Under current IHL, these systems cannot be developed or used until they can demonstrate the capability of adequate distinction, proportionality, and shown that they do not produce unnecessary suffering, and must only be used given military necessity. Outside those bounds any individuals responsible should be held accountable for violations of IHL, whether they are scientists, industrialists, policymakers, commanders, or soldiers. As these systems do not possess moral agency, the question of responsibility becomes equated to other classes of weapon

systems, and a human must always ultimately bear responsibility for their use²³. Until it can be shown that the existing IHL is inadequate to cover this RMA, only then should such action be taken to restructure or expand the law. This may be the case, but unfounded pathos-driven arguments based on horror and Hollywood in the face of potential reductions of civilian casualties seems at best counterproductive. These systems counter-intuitively could make warfare safer in the long run to the innocents in the battlespace, if coupled with the use of bounded morality, narrow situational use, and careful graded introduction.

Let it be restated that I am not opposed to the removal of lethal autonomous systems from the battlefield, if international society so deems it fit, but I think that this technology can actually foster humanitarian treatment of non-combatants if done correctly. I have argued to those that call for a ban, they would be better served by a call for a moratorium, but that is even hard to envision occurring, unless these systems can be shown to be in clear violation of the LOW. It's not clear how one can bring the necessary people to the table for discussion starting from a position for a ban derived from pure fear and pathos.

For those familiar with the Martens clause²⁴ in IHL, a case could be made that these robotic systems potentially “violate the dictates of the public conscience”. But until IHL lawyers agree on what that means, this seems a difficult course. I do believe, however, that we can aid the plight of non-combatants through the judicious deployment of these robotic systems, if done carefully and thoughtfully, particularly in those combat situations where

warfighters have a greater tendency or opportunity to stray outside *International Humanitarian Law*. But what must be stated is that a careful examination of the use of these systems must be undertaken now to guide their development and deployment, which many of us believe is inevitable given the ever increasing tempo of the battlefield as a result of ongoing technological advances. It is unacceptable to be “one war behind” in the formulation of law and policy regarding this *revolution in military affairs* that is already well underway. The status quo with respect to human battlefield atrocities is unacceptable and emerging technology in its manifold forms must be used to ameliorate the plight of the non-combatant.

Small portions of this essay appeared earlier in a Viewpoint article by the author appearing in the Journal of Industrial Robots 38:5, 2011, and from a more comprehensive treatment of the subject in the author’s book Governing Lethal Behavior in Autonomous Systems, Taylor-Francis, 2009, and are included with permission. This article also appeared in the AISB Quarterly No 137, July 2013 and is reprinted with permission.

- ¹ We do not use *autonomy* in the sense that a philosopher does, i.e., possessing free will and moral agency. Rather we use in this context a roboticists' definition: the ability to designate and engage a target without additional human intervention after having been tasked to do so.
- ² U.S. Navy, “Phalanx Close-in Weapons Systems”, United States Navy file, http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=487&ct=2, accessed 7/23/2013.
- ³ R.C. Arkin, *Governing Lethal Behavior in Autonomous Robots*, Chapman-Hall, 2009.

- ⁴ Notably Human Rights Watch, International Committee on Robot Arms Control (ICRAC) and Article 36.
- ⁵ Bill, B. (Ed.), *Law of War Workshop Deskbook*, International and Operational Law Department, Judge Advocate General's School, June 2000; Danyluk, S., “Preventing Atrocities”, *Marine Corps Gazette*, Vol. 8, No. 4, pp. 36-38, Jun 2000; Parks, W.H., “Crimes in Hostilities. Part I”, *Marine Corps Gazette*, August 1976; Parks, W.H., “Crimes in Hostilities. Conclusion”, *Marine Corps Gazette*, September 1976; Slim, H., *Killing Civilians: Method, Madness, and Morality in War*, Columbia University Press, New York, 2008.
- ⁶ Surgeon General's Office, Mental Health Advisory Team (MHAT) IV Operation Iraqi Freedom 05-07, Final Report, Nov. 17, 2006.
- ⁷ For a more detailed description of these abhorrent tendencies of humanity discussed in this context, see Arkin, R.C., “The Case for Ethical Autonomy in Unmanned Systems”, *Journal of Military Ethics*, 9:4, pp. 332-341, 2010.
- ⁸ Slim, H., *Killing Civilians: Method, Madness, and Morality in War*, Columbia University Press, New York, 2008, p. 3.
- ⁹ Grossman, D., *On Killing: The Psychological Cost of Learning to Kill in War and Society*, Little, Brown and Company, Boston, 1995, p.229.
- ¹⁰ Adams, J., “US defends unmanned drone attacks after harsh UN Report”, *Christian Science Monitor*, June 5, 2010; Filkins, D., “Operators of Drones are Faulted in Afghan Deaths”, *New York Times*, May 29, 2010; Sullivan, R., “Drone Crew Blamed in Afghan Civilian Deaths”, *Associated Press*, May 5, 2010.
- ¹¹ For more information see Arkin, R.C., *Governing Lethal Behavior in Autonomous Systems*, Taylor and Francis, 2009.
- ¹² [http://en.wikipedia.org/wiki/Deep_Blue_\(chess_computer\)](http://en.wikipedia.org/wiki/Deep_Blue_(chess_computer)), [http://en.wikipedia.org/wiki/Watson_\(computer\)](http://en.wikipedia.org/wiki/Watson_(computer))
- ¹³ Walzer, M., *Just and Unjust Wars*, 4th ed., Basic Books, 1977.

- ¹⁴ Sagan, S., “Rules of Engagement”, in *Avoiding War: Problems of Crisis Management* (Ed. A. George), Westview Press, 1991.
- ¹⁵ Adams, T., “Future Warfare and the Decline of Human Decisionmaking”, in *Parameters*, U.S. Army War College Quarterly, Winter 2001-02, pp. 57-71.
- ¹⁶ E.g., Arkin, R.C, op. cit., 2009.
- ¹⁷ Wallach, W. and Allen, C., *Moral Machines: Teaching Robots Right from Wrong*, Oxford University Press, 2010.
- ¹⁸ Human Rights Watch, “International Humanitarian Law Issues in the Possible U.S. Invasion of Iraq”, *Lancet*, Feb. 20, 2003.
- ¹⁹ Human Rights Watch, “Losing Humanity: The Case Against Killer Robots”, Nov. 19, 2012.
- ²⁰ Christof Heyns, Report of the Special Rapporteur on Extrajudicial, Summary, and Arbitrary Execution, United Nations Human Rights Council, 23rd Session, April 9, 2013.
- ²¹ United States Department of Defense Directive Number 3000.09, Subject: Autonomy in Weapons Systems, November 21, 2012.
- ²² Royal United Services Institute for Defence and Security Studies, “The Ethics & Legal Implications of Unmanned Vehicles for Defence and Security Purposes”, Workshop webpage, held Feb. 27, 2008, <http://www.rusi.org/events/ref:E47385996DA7D3>, accessed 5/12/2013.
- ²³ Cf. Arkin, R.C., “The Robot Didn't Do it.”, Position Paper for the Workshop on Anticipatory Ethics, Responsibility, and Artificial Agents, Charlottesville, VA., January 2013.
- ²⁴ The clause reads “Until a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between civilized nations, from the laws of humanity and the requirements of the public conscience.” (Available at the ICRC

site, <http://www.icrc.org/eng/resources/documents/misc/57jnhy.htm> last visited on 30 April 2013).



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The Need for a Preemptive Prohibition on Fully Autonomous Weapons

By Stephen Goose

There is no doubt that for advanced militaries, a predominant trend in the future of warfare is the movement toward ever more autonomous weapons systems. The rapid proliferation of unmanned aerial vehicles – or drones – is the best known example of that trend. But, technical experts have pointed out that today’s drones are extremely rudimentary compared to the technology that is to come.

Some military personnel, scientists, and others believe that it is both inevitable and desirable that armed forces will one day field fully autonomous weapons systems. These are weapons systems that, once initiated, would be able to select and engage targets without any further human intervention. Unlike a drone, there would no longer be a human operator deciding what to fire at, and when to shoot. The weapon system itself would make those decisions.

While there is also no doubt that greater autonomy can have military and even humanitarian advantages, it is the belief of Human Rights Watch and many others, that full autonomy is a step too far. Fully autonomous weapons would cross a fundamental moral and ethical line by ceding life and death decisions on the battlefield to machines. It is also our assessment, based on input from technical experts, that it is highly unlikely that fully autonomous weapons would be capable of complying with the principles of *International Humanitarian Law* (IHL). There are also serious

technical and proliferation concerns. We are convinced that these weapons would pose grave dangers to civilians – and to soldiers – in the future.

Taken together, this multitude of concerns has led to the call for a preemptive prohibition on fully autonomous weapon systems. There must always be meaningful human control over targeting and kill decisions. In fact, this would not just be a new weapon, but a new method of warfare, one that should never come into existence.

A rapidly emerging issue of great concern

International attention to the subject of fully autonomous weapons has grown rapidly since the end of 2012, as it has rocketed to the top ranks of concern in the field of humanitarian disarmament. Previously, this had been a largely unknown subject, except for a relatively small community of military personnel, scientists, ethicists, and lawyers.

Human Rights Watch and Harvard Law School’s International Human Rights Clinic released a report, “Losing Humanity: The Case Against Killer Robots”, in November 2012 that called for a preemptive prohibition on the development, production, and use of fully autonomous weapons. The report received extensive media attention and spurred the first widespread public debate on the issue.

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In April 2013, an international coalition of nongovernmental organizations (NGOs) launched the Campaign to Stop Killer Robots, calling for a preemptive ban on the weapons. The Campaign, coordinated by Human Rights Watch, now consists of about 50 NGOs in about two dozen countries. It is modeled on the successful campaigns that led to international bans on antipersonnel landmines, cluster munitions, and blinding lasers.

In May 2013, UN Special Rapporteur on extrajudicial killings Christof Heyns presented a report to the Human Rights Council that echoed many of the concerns of the Campaign about the dangers of fully autonomous weapons, and called on governments to adopt national moratoria on the weapons until international discussions could be held. The report prompted two dozen nations to speak about fully autonomous weapons for the first time, all expressing the importance of the issue and the need for it to be addressed multilaterally. More nations echoed this call during the UN General Assembly debates in October 2013.

Most importantly, the more than 100 States Parties to the Convention on Conventional Weapons (CCW) agreed in November 2013 to take up the issue in 2014. The first four days of talks have recently occurred in May 2014. In the diplomatic world, this is moving at lightning speed. The CCW, a forum generally dominated by the United States, Russia, and China, is known for its deliberative (i.e., slow) pace, and it often takes years of preliminary discussion before the States Parties even agree to add an issue to its agenda.

As late as October 2012, virtually no government had made a public statement about fully autonomous weapons, other than in military planning documents. Now, some four dozen nations have made statements, with all agreeing that it is an issue that must be addressed.

In February 2014, the European Parliament passed a resolution that calls for a ban on the development, production, and use of fully autonomous weapons. More than 270 prominent scientists have signed a statement calling for a ban.

In addition, the Secretary-General of the United Nations and the head of the UN Office of Disarmament Affairs, as well as the International Committee of the Red Cross, have expressed concerns about the development of fully autonomous weapons.

Still, the technology has been advancing rapidly, and diplomacy has a lot of catching up to do.

What are fully autonomous weapons?

A range of terms has been used to label these future weapons: fully autonomous weapons, fully autonomous weapons systems, autonomous weapons systems, lethal autonomous robots, lethal autonomous weapons systems, killer robots, and more. And slightly different definitions of or descriptors for these terms have been used.

Distinctions have also been made between these future weapons, and the automatic, automated, and semi-autonomous weapons that exist today. It is beyond the scope of this article to delineate all of these distinctions.

Fundamentally, a fully autonomous weapon would be an unmanned system in which the targeting and kill decisions are no longer the responsibility of a human operator, but rather the weapon itself. They could be aircraft, ground systems, or sea-based/underwater systems.

These weapons do not yet exist, but technology is moving in the direction of their development, and precursors are already in use. Among the precursors are the US's X-47B aircraft, the UK's *Taranis* aircraft, Israel's *Sentry Tech* robot, and South Korea's SGR-1 *sentry* robot. Those nations have other precursors as well, and other countries with advanced systems include China and Russia. Germany has developed and deployed in Afghanistan an automatic weapons defense system called the NSB *Mantis*, which detects and fires at incoming rockets and other weapons; the degree of human supervision is unclear.

Such precursors, which maintain a degree of human control and in some cases are not weaponized, are not the target of the Campaign to Stop Killer Robot. But they demonstrate the move toward ever-greater autonomy, and, in the context of the effort to address fully autonomous weapons, need to be examined carefully to determine how they maintain meaningful human control and provide adequate safeguards for civilian populations.

It is important to emphasize that the Campaign to "Stop Killer Robots" is not opposed to military robotics, or even necessarily the advance of autonomy in weapons systems, as both military and humanitarian advantages could be achieved if pursued and implement-

ed properly. The Campaign's call for a ban on development of fully autonomous weapons is not intended to impede broader research into military robotics or weapons autonomy or full autonomy in the civilian sphere. Rather, research and development activities should be banned if they are directed at technology that can only be used for fully autonomous weapons or that is explicitly intended for use in such weapons.

Some have touted the potential benefits of fully autonomous weapons, noting that they could reduce the risk to soldiers and increase the accuracy and speed of attacks. They would not be limited by pain, anger, hunger, exhaustion, or the instinct for self-defense. However, such possible advantages would be more than offset by the loss of human control. Moreover, these benefits are also possible with autonomous systems that are still under meaningful human control.

Moral and ethical objections

Perhaps the most powerful objection to fully autonomous weapons systems is moral and ethical in nature. Simply put, many feel that it is morally wrong to give machines the power to decide who lives and who dies on the battlefield. Christof Heyns, the UN Special Rapporteur on extrajudicial killings, has said, "It is an underlying assumption of most legal, moral and other codes that when the decision to take life or to subject people to other grave consequences is at stake, the decision-making power should be exercised by humans."

Giving life and death decision-making to machines has been called the ultimate attack on human dignity, and others have noted that an

action so serious in its consequences should not be left to mindless machines. The notion of allowing compassionless robots to make life and death decisions is repugnant to many. Compassion is the key check on the killing of other human beings. Fully autonomous weapons have been called unethical by their very nature, and giving machines the decision-making power to kill has been called the ultimate demoralization of war. Killer robots would constitute “losing humanity” in more ways than one.

Our experience at Human Rights Watch has shown that most people have a visceral negative reaction to the notion of fully autonomous weapons. Most find it hard to believe that such a thing would even be contemplated. There is a provision in international law that takes into account this notion of general repugnance on the part of the public: the Martens Clause, which is articulated in Additional Protocol I to the Geneva Conventions and elsewhere. Under the Martens Clause, fully autonomous weapons should comply with the “principles of humanity” and the “dictates of public conscience.” They would not appear to be able to do either.

Legal objections and accountability

Apart from the Martens Clause, it is unlikely that fully autonomous weapons could comply with basic principles of IHL, such as distinction and proportionality. Technical experts and international lawyers agree that the current state of technology would not allow for such weapons to meet the requirements of IHL. There is of course no way of predicting what technology might produce many years from

now, but there are strong reasons to be skeptical about compliance with IHL in the future.

IHL requires that a belligerent distinguish between combatants and civilians. The ability to make this distinction relies not just on visual or audible signals, but also on judgment of an individual’s intentions. There seems to be little prospect that robots could be programmed to have the innately human qualities crucial to assessing an individual’s intentions. Humans can make such assessments in large part because they can relate to and thus understand other individuals as fellow humans. The robots’ inability to do so could also undermine protection for soldiers, such as those wounded or surrendering.

A robot’s lack of judgment and intuition could present even greater obstacles to compliance with the rule of proportionality, which prohibits attacks in which expected civilian harm outweighs anticipated military gain. Proportionality relies heavily on situational and contextual factors, which could change considerably with a slight alteration of the facts. The US Air Force has called it “an inherently subjective determination,” and the International Committee of the Red Cross has said it is “a question of common sense and good faith.” The judgment and intuition necessary to weigh complex facts and make subjective decisions are qualities associated with human beings, not machines.

There are serious concerns not only about fully autonomous weapons’ inability to comply with existing IHL, but also about the lack of accountability when they fail to do so. Accountability deters the commission of viola-

tions of IHL, and also dignifies victims by giving them recognition that they were wronged and satisfaction that someone was punished. Holding a human responsible for the actions of a robot that is acting autonomously could prove difficult, be it the operator, commander, programmer, or manufacturer.

Technical problems

The U.S. Department of Defense and others have cited a multitude of technical issues that would have to be overcome before fielding fully autonomous weapons. These technical obstacles, when combined with moral, ethical, legal, and proliferation concerns, give further reason to question the wisdom and appropriateness of pursuing such weapons. A November 2012 U.S. DoD directive includes a long list of possible causes of failure in autonomous weapons: human error, human-machine interaction failures, malfunctions, communications degradation, software coding errors, enemy cyber attacks or infiltration into the industrial supply chain, jamming, spoofing, decoys, other enemy countermeasures or actions, and unanticipated situations on the battlefield.

The DoD also writes of the need to ensure the weapons systems: “function as anticipated in realistic operational environments against adaptive adversaries;” are able to “complete engagements in a timeframe consistent with command and operator intentions and, if unable to do so, terminate engagements;” and “minimize failures that could lead to unintended engagements or to loss of control of the system to unauthorized parties.”

Others have stressed that robot-on-robot engagements in particular are inherently unpredictable and could create unforeseeable harm to civilians.

Proliferation concerns

As militaries move toward ever-greater autonomy in weapons systems, the likelihood of advancing to full autonomy increases – unless checked now. There is the real danger that if even one nation acquires these weapons, others may feel they have to follow suit in order to defend themselves and to avoid falling behind in a robotic arms race. Even less technologically advanced nations would likely acquire the know-how once fully autonomous weapons systems were actually fielded, by getting their hands on a system and reverse-engineering, which is not as daunting a task as development from scratch.

There is also the prospect that fully autonomous weapons could be acquired by repressive regimes or non-state armed groups with little regard for the law. These weapons could be perfect tools of repression for autocrats seeking to strengthen or retain power. An abusive leader utilizing fully autonomous weapons would be free of the fear that armed forces would resist being deployed against certain targets.

Existing policies

Although the issue of fully autonomous weapons is progressing rapidly on the international stage, thus far very few countries have developed formal national policies. The only detailed policy in writing is the U.S. Department of Defense Directive of November 2012, which, for a period of up to 10 years, requires that a

human being be “in the loop” when decisions are made to use lethal force, although high level Pentagon officials can waive the policy. The United Kingdom has stated that autonomous weapons will “always” be under human control.

While many nations have now spoken publicly on this topic, such statements have not constituted national policies, but rather usually more vague expressions of concern and/or interest in the subject. Some, such as Pakistan, have spoken of a prohibition on the weapons.

It is hoped that the process now underway in the Convention on Conventional Weapons will spur governments to develop rapidly their national positions.

Why a ban is the best solution

Even among those who have expressed concern about killer robots, there are some who are opposed to a preemptive and comprehensive prohibition, as called for by the Campaign to Stop Killer Robots. Some say it is too early for such a call, and that we should wait to see where the technology takes us. Some say that restrictions would be more appropriate than a ban. Some say that existing international humanitarian law will be sufficient to address the matter, perhaps with some additional guidance in the form of identifying “best practices.” Some have also argued for acquiring the weapons, but limiting their use to specific situations and missions.

The notion of a preemptive treaty is not new. The best example is the 1995 CCW Protocol IV that bans blinding laser weapons. These weapons were in prototype stage in the U.S.

and China, but had never been fielded. After initial opposition from the U.S. and others, states came to agree with the ICRC’s determination that the weapons would cause unnecessary suffering and superfluous injury. The Martens Clause was also widely invoked to justify the ban, with the weapons seen as counter to the dictates of public conscience. Nations also came to recognize that their militaries would be better off if no one had the weapons than if everyone had them.

More broadly the point of a preemptive treaty is to prevent future harm. With all the dangers and concerns associated with fully autonomous weapons, it would be irresponsible to take a “wait and see” approach and only deal with the issue after the harm has already occurred.

While some rightly point out that there is no “proof” that there cannot be a technological fix to the problems of fully autonomous weapons, it is equally true there is no proof that there can be. Given the lack of scientific uncertainty that exists, and the potential benefits of a new legally binding instrument, the precautionary principle in international law is directly applicable. The principle suggests that the international community need not wait for scientific certainty, but could and should take action now. The principle holds that when there is uncertainty if an act will be harmful, the party committing the act bears the burden of proof the act will not be harmful. It is not necessary to resolve scientific uncertainty in order for preventive measures to be warranted. Today’s scientific uncertainty, combined with the potential threat to the civilian population from fully autonomous weapons, pro-

vides ample reason to undertake preventive measures in the form of an absolute ban.

Fully autonomous weapons represent a new category of weapons that could change the way wars are fought and pose serious risks to civilians. As such, they demand new, specific law that clarifies and strengthens existing IHL. There are numerous examples of weapons treaties designed to strengthen IHL, and these generally come about because the weapons are objectionable by their very nature, not just because of misuse. This would apply to cluster munitions, antipersonnel mines, blinding lasers, chemical weapons, and biological weapons.

A specific treaty banning a weapon is also the best way to stigmatize the weapon. Experience has shown that stigmatization has a powerful effect even on those who do not formally join the treaty, inducing them to comply with the key provisions such as no use or production, or risk international condemnation.

An absolute prohibition would maximize protections for civilians from these weapons. It would be more comprehensive than regulations, eliminate the need for case-by-case determinations of legality of attack, and make it easier to standardize rules across countries. If regulations restricted use to certain locations or to specific purposes, after the weapons entered into national arsenals, countries would likely be tempted to use them in other, possibly inappropriate, ways during the heat of battle or in dire circumstances.

A comprehensive ban treaty would also more effectively deal with proliferation concerns, by

prohibiting development and production as well as use (as IHL only addresses use). And, if a prohibition is in place, there is no reason to be concerned about accountability.

Conclusion

Nations urgently need to develop national policies on fully autonomous weapons if they are to engage in substantive deliberations on this emerging topic of international concern. If countries are unprepared to embrace the notion of a comprehensive prohibition immediately, they should institute national moratoria while multilateral discussions are ongoing, as recommended by the UN Special Rapporteur on extrajudicial killings.

The key is to embrace the concept that there should always be meaningful human control of the targeting and kill decisions in any individual attack on other humans. The determination of the meaning and nature of “meaningful human control” should be undertaken on the national level and in multilateral discussions.

The development, production, and use of fully autonomous weapons should be prohibited in the near future, in order to protect civilians during armed combat and to preserve human dignity. If the ban is not embraced soon, it will be too late.



Stephen Goose is executive director of the Arms Division of Human Rights Watch. He played an instrumental role in bringing about the international treaties banning cluster munitions (2008), antipersonnel landmines (1997), and blinding lasers (1995). He serves as the chair of both the International Campaign to Ban Landmines (co-recipient of the 1997 Nobel Peace Prize) and the Cluster Munition Coalition. Goose and Human Rights Watch are leading the new global Campaign to Stop Killer Robots, which calls for a pre-emptive prohibition on fully autonomous weapons.

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Of Men and Machines. What Does the Robotization of the Military Mean from an Ethical Perspective?

By Bernhard Koch

It usually takes specific events to bring academic debates into public discourse. Since the beginning of the new millennium, the idea has been in circulation that we are witnessing a revolution in military affairs akin to the advent of firearms or the emergence of aerial warfare. Back in 2005, the British sociologist Martin Shaw wrote that the new Western method of waging war is the risk-transfer war, stating that one of its rules is that the number of Western casualties must be as small as possible. It was not surprising, therefore, that a few years later, in 2012, the German armed forces – the *Bundeswehr* – and German defense ministry wanted to acquire remote-controlled weapons delivery systems for the better protection of their soldiers during operations, indeed particularly the sort that fly through the air and are commonly called, after male bees, “drones”. However, armed drones are associated with a practice carried out by the U.S. in their fight against groups suspected of terrorism in Afghanistan, Pakistan and Yemen, commonly known as “targeted killing” – specifically because wanted persons are tracked down, watched, and then killed by a guided missile fired from the drone. For many good reasons, this practice is regarded as being immoral. Certainly by the time that high-ranking representatives of the Catholic episcopacy in Germany issued statements critical of the *Bundeswehr’s* procurement plans, a

“drone debate” had been ignited, which subsequently continued in the parliamentary sphere.

It is understandable that debates become emotional when the subject is killing and the risk of being killed. Yet particularly in ethics, one should endeavor to adopt a dispassionate and unprejudiced approach. So what is the nature of this “must” of which Martin Shaw speaks? Why must – as he says – Western wars today be conducted in such a way as to minimize the number of Western casualties? Is it merely democratic pressure on politicians that induces them to find ways and means to minimize the risks for soldiers, because otherwise they will be voted out of office? Or is this “must” an imperative that soldiers themselves present to their military and civilian masters, with the result that these leaders are obliged for purely functional reasons to listen, because otherwise they would be faced with refusal to carry out orders? Or is this “must” also an expression of moral reason, because Western soldiers are called upon, on behalf of others who were unjustly harmed – e.g. in terrorist attacks – to fight against opponents who for their part deliberately set out to hurt persons whom the West regards as “innocent” – i.e. people who have done nothing that would cause them to forfeit their own right to life and physical integrity? Why should soldiers forfeit

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their rights when they come to the assistance of such people – whether they be victims of terrorism or of crass human rights violations? Particularly from an ethical point of view, shouldn't one exploit all available means of enhancing these soldiers' protection – which of course also means keeping them as far away as possible from the action? Drones and the use of military robotics technology therefore seem to be the obvious method of choice, particularly since they not only protect the operators but also – according to proponents of these machines – reduce the number of civilians put at risk by military action, because they allow better reconnaissance and more accurate weapons fire. Distance from the enemy's reach, but closeness and hence greater precision in reconnaissance and the use of weapons by one's own side – this seems to be the combination that makes drones and all remote-controlled systems so attractive.

Yet Martin Shaw's thesis was not that the West today fights risk-minimization wars, but risk-transfer wars. This is where drone opponents' voices come in. Even if we admit that the protection of soldiers is important in an armed conflict, we have to acknowledge that any such enhancement of protection cannot be achieved *ceteris paribus*, that is, with all other circumstances remaining the same. Thus there is the danger that fighting drone wars will render the traditional containment of combat zones obsolete, and so in principle war will be fought worldwide. Instead of better protection for civilians in war zones, civilians worldwide would now be perpetually exposed to military force. And civilians in war zones could be placed in more danger because the drone operators' inhibition threshold for using

military force is reduced when they are no longer personally in danger. Drone deployment could also increase the risks even for soldiers – namely if the supposedly “politically more palatable” alternative of remote-controlled warfare increases the willingness to take military action.

It is not yet clear how risks are actually transferred as a result of using remote-controlled military robotics technology. There is a large field for further empirical research here. But it is not at all clear in ethics, either, what degree of risk transfer can be regarded as acceptable. Should soldiers actually be allowed to shift all risks away from themselves, or are they not precisely the ones who are called upon to be professional risk-adopters today?

Opponents of the use of armed drones believe that such weapons systems should be seen in the context of a robotization and automation trend in warfare, culminating in a war of robots – which to some extent also implies the abolition of the conventional military. After all, the drones whose acquisition by the German armed forces is now a topic of controversy are not mere remote-controlled airplanes but rather the mobile part of a complex technological system, comprising ground station, communication channels and aircraft. They can take off and land by themselves; many processes are not controlled by operators (operator in the loop) and are only monitored (operator on the loop), while some are not even monitored (operator out of the loop). In the future, so this theory goes, human operators will be pushed ever further into the background in favor of fully automated control and decision processes. Opponents of armed drones point

to the risk that software-controlled weapons systems could be reprogrammed and possibly even turned against the side that deploys them.

Currently, the German federal government is making assurances that weapons fire from drones will only ever be triggered by specific human action, and never by a software program. This is intended to meet the objections of those who oppose drone deployment. But here they violate the logic of technological progress, which the argument that “we can’t hold on to the stagecoach while everyone else is developing the train”¹ is designed to appeal to: Why should the automation of weapons firing be permanently ruled out? In the future, there will be situations where the automated firing of a weapon protects human lives more effectively, for example because it eliminates time delays or negative emotional impulses from human operators that could make the situation more dangerous. The American roboticist Ronald C. Arkin, who also appears in this journal (pp. 3-10), produced a study for the Pentagon in which he says that automated weapons will be better at respecting international law than humans, and that the risks of possible reprogramming are technologically surmountable.

People often associate the idea that drones will lead to the automation of killing with a phenomenon known as “big data”. In urgent situations, people today are often completely unable to assess the information provided to them by machines, including drones, or even to understand the calculations and assessments produced by a computer. So even where humans are supposed to take deci-

sions, in reality they just receive orders and are increasingly at the mercy of machines. Ultimately, as a result, it seems reasonable simply to “let the machine take the decision”.

But here the debate arrives at a crucial point. In the strict sense of the word, the weapons system never “decides” for itself. Unfortunately this anthropomorphic figure of speech diverts the debate from the real problem, which is the diffusion of responsibility for the use of certain weapons. Thus the question should not be whether we ought to let robots take life-or-death decisions – for this is impossible – but rather whether we should allow machines to be used which afterward leave such great uncertainty as to who made what decision, that we are finally willing to believe the machine took the critical decision by itself. The logic of protection, in principle, knows no end. Protection and safety are not operational terms that can be empirically tested and measured. In principle, protection and safety can always be increased. The need for this increase appears to be one of the hallmarks of our eschatology-free age.

In his famous essay, first published in 1935, called “The Work of Art in the Age of Mechanical Reproduction”, Walter Benjamin contrasts two concepts of technology: one which is based on the unique and unsubstitutable use of the self as a medium, and a second which describes the endlessly repeatable, representative instrumental use of a distant object. The difference is that

“the first technology involves the human being as much, the second as little as possible. The greatest feat of the first technol-

ogy is, in a manner of speaking, the human sacrifice; that of the second is in the line of remote-controlled airplanes that do not even require a crew.”²

Thus, almost eighty years ago, Benjamin named the poles which characterize many contemporary asymmetrical military conflicts. The Western drone warfarer, who keeps himself out of the danger zone as far as possible, contrasts with the Eastern suicide killer, who wants himself to be consumed in battle. The rationales are guided by two diametrically opposing aims: total preservation and total engagement. In Albert Camus’ play “The Just Assassins”, the protagonists argue over who will get the privilege of throwing the bomb at the Grand Duke and therefore being arrested and executed. A number of authors believe that the increasing use of drones and robotics technology by Western military powers will ultimately result in an increasing number of people from Eastern cultures that are willing to carry out suicide attacks. Yet this theory too awaits dispassionate scientific review.

- ¹ In other words, we should not oppose technological progress. The “stagecoach” metaphor was used in a speech by the German defence minister Thomas de Maizière to the German Bundestag in January 2013: “Germany cannot ignore this technology of the future. We cannot say that we will hold on to the stagecoach while everyone else develops the train. That is not possible.”
- ² Walter Benjamin, „Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit. Dritte Fassung“, in: Walter Benjamin: Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit, edited by Burkhardt Lindner, Kritische Gesamtausgabe vol. 16, Berlin, 96-163, 2012, here 108.



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Remote-Controlled Aerial Vehicles – Made-to-Measure Effectiveness for Better Protection of our Soldiers on Missions

By Karl Müllner

Today, according to analysts, nearly ninety countries use remote-controlled aerial vehicles for military purposes. One-third of these countries have the capability to fly armed missions. Hence armed remote-controlled aerial vehicles are not something completely new – they are now a widespread reality. And the trend is continuing, because many countries – including in Europe – find that these aircraft have obvious advantages. The question of the position Germany should take with regard to this situation is not only a military one. It also has a bearing on security policy and industrial policy, and is often closely linked to ethical and moral issues. Thus the decision regarding the development and procurement of remote-controlled aerial vehicles should be taken not only according to costs and benefits, but rather only after careful consideration of their legality and legitimacy. To take all of this into account, in their coalition agreement the governing parties promised a review of the associated issues with regard to international law, constitutional law, security policy and ethics, before making any decision. Such a comprehensive review seems politically expedient in view of the ongoing debate – at least in sections of German society – about armed remote-controlled aerial vehicles. After all, in this important question for the future, the German federal government and federal parliament (*Bundestag*) need not only to find the

objectively correct answer for the German armed forces (*Bundeswehr*) and for Germany as a high-tech location, but also to advocate and explain this decision to society. There are good reasons for addressing this issue as promptly as possible. Firstly, other countries are rapidly gaining a technological advantage. Secondly, the *Bundeswehr*'s use of unarmed remote-controlled aircraft in Afghanistan for reconnaissance and surveillance made two things very clear: A) The much clearer situational overview that they provided substantially reduced the risk for our soldiers during operations, and hence significantly increased their safety and that of the innocent civilian population. B) The fact that they were not armed represents a serious deficiency, since close air support when needed can only be provided with a time delay and reduced precision. Our allies in France, Great Britain, Italy and the Netherlands had the same experience and have already taken appropriate decisions to arm their forces. Comparable decisions are imminent in Poland and Spain. In none of these countries has there been or is there currently a similar, at times emotionally charged debate in respect of ethical and moral issues and possible negative consequences resulting from this technology. Germany, on the other hand, is faced with losing experience and expertise already gained in the operation and use of remote-controlled aircraft, since the

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unmanned aerial vehicles leased for the *Bundeswehr* from Israel can only be deployed in Afghanistan, while the ISAF mission there is coming to an end and technological development is stagnating for want of further orders. For well over two years, therefore, the German Air Force has been pointing to existing and emerging capability shortfalls and arguing for the procurement of armed remote-controlled aerial vehicles in political, church, peace ethics and other social forums. Now there are signs that the *Bundestag* will turn its attention to this issue in the early summer – or more precisely there will be an expert hearing in the Defense Committee of the German *Bundestag*. It therefore seems a suitable time to give a brief summary of the issues as they currently stand, as a constructive contribution to political decision-making from a military perspective.

Regrettably, the debate in Germany about armed remote-controlled aerial vehicles is strongly colored by the legally and ethically problematic use by other countries – known as “targeted killing” – which, however, is the subject of heated debate in these countries as well. Yet the *Bundeswehr* is solely concerned with having a military capability so that the mission objectives which are issued by the German *Bundestag* and based on our social values and constitutional standards can be implemented as effectively as possible and with the lowest reasonable risk to our soldiers and to the innocent civilian population. The strong parliamentary control mechanisms which exist in our democratic constitutional state, which are enshrined in the German Parliamentary Participation Act (*Parlamentsbeteiligungsgesetz*, ParlBG), and the

responsible practice of the executive, which generally bases operational mandates on a broad parliamentary majority, have proven highly successful in past years in all armed deployments of the *Bundeswehr*. They reliably ensure that remote-controlled aerial vehicles can only be used legally and legitimately, as is the case for all other weapons systems. I see no objectively justifiable reason to doubt this. Therefore, the debate being conducted in Germany can be clearly separated from the deployment practices of other states. In my view, it can essentially focus on four main questions:

1. Is there a military need, beyond the use of remote-controlled aerial vehicles for reconnaissance, to have the option of arming such aircraft for military operations?
2. Is the use of armed remote-controlled aerial vehicles permitted under international and constitutional law?
3. Beyond the issue of legality, is it possible to find a satisfactory answer to the question of the legitimacy of such weapons?
4. In the development of remote-controlled aerial vehicles, are there technological trends which it would be necessary to take preventive action against via arms control policy initiatives?

Is there a military need, beyond the use of remote-controlled aerial vehicles for reconnaissance, to have the option of arming such aircraft for military operations?

It is highly likely that current and future crises and conflicts will be characterized by asymmetric warfare. In general, an enemy will seek to avoid our strengths and attack our weaknesses. It is not only in Afghanistan that we are

seeing this pattern; it was also evident in other conflicts – in Libya and Mali – under somewhat different circumstances. The conflict in Ukraine, with its unconventional methods of applying military force via local militia and covert special forces operations, can also be construed as an asymmetric strategy. Such forms of warfare, in which an asymmetric alignment is already part of the strategic approach, make it difficult to uphold and indeed in some respects deliberately undermine the principles of discrimination and proportionality under international humanitarian law. To satisfy these requirements in spite of such difficulty, it is necessary at the strategic, operational and above all tactical level – in the first instance regardless of the methods used – to obtain the right information at the right time in order to be able to take decisions and act at all. If this information is missing, then under increasing pressure to act – which is sometimes not possible to influence – as the situation develops, the result can be that decisions are taken which, although subjectively correct, subsequently and objectively turn out to be wrong or disproportionate. The airstrike on two tanker trucks in Kunduz in 2009 could serve as a case in point. Even if an enemy very deliberately uses their own lack of identifiability as a weapon – for example by blending in with the civilian population – it is first of all necessary, as a very general principle, to be able to monitor areas continuously and in their entirety. This is the only way to detect patterns of movement and behavior which enable conclusions as to the adversary's identity and intentions. Continuous reconnaissance and surveillance is often only possible from the air, yet this is not feasible using manned aircraft or satellites. These can only

take snapshots and reconnoiter stationary objects or infrastructure, but not moving objects or behavioral patterns of a covertly fighting enemy. And the more distant and remote a conflict area is, the more difficult it becomes to obtain the necessary situational overview by other means, including on-the-ground reconnaissance and surveillance. Remote-controlled aircraft, however, can do all of this. Firstly, they can stay in the air for longer than the human endurance limit. Because they never get tired, they are essentially always there, including for example to permanently accompany a patrol over an extended period of time. Modern remote-controlled aerial vehicles can now stay in the air for up to forty hours at a time, enabling them to remain in the theater of operations for long enough, even if they have to fly a long way to get there. Secondly, remote-controlled aircraft are extraordinarily flexible. Since they are constantly present in the theater of operations, they can change their reconnaissance objectives within minutes, according to priorities, and then continue their surveillance for a further long period. Thirdly, they are discreet and inconspicuous. This is particularly important when it comes to distinguishing a covertly fighting adversary from the innocent civilian population. If it was possible to hear or see the reconnaissance aircraft, the enemy would know they were being watched and change their behavior accordingly. Then it would hardly be possible to distinguish the enemy anymore. The German Air Force has successfully used the remote-controlled aircraft HERON 1 in Afghanistan for surveillance and reconnaissance. Hardly a patrol leaves camp today without information from a HERON being involved in the preparation and without being

accompanied by a HERON. The presence of the remote-controlled aircraft has considerably increased the safety of our soldiers during missions. Unfortunately, however, reconnaissance systems can only observe enemy combatants during an attack on our soldiers. They cannot intervene effectively and help. During a visit to Afghanistan, I witnessed a German patrol fall into an ambush, despite good preparation. As a result of the better situational overview which HERON helped provide, the patrol was able to successfully defend itself. The insurgents gave up their attack after a short engagement, took their weapons to a hiding place, and disappeared again. Had the attackers been better prepared, however, and acted more aggressively and resolutely, successful defense would not have been possible without armed aerial support. Yet the HERON that was already on the scene and would have had to help in that situation, would not have been armed. It would have been necessary first to call in one of our allies' warplanes. Valuable time would have been lost, in which our soldiers would have been exposed to grave danger in the battle on the ground. And once the warplane arrived, the pilot would have first needed to be briefed on the situation, from the ground, and identify his target. This would have been a possible additional source of error, since it would not have been possible to rule out mix-ups with our own forces or innocent civilians in the stress of battle that would then prevail. In contrast, an armed remote-controlled aerial vehicle would have been able to intervene and help immediately, without any extra coordination effort, and on the basis of a situational overview which already existed, precisely, proportionately and without the risk of mix-ups. In calling for armed remote-

controlled aerial vehicles, I am primarily concerned with countering an attack on our soldiers in an armed conflict as effectively as possible – but only just as effectively as necessary – and thus fulfilling the politically assigned mandate while keeping to the rules of engagement and maintaining a sense of proportion. With regard to the military necessity, therefore, my summary is as clear as it is simple: Armed remote-controlled aerial vehicles are necessary tactically and operationally just as much as it is a duty of care toward soldiers during deployment to arm remote-controlled aerial vehicles in case of need.

Is the use of armed remote-controlled aerial vehicles permitted under international and constitutional law?

From the point of view of the German Air Force, the deployment of armed remote-controlled aerial vehicles within the framework determined for the *Bundeswehr* by international law and the German constitution is not merely conceivable, rather it is subject to the same requirements, restrictions and regulations as the deployment of the *Bundeswehr* as a whole. Exaggerating somewhat, one might say that it is only possible within precisely this framework! With regard to the constitutional framework, one can note that for the first time in German history, it is our people – our society – who decide to deploy the *Bundeswehr*, after careful consideration, through their representatives' mandate in the German parliament, the *Bundestag*. The German *Bundestag* also decides on the type of military force exerted in the context of such deployments. It sets out mandatory boundaries and conditions for the use of weapons by German soldiers, taking international law into

account in the rules of engagement. Thus deployments in general, and hence also deployments of armed remote-controlled aerial vehicles, not only follow the mandatory requirements and rules of engagement applicable to deployment in general, they are also – as are all deployments – subject to supervision by the relevant constitutional bodies. The parliamentary groups in the *Bundestag* can demand comprehensive information, and the parliamentary groups and members of the German parliament use this right extensively. From the quality of meals to strategic questions regarding the Afghanistan mission itself, just about every aspect concerning the *Bundeswehr* has been and is the object of inquiry. With the parliamentary commissioner for the armed forces, the *Bundestag* has a further supporting body, which at the same time is also highly committed to bringing forward the concerns of soldiers. The Defense Committee, which in any case is constantly active, can additionally act as an investigation committee – which it did twice in the last legislative period alone. The Budget Committee checks on amounts and equipment – and in the past, for example, it allocated resources for the procurement of different items than the *Bundeswehr* applied for. Both citizenry and soldiers can trust in these institutions. In my opinion, the idea – which is apparently expressed as a result of the pattern of problematic deployment practice by other countries – that by introducing remote-controlled armed aerial vehicles the *Bundeswehr* or German Air Force is on the path toward illegal killings, completely – indeed almost criminally – ignores our social, our political, and our legal framework. What about international law issues? Unlike chemical weapons or cluster munitions, which

are banned because they cannot meet various humanitarian criteria of international law, there is no general prohibition under international law with regard to manufacturing, buying or using remote-controlled aerial vehicles. Since remote-controlled aircraft are not essentially different than manned warplanes, it can be assumed that initiatives to ban them will have no prospect of success. But of course the armed deployment of remote-controlled aerial vehicles – as for all other weapons – must take place within the precepts of international law. Among other things, these forbid the disproportionate and indiscriminate use of military force. In Germany, even the suspicion of a violation will result in investigations by the public prosecutor. Up to the present day, no investigatory proceedings in connection with the use of weapons in missions have ever resulted in charges being brought against a soldier. This makes it clear that our soldiers are professionally aware of what the use of military force can mean, and above all what limits are imposed on them in each case for its specific deployment. Moreover, the protection of innocent civilians is a maxim of international law which is upheld in every deployment of weapons authorized by the *Bundestag*. The higher the precision, the better the targeting, and the greater the scalability with which force can be exerted, the better the armed forces can satisfy this imperative. Hence, as a result of their inherent characteristics, combined with rules of engagement that are consistent with international and national law, remote-controlled armed aerial vehicles afford greater protection to innocent civilians in an armed conflict. Hence one can say with some justification, even if it is something of an exaggeration, that precisely on account of the

protection of innocent civilians and the need to guarantee, as comprehensively as possible, discrimination and also the proportionality of means, there is really no way to avoid using armed remote-controlled aerial vehicles.

Beyond the issue of legality, is it possible to find a satisfactory answer to the question of the legitimacy of such weapons?

With regard to ethical and moral issues, it is often argued that the use of remote-controlled armed aerial vehicles will reduce the inhibition threshold for killing. Death is abstracted, it is said, and distance killing is unnecessarily cruel. In my view, owing to the primacy of politics, concerns that the threshold for the use of force could fall are unfounded. Deployments of military force take place after a full consideration of all relevant factors. Because of the potentially serious consequences, such decisions are never taken lightly and always as a last resort. Furthermore, particularly with regard to armed remote-controlled aerial vehicles, I cannot see that these would lead to an erosion of the deterrent military strategy elements and hence contribute to a falling inhibition threshold. Rather, a weapon which can be deployed rapidly, precisely and scalably is a useful addition to the currently available spectrum of military options and therefore strengthens precisely the preventive elements of the overall strategy. The desire to put distance between one's own soldiers and the enemy yet still fight effectively is not new. Ever since the invention of the bow and arrow, attempts have been made to protect one's own soldiers from the effects of the enemy's weapons. This was and is an understandable and legitimate endeavor, which has certainly shaped and will continue to shape warfare.

However, I would not be able to find any added moral value in deliberately withholding a technological advantage from one's own soldiers, who risk their lives around the world for the freedom, values and rights of our citizens and other people, merely in order to force a supposed "chivalrousness" on the battlefield. Such ideas, which come along in ethical guise, suggest a basic attitude more suited to a sporting competition, along with the demand that a military operation should also be based on such an attitude. In view of the serious consequences of fighting – wounding and death – this seems to me to be inappropriate as a general ethical requirement, and in any case unrealistic with regard to the enemy. Soldiers accept risks in order to protect themselves, their fellow soldiers, or innocent civilians, and to fulfill the mission authorized by the *Bundestag*. Meanwhile they always remain citizens of our country. For this reason alone, their own rights, for example to physical integrity, should not be diminished more than is necessary. They do not need to accept a greater risk in order to protect the enemy. I consider that making such demands of our soldiers is utterly immoral and extremely cynical. By contrast, I consider it morally imperative to call for our soldiers to have the best possible equipment – indeed, the best that our highly developed society can legally and financially provide. The principle should be that one's own soldiers are exposed to the least possible risk and given the best possible support and protection during their dangerous mission. It also remains unclear to me why the arming of remote-controlled aerial vehicles in particular should create a new ethical dimension or category of weapons. Armed remote-controlled aircraft are not different than

manned warplanes, except for the fact that the pilot sits not in the aircraft itself but in the control segment on the ground. In both cases, it is humans who act and in both cases this action is subject to identical legal and moral standards and rules.

In the case of armed remote-controlled aircraft, the aspect of human decision-making is even more pronounced than in manned warplanes, since here it is not a single pilot in the cockpit making a decision within a few seconds but rather a team of two to three operators who decide jointly, and after careful consideration. Hence the use of remote-controlled aerial vehicles is not ethically subject to any different principle than the use of military force in general. Objectively, the specified rules of engagement can be adhered to even more reliably.

In the development of remote-controlled aerial vehicles, are there technological trends which it would be necessary to take preventive action against via arms control policy initiatives?

Critics of armed remote-controlled aerial vehicles fear that their development and procurement mark the beginnings of the development of automated weapons systems which, at some time in the future, could autonomously wage wars without human intervention. Hence they oppose their development and procurement from the outset as being the “start of a slippery slope”. I do share this concern, but only with a view to the distant future, if it ever came to gradually replacing manned warplanes with a future generation of remote-controlled warplanes. In some combat situations, particularly in direct combat against other warplanes, owing to the associated pace

of action it is often necessary to make instant decisions and take immediate action, which the pilot in the cockpit is ideally placed to do. This contrasts with the physical limits resulting from the time it takes sensor data and control signals to travel between remote-controlled warplanes and pilots on the ground, especially via satellites. In a number of countries, work is already underway on technological solutions which in the more distant future (2025+) will be able to process sensor data directly and allow the on-board software to decide on target selection and the use of weapons. I find this trend extremely problematic, since it shifts the legal and moral dimension of weapon deployment from soldiers and their ability to weigh this up directly in battle, to the far-away development departments of software providers. In war, when it comes to the ultimate decision over life and death, humans must always be able to make the final decision directly. They must not let this decision be taken by a piece of computer software, even if this were technically feasible. To thwart such a problematic development early on and with lasting effect, I advocate suitable arms control policy initiatives and the development of an international code of conduct aimed at stopping such activity. With the technology available today and in the foreseeable future, whose potential procurement is currently the subject of debate, this degree of automation is still not possible. At any rate in the remote-controlled aerial vehicles that are available over the next ten to fifteen years, the direct decision to use weapons will still be taken by soldiers, who are thoroughly trained to adhere to the politically approved rules of engagement, and who are familiar with the mandatory principles under international law

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regarding the use of military force, and take these into account in their decisions.

In summary, I would like to say that remote-controlled aerial vehicles are an especially effective and efficient means of obtaining important information, particularly in asymmetric conflicts. With a good, detailed situational overview serving as the basis for even better decisions, and weapons fire that is appropriate for the situation, rapid, easily available and scalable, the risk for deployed soldiers is minimized or reduced. Armed unmanned aerial vehicles considerably reduce the amount of time and coordination work required to help our own and allied forces. This is something that our duty to care and provide demands. Furthermore, they are practically imperative because of the reduced risk of harm, and for innocent civilians for reasons of proportionality and discrimination. From a moral point of view and with regard to international law, armed remote-controlled aircraft are not different than other, existing weapons systems. Ethical questions only become relevant when humans – whether soldiers or political decision-makers – use armed remote-controlled aerial vehicles. Since the use of armed remote-controlled aerial vehicles is tied to the same principles of international law, national law and ethics as the use of military force in general, in our democratic constitutional state there is no reason to fear misuse or to abandon these weapons from the outset because of such concerns. To conclude, let us turn to German public opinion, which speaks for itself. In April 2013, the Forsa institute conducted a representative survey on armed remote-controlled aerial vehicles. 27% of German people generally did not want such systems to

be used. However, 59% could imagine their use under certain conditions, such as to prevent danger, and 12% generally supported their use.



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Armed Drones: Legal Issues from an International Law Perspective

By Stefan Oeter

Since President Obama took office, the sharp increase in the use of armed drones (or unmanned aerial vehicles – UAVs) against members of the Al-Qaeda terrorist organization and Taliban fighters in Afghanistan and north-western Pakistan (but also against militants in Somalia and Yemen) has triggered a broad public debate on the issues surrounding armed drone usage. This debate has been particularly explosive in Germany. While many Germans find it generally difficult to accept the targeted killing of enemy combatants (not to mention civilians), killing by machines (such as armed drones) makes them particularly uneasy. Politically, this unease has found expression in reactions to suggestions that the German armed forces should themselves consider acquiring armed drones. From the military standpoint, the case for armed drones is clear: If reconnaissance drones are able through electronic surveillance to detect enemy activity that could pose considerable danger to German military personnel and equipment, it makes sense to deal with that threat immediately in real-time. And the only feasible way to engage in real-time combat is to launch guided missiles directly from the drones.

Despite these military reasons for the deployment of armed drones, large sections of the public remain skeptical – as do specialists in law, social ethics and political science. Normative considerations appear to militate against the use of armed drones. But what sources

substantiate these normative grounds? At any rate not positive international law – as this article will briefly explain below. *International Humanitarian Law* (IHL) does not prohibit the use of armed drones. It does impose certain restrictions, but these apply equally to the deployment of the guided missiles in other operational contexts, for example the deployment of such guided missiles from warplanes and helicopters. In-depth analysis shows that the problem resides behind the norms of positive international law, at another level of normative judgment; at best it can be exemplified with (social ethics) principles on which IHL and its rules on methods and means of warfare are based. That is not to say, however, that there are no good reasons for a healthy dose of normative skepticism regarding the “normalization” of armed drone usage.

Armed drones in International Humanitarian Law

One basic problem from an international law perspective regarding the phenomenon of armed drones is the fact that the drones themselves are not weapons, or ordnance, in the technical sense, but rather in terms of basic principles solely an (unmanned) military aircraft that serves as a weapon platform. IHL law only governs weapons, not weapon platforms. The drone as a military object is clearly a legitimate military target, but only the guided munitions which are carried and directed to their targets by the drones are the object of

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regulation of the norms of IHL concerning means and methods of warfare. In turn, the types of guided munitions in question are not specific to drones and are used on other aircrafts as well, such as fighter jets and military helicopters. In these applications they have largely been regarded as unproblematic. Yet growth in the scope of deployment to include drone usage in no way changes the effects of weapons with which IHL is concerned. Does this mean that armed drone missions are unproblematic per se? Things are not quite that simple. What causes unease is ultimately not the weapon platform or the guided missile as a weapon, but rather the typical deployment scenario for armed drones, which constitute an archetypal military technology of asymmetrical conflict. Under such circumstances, the guided missile directed to its target from drones is in effect a radical type of distance weapon. There is only a very fine difference compared to firing an artillery shell from a distance or launching a cruise missile. Particularly in situations when a reconnaissance drone observes and marks the target, the boundaries between the different types of use are blurred. And yet there are discernible differences. Artillery has a limited range, and a suitable battery has to be sufficiently close by and ready to fire, if distance combat – with any kind of mobile target – is to be successful. The same applies to the deployment of warplanes. Only an armed drone is capable of fighting an identified military target immediately, in real-time.

Military targets in asymmetrical conflicts are frequently gatherings of enemy combatants. However – and this is one of the characteristics of asymmetrical conflicts – these are

usually not clearly distinguishable from the general civilian population. From a purely legal point of view, “irregular” fighters in non-international armed conflicts are members of the civilian population. Although they lose their protection if they directly participate in fighting, the problem of differentiation remains. This differentiation problem is negligible if a patrol or combat unit encounters and opens fire on a group of enemy combatants. Things become more complicated when using distance weaponry. If I come to the assistance of a patrol caught in an ambush with artillery fire or “close air support”, the situation remains relatively simple. The problem of making a clear distinction becomes more tricky, however, if I want to use distance weaponry against suspected enemy combatants – i.e. actively launch an attack against a supposedly or actually identified opponent. The fact that targeted persons are carrying or firing weapons without enemy engagement doesn’t count for much in contexts such as Afghanistan, Yemen and Somalia – one is reminded of cases where wedding parties were accidentally obliterated following ritual celebrations with the small arms that are socially customary in such places. The narrower the time window between identifying the (supposed) military target and the use of weapons, the greater the risks of misjudgment, distorted perception or a sudden change in circumstances that the military actor taking the decision is unaware of. As an example, one needs to think only of the infamous Kunduz incident, in which a tragic error of judgment led to an airstrike on two captured tanker trucks with substantial loss of civilian life.

Unease over the use of armed drones becomes confused here with the debate on the issue of targeted killing. Targeted killing of military opponents who are fighting against you with a weapon in their hand is unproblematic. According to prevailing opinion, the concept of direct participation also extends to professional combatants who as part of an organized military apparatus fully devote their time and energy to fighting the enemy, including the political leaders of such military apparatuses. Part-time combatants, on the other hand, who only occasionally retrieve their weapons from their hiding places, but otherwise lead an inconspicuous civilian life as farmers or artisans, are protected as members of the civilian population – unless they are found with a weapon in their hand.

Further problems arise with regard to “collateral casualties”, which are virtually inevitable to some extent in military operations. We don’t know how many women, children and innocent civilians have been killed by American drone strikes. We only know that the numbers are considerable – and in the context of operations in Afghanistan and Pakistan this is hard to avoid, if we do not refrain entirely from strikes on targets in human settlements or vehicle convoys, where protected civilians are found alongside enemy combatants. The problem of the legitimacy of such collateral casualties is highly complex and an in-depth examination is beyond the scope of this article. In principle, though, it is no different from the collateral casualty problem with conventional air or artillery strikes.

The legitimacy of targeted killings outside of armed conflict settings is an extremely difficult

question. Human rights guarantees apply here. Targeted killings – according to the rules concerning the use of police force which are applicable in this respect – are allowed only in extreme cases of direct self-defense or emergency assistance in the event of an acute threat to the lives of task forces or innocent bystanders. This almost completely rules out the (military) use of armed drones.

The limits of military force from an ethical perspective

Yet these considerations of positive international law have not yet really touched on the actual problem of social ethics that is responsible for most of the unease regarding armed drones. Aversion to radicalized distance weaponry, which is what armed drones turn out to be, is not really fueled by the problems of targeted killing and collateral casualties. Instead, it has to do with the basic models of ethical justification for killing in war, which no longer seem so sound in the case of drones. As a soldier, I can target and kill the enemy, because I am - ultimately - engaged in a kind of institutionalized self-defense. Even if my own life is not in danger from possible enemy fire – which is unlikely to be the case with distance weaponry – I am allowed to fight the enemy where I find him, as otherwise he will direct his force against my fellow soldiers, whom I am to protect in solidarity against the adversary. The foundation of this legitimacy on social ethics principles generally becomes rather shaky in “asymmetrical” conflicts. With the use of armed drones, however, this model of justification finally reaches its limits.

This becomes particularly apparent in the circumstances surrounding drone strikes in

Pakistan, which on the American side are controlled by CIA civilian personnel. The persons involved are not in any danger themselves (not even potentially), nor do they have any kind of fellowship or ties of solidarity with the U.S. army soldiers whose lives are being protected in Afghanistan. For the agent taking action, the targeted use of deadly weapons increasingly mutates into a kind of computer game which bears no resemblance to armed confrontation (that carries risks). This causes two problems: the problem of perceptual shortcomings that occur with drastically reduced decision-making time, and the problem of ethical desensitization. Exploiting the military advantages of real-time military action demands short decision-making processes and the ability to make an immediate decision on the spot. As a result, there are no more long chains of command with legal counsel. The decision must be taken immediately, otherwise the advantage of the drone is lost. In this activity loop of (perhaps only supposedly) identifying a military target with the expectation of immediate response, all forms of perceptual distortion and bias that humans bring to such situations inevitably come into play. One is no longer directly confronted with the consequences of using force (as opposed to a soldier in conventional combat, who might subsequently discover he mistakenly shot a harmless civilian). This complete separation from the problematic consequences of using force ultimately leads to ethical desensitization, such as we can observe in psychological research in relation to typical violent computer games. Just as it is difficult for conventional soldiers in the field to overcome their intuitive inhibition to kill and to avoid that the crises of conscience caused by witnessing the conse-

quences of force lead to post-traumatic stress disorder, the same way it is easy for drone operators to distance themselves from acts of violence.

This is all the more unfortunate given that central regulatory provisions of IHL – particularly with regard to the problem of collateral casualties – appeal to the ethical judgment of military decision-makers. The decision of conscience that is required in balancing the expected military advantage with the likely collateral casualties ultimately relies on the ethical sensibility of the military person responsible for taking action or making the decision to act – and indeed, such a decision of conscience crushed many soldiers and officers when facing it. The almost complete disburdening of active personnel as regards this kind of crisis of conscience may be “efficiency boosting” for bureaucratic military apparatuses, but in essence it undermines the foundations of the way in which the rules of IHL law operate.

This is particularly obvious in the practice of signature strikes, where the operational decision is routinized with respect to particular combinations of factors – and it is taken to extremes in scenarios where autonomously operating machines automatically respond to particular detection patterns with a signature strike. The active subject, equipped with a conscience, is relieved of all responsibility here, while the ethically wrong decision (which is still possible) is invisibilized in the anonymous program codes of the drones’ control software. In fact, no individual person is legally responsible anymore; what we are left with is the collective responsibility of the military

apparatus, which is difficult to pinpoint. The military apparatus, meanwhile, has no conscience and is also unable to conduct an ethically responsible balancing of conflicting interests. But at this point we once again have a problem for positive international law – *International Humanitarian Law* absolutely requires military decision-makers to take personal responsibility for the balancing of conflicting interests.



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Killing by Drones: The Problematic Practice of U.S. Drone Warfare

By Peter Rudolf

The ethical evaluation of armed drones could hardly be more controversial. First of all, there is a fear that their increased availability could lower the threshold for using military force. Because drones are a military instrument that can be used easily and without risk – so the argument goes – there are concerns that they enable recourse to military action without the criterion of *ultima ratio* being fulfilled, i. e. without pursuing or even considering other options first. On the other hand, there is an expectation that drones can facilitate morally justifiable missions, e. g. for humanitarian purposes, which otherwise might not take place. For the most part, however, proponents of combat drones base their arguments less on *jus ad bellum* than on *jus in bello*. Because of their precision, the use of combat drones is said to suit the principle of distinction between civilians and combatants better than other types of operations. According to another argument used by proponents, they also reduce the risk for one’s own soldiers, whose protection is a moral duty when they are sent into justifiable combat mission. Indeed, in a moral evaluation of the use of armed drones, what counts first and foremost is whether the organized use of force in which they are deployed is justified. Although combat drones may become problematic in themselves if they are developed into “autonomous weapons systems” capable of deploying deadly force without the direct control and direct involvement of a human being in the decision pro-

cess, their development has not yet reached this stage.

Nevertheless, as the American philosopher and war ethicist Michael Walzer has written with regard to his own country’s practice, combat drones have become a source of moral unease precisely because of how easily they enable targeted killings. For the U.S., the use of drones has become the method of choice in the war against Al-Qaeda and its allies. Although the Obama government has broken with the ideology and rhetoric of the “war on terror”, it certainly does not regard fighting Al-Qaeda as a police and criminal matter. As regards the legitimacy of its actions in international law, the Obama administration still claims the existence of an “armed conflict” with Al-Qaeda and associated forces (who are not defined in any more detail) on one side, and the U.S. on the other. It argues that this “armed conflict” is not geographically restrictable, which is highly contentious under international law and is also not an opinion shared by allies of the U.S. A number of criteria for the existence of a “non-international armed conflict” can be found in international treaty law and customary law. But it is problematic whether any such degree of duration and intensity of violence exists outside of Afghanistan and Pakistan’s border region with Afghanistan (and formerly Iraq), and whether “non-state armed groups” can be identified as a party to the conflict, so that one can speak of

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an “armed conflict” under *International Humanitarian Law* (IHL).

In its public justifications under international law, the administration refers not only to the existence of an “armed conflict” between Al-Qaeda and associated forces on one side and the U.S. on the other, but also to a very broadly defined right to pre-emptive self-defense. It remains unclear, however, whether both lines of justification are valid in all cases. It appears that the administration finds it necessary to invoke the right to self-defense in order to legitimize operations away from the “hot” battlefields. And yet it is claimed that there is no need to conduct an analysis regarding the applicability of the right to self-defense before every targeted attack. Behind this lies an understanding of the imminence of a threat which is legally and ethically dubious because it is so very broad. A white paper by the United States Department of Justice considering the circumstances under which it would be legal to kill American citizens in foreign countries contains a number of statements on this point. It says that the threat posed by Al-Qaeda and its associated forces demands a “broader concept of imminence”, since the U.S. government may not be aware of all planned attacks and so cannot be confident that none is not about to occur. In this view, therefore, a person who has been continually involved in plotting attacks against the U.S. and has not obviously renounced or abandoned those activities constitutes an imminent threat.

Within this legitimizing context, combat drones have enabled a largely opaque institutionalized practice of more or less targeted

killings in the grey area of asymmetric conflicts.¹ Targeted killings and drone attacks are now frequently cited in the same breath. Targeted killings are a practice which, in the case of the U.S., has only become possible with such intensity because long-range, remote-controlled, highly accurate combat drones can be used. Yet the problems associated with targeted killing – defined as the planned killing on behalf of a state of particular individuals who are not in custody – are not dependent on a specific technology and not limited to the U.S. Israel, for example, took a leading role in this respect (and, by the way, the U.S. used to publicly criticize Israel for such activities prior to 9/11).

It appears that the availability of drones, which can be deployed without risks to U.S. soldiers and intelligence operatives, has had the effect² of lowering the threshold for their use and increasing the number of target persons, that is, to include persons whose killing cannot be convincingly justified using the criteria of necessity and proportionality. People are killed in Yemen, for example, because the technology makes it easy. If the drones did not exist, Washington would hardly go to the trouble of sending teams to arrest or kill these target persons.³

Killing is politically more opportune and less risky for U.S. security forces than capturing suspected terrorists. If anyone is going to be captured or arrested, it is more likely that other countries’ security forces will do it. Handling detainees causes problems for the U.S. – after all, Guantánamo is still supposed to be closed down. Despite official denials, the difficulties involved in capturing suspected terrorists

have created incentives to kill.⁴ Hence it is questionable to what degree the ostensible preference for capturing suspected terrorists – which was reaffirmed by President Obama in May 2013 – actually affects the bureaucratic decision process.

The use of drones has long gone beyond eliminating leading figures of Al-Qaeda and the Taliban. According to calculations by the New America Foundation, as far as is known and confirmed by two public sources, 55 Al-Qaeda and Taliban leaders were killed by drone attacks in Pakistan between 2004 and mid-April 2013. This means that they are just a small fraction of the total number of people killed by drone attacks in that period – which the organization estimates at between 2,003 and 3,321. In Yemen, the number of Al-Qaeda leaders killed since drone attacks began under Obama is 34 out of an estimated total of 427 to 679 killings.⁵ In other words, the large majority of attacks are targeted at low-ranking members of the Taliban and al-Qaida.

The administration's public justifications of its drone program always give the impression that it solely involves the precise killing of leading terrorists and those posing a serious potential threat. Yet most CIA drone strikes in Pakistan appear to be of the "signature strike" type. During such operations, persons or groups of persons are attacked apparently on the basis that they exhibit a particular pattern of behavior, from which it is concluded that they present the risk of a threat.

Precisely for attacks of this kind, the official line that "collateral damage" is extremely rare hardly seems credible, particularly since a

number of shocking mistakes have come to light. There are no really reliable figures for the number of people killed in drone strikes or for the number of "non-combatants" falling victim to these attacks. The administration remains silent on this point. The figures that some organizations compile on an ongoing basis differ considerably from each other and involve a high level of uncertainty, for methodological as well as purely practical reasons. They are based on media reports, mainly in English-language media. Their sources often remain anonymous, and their reliability is uncertain. It can be assumed that not all strikes are reported. There is no way to verify the distinctions made in such reports between civilians and militants, for example. The term "militant", which is used time and again to make it clear that the victims are not innocent, is never defined and also irrelevant in international law.⁶ A positive trend, so to speak, can be seen in an apparent substantial drop in the number of civilians killed by drone strikes in the tribal areas of Pakistan. According to calculations by the Bureau of Investigative Journalism, the proportion of civilians killed fell from 14 percent in 2011 to 2.5 percent in 2012.⁷

As problematic as American drone warfare is, and however much it shapes opinions on the instrument of armed drones, one has to keep in mind: Although technology has facilitated the practice of more or less targeted killings, it required and requires the specific legitimization resulting from the permanent state of war in which the U.S. has imagined itself to be since September 11, 2001. Within this context of legitimization, a bureaucratic apparatus of killing has developed, whose decisions are largely free of political or independent legal

oversight. The lists of targets are not independently verified either beforehand or afterward, the criteria are largely kept secret, and decisions are taken by a group of publicly unaccountable decision-makers, without so much as a subsequent independent review. The U.S. has developed an institutionalized policy that rightly causes moral unease.

- ¹ For a comprehensive discussion of this point, cf. Rudolf, P. / Schaller, C., 'Targeted Killing' - Zur völkerrechtlichen, ethischen und strategischen Problematik gezielten Tötens in der Terrorismus- und Aufstandsbekämpfung, Berlin: Stiftung Wissenschaft und Politik, 2012; on the subject of what is known about the drone war, cf. Rudolf, P., Präsident Obamas Drohnenkrieg, Berlin: Stiftung Wissenschaft und Politik, 2013.
- ² Obama himself, during an appearance on "The Daily Show" on October 18, 2012, addressed the temptation that drone warfare presents: "There's a remoteness to it that makes it tempting to think that somehow we can, without any mess on our hands, solve vexing security problems." Shane, S., "Election Spurred a Move to Codify U.S. Drone Policy", in: The New York Times, November 24, 2012.
- ³ A former official tasked with selecting targets neatly expressed this point: "It's not at all clear that we'd be sending our people into Yemen to capture the people we're targeting. But it's not at all clear that we'd be targeting them if the technology wasn't so advanced. What's happening is that we're using the technology to target people we never would have bothered to capture." Quoted in: Junod, T., "The Lethal Presidency of Barack Obama", in: Esquire, 2012.
- ⁴ One of Obama's leading anti-terrorism advisors, who did not want to be named, had this to say: "We never talked about this openly, but it was always a back-of-the-mind thing for us." Klaidman, D., "Kill or Capture: The War on Terror and the Soul of the Obama Presidency", Boston/New York: Houghton Mifflin Harcourt, 2012, 126.

- ⁵ Concerning these figures, cf. Bergen, P. "Drone Wars: The Constitutional and Counterterrorism Implications of Targeted Killings", testimony presented before the U.S. Senate Committee on the Judiciary, Subcommittee on the Constitution, Civil Rights and Human Rights, April 23, 2013, 4 ff.
- ⁶ See International Human Rights and Conflict Resolution Clinic, Stanford Law School / Global Justice Clinic, NYU School of Law, Living Under Drones: Death, Injury, and Trauma to Civilians From US Drone Practices in Pakistan, 2012, 30 ff.
- ⁷ See Columbia Law School, Human Rights Clinic, Counting Drone Strike Deaths, New York, October 2012; Woods, C., Serle, J. & Ross, A. K., "Emerging from the shadows: US covert drone strikes in 2012", Bureau of Investigative Journalism, January 3, 2013.



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Drones, Robots and the Ethics of War

By Daniel Statman

The nature of war is changing before our eyes. With the rapid development of unmanned measures – drones and robots of various types – we seem to be moving towards a state of affairs in which fighting no longer takes place between human beings but between machines which currently are still operated by humans, but which are becoming increasingly autonomous.

Some people believe that, from a moral point of view, the trend toward weapons that are increasingly autonomous is very worrisome. The Human Rights Watch organization has gone so far as to refer to the use of such weapons as a case of "losing humanity". This paper takes an opposite view. I seek to show that, in spite of some drawbacks, overall, the new technologies mark significant moral progress in the history of warfare. In what follows, I focus mainly on drones because it is their use that has drawn the most attention in discussions about the changing practice of warfare, but what holds true for drones applies, *mutatis mutandis*, to other potentially unmanned platforms, be they airplanes, submarines, or armored vehicles.

The advantages of drones

Drones are just a tool of war, one among many: There are tanks, cannons, aircrafts, submarines, and now there are also drones. The question concerning their moral legitimacy belongs, therefore, to the level of *jus in bello*. If the use of drones raises any special difficulties beyond those raised by other tools of

war, this can only be because they pose some special threat to the central goal of *jus in bello* which is the protection of civilians. Recall that *jus in bello* incorporates two main constraints on the conduct of war: (a) non-combatants should never be attacked directly and (b) when non-combatants are attacked indirectly, they should not suffer disproportionate harm. How does the use of drones fare with respect to these constraints?

There is obviously no reason to think that drones are more dangerous than other tools of war insofar as the intentional killing of non-combatants is concerned. To be sure, drones can be used to attack non-combatants directly, but so can tanks and aircrafts. Moreover, if some country decides to attack enemy civilians directly, maybe because it sees itself in what Walzer famously termed "a supreme emergency", drones seem the least successful tool to select out of the possible range in its arsenal.

What about collateral damage – are civilians put at higher risk by the use of drones than they would be if drones were not used? The crucial point to remember here is that the alternative to the use of drones is not the avoidance of violence altogether, which would entail zero-risk to civilians, but the use of other, more conventional, lower-tech measures, such as tanks, helicopters, and so on. But such imprecise measures would almost certainly lead to more civilian casualties rather than to fewer.

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In response, one might argue that while the use of drones in "old" wars would indeed pose no special problem in terms of *jus in bello*, "new" – asymmetric – wars are different. In asymmetric wars, it is sometimes argued, the use of drones puts civilians at special risk. But I see no reason to think this is true. The real alternative to the use of drones in fighting against Hamas and Al-Qaeda is not peaceful negotiation, but other, far less discriminate measures. So if lethal measures (under the rubric of war, rather than under that of law-enforcement) are permitted in these conflicts, it is hard to see why drones should be seen as especially worrisome. (And needless to say, if such measures are not permitted then old-fashioned weapons would be ruled out as well.)

To be sure drones might be abused, but so could other tools of war. At any rate, the danger of abuse should not make us lose sight of the great moral promise at hand. Other things being equal, the more precise a weapon is, the better its use can comply with the requirements of discrimination and proportionality.

However, this is not the only moral advantage of drones. Another is the reduced risk to a country's own soldiers. Thanks to the availability of drones and other unmanned measures, countries can, and hence should, expose their soldiers to the lowest possible risk when they seek defense from their enemies. Reducing casualties among the soldiers of one's own side is not only a moral issue, but a prudential one too, not only because the loss of an additional number of soldiers undermines the army's ability to withstand its enemy, but also because sensitivity to military

losses is increasingly limiting the ability of states to deploy their forces for military missions.

Furthermore, lowering the risk to soldiers by using unmanned weapons may make states more willing to get involved in humanitarian interventions and would make such interventions less problematic in terms of the risks to the soldiers sent to fight. It is not easy to justify forced participation in wars aimed at the protection of some other nation from an oppressive regime or from some form of genocide, but if the risk to soldiers is reduced thanks to the use of drones, this problem is very much alleviated.

The option of carrying out effective attacks by drones might also have the advantage of delaying the need for a full-scale war, or helping to avoid it altogether. This is so because targeted attacks by drones might be sufficient to convince the enemy to withdraw from its aggressive plans without the need to mobilize troops and get involved in bloody battles on the ground. Finally, drones are cheaper to produce and to deploy than manned planes, which could enable the re-routing of money saved to worthy concerns like education, social justice, etc.

Drones, thus, seem to have significant moral advantages:

- Other things being equal, they comply better than other tools of war with the requirements of discrimination and proportionality.
- They enable states to reduce the risk to their own soldiers.

- They weaken moral arguments against involvement in wars of humanitarian intervention.
- They make it possible to respond effectively against perceived aggression without the need to engage in full-scale war.
- They are cheaper in comparison to man-operated tools of war and thus leave more public money available for other causes.

Arguments against the use of drones: A critical assessment

(a) Disrespectful death

Imagine a person walking in his neighborhood when, suddenly, literally out of the blue, he is shot and killed by a drone which he cannot even see. Now compare this to the death of a soldier on the battlefield. Arguably, there seems to be something disturbing about the former kind of death, something particularly disrespectful or humiliating.

But what exactly is disrespectful in being killed by a robot in comparison to being killed by a tank or by a helicopter? Maybe when a human being does the killing, that human being acknowledges, albeit in a paradoxical manner, the humanity of his victim. He identifies the victim as a fellow human being, though one posing a threat to him. For a very short time, they meet on the same plain, so to say, thus mutually affirming each other's existence and humanity. In contrast, when a drone shoots and kills a person, no such meeting takes place; hence, the humanity of the victim is denied or, at any rate, does not receive the acknowledgment it merits.

There is something appealing about this argument, though on reflection I don't find it convincing. First, it is unclear in what sense a helicopter pilot "affirms the humanity" of her victim when she targets and kills her from afar. Second, the argument sounds most appealing when one thinks of a physical, close confrontation between combatants, in which they see the faces of one other and, in some sense, thereby acknowledge their humanity. But most fighting has long lost this feature. Operators of cruise missiles don't see the faces of their victims, neither do pilots, nor tank operators. The victims of such weapons are no less "faceless" than those of drones.

The assumption underlying my objection was that arguments against drones must be powerful enough to explain why they are morally wrong without implying that conventional weapons, the legitimacy of which is universally accepted, are also morally wrong. Since the denial of such legitimacy would lead to a position close to pacifism, let's call the assumption in question the 'Non-Pacifist Assumption,' or 'NP'. I believe that most objections to drones fail because they contradict this assumption.

(b) Unfair or "dirty" killing

Maybe the sense of disrespect grows out of a sense of unfairness. Back to the person walking in his neighborhood and killed by a drone: one might see such killing as a case of "fighting dirty", probably because the victim stands no chance against the drone. But that would be in clear contradiction to NP because soldiers are similarly defenseless against F16s or long range artillery.

There seem to be two separate arguments here: One against unfairness in the sense of asymmetric military force, and one against unfairness in the sense of visiting death upon the enemy by using "dirty" measures and tactics. But both fail in terms of NP. To realize just how weak and unstable the argument from unfairness is, one should note its resemblance to the arguments raised a century or so ago against submarines and military aviation, or, much earlier, against the use of crossbows. Unless one wants to rule out machine guns (the modern version of crossbows), submarines, and jets, one cannot rule out drones on the basis of their being unfair or dishonorable means of warfare.

(c) Riskless killing as undermining the license to kill in war

In Paul Kahn's view, the morality of law is caught in a paradox. On the one hand, countries have a moral obligation to minimize the risk to their soldiers and to create what he calls an "asymmetrical situation" in which they totally overpower their enemies. On the other hand, beyond a certain threshold, such asymmetry undermines the very license to kill in war. Why is that so? Kahn contends that due to their young age and to the indoctrination and pressures from peers and superiors, most combatants are not morally guilty for their participation in war and, insofar as such guilt is concerned, they are no worse than non-combatants. If the mutual killing of combatants in war is permissible, it must have a different ground, which, in Kahn's view, is mutual self-defense; each side is defending itself from the threat posed by the other. But to say that each side poses a threat to the other is just a different way of saying that they impose a risk

on each other, or that both sides are exposed to some non-trivial risk when in combat. What follows is that when such mutual exposure to risk does not exist because the power relation between the warring parties is manifestly asymmetrical, the paradigm of war is inapplicable, together with the mutual license it entails to kill enemy combatants. "Without reciprocal imposition of risk," asks Kahn, "what is the moral basis for injuring the morally innocent"?

Kahn's argument for the mutual license to kill in war reflects a widespread intuition, according to which it is the willingness to die that creates the license to kill. Since the drone operator kills but does not live with the risk of sacrifice, she doesn't have the above license to kill enemy soldiers. Thus, the more warfare consists of drones and killer robots, the less justified these operators are in bringing death and destruction on their enemies.

This is a sophisticated argument against the use of drones, though I remain unconvinced. First, the tension with NP remains. Drone operators are not the only combatants whose risk is close to zero. The same is true for those who fire artillery or cruise missiles far away from their targets. Second, if incurring risk were a condition for engaging in warfare, then humanitarian intervention by third parties would hardly ever be justified. Kahn's view would entail that the only way to deal with humanitarian crises would be to turn to law-enforcement bodies, not to use military force.

Conclusion

There are other arguments against the use of drones which will have to wait for some other

day. I believe that the above discussion is sufficient to establish the moral advantage of drones over other more traditional tools of war. Although one must be cautious in making evaluations about the future, drone-centered campaigns seem much more humane when compared with the grand battles of the past. Judged against bombers, cruise missiles, and obviously against weapons of mass destruction, the drone may well be remembered in the annals of warfare as offering real promise for moral progress.



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My new Fellow Soldier – Corporal Robot?

By Jörg Wellbrink

Is the Terminator ready to take action in the battles of tomorrow? In the future, will autonomous machines conduct armed conflicts against people, as portrayed in the film “The Matrix”? Is this all still science fiction, or will it soon become reality?

Lurid headlines such as “Can robots replace soldiers?” or “Robots are cheaper than soldiers” are increasingly common. Meanwhile, human rights organizations such as Human Rights Watch are calling on governments to take prompt action to ban killer robots.

It is much rarer for the public debate to focus on other – military and civilian – applications for robots, such as rescuing the wounded or using robots in medical care. Thus there is an urgent need to bring some objectivity to the discussion.

The German *Bundeswehr* has conducted a scientific analysis of the future of robotics technology and its possible impacts on armed forces. A study produced by the *Bundeswehr* planning office (*Planungsamt der Bundeswehr*) in Berlin examined the latest and anticipated future developments in robotics research, artificial intelligence and nanotechnology, as well as their potential impacts on aspects of security policy and on the military. The planning office primarily looked at possible developments over the next five to ten years. Within this time frame, the combat robots that have so far been discussed in such populist terms do not yet play any role.

According to the study, for technological reasons it is doubtful whether it is even feasible to develop autonomous robots that have the functionalities of soldiers in combat. The study therefore recommends that research should be limited to robotic systems that have a relatively small range of functions for supporting soldiers, rather than allocating research funding to the development of fully autonomous humanoid robots. This does not imply any change of direction for the *Bundeswehr*, since it rules out the deployment of systems that make an autonomous decision to use weapons against people solely on the basis of computer or machine logic.

Technically feasible, questionable for military use

The deployment of soldiers does not solely comprise the use of weapons against potential opponents, but rather it involves a significantly more extensive and varied range of tasks. For example, these include carrying out patrols past children at play, or assessing passing vehicles which may present a danger. The *Bundeswehr* already talks about “strategic corporals”, whose actions can have major impacts in a conflict situation.

The future analysis section at the *Bundeswehr* planning office expects a further increase in complexity in future crisis situations where an alliance of forces is deployed. For the *Bundeswehr*, these situations will continue to range from humanitarian disaster relief missions to possible shorter stabilization

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operations and combat scenarios. In future operations, soldiers will be faced with increasingly complex environments and missions that place them under even greater pressure. Handling complex situations and adapting flexibly to unfamiliar new situations requires human intelligence. This is why the *Bundeswehr* clearly focuses on the training of its soldiers – and this training includes, and underlines, the field of ethics.

It is in precisely this field that the enduring weaknesses of artificial intelligence are apparent:

- An inability to cope with unpredictable events or overly complex tasks,
- very limited task-oriented flexibility, and
- no ability to improvise.

Thus it is highly likely that combat robots would have only a very limited range of applications in operations against adversaries who were reasonably evenly matched in technological terms. On the other hand, technologically inferior adversaries tend not to engage in open combat, preferring instead to attempt ambushes or other ways of achieving their objectives.

It would also be appropriate to investigate whether combat robots should be deployed together with soldiers, and whether – for example – a squad leader can lead a squad of, for example, five soldiers and two combat robots during a military operation. The question of whether soldiers can learn to trust robots also needs to be examined. Communication between humans and machines, and between robots, must function smoothly. Communication channels must be secure, and

the combat robots must be protected against hackers.

The situations in which the use of a combat robot is deemed appropriate need to be clearly identified before the operation. Another challenge is the logistical arrangements for combat robots, e. g. their power and ammunition supply in combat. Provisions also have to be made for safely recovering damaged combat robots – possibly using a recovery robot.

In summary, therefore, the value of such combat robots is highly questionable from a military point of view. Many unresolved pragmatic issues are met with technologically doubtful promises. Will future armed forces even be able to afford to acquire systems that will probably have only very limited deployment options? Here too, it becomes apparent that not everything which seems technically possible in theory is actually useful in military terms.

Robot moral

The decisive point of view from which the problem as a whole should be judged is the ethical and legal perspective. Unfortunately, not everyone shares the same legal and ethical opinions. Views differ even among allies.

When weapons are used against people, the question of responsibility always needs to be asked, since International Humanitarian Law holds that someone must be responsible. Yet with autonomous systems, it would be unclear who bears responsibility. It could be the commanding officer, the manufacturer, or even the programmer. Even if a person threatens a machine, for example, it would be legally un-

justified for that person to be killed by the machine. Whether to use firearms or force against people is and will remain a deeply ethical decision. A person who has killed must subsequently come to terms with the consequences of its actions. Cultural background and ethical principles play a decisive role in how armed forces deal with this challenge. In our society, the use of force against people is a punishable act.

According to the basic understanding of the *Bundeswehr*, a military operation is never a matter of killing as many of the enemy as possible, but rather of incapacitating the enemy in order to achieve one's own objectives. Therefore, soldiers in combat aim to render their opponents unable to fight, not to kill them. However, the death of enemy combatants in battle cannot always be avoided.

The ethical principle of not using more force than absolutely necessary is at issue here. It is undisputed that soldiers in combat can make mistakes, for example because they get carried away by emotions. This is one of the main arguments used by proponents of combat robots. Moreover, it is only through appropriate ethical training – which includes training in ethical principles – that the *Bundeswehr* ensures that its soldiers achieve their objectives and carry out their tasks in combat situations in a well-considered manner and with minimal use of force. Yet significant doubts exist as to whether a computer algorithm can even come close to coping with this complexity.

Robots as potential enemies

Apart from impacting people and their environment, the use of weapon systems has a

security political dimension. Particularly in the drone debate – including in the U.S. – the question is increasingly raised of whether the deployment of combat drones for targeted killing might in fact have generated more resistance, and whether strategic objectives have actually been achieved. This question would be asked even more often if one side ended up employing increasingly or exclusively machines in combat.

With the proliferation of civilian robotics research, there is a growing danger of dual use, i. e. that civilian applications will be adapted for other purposes. This needs to be monitored and assessed within the context of national risk management and security planning.

It is important for the *Bundeswehr* to address long-term risk management. Some potential enemies may have different legal and ethical principles, and might use robots that the *Bundeswehr* would refrain from using. If the international community is unable to uphold a policy of self-restraint – as demanded by Human Rights Watch – then the use of combat robots with their perhaps dramatically shorter response time and greater accuracy presents a high future risk potential for *Bundeswehr* soldiers. Hence the development of supporting robotic systems for *Bundeswehr* soldiers and strategies for dealing with threats from robotic or partially autonomous systems should be promoted.

From various different perspectives, this article brings objectivity to the burgeoning debate on the use of (killer) robots by armed forces. None of the arguments from the different points of view supports the development or

indeed the use of these systems. On the contrary, there are very many arguments against such developments.

In deciding whether to use systems that operate without human interaction, we should carefully consider whether such use is ethically and legally justifiable. One thing, however, should now be perfectly clear: the soldiers of the *Bundeswehr* cannot and will not be replaced by robots.



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Special: What do we actually expect from our Soldiers on Overseas Missions?

By Harald J. Freyberger

Only since the publication of an empirical study by Hans Ulrich Wittchen's working group¹ has it been possible to assess more accurately the health risks faced by soldiers in the German armed forces (*Bundeswehr*) in the context of their military service and particularly during overseas missions. According to this study, around two percent of *Bundeswehr* soldiers return from overseas deployment in Afghanistan with a post-traumatic stress disorder (PTSD). Only one in every two soldiers who is affected subsequently seeks professional help, despite reports that soldiers on average experience twenty trauma-relevant events during their deployment. Yet PTSD rates in the *Bundeswehr* are better than in other similar armies, e. g. among British and American soldiers. This appears to be due to better selection criteria for overseas deployments, better mission preparation, a shorter deployment duration of four to five months instead of up to two years, and less direct exposure to violence². The fact that the occurrence of post-traumatic stress disorders (PTSD), for example, rises linearly with the number of traumatic stress events (and possibly the number of overseas deployments) has been little mentioned so far in discussions concerning this research, but it will gain importance as the *Bundeswehr* is increasingly deployed overseas.

Yet this is only half the story. As has been shown particularly in more recent studies on

gene-environment interaction³, first of all, in the future, it will be possible to identify and perhaps preventively observe high-risk groups via neurobiological and psychological risk factors. Secondly, the risk of developing another mental disorder in later life – such as a depressive disorder – is greatly increased. Considerable latency periods have been found here, with the result that risk assessments should be based on timeframes in excess of five years.

In addition, subsyndromal symptoms are reported by many soldiers. These are defined as symptoms which fail to meet the full diagnostic criteria for a disorder, but include, for example, sleep disturbance, anxiety symptoms that are more likely to be experienced as somatic symptoms, and the feeling of returning home a changed person after such a deployment. Thus questions about one's own existence and identity are touched upon.

And now another dimension comes into play, whose health consequences cannot yet be assessed, i. e. the use of drones in military situations, not only for reconnaissance but in targeted armed missions which explicitly aim to kill an enemy who is "invisible" in certain respects, for whom the soldier concerned also remains "invisible". Although no empirical studies on this topic currently exist, a number of surveys have been published, which are evidently based on qualitative case study re-

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ports and theoretical considerations. For example, Sparrow⁴ and Pepper⁵ assume that the interface systems used must play an important role as a stress factor. Systems that deliver abstract and mediated images of the battlefield result in less exposure to stress, whereas real depictions may be significantly associated with hyperarousal. They also discuss the quite considerable risk of developing a psychological disorder after witnessing or being involved in visible traumatic events, and having to intervene in or passively watch such events. The “collateral damage” that is frequently reported – where in addition to the intentional killing of targeted persons or groups, non-combatants are also harmed – is likely to be particularly relevant here, especially since there is agreement in the literature that in wars of all kinds, these types of casualties among the civilian population far exceed the numbers of soldier casualties. With the beginning of a “virtual war”, therefore, the associated guilt and shame issues take on a completely new form, while we know little about the coping mechanisms used by the persons involved. The armies in which this is already common practice remain shrouded in silence.

But how does a *Bundeswehr* soldier face up to the fact that he has killed not only one or more “enemies” but also a critical number of innocent persons via a “virtual maneuver”, as has often happened in past combat deployments? How does he subsequently behave in the unfamiliar cultural context of the overseas deployment in which this terrible event has taken place? How does this change his attitude toward the local population? How does it change his inner concept of what it means to

be a soldier, and a person in other social roles? These are questions which have not yet been answered in any way and about which we can currently only speculate.

In a broader context, there is a relevant analogy between these systems and computerized “war games” or “violent games”, whose desensitizing impact, resulting in a lowering of the naturalistic threshold for violence and aggression, is widely discussed. In this regard, however, Ritchie and others⁶ point out that only a comparatively small number of psychologically damaged war veterans subsequently become involved in violent crimes in civilian life. In contrast, a number of forensic authors estimate that the likelihood of a victim turning perpetrator is as high as 15%⁷.

Thus the health risks for soldiers involved in the use of “combat drones” cannot be accurately assessed.

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Special: Stress among UAV Operators – Posttraumatic Stress Disorder, Existential Crisis, or Moral Injury?

By Michael D. Matthews

In recent years the media have reported with increasing frequency on the psychological stress incurred among pilots of unmanned aerial vehicles (UAVs) popularly referred to as “drones”. As recently as February 22, 2013, the New York Times reported that research sponsored by the U.S. Department of Defense showed that UAV pilots experience posttraumatic stress disorder rates similar to that of other, more traditional, combatants.¹ Despite the extensive media coverage, there is little scientific evidence to support the contention that UAV pilots are more or less prone to combat stress related disorders in comparison to ground forces or pilots of traditional combat aircraft. Indeed, a search of the PsychINFO database revealed only one published experiment on the topic of stress and UAV pilots.²

The researchers employed a quasi-experimental design to investigate the impact of flying a simulated UAV mission that resulted in enemy loss of life on stress as measured by the Impact of Event Scale–Revised.³ Half of the 30 participants flew a simulated UAV mission on a commercially obtained flight simulation game, and following the mission viewed actual videos of the aftermath of a UAV mission that resulted in enemy loss of life. The other half did not participate in a simulation but viewed the same video. The study also looked at the effect of gender on stress. The results

showed a main effect for simulation versus no simulation, with participants who flew the simulated mission showing significantly higher levels of stress than those who did not fly the mission. Additionally, women reported higher levels of stress than the male participants. The interaction between the simulation condition and gender was not statistically significant. While these findings are congruent with the view that UAV operators may be vulnerable to mission-related stress, the authors underscore that additional experiments using trained UAV pilots and more sophisticated simulations are needed to establish the ecological validity of the results.

It is worth considering whether or not experiences of UAV pilots meet the definition of PTSD. According to the latest edition of the *Diagnostic and Statistical Manual of the American Psychiatric Association*⁴, PTSD is an anxiety disorder that occurs in response to exposure to a traumatic experience, such as in a victim of a violent crime, serious bodily injury, or threat of death or serious bodily injury. Typical symptoms include flashbacks, blunted affect, hyper arousal, social disruption, nightmares and disturbed sleep, and sometimes aggression. Symptoms must persist for a month to support a clinical diagnosis of PTSD. Because UAV pilots do not directly experience trauma as defined by the DSM-V, one can argue that

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whatever psychological distress they may experience after flying missions it is not, strictly speaking, PTSD.

Paul Bartone offers an alternative model for understanding the psychological impact of military service, particularly for situations that do not meet the diagnostic criteria for PTSD.⁵ Bartone suggests that combat may erode the sense of meaning of life among soldiers, leading to a form of existential neurosis. This existential crisis may be accompanied by changes in cognition, affect, and behavior that overlap with PTSD symptoms. In some cases, it could lead to suicide. This view may be especially relevant to UAV pilots. While they do not personally experience trauma, per se, they indeed see or can imagine the mortal consequences of their actions.

Psychiatrist Larry Dewey has spent his career providing care for veterans with psychological disorders. The common denominator among the thousands of veterans he has treated for a myriad of disorders is the impact of killing on meaning making.⁶ Dewey maintains that the majority of his clients suffer a loss of meaning in life, in many characterized by a loss of religion or spirituality, that leads to a host of psychological consequences, including PTSD and depression. For Dewey, how you kill matters less than the comprehension of the fact that you have taken the lives of others.

Nash and Litz⁷ suggest that moral injury may be a factor in causing psychological problems among military personnel. Closely related to both Bartone's and Dewey's views, the concept of moral injury holds that when a person engages in behavior that violates his or her

personal moral standard, psychological disorder may follow. Almost all people in all societies, regardless of their particular religious or spiritual beliefs, sanctify life. When forced to take life, even under the auspices of legitimate war, military members are likely to experience a dissonance between long held belief systems and their own behavior. Because UAV missions may often result in the death of non-combatants, the dissonance between belief structure and behavior may be even greater, leading to an even more severe psychological reaction.

This view also suggests that the psychological challenge faced by UAV pilots is not substantively different from that faced by other military members. It follows that a variety of general strategies should be developed to prevent, treat, or reduce the severity of the psychological injuries that commonly follow combat. Some avenues for accomplishing this follow.

Improved selection. Potential UAV pilots should be screened for pre-existing conditions or experiences that may predispose them to stress-related reactions. Prior drug or alcohol abuse, a history of poor family or social adjustment, and pre-existing psychological problems may greatly increase vulnerability to combat stress.

Improved training. Programs tailored after the U.S. Army's Comprehensive Soldier Fitness (CSF) Program may be designed to help UAV pilots develop the emotional, social, and spiritual skills needed to cope effectively with the demands of combat.⁸ Barnes, Banks, Albanese, and Steger describe actions leaders

can take to improve meaning making among subordinates, providing protection against the existential crises that most people experience after taking lives.⁹

Hardiness training. Salvatore Maddi describes the concept of psychological hardiness and its role in psychological health, especially in trying circumstances.¹⁰ Military members high in hardiness perform and adapt better than those low in hardiness.¹¹ Valid hardiness training protocols exist, and UAV pilots could be given this training to increase their resilience to combat stress.

Cohesion. Members of highly cohesive military units are significantly less vulnerable to combat stress than members of less cohesive units. Among U.S. ground forces, elite units – Rangers, Delta Force, and the like – are less than 50 percent as likely to experience PTSD as members of standard units. One reason for this is the highly cohesive nature of military special forces. Zaccaro, Weis, Hilton, and Jeffries describe the relationship between unit cohesion and psychological adjustment, and outline ways of developing more cohesive teams.¹² For UAV pilots, the social support of peers in a highly cohesive team environment may provide a major protective factor against combat stress.

Treatment. More effective psychopharmacological interventions may be developed to reduce or prevent adverse psychological reactions among UAV pilots. Emerging digital technologies may be used to train improved resilience skills. For example, virtual reality systems are being developed to treat combat

stress and to prevent it from developing in the first place.¹³

An interesting paradox is that, in the larger sense, some of the natural reactions that UAV pilots and other combatants have to killing and combat – while personally damaging – may be socially adaptive. I have speculated elsewhere that biological psychologists may soon be able to manipulate brain chemistry in ways that eliminate the sense of despair or guilt that accompany killing.¹⁴ While this might help the individual soldier be more effective in killing the enemy, such interventions run the risk of removing a natural barrier to killing that, once absent, could increase unsanctioned violence when the soldier leaves the war zone or returns to civilian society. Said another way, humans may be genetically wired to be repulsed by killing. In the absence of this repulsion, social chaos could ensue.

It is also important to note that social and cultural support for UAV pilots provides a critical protective factor. Besides unit cohesion, having a network of peers, friends, and family that understand and appreciate the value of the pilot's work helps minimize guilt and moral injury. The military often attempts to frame and defend killing from a religious perspective, claiming that its own military objectives are on the side of good and justice. Military members themselves turn to religion to allay doubts about their actions. Finally, military members who enjoy the support of their fellow citizens may derive greater meaning. In the U.S., one can compare the hero's welcome experienced by its troops following World War II with the hostile reception many Vietnam veterans received upon their return from the war.

In conclusion, relatively little empirical evidence exists about the psychological consequences UAV pilots experience after killing the enemy or noncombatants. In most ways, killing with a missile launched by a UAV is not much different than killing with artillery or other indirect fire weapons. A soldier does not have to personally see corpses to know he or she has taken life. While this may not neatly fit the concept of PTSD, it is consistent with the idea that existential threat and moral injury may cause lasting harm to UAV pilots. While psychologists may play a key role in preventing and treating these reactions, in the end human nature may dictate how effective these strategies may be. War always has been, and will continue to be, a morally hazardous endeavor.

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