Peer Review Assignment 3: VSD and autonomous weapons
Top 25 according to system on February 9. 2015

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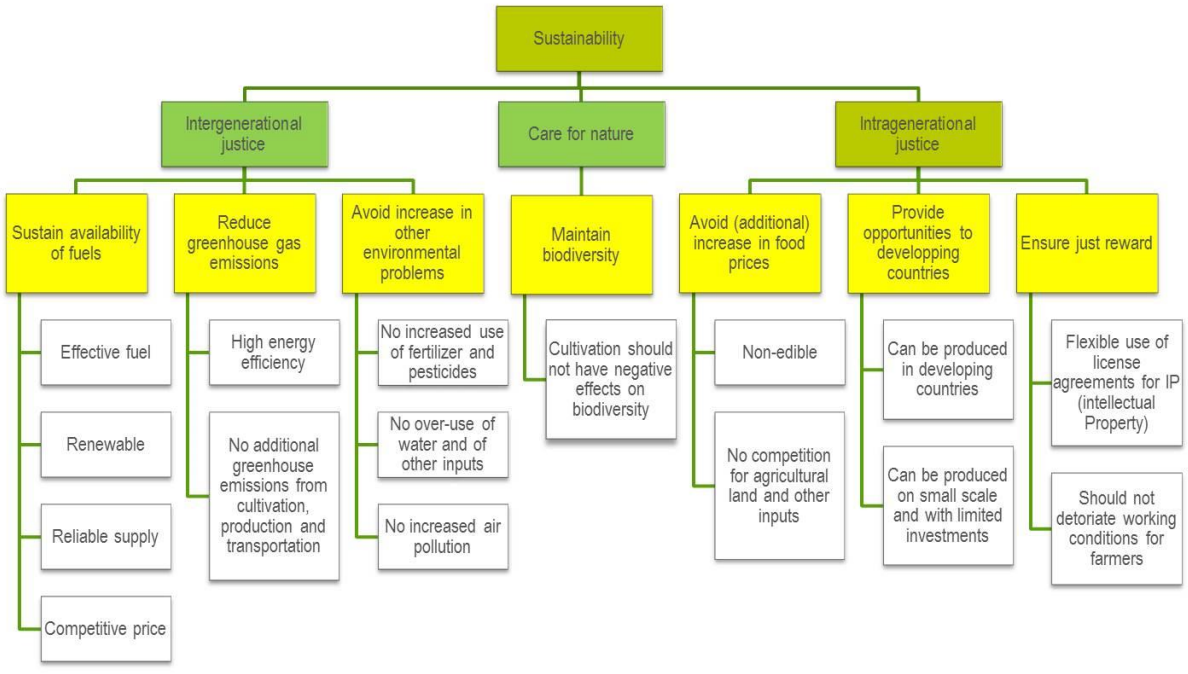
1. **Assignment (see also week 7)**

So here comes our final assignment and it will be about autonomous weapons. In **Section 7.3** we explained the ethical questions and the policy recommendations. So how can we translate this into a Values Hierarchy matrix for VSD? (Click here for a quick refresher on the Values Hierarchy matrix.)

We ask you to do 2 things:

- Briefly indicate what the main moral dilemmas and risks are when we speak of autonomous weapons. You will find a lot of information on the Internet. Please include your references.
- To try to fill in this matrix (see below: Values Hierarchy matrix for biofuels as shown in **Section 7.3**). To get you started: responsibility is one of the key values for this assignment.

Values Hierarchy matrix for Biofuels



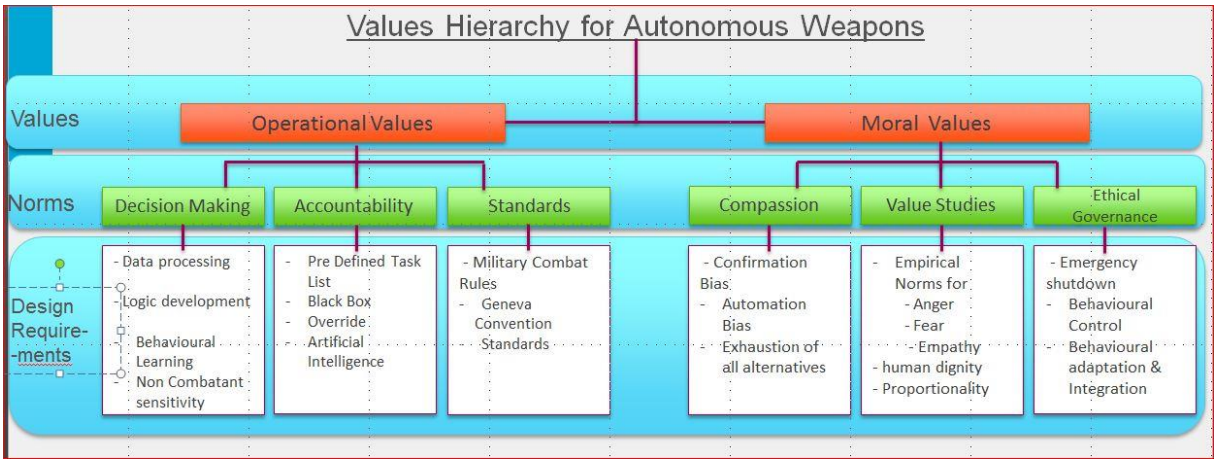
2. Top 25 contributions

1

20 POINTS

Lets begin by distinguishing Automatic from Autonomous.A UN report observes. "Automatic systems, such as household appliances, operate within a structured and predictable environment," while "autonomous systems can function in an open environment, under unstructured and dynamic circumstances." Thus we see the origin of dilemmas & risks (are) arising from UNSTRUCTURED & DYNAMIC circumstances. There are fundamental ethical implications in allowing full autonomy for these autonomous machines. Among the dilemmas to be addressed are:
• Will autonomous robots be able to follow established guidelines of the Laws of War and
Rules of Engagement, as specified in the Geneva Conventions?
• Will robots know the difference between military and civilian personnel?
• Will they recognize a wounded soldier and refrain from shooting?
The ever underlying risks with autonomous war machines or Robots is :
- Morals cannot be programmed (as in human mind)
- Cannot blame a machine (for crime against humanity /war crimes - problem of many hands)
- End of political dialogues between nations (just send the killing machines & settle the score/issue)
- Complexity & unpredictability (in case of an programmed situation arises - Trolley Situation)
- Economy over emotion (US army spends about 4 million USD on an average soldier's lifetime,where as the machines would cost less than 10% of it)
- Undermine the principle of Human dignity
From the philosophical point of view, i can quote Asimov's laws, arguing that there is an inherent moral flaw in granting a machine legitimacy to decide whether a human should live or die. Politically speaking, it is argued that technology would provide leaders with the possibility of fighting wars without risking the lives of their soldiers, and this would be an incentive to choose military options over a policy of dialogue and avoidance of conflict. This criticism is similar to that directed at the expanding use of remote controlled unmanned weapons, but with the added concern that adding autonomous capabilities to these systems would prompt increased use.
From the technological perspective, the main argument is that autonomous weapon systems will never be able to select and strike targets on the basis of an ability to analyze a complex situation, identify human nuances, and use basic instincts of mercy, identification, and morality, as human beings are able to do. In addition, some experts have warned that there is a large, difficult-to-predict area between the intentions of the developers and operators of autonomous weapon systems and their ultimate behavior in practice
The only viable route to slow and hopefully arrest an inexorable march toward future wars that pit one country's autonomous weapons against another's is a principle or international treaty that puts the onus on any party that deploys such weapons. A prohibition on machines making life-and-death decisions must either be made explicit and/or established and codified in a new international treaty.The inflection point for setting limits on autonomous weaponry initiating lethal force exists now. This opportunity will disappear, however, as soon as many arms manufacturers and countries perceive short-term advantages that could accrue to them from a robot arms race.

References: 1) Autonomous Military Robotics: Risk, Ethics, and Design by Patrick Lin, Ph.D. George Bekey, Ph.D. Keith Abney, M.A. Ethics + Emerging Sciences for US Naval research
2)Creating an autonomous fighting machine: An ethical dilemma Anthony J. Rosage
3)Killer Robots :Armin Krishnan
4) Terminating the terminator - Wendel Walch
5) Many other readings for comprehenison incuding the course material



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20 POINTS

AUTONOMOUS WEAPONS

We observed many implications that have automatically weapons in the lecture Robo-Wars (Leveringhaus & Giacca, 2014), the first and main problem of these technologies is in its operation. Autonomous weapons are programmed to comply a specific goal, but what happens when different conditions in the area change, in this case it is perfect cite to the problem of who is responsible, in case that the outcome of operation of this technology was bad, something very similar happens with the topic of obsolete pesticides by FAO (Organizacion de las naciones unidas para la alimentacion y agricultura., 2014).
Citing again the regulation of robotic weapons, we note that exist also a problem with the international law, because this change depends of the scenery and this aspect is a completely downside for autonomous weapons. That's why we have to implement these awesome technologies having to account VSD to mitigate those problems and become in a technology with responsible innovation.

Leveringhaus, A., & Giacca, g. (2014). Robo-Wars. Inglaterra: Oxford Martin Policy Paper.
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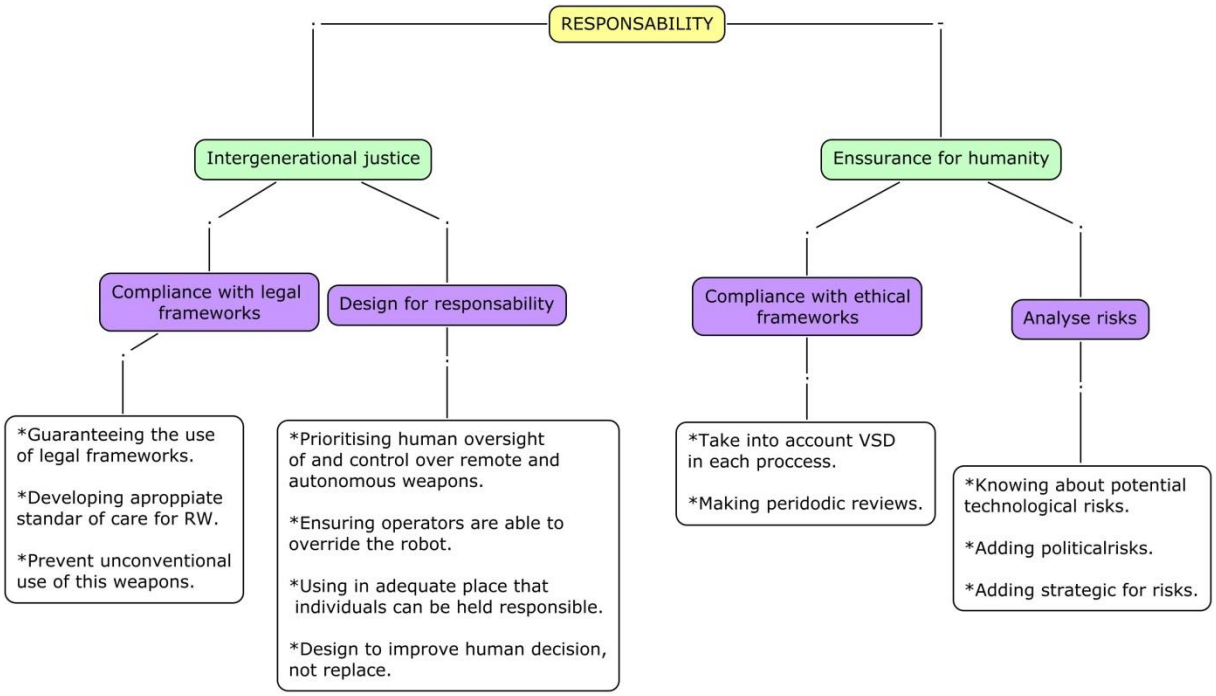
FAO. Retrieved Enero 27, 2015, from FAO: http://www.fao.org/agriculture/crops/obsolete-pesticides/quien-es-responsable/es/



3

20 POINTS

1. Main moral dilemmas and risks of autonomous weapons

Protection of civilians. Bearing in mind that most of today's armed conflicts are inter-state conflicts without clear boundaries between a variety of armed groups and civilians, it is questionable how a robot can be effectively programmed to avoid civilian casualties when humans themselves lack the ability to make distinctions in such conflict settings and face difficulties to overcome these dilemmas.

Proportionality. In certain situations, military attacks are not conducted due to the risk of causing disproportionally high civilian damages. It has been doubted that a robotic system is capable of making such decisions.

Accountability. With an autonomous weapon system, no individual human can be held accountable for his or her actions in an armed conflict. Instead the responsibility is distributed among a larger, possibly unidentifiable group of persons, including perhaps the programmer, or manufacturer of the robot.

Increasing the risk of war. As the UN Special Rapporteur on extrajudicial, summary or arbitrary executions pointed out in his report to the Human Rights Council, the removal of humans from the selection and execution of attacks on targets constitutes a critical moment in the new technology which is considered as "revolution in modern warfare". He urged states to think carefully about the implications of such weapon systems, noting that such technology increases the risk that states are more likely to engage in armed conflicts due to a reduced possibility of military causalities. Fully autonomous weapons could lower the threshold of war.

Cool calculators or tools of repression? Supporters of fully autonomous weapons argue that these systems would help overcome human emotions such as panic, fear, or anger, which lead to misjudgment and incorrect choices in stressful situations. However, opponents to the development of these weapon systems point out that this so-called advantage can turn into a massive risk to people who live in repressive state systems. Fully autonomous weapons could be used to oppress opponents without fearing protest, conscientious objection, or insurgency within state security forces.

Proliferation. Finally, concerns have been expressed that fully autonomous weapon systems could fall into the hands of non-authorized persons.

References:

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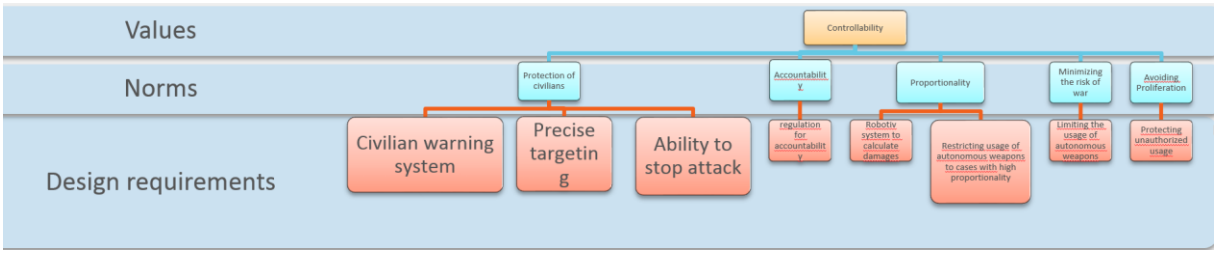
2. Values Hierarchy matrix for autonomous weapons

See picture: Matrix


Values
Norms
Design requirements
Controllability
Protection of civilians
Accountability
Proportionality
Minimizing the risk of war
Avoiding Proliferation
Civilian warning system
Precise targeting
Ability to stop attack
regulation for accountability
Robotiv system to calculate damages
Restricting usage of autonomous weapons to cases with high proportionality
Limiting the usage of autonomous weapons
Protecting unauthorized usage

4

20 POINTS

According to Alex and Gille (2014), they defined autonomous weapons as robotic weapons that have the capabilities to select and engage their targets without any human intervention. In such cases, the weapon is able to make complex maneuvers and locate its target without any pre-programmed GPS code and human guidance.

The moral dilemma in the use of autonomous weapons is the ability to reduce human casualty of the attacking team while at the same time achieving the desired results for which they are intended for. Since we are transferring responsibility of human actions to a machine that is unable to think rationally under a complex situation, there is the need to implement regulatory framework as well as technical designs and development to ensure that the use of these weapons are safe and in full compliance with existing international humanitarian laws.
There is the dilemma of "many hands" as outlined by Sparrow (2007). This has to do with who takes responsibility for the behavior of autonomous weapons; is it the manufacturer, the programmer, the commanding officer or the machine itself? De Georges in his book, The Ethics of Information Technology and Business (2003), asserts that technological choices do not have moral consequences through what he refers to as the myth of amoral computing and information technology (MACIT). He writes: ''Those who build, program, run, own, and/or manage the computers or information systems are the only ones who can be held morally responsible for results'' (p 30).
Johnson (2007) debunked this assertion saying it was wrong for De George to agree to use that myth critique as the starting point of his analysis.
There is also the argument that because certain artificial agents learn as they operate, those who designed or deployed those agents may not be able to control or even predict what their agents will do. As these agents become increasingly more autonomous, the argument goes, no humans will be responsible for their behavior. Matthias (2004) characterizes this possible, future situation by referring to a responsibility gap. Sparrow (2007) also made a similar argument to suggest that machines can learn as they operate thereby making it difficult for their behavior to control or predict them.

Sparrow (2007) makes a similar argument, though he is concerned only with autonomous weapon systems (AWS). Taking programmers, the commanding officer, and the machine itself as the likely candidates for bearing responsibility for AWS behavior, Sparrow argues that responsibility is not justified for any of them. His explanation of why programmers are not responsible illustrates his acceptance of the responsibility gap.

Santoro et al. (2008) reject the responsibility gap by rejecting what they refer to as the control requirement (CR). According to CR, it is not fair to hold someone responsible for outcomes or behavior that they could not control.

Nagenborg et al. (2008) argue that engineers would be held responsible for the behavior of artificial agents even if they can't control them, on grounds of professional responsibility. For engineers to avoid such responsibility would be a

serious breach of professional conduct as it would be in other cases of dangerous and risky products.

Thus, Nagenborg et al. also reject CR and argue not just that engineers are fairly held responsible for the behavior of machines they create, but that this responsibility ''comes with the territory'' of being an engineer.

The Santoro and Nagenborg arguments both refer to responsibility practices in which individuals or corporate entities are held responsible despite the fact that they are not able to control the outcome. In the literature on artificial agents, this has been the direction taken by those who suggest that existing law will prevent or fill the responsibility gap. For example, Asaro (2007, 2012) reviews product liability law, vicarious liability, the law of agency, the concept of diminished responsibility, and the criminal law, showing how these laws might be used in the case of autonomous agents that learn.

Yet another response to the responsibility gap has been to entertain the possibility that artificial agents could themselves be responsible. Hellstro¨m (2013), for example, claims that the ''advanced learning capability will not only make it harder to blame developers and users of robots, but will also make it more reasonable to assign responsibility to the robots'' (p. 105). His argument relies on the idea that robots will be responsive to praise and blame, and hence holding robots responsible will have a deterrent effect. In other words, his claim is not that robots will be responsible for their own behavior but that humans will be inclined to treat robots as if the robots were responsible for their own behavior.

The risks involved in the use of autonomous weapons are technological risks which have to do with the fact that the device can be intercepted and hacked into by the enemy team. The enemy team could then re-programmed it to commit war crimes or to re-directed back to target the attacking team. There is also the risk of the machine not being able to identify the exact target especially under very complex situations. The issue of irrationality as the machine may behave in a way that humans would do under circumstances that requires emotional intelligence and a combination of many other psychological factors. Political and strategic risks as less advanced countries may feel left behind and could therefore respond with asymmetry methods in the event of the deployment autonomous weapons by the more technologically advanced countries. This could be an attack on civilian or military convoy in civilian areas as witnessed in Iraq and Libya.

We could apply the principles of "ought implies can" in resolving the above dilemma by pursuing ethical values in the use of autonomous weapons. We must ensure that those who ought to use them take full responsibilities for their actions. The necessary regulations, the responses of civil societies, and the international institutions such as the UN and the Red Cross must be added to enforce compliance with existing regulations for the development and deployment of autonomous weapons. We must build values into the designs that must ensure accountability and openness.

The state must play a critical role in creating the necessary regulatory environment to regulate the proper use and deployment of autonomous weapons. The manufacturer must also ensure they design for responsibility so that individuals can be held accountable for the actions of autonomous weapons.

References

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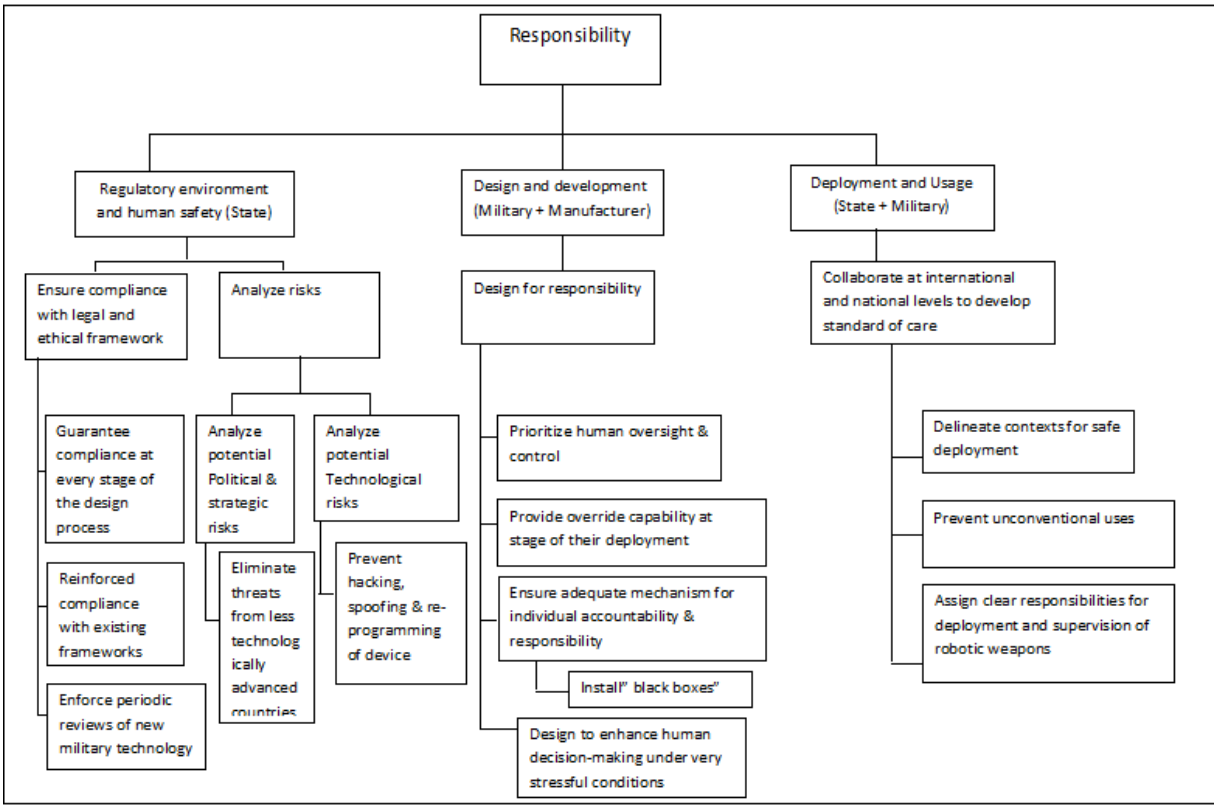
Value Hierarchy matrix for Automatic Weapons



5

20 POINTS

Moral dilemmas and risks associated with autonomous weapons
Autonomous weapons are not able to distinguish between combatants and civilians. These weapons are highly inaccurate. They are more problematic since they do not function under the direct control of an operator, although they are programmed by a human operator. Autonomous weapons cannot reason for example, they cannot give a clear distinction between a child with a toy gun and a soldier with a machine gun, a sniper and a wounded combatant lying on the ground. These machines cannot reason that the wounded combatant is protected under international human law and no longer poses a threat. A robotic machine can also fail to identify a combatant who has expressed the will to surrender and thus protected by law. Therefore, it is highly unlikely that an automated machine can interpret human behaviour in necessary ways as well as distinguish between different categories of warfare. Autonomous weapons are inaccurate because they will not be able to identify legitimate targets. These weapons are also unlikely to carry out assessments of proportionality. These assessments involve intricate value judgements that machines are unlikely to be capable of outperforming humans.They are unsuited to many areas of operation like law enforcement operations.
To add on, autonomous weapons may be more vulnerable to hacking, spoofing and reprogramming by enemy forces. For example, the hacking of RPAS by Iran in 2011.The reprogramming by enemies might lead to committing of crimes, or attacking those who originally deployed them. Robotic weapons might also increase technological and military asymmetries between states. The technologically advanced states will benefit more as compared to the less technologically advanced, for example, experiences of military action in Iraq, Libya and Afghanistan have demonstrated that the technologically advanced states can easily overpower the technologically inferior enemy.
These machines have little or no capacity to perceive their environment or to adapt to unexpected changes .Robotic weapons often fail to apply the criterion of an enemy posing a direct threat and an immediate threat, as exemplified by recent killing operation in Pakistan. Questions raised in this scenario are: Do individuals who are being targeted in this way pose a direct or immediate threat? To whom? Could it be a remote threat? If so, how can targeting them be justified?
Autonomous weapons are incapable of complex decision making and reasoning performed by humans. Autonomous machines cannot reason /make the best choices, for example, making a choice to save more people and put one person’s life at risk and vice versa. There are known number of soldiers who not able to fire their weapon at the enemy due to mercy, pity, compassion. An autonomous weapon will shoot if it has been programmed to do so. The taking of a human life is a truly existential choice every soldier has to justify at his conscience .If a trigger has to be pulled, it should be a human hand that should decide it should be pulled or not pulled at all.
There is also lack of ability to define human dignity. Morality requires meaningful human supervision of decisions to take life. Respecting human rights means that we do not delegate killing capacity to a machine.Instead, the decision to take someone’s life should remain with humans.
There is also a lack of responsibility in the case of a glitch or a violation of law. As a result, a vacuum of responsibility /room for immunity could be created around autonomous offensive weapons.

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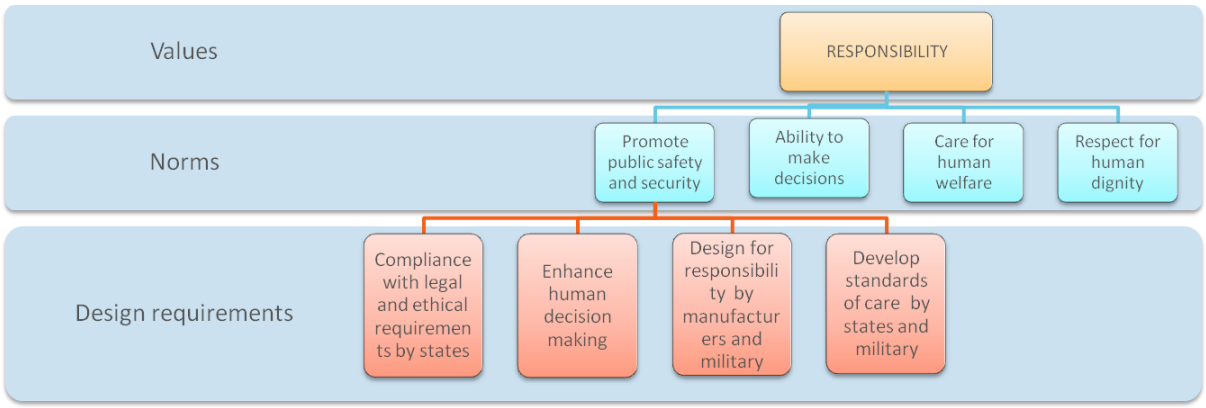


6

20 POINTS

What the main moral dilemmas and risks are when we speak of autonomous weapons?

A) Key Risks include:

Incorrect intentional use
Incorrect unintentional use
Hacking and malware type failures
Other systems failures
Incorrect application of force
Incorrect targeting
Collateral human damage (on both victims and operators)
Collateral non-human damage (both physical and electronic and other infrastructure)
Detrimental effect on specific operations, wars and conflicts
Detrimental effect on the fundamental nature (e.g. strategic and game theoretic) of specific operations, wars and conflicts
Terrorism related risk
Action and response risk (including asymmetric response risk)
Genie out of bottle risk (including tipping points and hysteresis)
Robotization
Sub existential risks (e.g. when robotized weapons reduce life expectancy or quality)
Super existential risks (e.g. if/ when robotized weapons can end or significantly set back human life)
Related precautionary principal and contextual risks (e.g. when automated weapons are patched in to a "super-component" "internet of things")

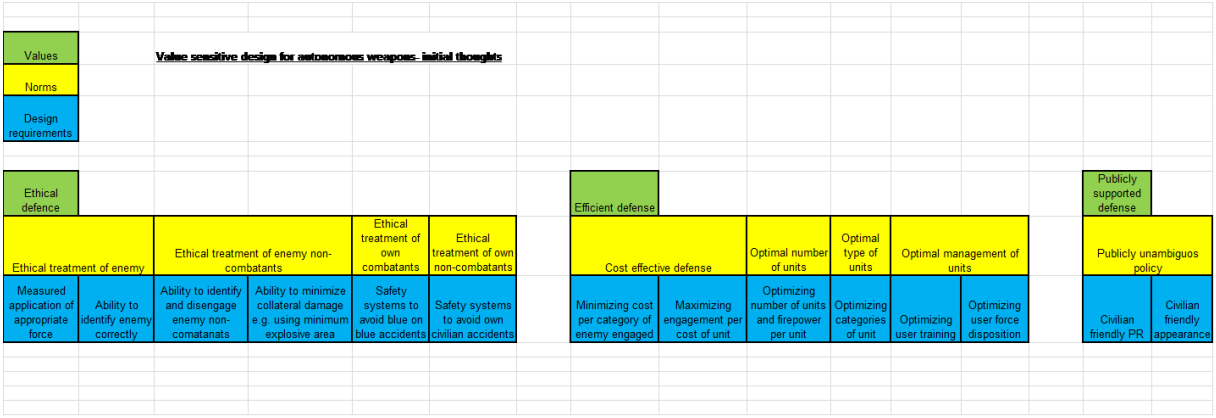
B) Key potential benefits and returns that also need to be weighed up include

Increasing effectiveness of weaponry and defense
Increased public support
Decreased cost ceteris paribus for defense (including domestic human and economic)
Strengthening of defense bargaining hand
Strengthening the bargaining hand of most high tech' free market countries
Ability to reduce or even remove human cost of military conflict
Beneficial civilian technology spin-offs

C) Main moral dilemmas reflect the balance of risks and returns and additional human and psychological and philosophical factors including:

How much targeting decision authority to give to the AW?
How much lethality authority to give to the AW?
What error rate is acceptable for the AW and how should this vary with say geopolitical conditions?
What approval mechanism should be used for AWs?
What control mechanisms should be applied generally and at different mission stages for AWs?
What accountability mechanisms should be in place for AW related missions?

How should AW mission creep be controlled?
How should AW technology creep be controlled?
How can AW be reconciled with the ethical laws and principals of robotics (e.g. Asimov's)?
How can the floodgates risk of AW technology be controlled?
Is there a coherent/compelling ethical theory of boundaries and limits on the behaviour of AWs?
What high level treaties, conventions, principals (cf Geneva conventions) and national and supernational bodies (cf ICC) should be instituted in parallel with the development of AWs?
Should AWs actually be used in war (like bombs and bullets) or disavowed (like chemical and biological weapons)?
To what degree should more quantitative Benthamite utilitarian, more absolutist Kantian or more situational Foot type (trolley problem) approaches be applied to the questions of whether to develop AWs and whether to use AWs?
When would Shelling type game theory and deterence considerations allow one side not to develop and use AWs?
How do AWs fit into the general sociology and philosophy of war and particularly just war?
(Looking further ahead, what moral status should be attributed to future AWs with more human characteristics?)



7

20 POINTS

Q1: Briefly indicate what the main moral dilemmas and risks are when we speak of autonomous weapons.

Greetings from the Hague, Netherlands with its international court of justice.
Here is my answer to question 1:

- Dilemma and risk #1
Potentially Autonomous weapons (AW) LAWS could identify and attack a target without human intervention. This is consider as unacceptable risks in the reading for this MOOC but also in for example a report from Human Right Watch (reference below)

- Dilemma and risks # 2
This is new technology with many unknown unknowns. Will they be safe against, for example, cyberattacks? What will happen if terrorists get these weapons?

Dillema # 3; Who is responsible, the problem of the many hands
Is the person sitting in a bunker killing 3 people by a drone responsible or the person who made the software. The risk is that no one is real accountable

Dilemma and risk # 4:
There is not yet a legal framework for such weapons. To quote the report: "Losing Humanity: The Case Against Killer Robots" (
http://www.hrw.org/reports/2012/11/19/losing-humanity)
'Fully autonomous weapons would not only be unable to meet legal standards but would also undermine essential non-legal safeguards for civilians.

What to do next:

• Commence reviews of technologies and components that could lead to fully autonomous weapons. These reviews should take place at the very beginning of the development process and continue throughout the development and testing phases. This follow thee suggestions made by professor Ibo van der Poel.
• Establish a professional code of conduct governing the research and development of autonomous robotic weapons, especially those capable of becoming fully autonomous, in order to ensure that legal and ethical concerns about their use in armed conflict are adequately considered at all stages of technological development (see also the reading in the MOOC)

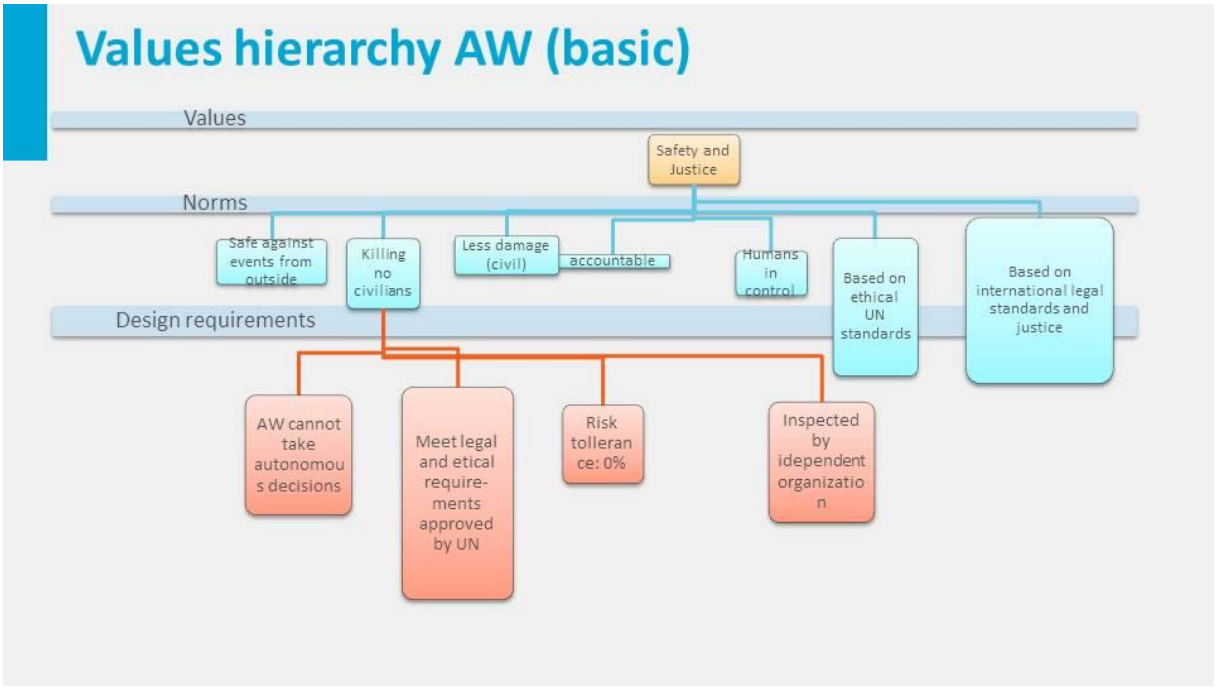
References

I was indeed surprised by the interesting materials you can find. These are the sitees I used:

- http://www.hrw.org/reports/2012/11/19/losing-humanity (great report with recommendations)
- http://www.unog.ch/80256EE600585943/(httpPages)/8FA3C2562A60FF81C1257CE600393DF6?OpenDocument (UNOG, special page about autonomous weapons
- https://www.law.upenn.edu/institutes/cerl/conferences/ethicsofweapons/ (nice portal with al kind of links)

Question 2: VSD for autonomous weapons

See the picture. The arrows are not correct but this is a sketch.



8

20 POINTS

Autonomous technology is poised to revolutionize warfare. Nations will undoubtedly clamour for the weapon systems that this technology will make possible. However, as with prior technological leaps, those intent on using autonomous technology in combat must be mindful of the tenets and teachings of the law of armed conflict! a robust set of laws that exists in a synergistic relationship to warfare. Sceptical of the willingness of states to comply with this law, critics of autonomous weapon systems have embarked on a campaign to pre-emptively ban lethal autonomous weapons and targeting.

Unfortunately, the effort has failed to capture accurately or adequately the significant legal issues at stake. This assignment has attempted to refocus the debate. In so doing, four core conclusions emerged.

First, autonomous weapon systems are not unlawful per-se. Their autonomy has no direct bearing on the probability they would cause unnecessary suffering or superfluous injury, does not preclude them from being directed at combatants and military objectives, and need not result in their having effects that an attacker cannot control. Individual systems could be developed that would violate these norms, but autonomous weapon systems are not prohibited on this basis as a category.

Second, the use of autonomous weapon systems in certain circumstances would be lawful under the law of armed conflict, whereas in others it would not. This is true of every weapon which is not unlawful per-se, from rocks to rockets. Of course, the fact that autonomous weapon systems will locate and attack persons and objects without human interaction raises unique issues. These challenges are not grounds for banning the systems entirely. On the contrary, the law of armed conflict's restrictions on the use of weapons (particularly the requirements that they be directed only against combatants and military objectives, that they not be employed indiscriminately, that their use not result in excessive harm to civilians or civilian objects, and that they not be used when other available weapons could achieve a similar military advantage while placing civilians and civilian objects at less risk) are sufficiently robust to safeguard humanitarian 2013 / "Out of the Loop": Autonomous Weapon Systems and its values. After all, as the authority suggests, "new technologies do not change existing law, but rather must abide by it."

Third, humans are never really "out of the loop." While autonomous weapon systems will increasingly be capable of solving complex problems, absent dramatic improvements in artificial intelligence, humans will decide when and where to deploy the system and what parameters to embed within it. Human operators, not machines or software, will therefore be making the subjective determinations required under the law of armed conflict, such as those involved in proportionality or precautions in attack calculations. Although the subjective decisions may sometimes have to be made earlier in the targeting cycle than has traditionally been the case, this neither precludes the lawfulness of the decisions, nor represents an impediment to the lawful deployment of the systems. Similarly, the lawfulness of an autonomous weapon

system is not undermined simply because the system itself is incapable of making truly subjective decisions.

Finally, humans will always be accountable for the employment of autonomous weapon systems. Although they will gradually delegate more tasks to autonomous systems, the responsibility for the appropriate use of the systems will nevertheless remain with the human operators and commanders. Orders to deploy the system and judgements about how to program it will come from a human. Any recklessness or criminal misuse will result in accountability through the same war crimes mechanisms that already exist under the law of armed conflict. Assuming these conclusions are correct, calls for a ban on autonomous weapon systems are unlikely to gain much traction with states. Virtually every rule of the law of armed conflict reflects a balancing by States of two seminal factors!military necessity and humanitarian concerns.

The result of this dialectic interplay is the law of armed conflict, either in the form of treaty law that has been negotiated by states based on St. Petersburg Declaration, the law of armed conflict fixes "the technical limits at which the necessities of war ought to yield to the requirements of humanity."

The humanitarian concerns that are factored into the equation reflect the interest States have in maximizing the law of armed conflict's protection of their combatants and civilian population during armed conflict. In that States are self-interested entities, these concerns are tempered by their desire to retain the ability to fight effectively in order to achieve national interests, their assessment of the balance or customary law derived from state practice and opinion juries that reflects the balancing.

Taking this process of norm formulation into account, achieving an international consensus to prohibit autonomous weapons is highly implausible. While, as illustrated in the new Department of Defence directive on autonomous weapon systems, states are sensitive to the humanitarian implications of the systems, until both their potential for unintended human consequences and their combat capabilities are better understood, it is improbable that any state would seriously consider banning them. It would be irresponsible to prohibit autonomous weapons at this stage in their development.

As noted, such weapons may offer the possibility of attacking the enemy with little risk to the attacker. Although this "value" has sometimes been criticized with respect to unmanned combat aerial systems like the Predator, there is no basis in the law of armed conflict for suggesting that attacking forces must assume risk. Moreover, banning autonomous weapon systems may, as discussed, have the effect of denying commanders a valuable tool for minimizing the risk to civilians and civilian objects in certain attack scenarios. Until they are better understood, it would be naively premature to draw definitive legal, moral, and operational conclusions as to the use of autonomous weapon systems.

1) Robots are multi-use tools. Robots should not be designed solely or primarily to kill or harm humans except in the interests of national security.
2) Humans, not robots, are responsible agents. Robots should be designed; operated as far as is practicable to comply with existing laws & fundamental rights & freedoms, including privacy.

3) Robots are products. They should be designed using processes which assure their safety and security.
4) Robots are manufactured artefacts. They should not be designed in a deceptive way to exploit vulnerable users; instead their machine nature should be transparent.
5) The person with legal responsibility for a robot should be attributed. We urge these principles to be fortified from wishes ("should") to imperatives with specific technical realizations:
6) Like regular human combatants each Autonomous Weapon must exhibit "a fixed distinctive sign recognizable at a distance". Moreover every AI must be equipped with a unique ID, listing (among others) associated nation, manufacturer and model.
7) Autonomous Weapons may only be owned and operated by governments. Civilian purchase and operation of other intelligent machinery, similarly to firearms and hazardous transports, requires a licence based on a qualification test.
8) Comparable to mandatory motor vehicle registration, each autonomous robot must be assigned a legal custodian, registered at a designated national or international authority held responsible in case of a perpetration.
9) In addition to CE/FCC compliance and again inspired by the case of motor vehicles, producers of intelligent machines are required to classify their devices and to obtain Type Approval by said authority

The precise conditions imposed in (9) will depend on the type of the device. I propose a classification on four scales (that may also otherwise turn out useful):

i) Autonomous Weapon degree of 'intelligence' (not taking the human kind as yardstick but considering its plain predictive power as gauge, capturing both knowledge/experience and depth of computational game tree analyses)
ii) Autonomous Weapon means to manipulate the physical world (ranging from monadic brain in a vat to LAS)
iii) Autonomous Weapon types of sensors/interfaces (including possible access to the World Wide Web and connecting with other AIs)
iv) the kind of external control exercisable by humans (only on/off, changing parameters or objectives, up to complete re-programming).

Type approval according to (9) will of course have to pay particular attention to the algorithms controlling the AI — which brings us back to theoretical computer science. In view of the gravity of consequences of putative errors on the one hand and the undesirability of the Halting problem on the other side, I personally highly recommend:

9a) So-called Formal Methods of Software Verification be mandatory in this process: requiring the producer to provide a specification, the software, and a computer checkable proof for the software to meet the specification.

9b) Similarly to a flight data recorder, proper data/event logging is obligatory in order to facilitate forensic engineering as well as to settle putative torts in case of a malfunction. I suggest asymmetric encryption to prevent later manipulation: the log is publicly readable but entries and modifications must be supplied with an unforgeable digital signature:

6a) Each AI instance must be equipped with a 4096 bit private RSA key, tamper-resistant implemented in hardware; and distribute/deposit the corresponding public key at the authority according to (8) and (9).

Not all uses of unmanned aircraft are bad. Drones were used after the earthquake in Japan to observe radiation levels at the Fukushima nuclear plant. They were used in Australia to inspect the state of wildlife after a massive flood. They have great potential to help firefighters by hovering over swaths of burning forests. Environmental, human rights and even protest groups are starting to use drones. The Sea Shepherd Conservation Society is launching small drones over the vast expanse of ocean to spot illegal whaling. Human rights groups are advocating that drones be used to spy on regimes cracking down on their people, as in the case of Syria. Protest groups in Poland have flown drones over the heads of police to monitor their conduct, a tactic that Occupy Wall Street in New York mimicked with $300 toy mini-drones sold in Brookstone.

Autonomous Weapon don't revolutionize warfare; they are, rather, a progressive evolution in making murder clean and easy. That's why the increased reliance on Autonomous Weapon for killing and spying is not to be praised, but refuted. And challenged.

The burden is now squarely on us the people to reassert our rights and push back against the normalization of Autonomous Weapon as a military and law enforcement tool. The use of Autonomous Weapon needs to be limited, transparent and, at the least, acknowledged; it's no less a war if the plane firing the missile is remotely operated. Our ability to curb the use of Autonomous Aircraft — rescuing hurricane victims, YES,
— carrying out extra-judicial killings, NO
will not only determine the future of warfare and individual privacy, but shape how we live together as a global human community.

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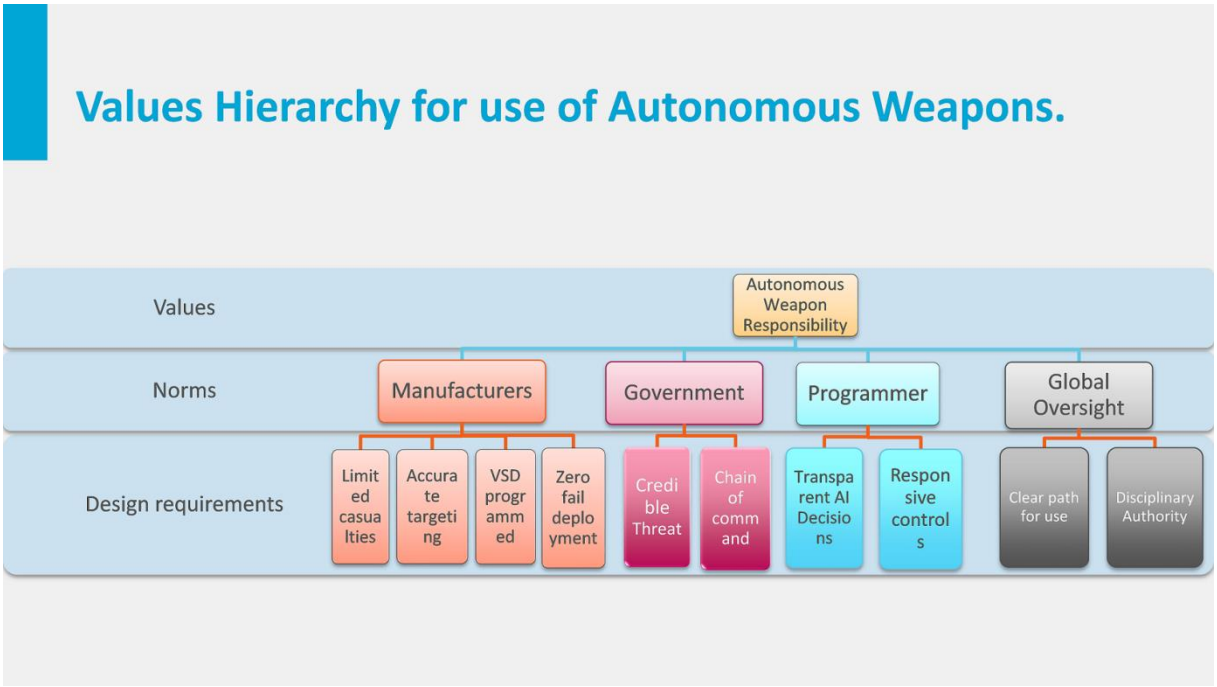

9

20 POINTS

MORAL DILEMMA:
Be sure can these systems be deployed in a way that complies with International Humanitarian Law, or

Ban these systems until there is guarantee of compliance with legal and ethics framework and it is not too late to control their deployment.

RISKS:

AWS could not distinguish between a fearful civilian and a threatening enemy combatant - robots will never do like humans,

Shift the burden of conflict onto civilians.
How to decide between one or few and many civilians near and the military target the robot have to achieve (trolley problem)
Increase the use as tools of repressive dictators seeking to crack down on their own people without fear their troops

Increase of armed conflict since political leaders could resort to force without their own troops face death or injury

Undefined accountability would fail to deter violations of international humanitarian law and to provide victims meaningful retributive justice

Difficult interpretation and review if the new or modified weapon should be prohibited by international law

The possibility that an autonomous system will make choices other than those predicted and encouraged by its programmers is inherent in the claim that it is autonomous

Failure in programming and testing of the weapon

Differences between real scenarios and simulated ones

Intercepting the command between remote control operator and weapon or autonomous weapons control by terrorists changing the original purpose.

Possible proliferation of fully autonomous weapons

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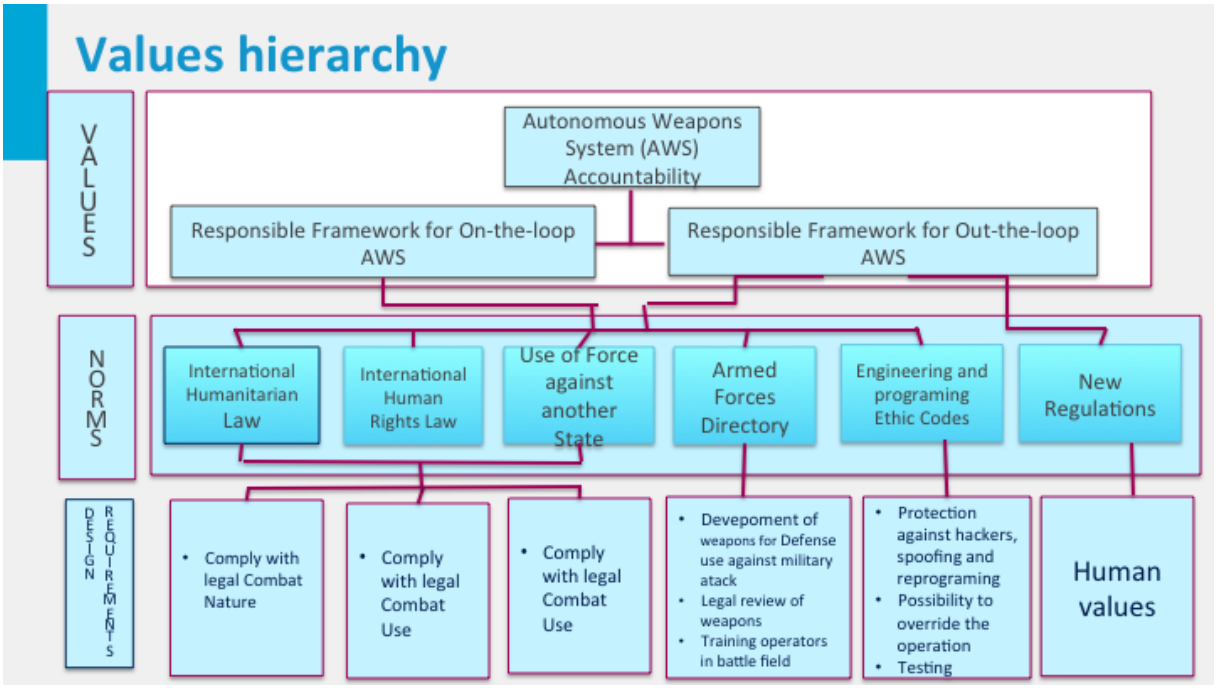


#10

20 POINTS

INTRODUCTION:
It is clear that in our time we will witness and continue to witness in an unprecedented manner both growth and complexity in technology breakthroughs where science will increase its strides in the area of robotics, cybernetics, and merging of humans with robotic parts (transhumanism).

In the classic science-fiction film “2001”, the ship's computer, HAL, faces a dilemma. His instructions require him both to fulfil the ship's mission (investigating an artefact near Jupiter) and to keep the mission's true purpose secret from the ship's crew. To resolve the contradiction, he tries to kill the crew.((i)The Economist: June 2, 2012 - Robot Ethics)

THE PROBLEM OF MANY HANDS:
Autonomous weaponry is just one of the manifestation of human strides in the use of technology to achieve its aim(s).
But autonomy means freedom. Are we to let machines run freely on their own will(Programming)? Are they to determine what I do and how do things in the years to come? How can a machine decide on its own to shoot a gun or not to shoot one. Supposing there is a glitch in its programming and a misfire occurs, who is to blame for this misfire: is it the robot, its maker, programmer, environment, user(military) or the law itself that gave ethical reasons for the machine to come on live in battle situations?
Who is to blame when something fails to go as planned!
The quote below reinforces my concern(s) with the dangers of using autonomous weapons.

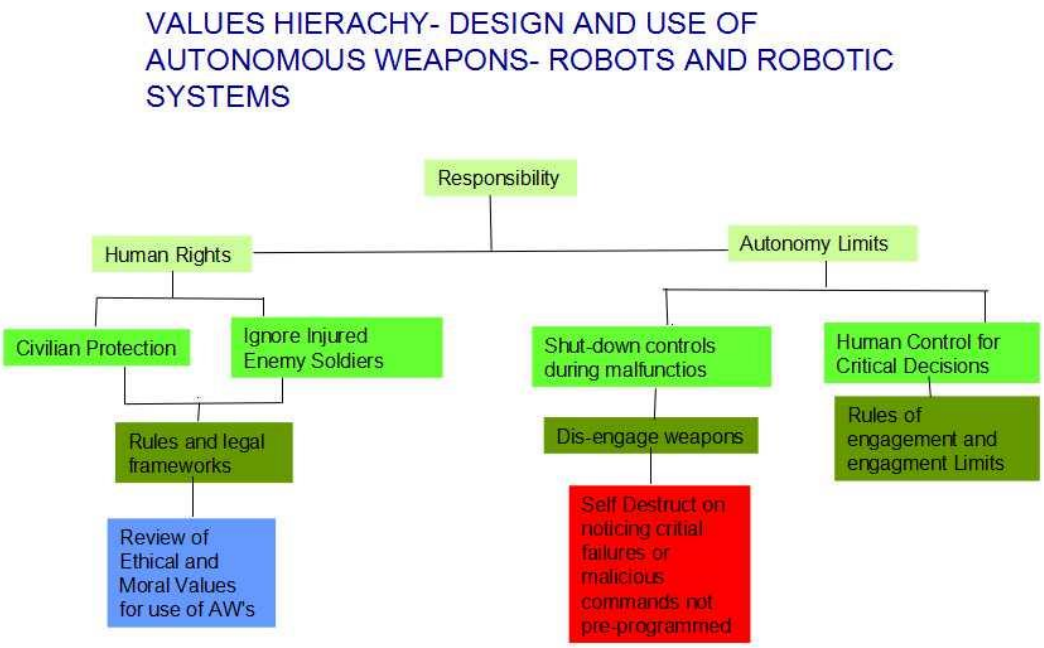
"Weapon systems are expected to become increasingly autonomous in the coming decades and fundamentally change the face of future military conflicts. There are already serious concerns that this trend will lead to the use of autonomous attack robots on the battlefield, and these concerns have prompted calls to impose sweeping restrictions on technological development. As the use of weapons with autonomous capabilities expands, doubts as to their moral and legal legitimacy will likely multiply. ((ii)Dilemmas in the Use of Autonomous Weapons Strategic Assessment, Volume 16, No. 4, January 2014 Gabi Siboni , Yoni Eshpar; (iii) Arms Control Now August 13, 2014 -Tim Farnsworth)"

SELF WILL WHEN MY PROGRAM FAILS:
A risk not really considered is what happens when an autonomous machine is breached in terms of hardware failure and it turns against its master.
Is it allowed to go on rampage destroying or causing harm to innocent people or could this multimillion dollar machine be given instructions to self destruct? How can it self destruct when it is autonomous. The risk and real danger in removing human control over machines of this type is that in cases of complete deviation from its program; it cannot be stopped.

PRECAUTIONARY MEASURES AGAINST CATASTROPHIC FAILURE(S):
In order to forestall unwanted outcomes in engaging autonomous systems,

precautionary measure(s) such as or such that a machines can learn from examples rather from pre-defined algorithms or programs. Again, to allocate responsibility, autonomous systems must keep detailed logs so that they can explain the reasoning behind their decisions when necessary. Decisions that these machines would take in any situation should such that are pleasing to people or seems right, thus machines would be embedded with ethical systems.(iv) The Wall Street Journal By ROBERT H. LATIFF And PATRICK J. MCCLOSKEY
Updated March 14, 2013 7:37 p.m. ET

In closing, autonomous weapons can be put to use on the condition that if most or if not all ethical and moral issues are embedded in such a system. Risks should be properly analysed to limit unknown outcomes during engagements and to forestall civilian losses. Humans should have the last say in critical situations; in order words, human decision making should be enhanced at the design stage.(v) Robo Wars-The Regulation of Robotic Weapons : Alex Leveringhaus; Gilles Giacca



#11

20 POINTS

Main moral dilemmas and risks

Can a machine be programmed to function in a ethically correct way?

Programming can only go so far, assessment of situation on the ground at the time cannot be undertaken. For example, can a machine differentiate between a civilian and a military target? What is an acceptable level of risk?

Who is accountable?

There is a risk that accountability for actions of the weapon cannot be clearly established. Who is responsible if the weapon does not reach its target, and somehow veers off course and kills many civilians? The problem of many hands is relevant here.

Lack of human control at implementation

Whilst the weapon can be pre-programmed potentially to a great level of detail there is no control once the weapon is discharged. The situation on the ground could have changed between the release of the weapon and it reaching its target. For example a school bus is diverted to a path close to the target area due to road-work or other issues. The attack cannot suddenly be aborted or modified to deal with any changes on the ground.

Risk of increase in war

It may be more likely that Governments will undertake lethal sanctions where their own armies are not at risk.

Risk of misuse including accessibility to terrorist groups

The development and production of fully autonomous weapons also gives rise to risks associated with the availability of such technology and in particular the risk of the technology or physical weaponry being acquired by terrorist groups.

Risk of non-compliance with international humanitarian law

Given that the situation on the ground is not being monitored in real time, and the weapon reaches its target without consideration of the circumstances on the ground at the time, it would be extremely difficult to guarantee compliance with international humanitarian law.

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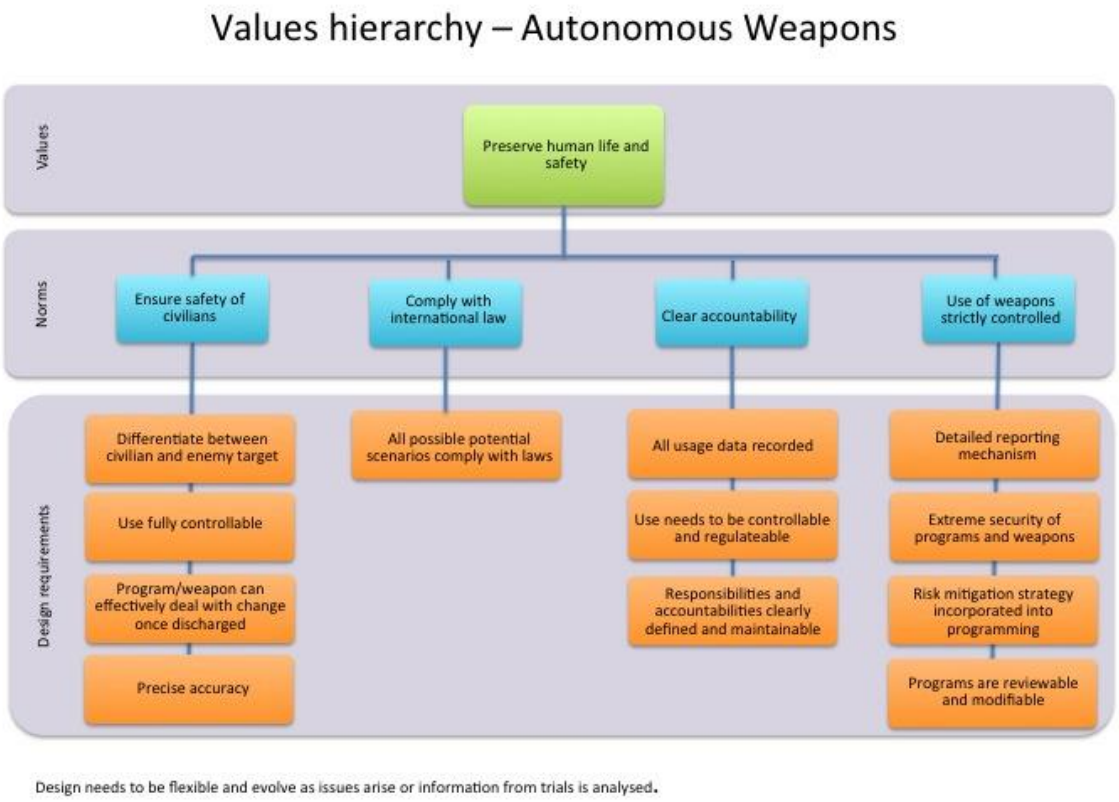


#12

20 POINTS

1. main moral dilemmas :

Autonomous weapons are safe for the user and spare lives of own troupes, but can the decision over death and life be left to a machine?
Moral decision-making by human beings involves an intuitive, non-algorithmic capacity that is not likely to be captured by even the most sophisticated of computers.

Can fully autonomous weapons function in an ethically "correct" manner?
Are these weapon systems able to differentiate between combatants on the one side and defenceless and/or uninvolved persons on the other side?
Are machines capable of acting in accordance to international humanitarian law (IHL) or international human rights law (IHRL)?
Can such systems evaluate the proportionality of attacks?
Who can be held accountable?

Protection of civilians : Bearing in mind that most of today's armed conflicts are inter-state conflicts without clear boundaries between a variety of armed groups and civilians, it is questionable how a robot can be effectively programmed to avoid civilian casualties when humans themselves lack the ability to make distinctions in such conflict settings and face difficulties to overcome these dilemmas.

Is this intuitive moral perceptiveness on the part of human beings ethically desirable?

Does the automaticity of a series of actions make individual actions in the series easier to justify, as arguably is the case with the execution of threats in a mutually assured destruction scenario?

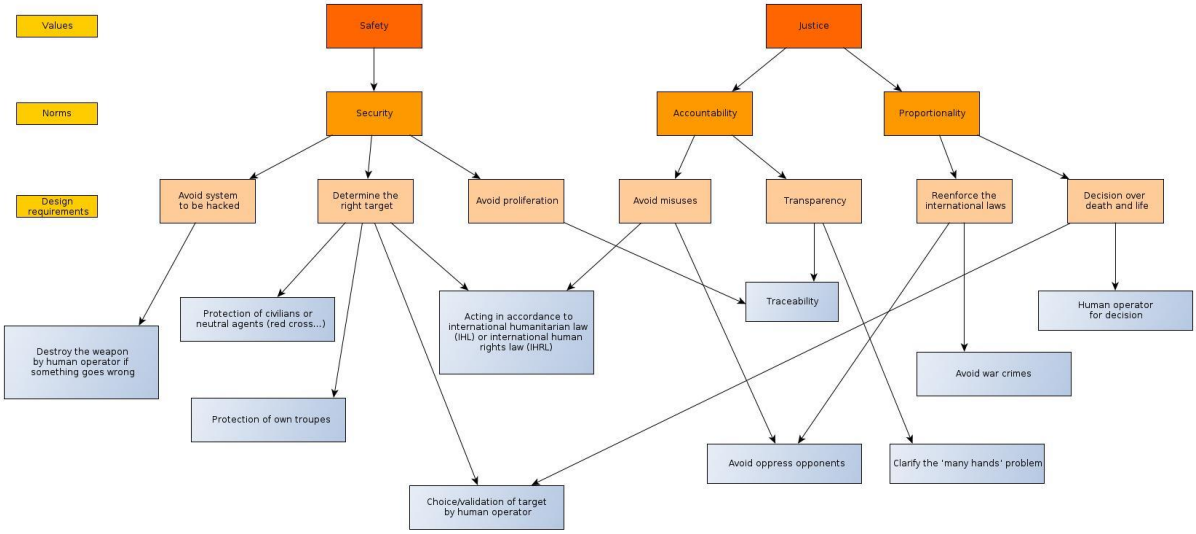
Does the legitimate exercise of deadly force should always require a "meaningful human control?" If the latter is correct, what should be the nature and extent of a human oversight over an AWS?

Should the definition focus on the system's capabilities for autonomous target selection and engagement, or on the human operator's use of such capabilities?
Should the human operator's pre-engagement intention have a decisive bearing on the system's definition as an AWS?

Who is responsible if something goes wrong ? Accident, wrong target, malfunction…
AWS present a unique challenge to the way legal responsibility in combat should be assessed.
As the Self-Driving Vehicles, the first topicis often referred to as the 'many hands' problem, resulting from several actors being linked to each other, and the combination of actors raise concerns.

How reliable are these systems? And to what extent would their deployment be within an acceptable level of risk, or will they impose excessive risks on others?

1. Values Hierarchy matrix --> See the attached image...



#13

19 POINTS

1) main moral dilemmas and risks regarding autonomous weapons

- problem of many hands:
It is not clear who can be held responsible for the actions taken by an autonomous weapon. It could be the company that developed the robot, it could be the person/group who programmed the robot for the specific mission, it could be the person/group who commanded the mission, and so on. There are many people involved before such a weapon can be used and it is not clear who can be held responsible.

- trolley problem:
In case of an accident, e.g. the crash of a drone, there could be the hypothetical situation that there are only two places where the drone can crash. When not acting the drone crashes at the first spot and would probably kill five person, some steering would make the drone crash at the second spot where only one other person is probably going to die. How should the drone decide?

- ought implies can:
There might be situations where a human would decide by moral concerns that it is better to stop the mission. A robot can only decide the way his software tells him to do. Thus there should be the possibility for a human to stop the robot from doing something morally questionable.

When talking about the risks, the precautionary principle is important. As it is still about weapons, the risks that arise from a misfunction are nearly always high and could cause the death of innocent people. There should be a lot of failsafes, emergency switches or similar things integrated.

There is always the possibility of 'unknown unknowns'. There is no software in the world that is perfect, so there will always be situations where the autonomous weapon might act totally different than one would expect. Additionally you can't be sure how hardware defects could change the behavior of the robot. If some sensors are faulty the robot might think it is doing the right thing but it is actually doing something unforeseeable.

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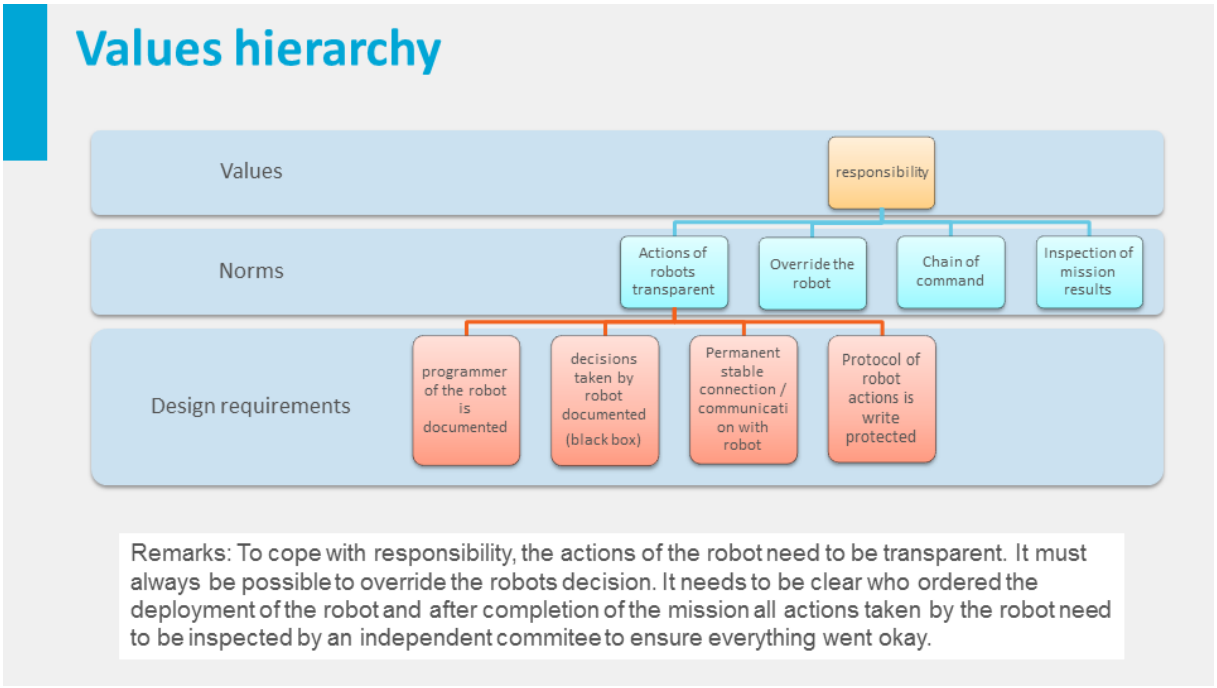
2) Values Hierarchy matrix

See attached image



#14

19 POINTS

MAIN MORAL DILEMMAS WHEN WE SPEAK OF AUTONOMOUS WEAPONS

Potential benefits:
*Autonomous weapons may reduce noncombatant casualties and other forms of collateral damage.
*Robots don’t need to protect themselves. They can be used in a self-sacrificing manner if needed.
*Robotic sensors are better equipments for battlefield observations than human sensory abilities.
*Robots can be designed without emotions.
*Robots can quickly integrate more information from more sources (before responding with lethal force) than a human can, in real time.
*Robots have the potential capability of independently and objectively monitoring ethical behavior in the battlefield by all parties, and reporting infractions that might be observed, what can lead to a reduction in human ethical infractions.

Potential harms:
*Establishing responsibility. Who’s to blame if things go wrong with an autonomous weapon?
*The possibility of unilateral risk-free warfare, which could be viewed as unjust.
*It’s too hard for machines to discriminate targets.
*Human warfighters may not accept ethical robots monitoring their performance.
*A robot refusing an order. The question of whether ultimate authority should vest in humans.
*The issues of overrides, placed in the hands of immoral, irresponsible, or reckless individuals.
*Proliferation of the technology to other nations and terrorists.

MAIN RISKS ARE WHEN WE SPEAK OF AUTONOMOUS WEAPONS

The grave danger associated with autonomous weapons includes the possible abuse of this technology by parties that don’t respect existing international legal requirements. It also includes significant risks, such as unintended and unpredicted interactions between automated or autonomous systems; mistaken belief that a human operator will be able to meaningfully remain "alert" in real-time; or even a decision algorithm for which the programmers didn’t sufficiently understand, incorporate, or test the requirements of the law of armed conflict for a particular situation that arises. Whether a system is merely highly automated or genuinely autonomous might well depend less on the machine’s design than on the anticipated role for the human operators. If they can’t reasonably perform that role, a system believed to be merely automated to a limited point might turn out to be effectively autonomous.

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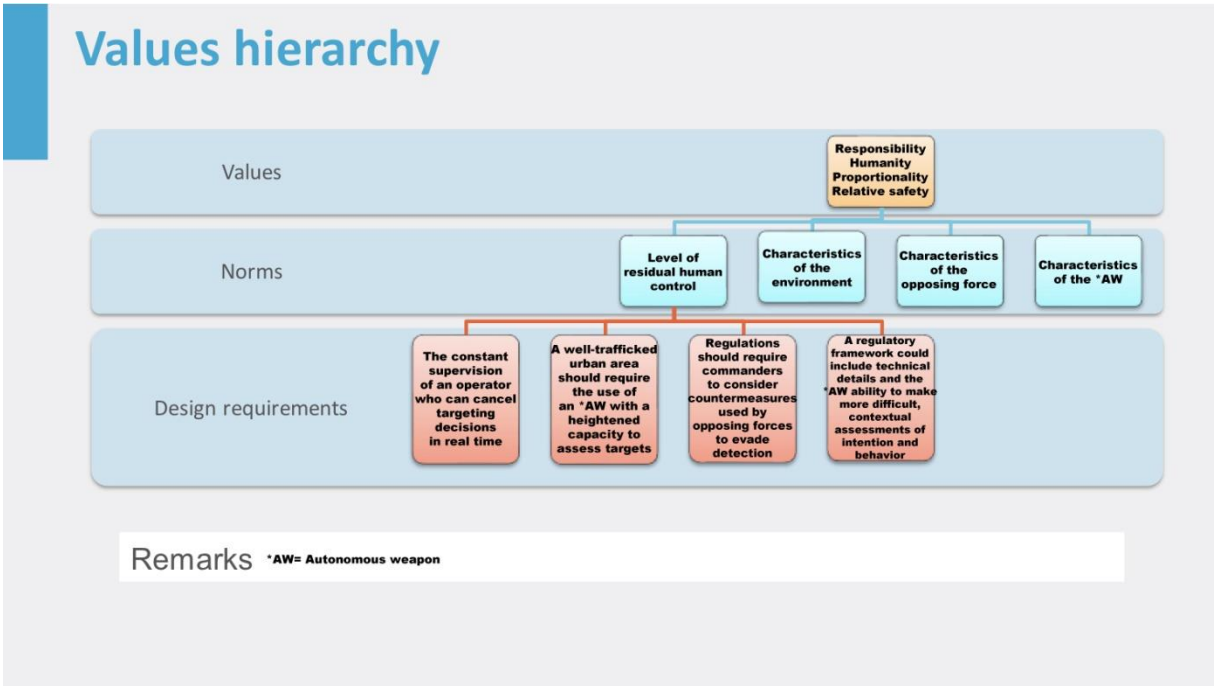
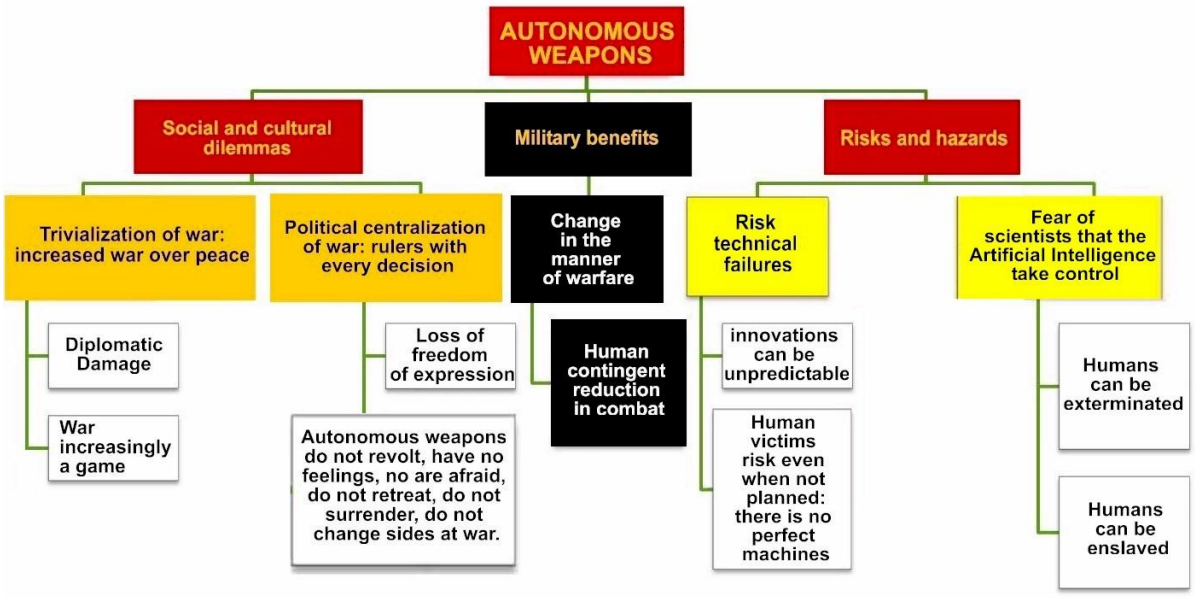


#15

19 POINTS

The only advantage of the Autonomous Weapons is precisely the source of all the risks and dilemmas: the reduction of human contingent in combat, which on the one hand, reduces the chance of people die as soldiers, and tends to make the increasingly facing attacks generating technological or economic damage, moreover, favors war is increasingly seen as a game, which is becoming more automated, robotic over which decisions are increasingly centered only on the rulers, and means a loss freedom of action and change by humans, and the risk of one day robots take over, and humanity be destroyed or enslaved, either by unpredictability of technological developments, or by a failure to create changes cascading effect, leading all the process of production and development of weapons, industry, various technologies, to control some of Artificial Intelligence system.

Read more: http://www.reachingcriticalwill.org/resources/fact-sheets/critical-issues/7972-fully-autonomous-weapons



#16

19 POINTS

I think the main moral dilemmas and risks of autonomous weapons are the following:

MORAL DILEMMAS

a) Compliance with legal and ethical frameworks

- If legal and ethical frameworks are taken into account at every stage of the design process and during its use.
- If the aim when developing robotic weapons is to enhance legal compliance and ethical principles.
- If in war and civil conflict scenarios international humanitarian and human rights law are respected. It rises the dilemma of the ‘trolley problem' when civilian and combatants are involved: How many civilians can be killed to kill combatants? or How many civilian can be killed when targeting a military tank?.

b) Responsibility in design and use

- Human control and oversight over autonomous weapons at all stages.
- Operators are able to override the robot at any stage of its deployment.
- Adequate mechanisms to hold individuals responsible for use of autonomous weapons. It raises the dilemma of 'the problem of many hands' in case of failure, accident or indiscriminate killing: Who is responsible for it? The operator? The senior oficials who command the operator? The army for the use of the robot? The manufacturer who makes the machine? Etc.
- Machine autonomy is oriented to enhance human decision-making, not replace it. It raises the dilemma of ‘ought implies can‘ when questioning the main purspose of its use.

RISKS

a) Technological risks

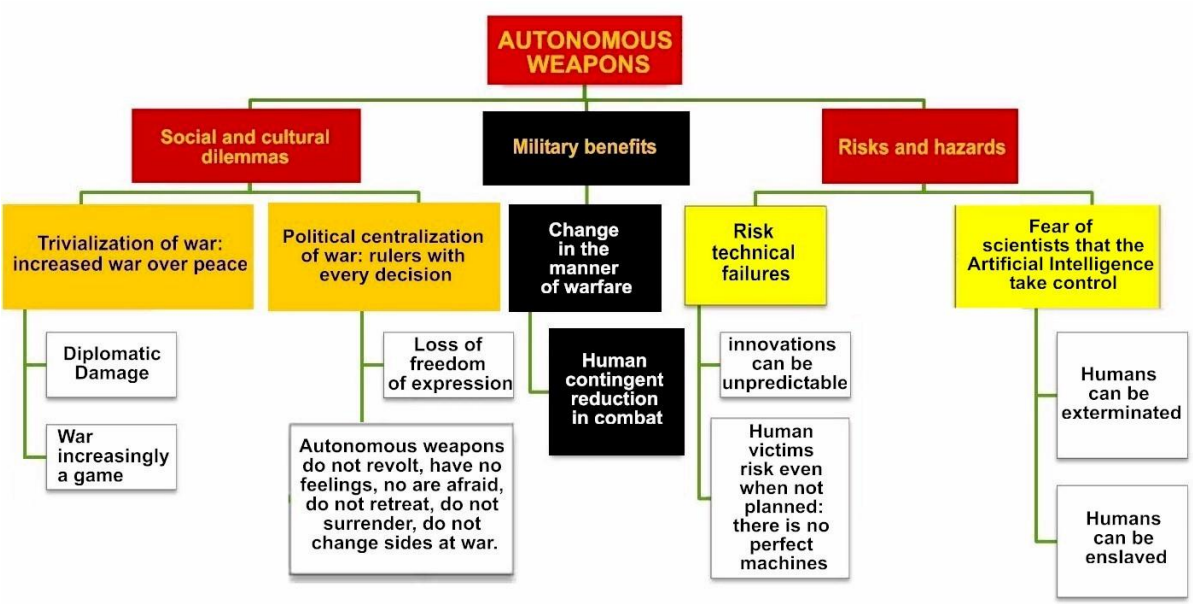
- Unpredictability.
- Unreliability (Leveringhaus, A. and de Greef, T., 2013) (Note 27 - Leveringhaus, A. and de Greef, T., “Tele-operated weapons systems: Safeguarding moral perception and responsibility”, in Aaronson, M. and Johnson, A. (eds.), Hitting the Target? How New Capabilities are Shaping International Intervention (London: Royal United Services Institute, 2013).
- System failure.
- Hacking, spoofing and re-programming by enemy actors.

b) Political and strategic risks

- Adoption of asymmetrical methods by enemy actors (Moskvitch, K., 2013/14). (Note 28 - Moskvitch, K., Are drones the next target for hackers?, BBC Future (2014), see http://www.bbc.com/future/story/20140206-candrones- be-hacked (accessed 22/07/2013).
- Autonomous arms race and competition.
- Increase in complexity of peacekeeping and stability.

c) Misuse of autonomous weapons

- Ilegal and unethical contexts and purposes where can be used.
- Unconventional uses.



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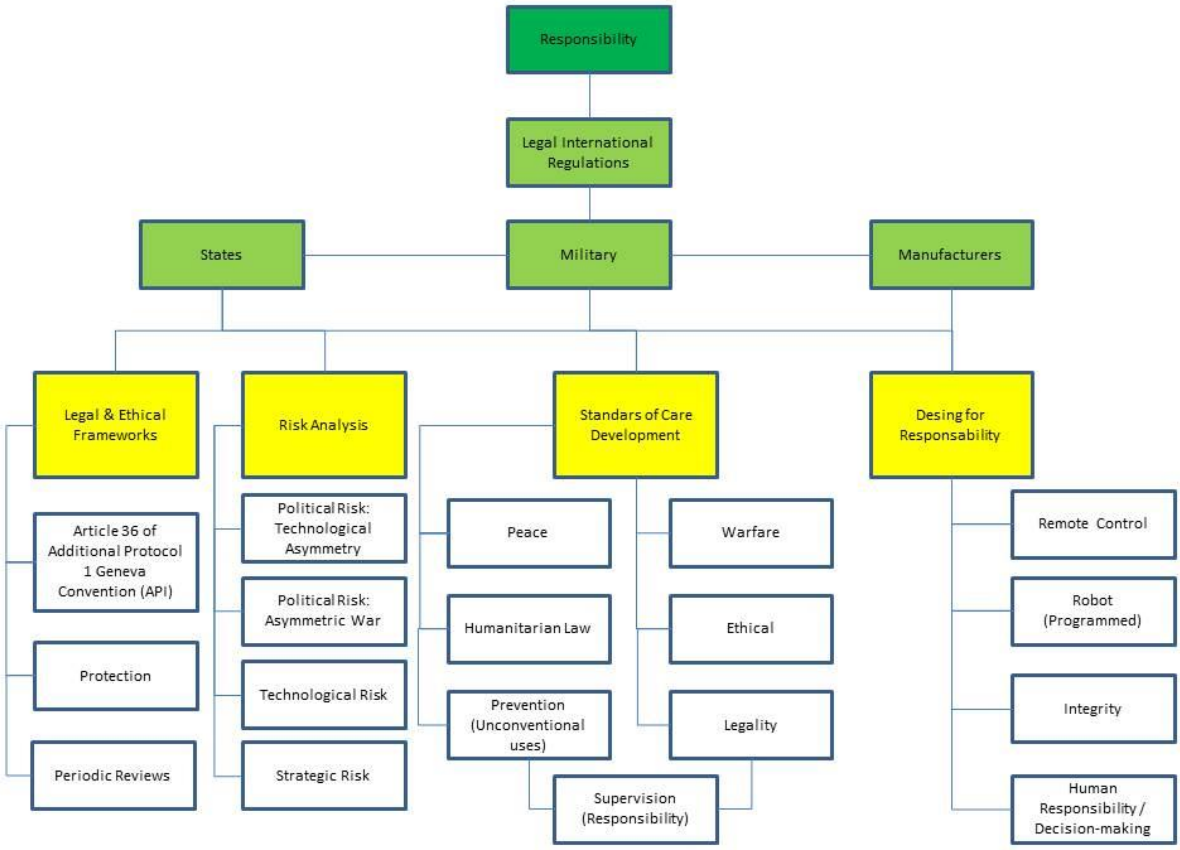
19 POINTS

There are many discussions about the risks and moral and ethical implications in the use of autonomous weapons. Within the most controversial aspects is the use of force through robots directed to distance or independently against human in conflict and the worst against civilians. Within the regulations there are still no clear arguments for the use of this type of weapons which may be deemed legal as well as the use of certain elements of war causing extreme damage. Many organizations monitoring human rights have given their point of view to consider that there must be an international regulation on the use of this type of weaponry.

From the philosophical point of view, it is possible to consider immoral that a machine can decide legitimately if a human should live or die (Asimov Laws) (Taken from Strategic Assessment Vol. 16 p.) 81 Siboni, Gabi and Eshpar, Yoni. 2014). Another aspect is the ethical issue which sets the limits for the use of autonomous weapons by ruling out any possibility of dialogue between the combatants.

It is important to analyze the risks involved the use of autonomous weapons such as the political, technological and strategic risks. I will concentrate on technological risks involving the use of this type of weaponry. It is difficult to understand if a robot can identify their opponent and not to confuse it for example with a child who plays with a toy gun. Or from the legal point of view a robot may violate international human rights standards. Another big risk is that terrorist groups may have access to such weapons. There are many implications that should be resolved with the help of all Nations to establish clear regulations and control mechanisms that help manage systematically but inevitable development of autonomous weapons.

Values Hierarchy Matrix for Autonomous Weapons



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Moral Dilemma associated with the Autonomous Weapon(AW):
There are good and bad uses of Autonomous weapons; When the autonomous weapons are misused to target people for killing without due course of law and justice system, the following dilemmas comes to my mind:

1. How a machine would target human? Based on what criteria? Who creates the algorithm and who owns responsibilities for autonomous weapons action?
2. Apart from obvious risk of collateral damage, it also alienates people from user state as it would be considered as extra judicial killings.
3. Autonomous weapons could be hacked or physically taken over by other "actors" and who is responsible for the same weapon now? Could we hold the "other" party responsible now? Does that not self-implicate the first party as well?
4. What is remedy for AW's action? What international laws should govern the AW itself, its manufacturers and users? Do victims of AW's action have same legal rights as victim of human action?
5. What should be standard governance structure around production and operation of AWs?

However above risks don't mean that we should not use autonomous weapons or ban its use either. The following uses would mean potentially saving human life by use of these machines:

1. In conflict zones, autonomous weapons could be deployed to maintain or impose cease fire and any violation could be punished by force by AWs. The machines could be as neutral force as we could get if configured and deployed carefully.
2. In areas, often attacked by terrorists like Syria, Yemen, Somalia, Nigeria etc. autonomous weapons could be very useful in prevention of attacks on civilians by armed rebels/terrorists. The vast areas could be monitored by drones and could take preventive actions with some manual supervision.
3. Autonomous weapons used as defense mechanism could save human lives and destroy weapons so the system like Iron dome in future would be totally autonomous and will provide shield from attacks across borders.
4. In hostile or extreme conditions like conflict between India and Pakistan at Siachin, where more soldiers die due to bad climate than enemy action, Autonomous weapons could prove useful.

Now let me explain the VSD that I have attached with this submission.
I see major three major issues in terms of usage of robotic weapons. principle of humanity as machines could not be trusted with lethal force as they could not value human life/rights. There is no conscience in machines so they can't contrast good/legitimate or illegitimate orders. Machines can't understand morality or can't make decision in situations similar to trolley problem. So human component must be involved if there is a decision involving human life is to be taken and Machines can't be trusted for that.

The legal issues surrounding the use of autonomous weapons are enormous. There is no international law addressing autonomous weapons. Per International law,

machines are not having human element required to take life & death decision so use of AWs are illegal per se. There is no clarity as to who should be held responsible for loss of life/property, is it the commander of force using it or manufacturer of the weapon or any third party.

The technical aspects of AWs are also pretty fast developing but are not quite there yet. Like in area of Artificial Intelligence, we have made strides but yet we are able to create intelligence less than a cockroach's brain. However the scientist are of the opinion that the progress in this area would be exponential and hence scientist like Stephen Hawking or Elon Musk are warning against the development of this very element. The another aspect of AWs is security as if compromised, it coud lead huge damages and liabilities. Last component in this puzzle is reliability as robotics, AI and security technologies are evolving rapidly and how tightly these components can work to deliver a usable AW is still not known. However undoubtedly this is best exmple where we could implement responsible innovation if international community works jointly. Appreciate your time and views on this subject! Thanks.

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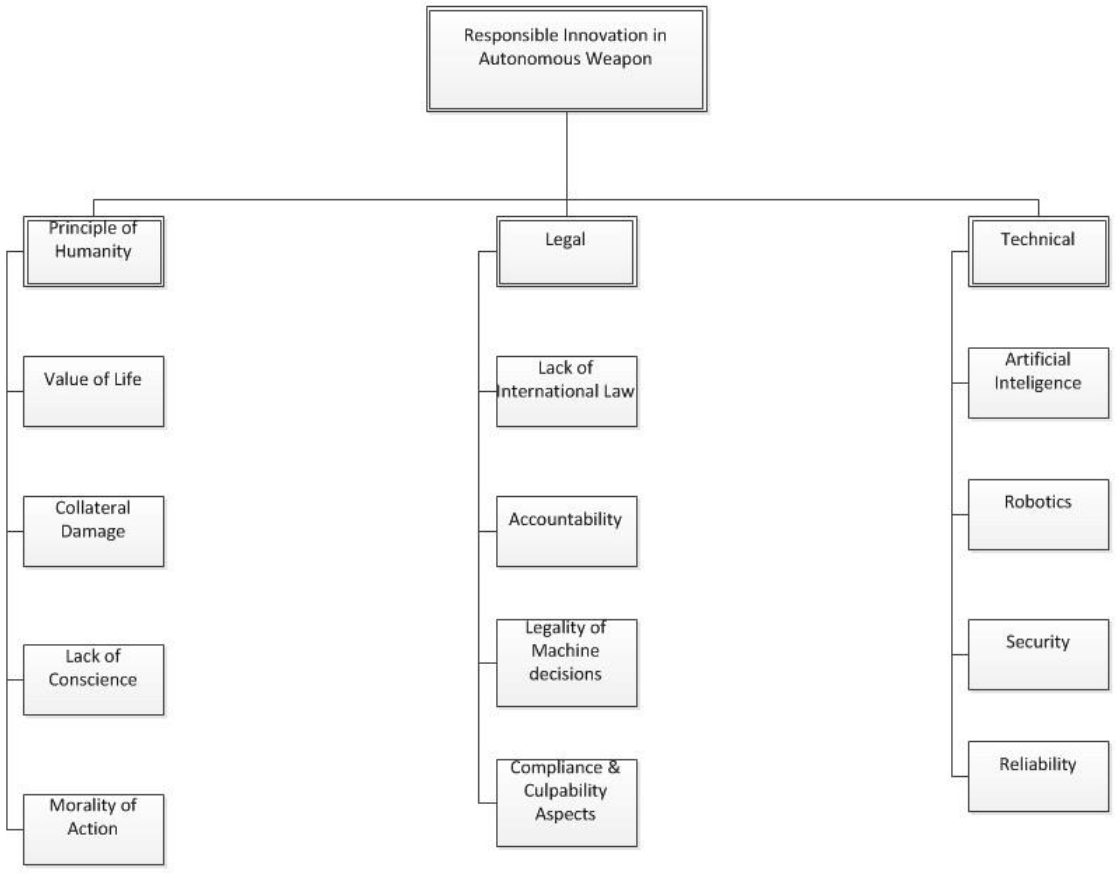

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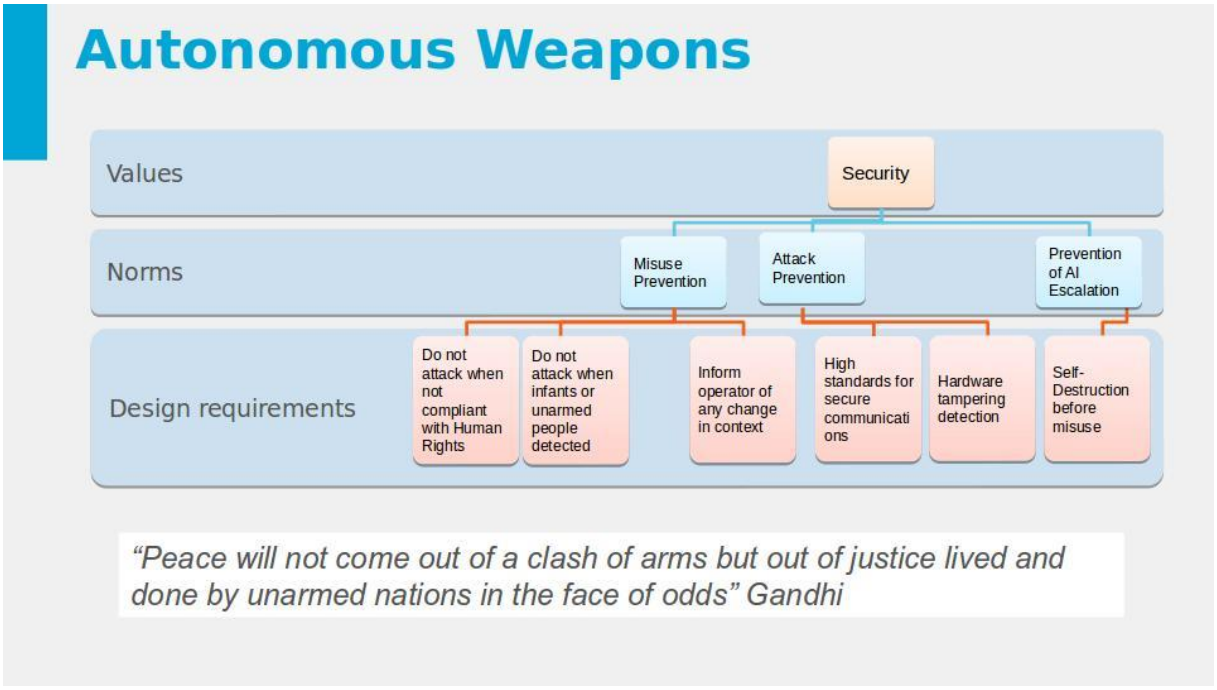
The first question regards dilemmas and risks of autonomous weapons. It is necessary to analyze the topic from the beginning. Which problem do autonomous weapons solve? Are there other possible solutions? Does the world really need more or better weapons?
The answer for me is no, any weapon development contributes to making worse the violence landscape and contributes only to making richer a very reduced group of people in the armaments industry. Weapons are used to protect the interests and assets of groups of people against others.
How would a world without weapons look like? Probably a world with more equality, less injustice and for sure less deaths on violence, possibly more freedom.
Alternatively if all the money invested in weapons development was invested in promoting peace, human rights, human dignity and the well being of all humans in the planet the situation would improve.
So a responsible innovator would not participate in any development of weapons, no matter what. There are plenty of problems to solve and weapons solve none.
Still the armament industry and their lobbies (i do not discard that the university of Delft receives money from such lobbies and therefore proposes this exercise on weapons as part of an innovation course) claims weapons can be used to make a more secure society. This is obviously not true, but if it were autonomous weapons would only be necessary in order to reduce the casualties created by the use of weapons during war and protecting civils and human rights.
The risks of autonomous weapons would be the
1) possibility of attacks in the remote control links that permit to control the weapons,
2) the uncertainity of re-programming of those weapons,
3) the uncertainity of misuse if those weapons are in wrong hands (all hands holding weapons are wrong hands),
4) the uncertainity of a Matrix scenario in which robots control humans,
5) the risks associated with the adaptation phase of the new technology.
6) the risk of wrong selection of targets

The unresponsible weapon designer should implement precautionary measures to reduce the probabilities of those risks and uncertainities. Some values should be respected: for example traceability of responsability, accuracy, high security of communications,

All ethical problems are present in the development of autonomous weapons, for example the trolley problem is present in several variants, what should a robot which has been programmed to attack a "terrorist" base do when it detects infants in the area. Should it attack to destroy the terrorist base with the damage of killing the infants or should it leave it and not attack with the damage that leaving the "terrorist" base unattacked would be. Or what should a robot decide when an accident is going to happen.
The problem of many hands is also present, once an attack has been done who is responsible of the casualties? the robot? the operator? the programmer? the army? the vendor of the robot?

Autonomous weapons can be seen as an experiment and as an unacceptable one since there are alternatives (peace), it is not controlable, population under attack are not informed and not asked for consent and the proportionality of the risks and the

benefits needs to be assesed in each scenario depending on the exact technology which is in use.



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19 POINTS

Moral Dilemmas and Risks with Autonomous Weapon Systems (AWS).

Militaries prefer AWS due to their being more effective in destroying the enemy while Human Right activists prefer them as they save civilian lives, for example there being 1-2 casualties in a drone strike in contrast to the tens of thousand killed in the days before automated weapons (Horrowitz and Schorre, 2014). However the ethical implications, philosophy and legality of AWS are far from settled and structured with at least one major forum (Experts in the field of Lethal Autonomous Weapon Systems) planning to meet in April of this year (2015) to progress an ethical framework with adequate human control.

The 'trolley dilemma' with respect to A.W.S. helps us to recognise how we have the moral choice to stop a weapon should the need unexpectedly arise. Hence the need for a 'kill switch' or automated breaking system to abort a mission before such tragic choices (as in the trolley scenario) have even come into existence. Design agents can be adopted into the architecture at the outset.

In the area of morally or causally responsible with regards to the use of A.W.S. from my perspective to design, operate and arm for destruction is a moral responsibility and choice. To programme a A.W.S is causal responsibility. To have an autonomous weapon that self generates decisions shifts the locus of responsibility to the AWSjQuery17203500356955919415_1422880793614 Legal liability must be addressed before we move much further down this path.
While this point also covers the 'many hands' dilemma. With so many people

involved in the development of this technology and its use in the field, the responsibility is wide spread and vast. Strategies are needed to facilitate and strengthen people in their ability to carry out their integral responsibilities.

Using the Precautionary Principle when viewing AWS, obviously the potential for harm is huge so anticipatory action needs to be planned in advance. The adequacy of the AW identifying the target, the risk of hacking and so re-programming the AW are but a few risks to be considered.

Through using a Fault Tree we may construct a logical, prospective way of establishing what might go wrong with AWS, how it may happen and what controls we can place by way of containing the hazards.

The Ethics of Autonomous Weapon Systems Conference (2014) raised the issue of whether moral decisions made by humans using intuitive, non-algorithmic capacities, could not possibly ever be captured by even the most sophisticated computer. That is assuming that intuitive moral perceptiveness from humans is even ethically desirable!
Much of the literature focuses on taking humans 'out of the loop' and handing the responsibility over to the weapons but Carr (2014) argues that by keeping humans 'in the decision loop' does not mean progress would be constrained, but that it would take on a more humanist path. Making the process more interactionist and so Value Sensitive in Design.

#21

19 POINTS

There is a big debate and moral dilemmas and risk when we speak of autonomous weapons because as Anderson and Waxman stated it is not merely a feature of weapons technology, but of technology generally (anything from self-driving cars to high frequency trading programs dealing in the financial markets in nanosecond intervals too swift for human intervention) what is making humans to ask themselves, how much importance does I have in the future decision making process, if I can not control/decide I would not be free, since freedom comes from having 2 options and being able to choose one by our own. Humans have been always driving to have more control, control in every action, every opportunity, human nature tendency is to control and therefore, to feel free and all these autonomous technologies in the aim to solve problems, do thing better, they are taking out from mankind the freedom as well as the responsibility.
Going to the topic, autonomous weapons, we can clearly look up to the trolley problem, you can save million lives with them, but....there would be one, maybe one in a billion, that there would be an unexpected outcome, did all the lived saved worth for that one mistake? If so, would you be able to blame the machine? the programmer? the one who started the mission? the one who ensemble the parts? this also involves the "Many hands problems" specially, when you can not blame the machine, it does have a program, but would it be able to think, to react, to learn, to understand the outcomes and values of the human race? Then, if we ought save lives, it implies we can do it now, then we should do it without considering the ways?
As Lin et al. stated on their work, the use of robots, particular military robots with the capacity to deliberately do harm and which have increasing degrees of autonomy, naturally raises issues with respect to established law and liability. However, in case of and act outside the bonds, the person (as far as we know, only a

person can be responsible, not a machine) will be responsible whether the act results from a programming error or malfunction or accident or intentional misuse. But in any case, we would be hard-pressed to assign blame today to our machines; yet as robots become more autonomous, a case could be made to treat robots as culpable legal agents. I agree with them, that while there are substantial benefits to be gained from the use of military robots, there are also many opportunities for these machines to act inappropriately, especially as they are given greater degrees of autonomy.
Anderson and Waxman stated that machine programming will never reach the point of satisfying the fundamental ethical and legal principles required to field a lawful autonomous lethal weapon. So if you can not have a weapon that understand at a deep ethical principles, it is our moral responsibility to do not let that weapon operates by itself.
The autonomous technology is arising, we can not let it stop, so it is better to start working on how we can put a legal, ethical framework to them. We need more detailed investigations in robotics, design, risk, and ethics from an interdisciplinary team, not only one country mean, but it is an internationally topic what might include general public as a key stakeholder.

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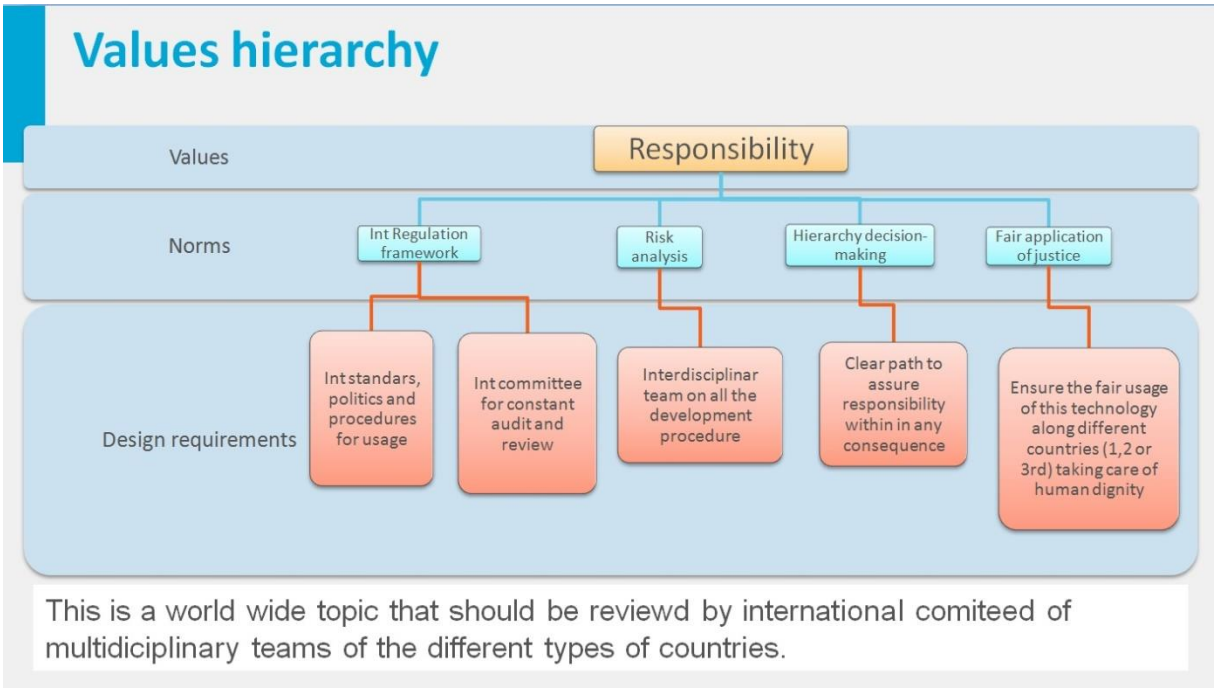
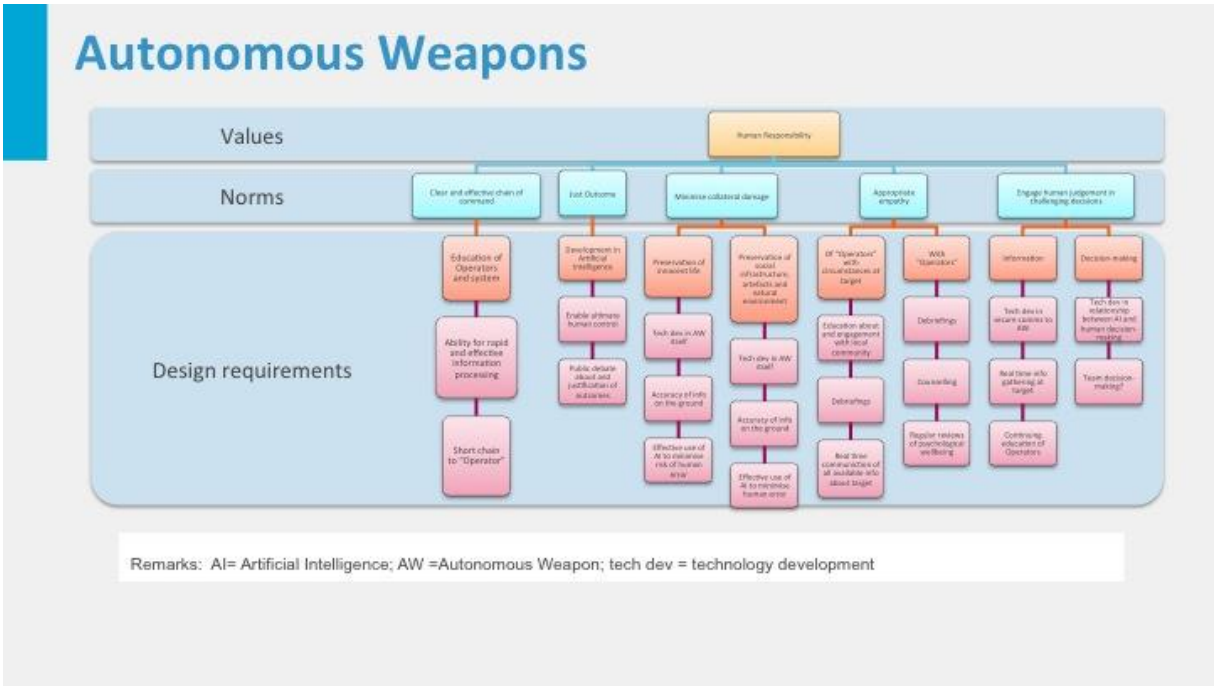


#22

19 POINTS

Moral Dilemmas
- trying to remove the risks of human error whilst at the same time removing humanity from decision-making

Risks
- third party interference (e.g. hacking and redirection) with a remotely controlled weapon
- collateral damage from a fixed automated decision where human judgement cannot be imposed
- removal of reality and empathy from "operators" (i.e. separation of operators from the reality of war/conflict) with the potential risk of escalation or prolongation of conflict
- potential retaliation against weaker and more accessible targets (e.g. civilian)
- "many hands" problem, where responsibility for collateral damage is unclear, or imposed on a device or system
- loss of trust and faith in the "operators" of autonomous weapons by those intended to benefit (i.e. local allies, civilians feeling alienated by lack of real human commitment)
- that the technology becomes available to terrorist groups, escalating terrorist activity and the potential delivery of illegal weapons by automated means.



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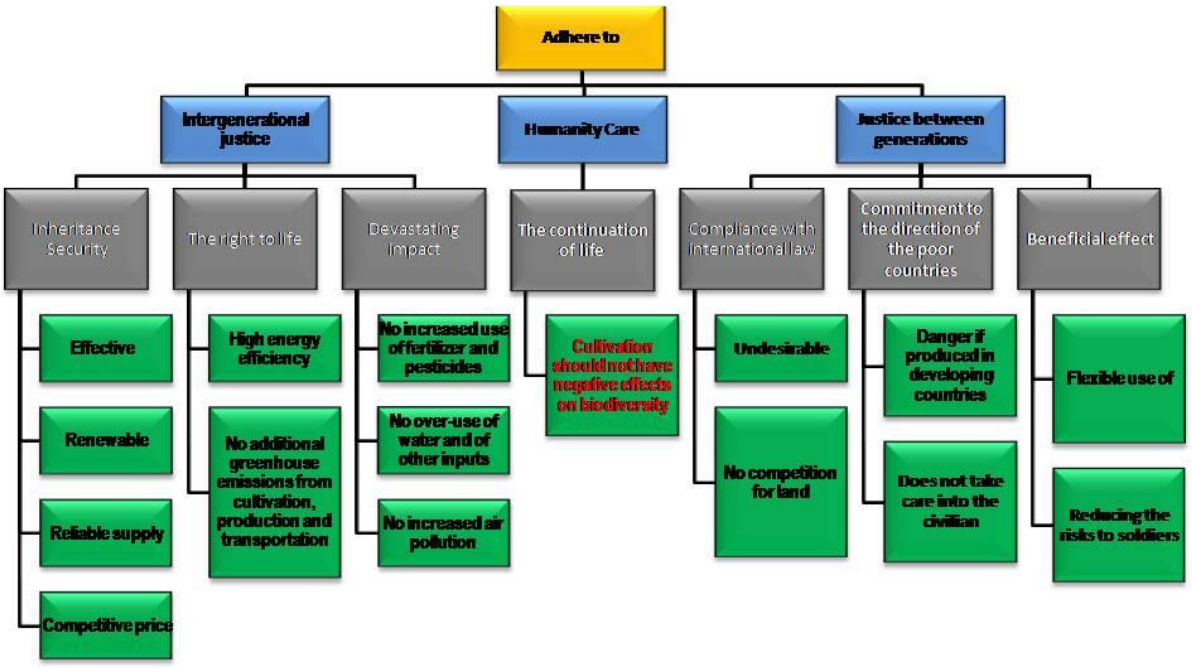
Moral dilemmas and risks are when we speak of autonomous weapons



#24

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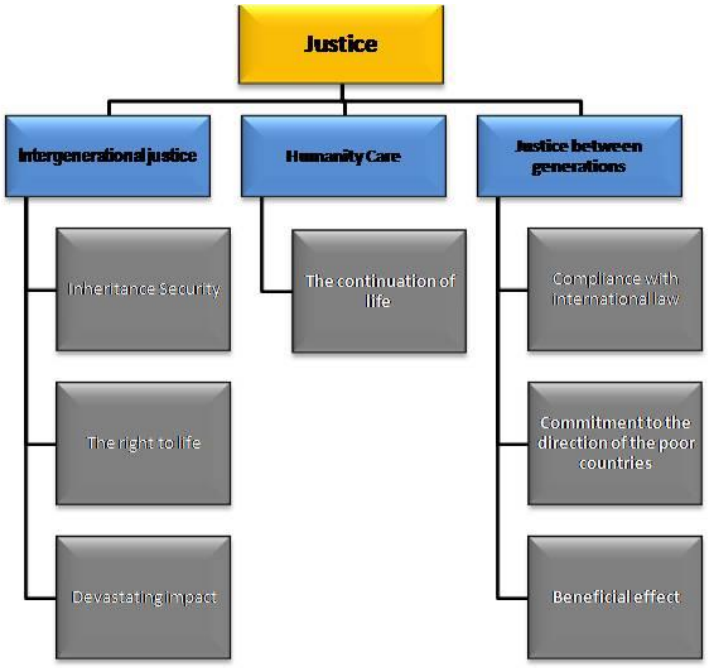
autonomous weapons



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summery

The right to life
Inter generational justice
Care of human being
Justice between generations
Inheritance Security
Life care
Bad impact
The continuation of life
Compliance with international law
Commitment to the direction of the poor countries
Beneficial effect