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Publication date

2015

Document Version

Final published version

Published in

Autonomous systems: issues for defence policymakers

[Link to publication](#)

Citation for published version (APA):

Roorda, M. (2015). NATO's targeting process: ensuring human control over (and lawful use of) 'autonomous' weapons. In A. P. Williams, & P. D. Scharre (Eds.), *Autonomous systems: issues for defence policymakers* (pp. 152-168). NATO HQ SACT.
https://www.act.nato.int/images/stories/media/capdev/capdev_02.pdf

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NATO's Targeting Process: Ensuring Human Control Over (and Lawful Use of) 'Autonomous' Weapons

Mark Roorda⁽¹⁾

Abstract

The prospect of the use of so-called autonomous weapon systems has raised significant legal and moral concerns. This chapter contributes to the debate by providing an alternative perspective to the current dominant focus on the technological capabilities of future weapons. The author argues that machines do not have to be able to distinguish and make proportionality calculations. No rule in IHL requires weapons to do so. It is 'merely' the effects of attack decisions that need to be in accordance with relevant norms. Human judgement is required to decide under what circumstances to allow a particular system – with its specific abilities – to operate. NATO's targeting process serves as an example how weapons may be used effectively and responsibly, partly by its incorporation of legal norms. The author concludes that weapons programmed to perform targeting tasks without direct human input may be lawfully used in many situations if the state employing the system would follow similar steps as described in NATO's targeting doctrine and if humans continue to make the critical decisions about when and how to employ the system given the conditions ruling at the time

1. The author wishes to thank Terry Gill, Paul Ducheine, Jeffrey Thurnher, and Merel Ekelhof for their valuable comments and suggestions.

Introduction

Autonomous weapon systems (AWS)⁽²⁾ have been defined as weapon systems that, once activated, can select and engage targets without further intervention by a human operator.⁽³⁾ A number of concerns have been raised about this envisioned type of weapon: (1) will they have the innate technological capability to perform the assessments that are required by the law of armed conflict (LOAC),⁽⁴⁾ (2) is it unethical to have a machine decide about the use of force, let alone life and death, and (3) who – or what – should be held accountable for wrongdoing that results from the weapon’s autonomous functioning?⁽⁵⁾ These concerns have led to calls for a complete pre-emptive ban on AWS, and quite understandably so, if one considers the implications of machines using force without human direction, oversight, or control.⁽⁶⁾ However, the term ‘AWS’, its accepted definition, and the associated concerns commonly harbor a singular focus on the platform and its technological capabilities. This focus neglects the human responsibility to decide on a particular weapon’s use. This is also reflected in descriptions of weapons as ‘man out of the loop’. To consider a system to be autonomous, and to ascribe to it the power to *select* targets or *make*

2. This is the most commonly used term. Others include: lethal autonomous weapon system, used in the context of the Convention on Certain Conventional Weapons Expert Meeting; lethal autonomous robotics, used by the UN Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns; and killer robots, used by several non-governmental organisations that actively seek a pre-emptive ban.

3. For an overview of several definitions, see Geneva Academy of International Humanitarian Law and Human Rights 2014, 6.

4. It is generally acknowledged that LOAC is applicable to weapons with autonomous capabilities (see, for instance Melzer 2014, 3; Thurnher 2013; ICRC 2014, 8. LOAC rules on attack include provisions that: (1) distinction must be made between military targets and civilians and civilian objects; (2) attacks are prohibited that may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated; and (3) all feasible precautions must be taken to avoid, and in any event to minimise, incidental loss of civilian life, injury to civilians, and damage to civilian objects.

5. A fourth concern is that seemingly risk-free warfare would lower the general threshold for the international use of force, making war more likely. While this is a legitimate concern, nearly every (technological) development aimed at lowering the risk to own personnel – from bulletproof vests to armed drones – lowers, to a certain extent, the risks of warfare and thus the reluctance for military action. It is a political matter (of the UN Security Council or nations that consider the use of force in self-defence, on the invitation of another state, or on humanitarian grounds) to establish institutional safeguards to ensure that armed force is only used in accordance with international law, an issue that remains outside the scope of this chapter.

6. ‘Both experts and layman have expressed a range of strong opinions about whether or not fully autonomous machines should be given the power to deliver lethal force without human supervision’ (HRW and IHRC 2012, 35).

decisions without human interference, seems to presuppose a machine's self-governance. Such a perspective tends to lead to anthropomorphism, whereby the platform itself is expected to perform tasks that are required to be operated in accordance with operational and legal requirements. This perspective has shaped the debate, yet it might be counterproductive in assessing the efficacy and legitimacy of weapons that are programmed to perform targeting tasks without direct human input.⁽⁷⁾

This chapter argues that no weapon should be regarded as a single entity operating in a vacuum. Nor is adherence to relevant norms only realised during execution. Humans will determine what type of system to launch for what type of mission, and under what circumstances. It is this decision, and the planning considerations that inform it, that is essential to constrain the use of force and to ensure that operational and legal requirements are met.⁽⁸⁾

To exemplify how assessments during the planning stage may facilitate the effective and lawful use of force, the following section describes NATO's targeting process. A phase-by-phase analysis shows how operational and legal standards are incorporated into a process that culminates in one essential decision. The subsequent section will elaborate on this decision, which is conceptually central to the use of force by any means or method. Since it is a human decision, it directly triggers human responsibility. The implications of this analysis for the use of AWS will be discussed in the section that follows, after which conclusions are drawn.

NATO's Targeting Process

NATO's joint targeting doctrine details procedures aimed at effective and lawful engagement of targets.⁽⁹⁾ The process has developed over the course

7. The author proposes to refrain from using the term 'autonomous' in combination with 'system' and/or 'weapon'. On this point, see Chapter 2 by Andrew Williams on definitional issues.

8. Operational requirements may include: commander's goals, guidance, and intent; direct orders; tactical directives; rules of engagement; special instructions, etc. Legal requirements in armed conflict are primarily derived from the LOAC, but also from other applicable treaties, customs, and principles.

9. 'The targeting process is focused on achieving the JFC's objectives efficiently and effectively...as limited by applicable rules of engagement (ROE) and relevant international law, and strives to minimize collateral damage (CD) and fratricide' (NATO 2008, 1-4). AJP-3.9 (1-7) furthermore states that both those planning and authorising attacks and those carrying them out have a responsibility to apply international law.

of history,⁽¹⁰⁾ possibly even from before NATO was established, and has been formalised in recent decades. It has now become embedded in the training and execution of NATO's military operations. The doctrine defines joint targeting as: the process of determining the effects necessary to achieve the commander's goals,⁽¹¹⁾ identifying the actions necessary to create the desired effects based on the means available, selecting and prioritising targets, and synchronising fires with other military capabilities, and then assessing their cumulative effectiveness and taking remedial action if necessary.⁽¹²⁾

Most military operations start with political direction that, although not formally part of the targeting process, contains a number of restrictions for targeting purposes.⁽¹³⁾ NATO's principal political decision-making body, the North Atlantic Council (NAC), will issue strategic military goals and provide guidance to the Joint Force Commander (JFC) responsible for executing the campaign.⁽¹⁴⁾ The NAC will simultaneously pass down approved target sets,⁽¹⁵⁾ including possible priority targets,⁽¹⁶⁾ and the JFC will receive guidance on how these targets will be selected for attack.⁽¹⁷⁾ Although strategic-level goals are typically very general and the associated target sets are relatively broad, it is clear that targets selection is controlled from the top down. Moreover, the goals and the designation of target sets must not contravene legal requirements. When the NAC approves target sets that contain civilian installations, those objects and

10. See Osinga and Roorda forthcoming.

11. The term 'goal' is used in this chapter even though doctrine uses the term 'objective'. This is to prevent confusion with the LOAC usage of 'military objective' – in the sense of target – as described in Additional Protocol (AP) I, art. 52(2).

12. NATO 2008, 1-1. The term 'joint' points to the fact that it is a joint effort between all armed force components. US doctrine defines targeting as the process of selecting and prioritising targets and matching the appropriate response to them, considering operational requirements and capabilities (DOD 2013, I-1).

13. An operation's legal mandate can also influence the targeting options. See Gill forthcoming.

14. NATO 2008, 3-1. These objectives are passed down from the NAC through NATO's Military Committee and Strategic Command to the JFC.

15. NATO 2008, A-13. Target sets include, but are not limited to: ground forces and facilities, military leadership, military supply and storage, electric power, transportation/lines of communication, and industry.

16. The term is 'time-sensitive targets' (TST), which are targets that require immediate response because they pose (or will soon pose) a danger to friendly operations, or are highly lucrative, fleeting targets of opportunity (Ibid., 1-3). Possible TSTs include mobile rocket launchers, theatre ballistic missiles, naval vessels, and terrorist leadership.

17. Ibid., 3-1. Note that 'engagement' encompasses both violent and non-violent action, while 'attack' is defined as 'acts of violence against the adversary, whether in offence or in defence' (AP I, art. 49).

persons may only be attacked if they qualify as legitimate military objectives in accordance with the LOAC.⁽¹⁸⁾ The JFC then formulates operational-level goals that will serve as input for operational targeting. If at any time the JFC wishes to appoint targets that have not yet been approved by the NAC, such approval needs to be sought.

When the JFC has formulated his goals, the targeting process formally commences in a six-phase cycle: (1) analysis of the JFC's goals; (2) target development, validation, nomination, and prioritisation; (3) analysis of capabilities; (4) assignment of capabilities to be used; (5) planning and execution of the mission; and (6) assessment of the results.⁽¹⁹⁾ While doctrine describes these as distinct steps, in practice some phases are conducted simultaneously and the whole process is iterative, depending on specific (changing) circumstances.

Phase 1: Analysis of Commander's Goals

Those responsible for targeting will have to understand the JFC's goals, guidance, and intent in relation to the NAC-approved target sets, and will translate those inputs into the desired effects and concrete tasks that are logically related to the overall desired end state.⁽²⁰⁾ Within the targeting cycle, this is the first moment that concrete violent action and physical effects may be considered; a consideration that is informed by operational and legal requirements. In attack, a distinction should be made between military objectives and civilian objects and persons, and only military objectives may be the object of attack.⁽²¹⁾ This means that target sets can include both military forces and civilians, but that attacks resulting in effects such as 'destroy' or 'neutralise' can only be connected to the former, while engagements generating effects such as 'reinstate' or 'inform' can also be linked to the latter. Analysis furthermore encompasses

18. Ibid., A-13.

19. Ibid., 2-1.

20. Ibid., 2-2.

21. AP I, arts. 48, 51, and 52. See also Henckaerts and Doswald-Beck, rules 1 and 7. Military objectives are limited to objects that, by their nature, location, purpose, or use make an effective contribution to military action and whose total or partial destruction, capture, or neutralisation, in the circumstances ruling at the time, offers a definite military advantage. See AP I, art. 52(2) and Henckaerts and Doswald-Beck, rules 8–10. In so far as persons are concerned, objectives are limited to combatants, unless they have become *hors de combat*, and civilians who have lost their protected status by directly participating in hostilities. See Henckaerts and Doswald-Beck, rules 3–6 and 47.

formulating appropriate measures of performance and effectiveness – if the JFC has not already done so – which are prerequisites for measuring progress toward accomplishing those tasks, effects, and goals – a function that links phase 6 (assessment) back to phase 1.

Phase 2: Target Development, Validation, Nomination, and Prioritisation

Since the NAC's target sets are very broad, with the possible exception of priority targets, phase 2 is aimed at specifying those sets while satisfying applicable operational and legal norms. Target development involves the analysis by targeteers of the adversary's capabilities, the determination of the best targets to engage in order to achieve the designated goals, and the collection of essential information on the target to be able to engage it.⁽²²⁾ This is also the stage at which initial issues related to potential collateral damage and other undesired effects may become apparent, which will be considered during validation and nomination; these issues could lead to restrictions on the means and methods of engagement, to be considered in phase 3.

Validation encompasses a process to ensure compliance with the JFC's goals and guidance, to ensure compliance with international law and established rules of engagement, and to verify the accuracy and credibility of intelligence used to develop a target. If the desired effect on a target is a violent one, the 'law of attack'⁽²³⁾ requires that '[w]hen a choice is possible between several objectives for obtaining a similar military advantage, the objective to be selected shall be that the attack on which may be expected to cause the least danger to civilian lives and to civilian objects.'⁽²⁴⁾ After positive validation, targets are nominated via a process of obtaining approval through the proper channels, after which they are prioritised.⁽²⁵⁾

22. Since target development requires substantial amounts of intelligence analysing capacity, there are different levels of development, and only targets that are assigned the highest priority, depending on the objectives in a particular phase of the operation, are developed fully .

23. This is often referred to as the 'law of targeting'. See, for instance, Boothby 2012. However, the term 'law of attack' seems more appropriate, since targeting also encompasses, for instance, non-violent actions directed at neutrals (e.g., information operations), of which the regulating norms are presumably not derived from LOAC. On non-kinetic targeting, see Ducheine forthcoming.

24. AP I, art. 57(3).

25. NATO 2008, 2-3.

At any given moment, there are, both conceptually and practically, two categories of targets: *specific targets* that have been sufficiently developed and validated to be nominated for action against them (e.g., enemy vehicle X at location Y), and *targets belonging to a set* that as a whole has been selected for engagement, but within which specific targets have not yet been sufficiently developed and validated to be nominated for action against them (e.g., enemy vehicles of a certain type).

Targets that have been sufficiently developed are known to exist in an operational area, for which sufficiently detailed target data is available to either directly schedule their engagement or to be held on call to be prosecuted if the situation demands it. Engaging these targets is called deliberate targeting.⁽²⁶⁾ Those that have not yet been sufficiently developed are either known to exist in the operational area (for which additional data is needed to engage them), or are unknown to exist and emerge unexpectedly, but do meet criteria specific to operational goals. Whenever such targets are detected in the conduct of operations, additional data needs to be collected to nominate them prior to engagement, through a process called dynamic targeting.⁽²⁷⁾

26. Ibid., 1-2.

27. Ibid. Although, compared to deliberate targeting, dynamic targeting is more reactive and is often more time pressured, it remains offensive action that requires the approval of a target engagement authority. This should be distinguished from (tactical-level) combat engagement, in which units do not require approval for individual attacks in response to enemy engagement (which should, in turn, be distinguished from self-defence), although boundaries are not always easily identifiable.

Phase 3: Capability Analysis

In this phase, capabilities are analysed to assess what means and methods are available and which are the most appropriate to engage a prioritised target, depending on the desired effect. The availability and efficacy of weapons that are programmed to perform targeting tasks without direct human input is included in this assessment. The analysis will cover considering: whether a target's characteristics (e.g., location and type) require action of a particular component (land, maritime, air, or special operations forces); whether achieving the desired effects is best served by forceful or non-forceful means; and whether certain capabilities within those options are ill suited because of operational or legal requirements. When collateral damage concerns are involved, for instance, no mean or method may be used that is expected to cause excessive collateral damage relative to the anticipated military advantage,⁽²⁸⁾ and some means or methods might be discarded if others would better avoid or minimise collateral damage.⁽²⁹⁾

A mean or method will be rejected for particular targets if it either cannot achieve the desired effect, or if it is assessed that its use cannot meet other operational or legal standards. Conversely, if there are no apparent concerns at this stage and it can achieve the desired effect, the weapon will be included among the options for the commander to decide.

Phase 4: Capability Assignment

After having evaluated the outcome of the previous phases, the JFC, typically supported by a Joint Targeting Coordination Board, will match capabilities against targets and assign those capabilities accordingly. Doctrinally, a capability is matched to a selected target to achieve the desired effects; but in practice, due to a scarcity of means, it is not uncommon for targets to be selected based on the available weapons and their characteristics. Either way, it is a conscious decision to use a particular capability on a particular target. Any relevant constraints and restraints that have emerged from these four phases will be passed onto the assigned unit. Depending on the assigned unit's capacity to ensure

28. AP I, arts. 51(5)(b), 57(2)(iii).

29. The requirement to 'take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects' is enumerated in AP I, art. 57 (2)(a)(ii).

compliance with operational and legal standards during the execution phase, these limitations could range from very strict to very lenient. It is a matter of a commander's trust in his subordinates, but it remains his prerogative to impose stricter limitations if he has reason to believe that the assigned unit is unable to ensure compliance with the relevant obligations.

Phase 5: Mission Planning and Execution

The assigned unit will conduct mission planning in similar steps to phases 1 to 4, but on a more detailed, tactical level. Goals are re-evaluated, additional intelligence is collected, targets are further refined, and means and methods are chosen from within the assigned unit that are best suited to achieve the goals. Assessments may include: location, type, size, and material of target; civilian pattern of life; time of attack (day or night); weapon capabilities; weapon effects; directions of attack; munition fragmentation patterns; secondary explosions; infrastructural collateral concerns; personnel safety; and battlespace deconfliction measures. Again, in every judgement, operational and legal standards are taken into account, including the obligation to take feasible precautions in attack.⁽³⁰⁾ A commander will subsequently approve the operation, which includes approving the use of a particular mean and method against a specific target during execution. Moving into the execution stage, precautionary measures remain to be applied.

One moment is of crucial importance during this phase: the moment when a person performs (or does not perform) an act, after which it is irreversible that violent action will – or could – occur. In most cases this is the decision to fire or launch a weapon. For example, when a sniper pulls the trigger, this final decision – in a long series of decisions – after which humans can no longer influence its direct violent effects, is essential to ensure adherence to operational and legal requirements. This decision will be further examined in the next paragraph, after briefly mentioning the final phase in NATO's targeting cycle.

30. Precautionary measures include: doing everything feasible to ensure the target is a lawful military target, taking all feasible precautions in the choice of means and methods to avoid or minimise collateral damage, refraining from deciding to launch a disproportionate attack, cancelling an attack if the target is not a lawful military target, and giving effective advance warning if the circumstances permit. See AP I, art. 57. Soldiers are often issued ROE to ensure that they use force within the boundaries of LOAC.

Phase 6: Combat Assessment

After engagement, combat assessment is conducted to determine whether the desired effects have been achieved, using the measures of performance and effectiveness. These determinations feed back into phase 1 by adjusting goals and tasks. The assessment will inform a decision on re-engagement that will include a re-assessment of earlier considerations, as changes in circumstances dictate.

The Central Decision

Practically, in most cases the central decision mentioned in phase 5 is made on the verge of pulling a trigger or pressing a button. The person performing this act is the last one to verify that the resulting effects will be in accordance with operational and legal requirements. Conceptually, though, it is not so much the moment of pulling a trigger; it is the moment after which humans can no longer influence the direct violent effects. For some weapons, this moment occurs *after* a munition has been launched or fired. For example, when launching a cruise missile that is re-programmable in flight, the conceptual moment of ‘no return’ is the point at which re-programming is no longer feasible. For other weapons, this moment can occur *before* a munition is launched. Take the example of a weapon platform that is programmed to find and engage enemy tanks in a certain area. A munition will be launched when the system has positively identified an enemy tank – based on sensor input and a pre-programmed database – but the conceptual moment of ‘no return’ occurred at the launch of the platform. With the use of any means or method, there will be a moment after which control is lost over the direct outcome. It is this moment (and the human decision that allows the process to surpass this point) that should be scrutinised more closely.

The person making this judgement has to consider a crucial question: will the effects that are expected to result from this decision be in accordance with operational and legal requirements? The answer to this question is influenced by his knowledge of, at least, the following five factors: (1) the situation at the time of the decision; (2) the expected functioning and effects of the weapon (including the operator’s ability to aim it); (3) the possible changes in the situation between the decision and the effect taking place; (4) the accuracy of

the intelligence used for these assessments; and (5) the operational and legal requirements.⁽³¹⁾

The combination of these factors should lead to the conviction that the expected effects will remain within the boundaries of operational and legal standards. In this sense, a weapon does not have to be perfect so that it can be used in all circumstances; it merely needs to be appropriate for the situation in which it is intended to be used. This judgement will in some cases be relatively straightforward, while in others it might be tremendously difficult. Either way, if a decision maker is not convinced that the expected effects will remain within the boundaries of operational and legal standards, the decision should be postponed and planning should continue, or it should be cancelled. Depending on the circumstances, there is a vast range of planning options to decrease uncertainty and to facilitate this decision, including (combinations of): assigning more specific targets, limiting the type of targets to be engaged (preferably to those that have characteristics that do not resemble the characteristics of civilian objects or persons in the same area), limiting operations that lead to dynamic targeting situations, decreasing the size of the area of operations, limiting the timespan of the operation (especially the time between the decision and the effect), increasing intelligence collection, limiting the operation to areas in which intelligence on the situation is easily collected and assessed and the circumstances are less complex (i.e., uncluttered environments), imposing measures that provide clarity on the accuracy of intelligence, imposing measures that prevent changes to the current situation (e.g., establishing a perimeter), giving advance warning, testing assigned means, reprogramming assigned means, opting for other means, or any other feasible measures.

Implications for the Autonomous Weapon Debate

The non-governmental organisation ‘Article 36’ asserted correctly that: ‘[t]he exercise of control over the use of weapons, and, concomitant responsibility and accountability for consequences are fundamental to the governance of the use of force and to the protection of the human person.’⁽³²⁾ The previous two sections have shown that humans will exercise such control even when

31. In military terms, this knowledge is often referred to as ‘situational awareness’. For an interesting analysis of the difference between ‘awareness’ and ‘understanding’, see MOD (2010), 2-1 to 2-9.

32. Article 36 2013, 1.

using weapons that are programmed to perform targeting tasks without direct human input. The central decision after which human control is lost is preceded – when taking NATO procedure as example – by an extensive planning stage, during which humans will formulate overall goals, gather intelligence, select and develop targets, analyse the most suitable type of weapon, and decide under what circumstances and preconditions to employ a particular weapon. In this sense, weapon systems are never truly autonomous.⁽³³⁾ The argument that man will be out of the loop in targeting must be based on a very narrow definition of ‘the loop’. When Markus Wagner asserted that ‘AWS remove a combatant from the decision-making process over a particular situation altogether’,⁽³⁴⁾ he surely did not contemplate the wider decision-making process described above. Accepting this broader view would invalidate assertions that a system ‘selects’ the targets and should thus have the innate technological capabilities to distinguish between military targets and civilians, to make proportionality calculations, and to take precautionary measures in attack.⁽³⁵⁾ This view was already quite remarkable, since existing law does not require that compliance is guaranteed by a system itself – an expectation that would also seem unrealistic. LOAC ‘merely’ requires compliance, regardless whether a weapon’s capabilities

33. Unless machines would be programmed to take over the entire targeting process, from formulating goals to deciding when and where to launch. For speculations in this direction, see Roff 2014. This is a very disturbing, but fortunately also very unrealistic, idea. There would seem to be no compelling reason why states would develop weapons over which they have no control (aside from the question of whether it is technologically possible).

34. Wagner 2012, 115.

35. See, for instance, the following statements: The necessary processes for applying those rules ‘would seem extremely challenging to programme into an autonomous weapon system’, especially in light of contemporary dynamic conflict environments (ICRC 2014, 13). ‘[T]he underlying software must be able to determine whether a particular target is civilian or military in nature’, and ‘[w]ith respect to target selection the software would have to be designed so as to anticipate all potential decisions, either by programming them in or by designing decision rules that are capable of making such decisions with a myriad of factors to be weighed’ (Wagner 2012, 113 and 121). ‘[N]o autonomous robots...have the necessary sensing properties to allow for discrimination between combatants and innocents (see Sharkey 2009, 27). ‘[F]ully autonomous weapons would not have the ability to sense or interpret the difference between soldiers and civilians’ and they ‘would not possess human qualities necessary to assess an individual’s intentions, an assessment that is key to distinguishing targets’, and ‘the [proportionality] test requires more than a balancing of quantitative data, and a robot could not be programmed to duplicate the psychological processes in human judgment that are necessary to assess proportionality’ (HRW and IHRC 2012, 30–3).

ensure adherence or whether this is achieved by the manner in which the weapon is employed. In this respect, the rules are result oriented.⁽³⁶⁾

Moreover, when accepting the idea – perhaps the fact – that humans will remain in control by virtue of the central decision, the real question becomes: how well has the person deciding on the employment of a particular weapon assessed the implications of its use? This is also reflected in the now widely adopted concept that insists that human control must be ‘meaningful’.⁽³⁷⁾ Without judging whether ‘meaningful’ is the most appropriate term, it seems to require human control that results in *lawful* use of force – a result that (as has been shown) is particularly well served by applying a process similar to NATO’s targeting cycle.⁽³⁸⁾ Doctrine details:

While all reasonably feasible care must be taken at each stage of the targeting process, targeting decisions and actions are not legally judged based on perfection, or that of hindsight. Those involved need only take all those precautions that were reasonably feasible at the time of their decision or actions and in the circumstances prevailing at that time. However, this objective standard also means that recklessness, negligence and willful blindness provide no excuse to unlawful targeting’.⁽³⁹⁾

36. Thus, the debate on whether robots will ever be capable of fulfilling the distinction and proportionality assessments is both speculative and irrelevant.

37. For a brief overview of this concept, see UNIDIR 2014.

38. In the author’s view, the concept of meaningful human control should not serve to ban a particular technological development. Rather, it should inform standards for the human operator. This view also seems to be taken by Horowitz and Scharre 2015. Interestingly, their ‘essential components’ of meaningful human control (pp. 14–15) – with which the author agrees – are not unique to the use of so-called AWS, but are necessary elements in *lawfully* using any type of weapon. Hence, the concept of meaningful human control seems redundant to existing legal norms and possible operational procedures (of which NATO’s serve as an example) to implement those norms.

39. NATO 2008, 1-7. It is recommended that states using weapons programmed to perform targeting tasks without direct human input should issue guidance on these issues. See DOD 2012: ‘Persons who authorize the use of, direct the use of, or operate autonomous and semi-autonomous weapon systems must do so with appropriate care and in accordance with the law of war, applicable treaties, weapon system safety rules, and applicable rules of engagement (ROE).’ Whether, in the case of breaches of the LOAC, this also leads to legal responsibility of an individual (or state) is a matter of (international) criminal law (and the law of state responsibility) or other relevant national laws. Concerns about the possibility that no person will be held accountable for wrongdoing in the conduct of warfare are not unique to the use of weapons that are programmed to perform targeting tasks without direct human input. Such concerns should be focused on the substance of (international) criminal law, the state’s acceptance of international tribunal jurisdictions, and matters of transparency.

It may be argued that the current state of technological development would preclude the use of weapons programmed to perform certain targeting tasks ‘to such an extent as to render them ineffective for the large majority of operations.’⁽⁴⁰⁾ Conversely, complex systems for which it is difficult to assess how they would respond to certain (unforeseen) situations can also complicate judgement.⁽⁴¹⁾ In both cases, uncertainties can be mitigated by a vast range of planning safeguards.⁽⁴²⁾ Interestingly, this produces a paradox: the more sophisticated the weapon – for example one that can be used in complex missions within operational and legal norms – the more a commander could be inclined to restrict its use due to a lack of understanding of how the system would respond to circumstances (predictable or not) and what effects it would generate.

Conclusion

The planning stage is of immeasurable importance to shape military operations and to ensure effective and lawful conduct, which also applies in the use of weapons that are programmed to perform targeting tasks without direct human input. NATO’s process shows that many steps can be taken from the moment that violent action is conceived to be an option: target sets are approved, goals are formulated, targets are selected, weapon capabilities are analysed, and detailed tactical planning takes place. In each phase, operational and legal requirements are considered. Inevitably, there is a ‘point of no return’, after which humans can no longer influence the direct effects of the use of force. In the case of weapons that are programmed to perform targeting tasks without direct human input that might engage targets without further human involvement, this point is its launch. It is a human decision (and responsibility) to let the process develop past this point, and the person making this decision

40. Wagner 2012, 121–2.

41. An important implication is that military commanders and staff should be familiar, to a reasonable standard, with how a particular weapon would respond to potential situations. This could be easier with a weapon of low sophistication than for weapons programmed with perhaps millions of lines of code. It is unavoidable that there will be errors in programming lines. See McConnell (2004) for current standards and how to reduce the number of errors.

42. This means, for instance, that ‘[t]here may be situations in which an [AWS] could satisfy [the rule of distinction] with a considerably low level ability to distinguish between civilian and military targets’ (Thurnher 2013).

has to be satisfied, taking the associated risks into account, that the expected effects are in line with operational and legal requirements. Using a complex weapon will invariably lead to higher restrictions on, for instance, the size of the area of operation or the type of targets it may attack. Thus, while a weapon's capabilities are an important factor, it is the combination of multiple factors that should give the decision maker the necessary confidence: 'the crucial question does not seem to be whether new technologies are good or bad in themselves, but instead what are the circumstances of their use.'⁽⁴³⁾

Even with humans in control and ample possibilities to restrict the use of weapons to ensure adherence to operational and legal requirements, lawful conduct is not guaranteed. Any weapon can be used unlawfully. The key issue is that weapons programmed to perform targeting tasks without direct human input may be lawfully used in many situations if the state employing the system follows similar steps as described in NATO's targeting doctrine, and if humans continue to make the critical decisions about when and how to employ the system given the conditions ruling at the time.

43. ICRC 2011, 40.

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