

Human Control in the Targeting Process

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Thank you Madam Chair.

In current practice there is an expectation that humans exercise some form of control over the use of weapon systems. The term 'autonomy' in autonomous weapon systems, however, suggests that humans are not in control of these weapons. This narrative is somewhat misleading as it fails to take into consideration the practical realities of targeting practices, in particular the adherence to a targeting process. Therefore, I will focus on the context of *use* of autonomous weapons by offering an analysis of this targeting process. As these systems do not operate in a vacuum, it is relevant to offer some context concerning targeting and the use of weapon systems by the military.

The types of weapon systems under discussion here are Lethal Autonomous Weapons Systems. The language to accurately describe these weapons is still unsettled. Nevertheless, regardless of what definition one decides upon using, the contextual approach that focuses on the decision-making processes in which humans exercise control remains important. In addition, irrespective of what *position* one chooses – whether AWS should be banned or not – the debate on these systems should include discussions about these processes. As such, I will not propose a working definition to describe Lethal Autonomous Weapons Systems. I will offer, however, an approach to the concept of Meaningful Human Control by considering the context in which autonomous weapons operate.

The targeting process

The term *targeting* is often associated with the actual use of force, lethal attack, kinetic action (e.g. the firing of a weapon at a target). However, the targeting process entails more than the actual kinetic action; there is, as the name implies, an entire process or decision-making cycle that surrounds this moment. The targeting process is an iterative process that aims to achieve mission objectives in accordance with the applicable law and ROE through the thorough and careful execution of six phases. Specifically, NATO's targeting process can serve as an example of how weapons are used and how humans can exercise control over increasingly autonomous weapon systems.

The diagram on this slide is an illustrative example of the different steps in a targeting process. It is an oversimplification – the targeting process is not a clear linear process, it requires constant feedback and reintegration in different phases – but it offers a useful lens for understanding the context within which weapon systems with autonomy in their critical functions operate.

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NATO doctrine¹ describes the six phases as the following:

- 1) Commander's objectives and guidance are formulated. What is the goal of the mission?
- 2) Targets are developed, validated, nominated and prioritized. What targets must be effected to achieve the goal? In this phase the target validation ensures compliance with relevant international law and the rules of engagement. For example, the principle of distinction plays a role in this phase to ensure that offensive action is only directed against military objectives and combatants, making a clear distinction between them and civilian objects and civilians. In addition, during target development issues related to collateral damage may also become apparent and must be considered.
- 3) Capabilities are analyzed to assess what methods and means are available and most appropriate to generate the desired effects. Collateral Damage Estimation (CDE), that begun in phase 2, remains a critical component of the analysis.
- 4) During force planning and assignment capabilities that are identified in phase 3 are matched to the targets that are identified in phase 2. After final approval, this information is passed on to the assigned unit.
- 5) Mission planning and execution. The assigned unit will take similar steps as phase 1-4, but on a more detailed, tactical level. Assessments in this phase take into account operational and legal standards as well, including the obligation to take feasible precautions in attack.² And, importantly, there is force execution during which the weapon is activated, launched, fired or used.
- 6) Combat assessment to determine whether desired effects are achieved. This feeds back into phase 1 and goals and tasks can be adjusted accordingly. Depending on this outcome, the targeting cycle will be executed again with these adjusted goals and new objectives.

Human control in the targeting process

This brief overview of the targeting process served as an example of how military missions are planned, executed and assessed, and what the human roles are or can be within that process. Examples of existing autonomous weapons also fit in this process. Current AWS are weapons that are programmed to select and attack targets without human intervention. These weapons are activated by humans in phase 5 of the targeting process (Force Execution). After activation, there is an inevitable moment after which humans can no longer influence the direct effects of

¹ NATO Allied Joint Publication. 2008. "AJP-3.9 Allied Joint Doctrine for Joint Targeting."

² Roorda, M. 2015. "NATO's Targeting Process: Ensuring Human Control Over and Lawful Use of 'Autonomous' Weapons." *NATO Allied Command Transformation Publication on Autonomous Systems*, 160.

the use of force.³ This is for example the case with the Israeli Harpy that is programmed to select and engage hostile radar signals in a predefined area. The Harpy seeks out and identifies an adversary's radar emitter by comparing the signal to its library of hostile emitters. Once the target is verified, the Harpy will attack it by detonating its warhead just above the target.⁴ After activation, humans can no longer intervene in the process of target selection and attack. However, that does not mean that humans are not in control of the autonomous weapon. Looking at the targeting process, it becomes clear that although parts of the mission will be executed by the weapon system autonomously, the targeting process as a whole is still largely human dominated.

Before an autonomous weapon system is deployed to conduct its assigned tasks in phase 5, humans have carried out an extensive planning stage in which humans (1) formulate overall goals, (2) gather intelligence, (3) select and develop targets, (4) analyze and match the most suitable weapon, and (5) decide under what circumstances and preconditions to employ a particular weapon. Thus, even though an autonomous weapon selects and attacks a target in phase 5, it is not truly autonomous in the overall targeting process. It is through this process that humans can remain in control of an autonomous weapon's actions on the battlefield, even though there is no direct human control over the system's critical functions of target selection and attack.

Key elements or components of Meaningful Human Control

The concept of Meaningful Human Control is often explained by pointing out key elements or components of human control. As mentioned by my fellow panelist, humans can exercise control by assigning operational constraints such as limiting the time and geographical area within which the AWS is allowed to operate without direct human control. In addition, humans can specify the conditions of their judgment by, for example, requiring humans to make informed, conscious decisions that are based on sufficient information about the applicable law, the target, the weapon and the context in which the weapon is deployed.⁵ The targeting process provides opportunities for humans to actually exercise these key elements or components of control in an organized and structured manner.

³ Roorda, M. 2015. "NATO's Targeting Process: Ensuring Human Control Over and Lawful Use of 'Autonomous' Weapons." *NATO Allied Command Transformation Publication on Autonomous Systems*, 165.

⁴ Defense Update. 2006. *Harpy Air Defense Suppression System*. <https://defense-update.com/directory/harpy.htm>

⁵ Horowitz, M.C. and Scharre, P. 2015. *Meaningful Human Control in Weapon Systems: A Primer*. Working Paper. Center for a New American Security, p. 4.

Conclusions

In this presentation, I decided to look at the targeting process by using an example of an *existing* weapon system with autonomy in its critical functions to see how meaningful human control is understood and implemented *today*. But that is not where the analysis should end. Due to rapid technological advances, autonomous functions and their complexity will change. Although it seems unlikely that anyone would desire a weapon that autonomously executes the entire targeting process without human involvement whatsoever, the possibility of a machine-dominated targeting process must be taken seriously, no matter how unlikely it sounds or how far ahead in time that scenario may be.

In addition, one of the effects of increasingly autonomous weapons seems to be further distribution (or redistribution) of tasks. As these tasks become more distributed, individuals tend to become part of an increasingly long chain of human actors and technologies, in which decisions of others elsewhere in the chain affect the choices or control that others have.⁶ For example, technically advanced autonomous weapons may be programmed to decide independently that a target is a military objective by nature. This means that legal considerations about distinction and military advantage are to be made in the design and validation process as well. Therefore, besides the targeting process, other decision-making processes in which humans make judgments about the use of these weapons also deserve attention in the analysis of meaningful human control.

It is up to humans to discuss these scenarios in depth and decide where to draw the line between what is *meaningful* human control and what is not. In this presentation, I offered one way of looking at Meaningful Human Control by focusing on the context of *use* of autonomous weapons. I presented an analysis of the targeting process to explain that weapons do not operate in a vacuum. Among other decision-making processes, the targeting process is one that should be considered when thinking about increasingly autonomous weapons and the manner through which humans can remain in control of them.

I hope that delegates will consider these issues during the course of this week, and I look forward to the discussions we will have on this important issue. Thank you for your attention.

Thank you Madam Chair.

⁶ Noorman, M. 2013. "Responsibility Practices and Unmanned Military Technologies" *Science and Engineering Ethics Journal* 20:809, 812.