

LETHAL AUTONOMOUS WEAPONS SYSTEMS: MAPPING THE GGE DEBATE

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Summary

- The Convention on Certain Conventional Weapons (CCW) established a Group of Governmental Experts (GGE) to discuss emerging technologies in the area of lethal autonomous weapons systems (LAWS).
- Despite the establishment of a GGE on LAWS, there is no clear agreement on the scope of the definition of LAWS. The main issues are related to questions regarding the extent to which these weapons are autonomous, and the necessary level of meaningful human control.
- There are a number of technological, military, legal and ethical challenges related to LAWS, including their potential unreliability, their proliferation, their legal accountability, and the absence of human decisions on life and death.
- The discussion is made more complex since the technologies driving LAWS – artificial intelligence (AI) and robotics – can be used for both civilian and military purposes. There is a concern that restrictions on LAWS could hamper innovation for the civilian use of these technologies. At the same time, technologies designed for civilian use might be transformed into lethal weapons.
- There is consensus that LAWS need to comply with international humanitarian law (IHL) and human rights law, and their development is already scrutinised through Article 36 on new weapons. Yet, many claim that existing provisions are not sufficient, supporting a ban on LAWS, or at least a moratorium on the deployment of LAWS, pending a decision on their prohibition.
- The GGE reaffirmed the applicability of IHL, the responsibility of states during their deployment in armed conflict, the importance of innovation in civilian research, and the need to keep potential military applications under review. The GGE will continue to meet on this topic in 2018.

I. Introduction

Technology has always revolutionised conflict. Yet today, society might be on the brink of an existentially different technological development: the loss of human control in warfare. To avoid scenarios in which LAWS cause unnecessary harm, the GGE met for the first time to try to strike the right balance between military necessity and humanitarian considerations.

Although there is no common definition of LAWS – we can roughly understand autonomous weapons systems to be weapons that can ‘select and engage targets without further intervention by a human operator’.¹ There is so far no clear agreement whether LAWS should also include semi-autonomous weapons, which could identify, monitor, prioritise selected targets and/or decide on the timing of targeting them, while a certain degree of human control over the decision of selecting targets remains.

While there is no indication that fully autonomous weapons are already employed by militaries, semi-autonomous weapons are in the process of being developed and tentatively used. For example, the Samsung SGR-1 patrols the demilitarised zone between North and South Korea and is able to detect, target and shoot intruders, although it still requires a human operator to approve the shot.² A long-range anti-ship missile (LRASM) is being developed to

autonomously travel to a specified area, avoid obstacles on its way, and target ships, although the area and targets are still pre-defined in the algorithm. The Harpy, a ‘fire-and-forget’ drone system is being developed to detect, attack and destroy radar emitters and the Taranis, a war drone, is able to engage in surveillance, identifying targets, gathering intelligence and carrying out strikes, albeit with the ‘guiding hand of a human operator’.³ Yet the full extent to which these weapons are developed and deployed is difficult to assess, due to the secrecy surrounding these practices.

Despite the novelty of the topic, discussions on LAWS are not entirely new. LAWS have been addressed by the CCW since 2014, in three annual informal experts meetings⁴. In 2016, the CCW decided to formalise this process and establish a GGE to meet in 2017, mandated to examine questions related to emerging technologies in the area of LAWS in two meetings. The GGE is open to all stakeholders, including states, international organisations, civil society, academia and industry. After the first meeting was cancelled as a number of states failed to pay their financial contributions exclude semi-autonomous weapons, more than a hundred leaders in AI and robotics signed an open letter⁵, urging the UN to take action on LAWS. The GGE came together for the first time from 13–17 November 2017.

II. Definitions: what are we actually talking about?

The topic of LAWS is covered in complexity. Moving the debate forward turned out to require removing its ethical, legal, moral, and technological layers. However, not only is the debate highly multidimensional, additional challenges lie in the difficulty to look into the future: if these weapons do not yet exist, when will they be developed and what will they resemble? How will they affect international peace and security, the nature of warfare, and the balance of power between states?

With these questions in mind, the development of a definition is a difficult task. Some states pointed at the need to identify key characteristics of LAWS to develop a working definition and to avoid confusion and misunderstanding. Yet there was widespread disagreement on the scope of such a definition.

Some pleaded for a narrow definition, arguing that a broad scope would risk hampering innovation in AI and robotics for civil and economic purposes. These states prefer to only discuss *fully* autonomous weapons, which they argue are not yet in existence. These are weapons systems with *total* autonomy in decision-making processes, their *full* independence from human intervention, an *uncertain or*

unclear division of authority, and the *impossibility* to bring LAWS back to controlled mode. As their autonomy is considered to be ‘total’, the difference between LAWS and non-autonomous weapons is considered one of nature, and not of degree. Therefore, these states prefer to exclude semi-autonomous weapons, which they claim are already regulated, from the discussion; so that it reads ‘exclude semi-autonomous weapons, since the human operators of these systems are ‘obliged to comply with the rules of armed conflict and all other applicable international law treaties’⁶. Fully autonomous weapons, however, might not fit within the current framework of international law.

Although there might be some agreement on the need to avoid weapons systems that have absolutely no human oversight, definitional issues arose related to what a sufficient level of human oversight is. Throughout the discussions, this is often framed as the *meaningful human control* that is necessary to ensure compliance with IHL.

The degree of human control over weapons is linked to the concept of autonomy, yet it is difficult to understand when a system moves from being automated to being semi-autonomous or autonomous. Moreover, the word autonomy is

used differently by different actors. While the extremes are clear, it is not easy to pinpoint where we cross from unacceptable to acceptable. According to proponents of broader definitions, the exclusive focus on the most extreme scenarios risk upscaling the technologies that are already employed, such as the transformation of semi-autonomous weapons into fully autonomous systems. In addition, they claim that the application of international law does not depend on technological sophistication, but rather, on the degree of human involvement in the critical functions of technology.

Finally, there were some who took issue with the inclusion of lethality in the LAWS-acronym. They argued that it could sometimes be difficult to distinguish between weapons

with obvious lethal functions (e.g. killer robots), and automated systems that could be turned into lethal weapons (e.g. weapons used for self-defence or automated vehicles). As such, lethality is not inherent of a weapon, but is determined by its characteristics and how it is used. A weapon does not need to have explicitly lethal functions to trigger obligations under international law. There are also weapons that, while designed for military use, are not lethal, such as automated devices that can fire tear gas or rubber bullets. As non-lethal automated systems are already being developed, some fear that a definition that *includes* such systems would hamper innovation, while others are concerned that the *exclusion* of such automated systems would provide a dangerous legal loophole.

III. 5 Key issues related to LAWS

1. Predictability & reliability: can we trust a killer robot?

While perfectly autonomous weapons systems can be a source of fear, a key challenge of LAWS might well be their potential *imperfection*. Some claim that LAWS can never be fully predictable and reliable, and that a level of uncertainty will always remain. As their decision-making processes are guided by technologies such as machine learning, the activities of LAWS might not be easy to predict, and desirable results might not be guaranteed. At a more technical level, the question arises whether and how ethical standards and international law could be incorporated in the algorithms guiding the weapons systems.

In addition, despite quick advances in AI, we are still far from systems with Artificial General Intelligence, which can replicate human's intellectual capabilities, as opposed

to current AI systems performing specific, narrow functions. There might be more risks from LAWS based on 'dumb machines' and failures in the interaction between the human and machine, rather than from smart machines that are outperforming humans. This also raises questions related to the accountability of the technological developers of such systems.

Yet, the potential unpredictability of LAWS could also mean that they will not be widely used. There needs to be a certain level of trust and confidence in the technology before it can be employed for military purposes. Highly unpredictable weapons systems will most likely not be employed if their successful outcome cannot be guaranteed.

2. Proliferation and arms race: towards mutual destruction or deterrence?

Many fear that states that are developing LAWS cannot prevent their proliferation over time, which could result in a global arms race. In addition to their proliferation internationally, some identified concerns about their domestic use against populations, as well as by terrorist groups and non-state actors. In this regard, some raised the question to what extent the development of such technologies by private companies could be regulated.

Ultimately, the proliferation of LAWS could have important implications for international peace and security, although we can only speculate on how these consequences could develop. For example, there could be a situation of mutual deterrence between nations possessing LAWS, although there is also concern over possible mutual destruction.

3. Humanity in conflict: should we outsource life & death decisions?

Many argued that machines are unable to replace humans in the qualitative judgements that are at the basis of lethally targeting an individual. Making such decisions requires compassion and intuition, which are attributes we cannot expect robots to possess. While LAWS might be able to

make quick and precise decisions, they will not be able to evaluate contexts.

In this context, the principles of humanity enshrined in the Martens Clause⁷ (which appears in the preamble of the

1899 Hague Convention (III)) were often evoked. The clause requires the application of humanity in armed conflict. Outsourcing life-and-death decisions to machines would not only risk making the wrong call, but it would make war more inhumane and could lower the threshold to the use of force.

However, there are some who claim that automated weapons systems actually offer potential humanitarian benefits and generate less collateral damage. Machines might

actually be able to make decisions more rapidly and of higher quality, which could in turn contribute to the protection of civilians and the proportionality and distinction of an attack. Human error might be reduced with automated decision-making. In addition, some point out that human beings are not always ethical themselves and could take unethical decisions in adverse circumstances. As robots are independent of emotion, would they be able to avoid human impulses that generate negative impacts?

4. Responsibility: how to hold a robot accountable?

One of the key concerns raised relates to accountability. If an autonomous weapon carries out a lethal attack, who is responsible for this attack? As LAWS encompass many nodes in a military chain of responsibility, it might be difficult to pinpoint who's accountable, and there are fears that unclear accountability could lead to impunity.

Yet law is addressed to humans, and legal responsibility rests with those who plan, decide on, and carry out attacks. This responsibility and accountability cannot be transferred to a machine. In this context, some states also cautioned against providing autonomous systems with a legal personality.

5. Dual use: what if the force for evil is simultaneously a source for good?

The future application of AI and robotics in many civilian and economic facets of society, generated to benefit humankind, has led some negotiators to urge for caution on additional legislation, or an altogether ban on LAWS. Yet,

the dual-use nature of these technologies also means that autonomous weapons designed for civilian use might be turned into lethal weapons, adding to the complexity of the issue.

IV. Legal Framework: Do we need new laws for LAWS?

Despite the many concerns and disagreements raised, there was one point on which there seemed to be consensus: any discussion of LAWS needs to comply with IHL and human rights law, in particular the right to life, human dignity, and fair trial.

Of fundamental concern during the discussion was the question of whether LAWS could comply with the principles of proportionality, distinction, and precaution of IHL. Many are concerned that autonomous weapons are insufficiently able to distinguish between civilians and combatants. The principle of proportionality prescribes that the harm to civilians must be calculated before an attack; yet LAWS might not be conducting such analyses.

Article 36⁸ of additional protocol 1 of the Geneva Convention – 'New weapons' – calls for legal reviews of new weapons to ensure their compatibility with IHL. Under Article 36, states are obliged 'to determine whether [a new weapon's] employment would, in some or all circumstances, be prohibited by this protocol or by any other rule of international law applicable to the High Contracting Party'.

According to some states, this is a sufficient mechanism to ensure the proper development and use of LAWS: if

every new weapon needs a review according to article 36, their compliance with international law is guaranteed. Therefore, an all-encompassing regulation or ban is considered premature by some. In addition, as they view that a legal framework is already in place that involves human responsibility, they fear that changes in the law could generate an accountability gap.

Yet, some claim that article 36 might not be sufficient to address the potential challenges posed by LAWS. If each country adopts their own review mechanisms, there might be little common understanding at the international level on the acceptable use of automated weapons. Additional solutions that were brought forward were the development of a political declaration, information and best practices sharing, a binding code of conduct, concrete recommendations, and ultimately, the development of a new legal framework or ban against LAWS.

According to a number of states, a political declaration or code of conduct can only be an interim step. They call to avoid a situation in which LAWS are legitimised without regulations. Those who are in favour of a new legal framework argue that existing provisions of IHL do not effectively address the concerns related to LAWS. Therefore, a

number of countries are proposing a ban on LAWS, as they see IHL as fundamentally incompatible with LAWS. They claim that there is a need for an immediate moratorium on the deployment of LAWS, pending a decision on their prohibition, and that limited regulations or codes of conduct

are insufficient. They fear that a legal framework with shortcomings might lead to a rapid proliferation of LAWS. One argument used by those wishing to pre-emptively ban LAWS is that, if fully autonomous systems do not yet exist anyway, why oppose a preventive prohibition?

V. Next steps

The GGE will continue to meet on this topic in 2018. However, with disagreement among member states on the creation of a common definition, it remains to be seen whether the GGE will be able to provide solutions in the very near future. At the same time, opponents to LAWS fear that in the absence of international action, LAWS will be developed without regulation. Some consider moving the discussions outside the UN framework, as was the case with the development of the Ottawa Convention on the Prohibition of Anti-Personnel Mines, and the Oslo Convention on Cluster Munitions. Yet, such a convention might lack the involvement of the most powerful players in this discussion.

Despite disagreements on definitions of LAWS and their appropriate legal framework, the GGE did agree on a report with conclusions and recommendations. The report reaffirms that the CCW provides an appropriate framework for discussions on LAWS, that IHL continues to apply to all weapons systems, and that their deployment in armed conflict remains the responsibility of states. In addition, it affirmed that the GGE should not hamper progress in civilian research and development of intelligent autonomous systems, but will keep potential military applications under review. Ultimately, the GGE agreed to meet for a duration of ten days in 2018.

Endnotes

- ¹ Group of Governmental Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons (2017), Characteristics of Lethal Autonomous Weapons Systems: Submitted by the United States of America, *Item 6 on the Examination of various dimensions of emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention*, CCW/GGE.1/2017/WP7, 10 November. Available at [https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/A4466587B0DABE6CC12581D400660157/\\$file/2017_GGEonLAWS_WP7_USA.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/A4466587B0DABE6CC12581D400660157/$file/2017_GGEonLAWS_WP7_USA.pdf) [accessed on 22 November 2017].
- ² Wareham M, Goose S (2017) The growing international movement against killer robots. Harvard International Review. Available at: <https://www.hrw.org/news/2017/01/05/growing-international-movement-against-killer-robots> [accessed on 22 November 2017].
- ³ Del Prado GM (2015) These are 'killer robot' weapons that terrify artificial intelligence researchers. Business Insider UK. Available at: <http://uk.businessinsider.com/which-artificially-intelligent-semi-autonomous-weapons-exist-2015-7?r=US&IR=T> [accessed on 22 November 2017].
- ⁴ Meeting of Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons (2014), (2015) and (2016), Meeting Reports CCW/MSP/2014/3, CCW/MSP/2015/3 and CCW/CONF.V/2. Available at: [https://www.unog.ch/80256EE600585943/\(httpPages\)/8FA-3C2562A60FF81C1257CE600393DF6?OpenDocument](https://www.unog.ch/80256EE600585943/(httpPages)/8FA-3C2562A60FF81C1257CE600393DF6?OpenDocument) [accessed on 22 November 2017].
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- ⁷ Ticehurst R (1997), The Martens Clause and the Laws of Armed Conflict, International Review of the Red Cross, N. 317. Available at <https://www.icrc.org/eng/resources/documents/article/other/57jnhy.htm> [accessed on 22 November 2017].
- ⁸ International Committee of the Red Cross (1977) Protocols Additional to the Geneva Convention of 1949. Available at https://www.icrc.org/eng/assets/files/other/icrc_002_0321.pdf [accessed on 22 November 2017].
- ⁹ Group of Governmental Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons (2017) Report of the 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS), Item 7 Adoption of the Report CCW/GGE.1/2017/CRP.1, 20 November. Available at [https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/B5B99A4D2F8BADF4C12581DF0048E7D0/\\$file/2017_CCW_GGE.1_2017_CRP.1_Advanced_+corrected.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/B5B99A4D2F8BADF4C12581DF0048E7D0/$file/2017_CCW_GGE.1_2017_CRP.1_Advanced_+corrected.pdf) [accessed 22 November 2017].

Resources for further consultation

Working papers of the CCW GGE 2017:

Document number	Title	Submitted by
CCW/GGE.1/2017/WP.1	Food-for-thought paper	The Chairperson
CCW/GGE.1/2017/WP.2	Examination of various dimensions of emerging technologies in the area of lethal autonomous weapon systems, in the context of the objectives and purposes of the Convention	The Netherlands
CCW/GGE.1/2017/WP.3	Towards a definition of lethal autonomous weapons systems	Belgium
CCW/GGE.1/2017/WP.4	For consideration by the Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS	France and Germany
CCW/GGE.1/2017/WP.5	Weapons Review Mechanism	The Netherlands and Switzerland
CCW/GGE.1/2017/WP.6	Autonomy in Weapon Systems	United States of America
CCW/GGE.1/2017/WP.7	Characteristics of Lethal Autonomous Weapons Systems	United States of America
CCW/GGE.1/2017/WP.8	Examination of various dimensions of emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention	Russian Federation
CCW/GGE.1/2017/WP.9	A "compliance-based" approach to Autonomous Weapon Systems	Switzerland
CCW/GGE.1/2017/WP.10	General principles on Lethal Autonomous Weapons Systems	Bolivarian Republic of Venezuela on behalf of the Non-Aligned Movement (NAM) and Other States Parties to the Convention on Certain Conventional Weapons

Other resources

ICRC (2016) *Autonomous Weapons Systems: Implications of Increasing Autonomy in the Critical Functions of Weapons*. Available at: https://shop.icrc.org/autonomous-weapon-systems.html?__store=default.

UNIDIR (2017) *The Weaponization of Increasingly Autonomous Technologies: Concerns, Characteristics and Definitional Approaches*. UNIDIR Resources, no. 6. Available at: <http://www.unidir.org/files/publications/pdfs/the-weaponization-of-increasingly-autonomous-technologies-concerns-characteristics-and-definitional-approaches-en-689.pdf>.

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UNIDIR (2014) *The Weaponization of Increasingly Autonomous Technologies: Considering how Meaningful Human Control might move the discussion forward*. UNIDIR Resources, no. 2. Available at: <http://www.unidir.ch/files/publications/pdfs/considering-how-meaningful-human-control-might-move-the-discussion-forward-en-615.pdf>.

UNIDIR (2014) *Framing Discussions on the Weaponization of Increasingly Autonomous Technologies*. UNIDIR Resources, no. 1. Available at: <http://www.unidir.ch/files/publications/pdfs/framing-discussions-on-the-weaponization-of-increasingly-autonomous-technologies-en-606.pdf>.



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Please cite as: Rosen Jacobson B (2017) Lethal Autonomous Weapons Systems: mapping the GGE debate. *DiploFoundation Policy Papers and Briefs*, No. 8. Available at https://www.diplomacy.edu/sites/default/files/Policy_papers_briefs_08_BRJ.pdf

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