



ANALYSIS

REINING IN AUTONOMOUS WEAPONS

IMPACT ON MILITARY INNOVATION – AN ESTONIAN PERSPECTIVE

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INTRODUCTION

Rapid technological development in the last decade has created opportunities for integrating new emerging technologies into military capabilities. Major military powers, as well as regional organisations such as NATO and the EU, expect these technologies to maintain or deliver strategic advantages over their potential adversaries. Creating robotic platforms and implementing artificial intelligence and autonomous functions into new military capabilities are important parts of the ongoing military modernisation. More

The prospect that autonomy and AI-enabled technological solutions when applied in new weapon systems may be in breach of international humanitarian law (IHL) has induced the governments to acknowledge the possible risks

developed AI-based solutions can lead to more sophisticated military capabilities, which (in addition to expected military benefits) has raised a new set of questions about the potential side effects of reduced human control over weapon systems. This challenging perspective has presented a number of ethical, legal, and political dilemmas that have compelled public attention and launched a wider international debate. The prospect that autonomy and AI-enabled technological solutions when applied in new weapon systems may be in breach of international humanitarian law (IHL) has induced the governments to acknowledge the possible risks. Subsequently, formal discussions to address these issues were launched by the

Group of Governmental Experts (GGE) in the framework of the United Nations Convention on Certain Conventional Weapons (CCW).¹

The discussions focus on emerging technologies in the area of lethal autonomous weapon systems (LAWS) and their compliance with IHL. The most challenging question so far has been about the demand for new international legal instruments to regulate the development of such systems. Since the lethal weapon systems with autonomy as their central function are at the core of the GGE deliberations, other possible applications of autonomy, not related to the use of lethal force, appear to be neglected. The CCW approaches arms and methods of war from a humanitarian standpoint, and so do the discussions at the GGE, therefore leaving the security implications of LAWS aside.

In this context, some new challenges posed by LAWS and the application of autonomy or AI in military capabilities have attracted significant international attention. The public reaction to the reports about LAWS on the verge of being deployed has been predominantly negative, with some governments and civil society groups even calling for an international ban on such weapons.

In democratic societies, public disapproval and civil society's campaigns have already affected the political, legal, and economic environment with repercussions on emerging technologies, military innovation, and competitiveness on the national and regional levels (e.g., the EU). These may further

lead to major security problems in the future by allowing less democratic and responsible adversaries to gain military advantage in some areas of defence innovation.

This paper outlines the state of play in the ongoing international deliberations on LAWS and their imprint on public acceptance of emerging defence technologies, as well as the legal and political environment of technological

¹ The full title: United Nations, [Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects \(As Amended on 21 December 2001\)](#) 1342 UNTS 137 (New York: Office for Disarmament Affairs (UNODA), 10 October 1980); also known as *The Inhumane Weapons Convention*.

and strategic competition. With a considerable number of Estonian companies active in military robotics, unmanned ground and aerial vehicles, loitering munitions, and swarm technologies (i.e., the area of military innovation where autonomous functions or AI-enabled solutions are applied), these international perceptions and proposed regulations – which might go as far as an international ban – will affect Estonia’s defence innovation and opportunities for international cooperation. In this regard, the paper introduces the Estonian views on the pivotal issues in the GGE debates and public attitudes towards emerging technologies and concludes by suggesting measures to avoid hurdles on the way to responsible military innovation.

1. AUTONOMOUS WEAPONS AND HUMANITARIAN CONCERNS

For decades now, dozens of countries have been deploying weapon systems with some autonomous functions. They are mainly anti-materiel weapon systems that identify and destroy targets with predetermined profiles – such as incoming missiles, aircraft, vessels, radars, or ground vehicles – but are usually supervised by a human operator. Most of them rely on simple algorithms, while few have functions based on more advanced AI. These systems are not the most problematic from point of view of the CCW and IHL.

Until recently, states have neither deployed nor publicly acknowledged developing lethal autonomous weapons that target humans. With continuous technological development and advanced AI-based solutions, however, more sophisticated autonomous weapons are increasingly available. In recent years, deployment of LAWS in Ukraine and cases resulting in human casualties in Libya have been reported.² Despite availability and

² UN Panel of Experts on Libya, [Letter dated 8 March 2021 from the Panel of Experts on Libya Established pursuant to Resolution 1973 \(2011\) addressed to the President of the Security Council S/2021/229](#) (New York: UN Security Council, 8 March 2021); Taylor Jones, [“Real-Life Technologies that Prove Autonomous Weapons are Already Here,”](#) Future of Life Institute, 22 November 2021.

news about the lethal use of such systems, there has been no reliable information data or evidence yet. Therefore, when evaluating media reports, it is important to bear in mind that verification of autonomy in critical functions of a weapon system is quite difficult; moreover, manufacturers tend to exaggerate the autonomous features.³ The ambition to design a system capable of identifying and engaging the targets on its own – while also being mature enough to be deployable in the battlefield – has encountered some technical difficulties.⁴

Concerns about the impact of LAWS on human safety and security promoted the debate about their compliance with IHL which governs the use of all weapons and methods of warfare. When the Special Rapporteur delivered a report to the U.N. General Assembly recommending a moratorium on the development of “lethal autonomous robots,” a formal discussion on autonomy in weapons with lethal effect began, with danger to non-combatants being the primary consideration.⁵

1.1. WHERE THE INTERNATIONAL COMMUNITY STANDS TODAY

Formal intergovernmental discussions on emerging technologies in the area of LAWS were launched in 2017 by the GGE in the framework of the CCW. The GGE has the mandate to examine issues related to emerging technologies in the area of LAWS pertaining to the objectives under the CCW that are meant to regulate the weapons known to cause “unnecessary, unjustifiable or superfluous injuries to combatants or to affect civilians indiscriminately” and to recommend options on the way forward. The supposed goal is to establish whether autonomous weapon systems with lethal effect comply with IHL

³ Will Knight, [“Russia’s Killer Drone in Ukraine Raises Fears About AI in Warfare,”](#) *Wired*, 17 March 2022; Gregory C. Allen, [“Russia Probably Has Not Used AI-Enabled Weapons in Ukraine, but That Could Change,”](#) Center for Strategic & International Studies (CSIS), 26 May 2022.

⁴ Mary (Missy) Cummings, [“The AI that Wasn’t There: Global Order and the \(Mis\)Perception of Powerful AI,”](#) in *POLICY ROUNDTABLE: Artificial Intelligence and International Security* (Texas National Security Review, 2 June 2022), 15-23.

⁵ UN Human Rights Council, [Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, Christof Heyns A/HRC/29/37](#) (Geneva: Human Rights Council, 24 April 2015).

and are consistent with the requirements of distinction, proportionality, and precaution of the use of force.

The GGE has investigated technological, military, legal, and ethical aspects of LAWS, clarified relevant concepts, and discussed definitions in order to promote a common understanding of LAWS among the states parties to the CCW. The Group's main achievements so far have been the formulation and endorsement of the Guiding Principles to be followed when dealing with LAWS.⁶ However, the Group has failed to agree on the definition of LAWS or the recommendations on the normative framework.

Consensus on the Guiding Principles, nevertheless, proves that the states parties share the view that IHL applies to all weapon systems (including LAWS); that ethical considerations remain relevant when dealing with the emerging technologies in the area of LAWS; and that some risk elements warrant further attention. By endorsing the Guiding Principles, the states parties commit to accountability for developing LAWS; the parties also confirm that human responsibility must be retained during the systems' entire life cycle, their deployment, and use in the chain of human command and control.

Human-machine interaction and human control are the key elements to ensure compliance with international law. No agreement has been reached on operationalising these principles:

Human-machine interaction and human control are the key elements to ensure compliance with international law

whether they must translate into international legal instruments to regulate LAWS and ensure their legality or provide guidance for further discussion to be integrated into the national

⁶ High Contracting Parties to the Convention on Certain Conventional Weapons (CCW), "Annex III. Guiding Principles affirmed by the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons System," in *Final Report of the Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects*, CCW/MSP/2019/CRP.2/Rev.1 (Geneva: CCW/MSP/ 13 December 2019), 10.

legislation. States parties also tend to have diverging views. Civil society groups and 30 states parties to the Convention support negotiating a legally binding instrument that would prohibit the production and deployment of LAWS. Whereas another group of countries (including Estonia) consider that the existing international legal framework is sufficient, but, if necessary, it could be supplemented by some additional legally non-binding measures.

Finally, the ambition to impose a ban on LAWS faces several legal hurdles of its own. First, there is no precedent of pre-emptively prohibiting weapons on which there is no preliminary agreement among the parties that such systems even exist. Second, LAWS lack both a common definition and understanding of the main characteristics of the weapon

States should at least agree on the definition of LAWS before attempting to regulate or even ban them

systems which would be the object of such regulation. From this perspective, states should at least agree on the definition of LAWS before attempting to regulate or even ban them.⁷

1.2. THE DEFINITION DILEMMA

Numerous definitions of autonomous weapon systems have been proposed by states parties and international organisations, with some formulated for domestic purposes. However, there has been no agreement on the general definition among government experts. The reason behind this failure is that the definitional discussion is not value-neutral. In international arms control debates, participants follow their political and strategic interests. And thus, proposing a definition might serve political or strategic interests, which complicates reaching a consensus.

In 2018, China – one of the nations that lead in the development and application of emerging technologies – announced that it would support a ban on the use of fully autonomous lethal weapon systems. The proposed

⁷ Michael C. Horowitz, "Ban killer robots? How about defining them first?," *Bulletin of the Atomic Scientists*, 24 June 2016.

Chinese definition states that LAWS are lethal, autonomous systems, which implies the “absence of human intervention and control during the entire process of executing a task,” having “indiscriminate effect”, and “learning autonomously” through interaction with the environment and expanding its functions.⁸ Such weapon would, therefore, be illegal already by definition and an eventual ban would be redundant. Should this definition be universally approved, all other versions of autonomous weapons – even with lethal effects – would fall outside of the scope of regulation. Estonia, on the other hand, emphasises that no definition – and no agreed set of characteristics – of LAWS should predetermine any future policy options.⁹

Estonia emphasises that no definition should predetermine future policy options

The CCW process risks being stalled as long as parties to the debate prioritise the ban issue. Traditionally, the CCW regulations imposed on weapon systems that are considered dangerous for civilians and combatants are based on the technological characteristics of

The process risks being stalled as long as parties to the debate prioritise the ban issue

weapons already in existence. In the case of autonomous weapon systems, however, this approach may be more challenging because the pace of technological development complicates the prediction of such systems’ characteristics. Definitions are only as good as

our present-day understanding of technology which is subject to changes over time.¹⁰

As the technological approach to defining ‘autonomous weapon system’ (AWS) is not ‘future-proof,’ Estonia advocates for a more productive approach with an increased focus on the level and quality of human involvement and the functions humans delegate to a weapon, such as selecting and engaging the target.¹¹ Autonomy in other functions – such as navigation, mobility, and data processing – are less relevant under this definition.

1.3. THE (NON)COMPETING DEFINITIONS

Today, there are two main, widely used general definitions of AWS: by the U.S. Department of Defense (DoD) and the International Committee of Red Cross (ICRC). These two definitions have a lot in common despite the respective institutions’ diverging views on how the international community should deal with such weapon systems. For instance, the DoD formulated a directive on “Autonomy in Weapon Systems” that outlined guidelines and regulations for the “design, development, acquisition, testing, fielding, and employment of autonomous and semi-autonomous weapon systems [...] that can independently select and discriminate targets.”¹² According to this document, AWS is:

A weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation.¹³

⁸ Permanent Mission of the People’s Republic of China to the United Nations Office at Geneva and other international organizations in Switzerland, [Position Paper Submitted by China](#), CCW/GGE.1/2018/WP.7 (Geneva: GGE of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, 11 April 2018).

⁹ Permanent Representation of Estonia to the UN and Other International Organisations in Geneva, [Remarks by ESTONIA. Agenda item 6\(a\) Characterization of the systems under consideration in order to promote a common understanding on concepts and characteristics relevant to the objectives and purposes of the Convention](#) (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, 9-13 April 2017).

¹⁰ Permanent Representation of Estonia to the UN and Other International Organisations in Geneva, [Statement by Estonia. Agenda item 6\(b\). Further consideration of the human element in the use of lethal force](#) (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, 27-31 August 2018).

¹¹ Permanent Representation of Estonia, “Statement by Estonia.”

¹² U.S. Department of Defense, [Department of Defense Directive No. 3000.09 Autonomy in Weapon Systems](#) (Washington, DC: 21 November 2012), 1.

¹³ U.S. Department of Defense, [Directive No. 3000.09](#), 13-14.

The ICRC has been calling upon states to support its efforts “to establish internationally agreed limits on autonomous weapons” since 2015; in 2021, it defined AWS as:

Autonomous weapon systems select and apply force to targets without human intervention. After initial activation or launch by a person, an autonomous weapon system self-initiates or triggers a strike in response to information from the environment received through sensors and on the basis of a generalized ‘target profile.’¹⁴

The ICRC considers that systems covered by this definition are already in deployment. Yet their use is limited to ‘active-protection’ weapons against incoming munitions, autonomous loitering weapons used against radars, missiles, vehicles, or sensor-fused munitions, while almost all of them are human-supervised in real-time. At the time of this assessment, the ICRC assumed that there were no anti-personnel AWS employed to target humans.¹⁵

Both definitions focus on the level of human control of the weapon system in their critical functions and are broad enough to cover some weapons already in use. In its statements at the GGE, Estonia proposed to include AI (as part of the system of systems) that provides information about targets on which the decisions are made.¹⁶ This approach is much broader, extending beyond the platform-level autonomous weapons.

There are other definitions that take a narrower focus on the AI component or the cognitive capabilities of weapon systems. For example, the 2017 *Joint Doctrine Publication* by the UK Ministry of Defence stated:

An autonomous system is capable of understanding higher-level intent and direction. [...] such a system is able to take appropriate action to bring about a desired state. It is capable of deciding a course of action, from a number of alternatives, without depending on human

oversight and control, although these may still be present.¹⁷

Since weapons with such capabilities do not yet exist and appear unrealistic in the foreseeable future, such definitions are less relevant in present-day discussions around LAWS. Debate on definitions of LAWS has so far evolved not around the existing weapon systems but around the applications of autonomy ‘in the abstract.’ It has further attempted to anticipate the challenges that such weapon systems might pose and envisage the restrictions on weapons that might not meet the criteria set by IHL.

2. FROM DEFINING TO LEGISLATING: THE NEXT STEPS TO TAKE

The GGE is unlikely to reach an agreement on definitions soon; a global legally binding regulation of LAWS is not viable in the short-term perspective; and some countries are increasingly alarmed by the time pressure. As the development and application of new military technologies are emerging – and some states are beginning to reap the benefits – an international consensus on regulation will appear less feasible.¹⁸

2.1. PROSPECTS OF THE U.N. DISCUSSIONS ON LAWS

In the past five years, the states parties to the CCW failed to reach a consensus on both a working definition of LAWS and how these systems should be regulated. Nonetheless, discussions at the GGE have clarified some issues related to LAWS and endorsed eleven principles that are supposed to guide the national governments in their approaches.

¹⁴ “[ICRC Position on Autonomous Weapon Systems](#),” International Committee of the Red Cross, 12 May 2021.

¹⁵ International Committee of the Red Cross (ICRC), [Autonomy, artificial intelligence and robotics: Technical aspects of human control](#) (Geneva: ICRC, 20 August 2019).

¹⁶ Permanent Representation of Estonia to the UN and Other International Organisations in Geneva, [Remarks by Estonia on the Chair’s paper on the GGE on LAWS](#) (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, 9 September 2021).

¹⁷ UK Ministry of Defence, [Joint Doctrine Publication 0-30.2 Unmanned Aircraft Systems](#) (Shrivenham: Development, Concepts and Doctrine Centre, August 2017), 13.

¹⁸ Permanent Representation of Switzerland to the United Nations Office and to the other international organizations, [Concluding remarks by Austria, Belgium, Brazil, Chile, Finland, Germany, Ireland, Italy, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, South Africa, Sweden, Switzerland, delivered by Switzerland at the Sixth CCW Review Conference](#) (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, 17 December 2021).

The states remain fractured on the issue of normative framework and recommendations that the GGE should give, with the divide affecting the EU and NATO member states as well. The Sixth Review Conference of the CCW (December 2021) and the meeting of the GGE conveyed through the CCW (March 2022) demonstrated that arriving at a consensus on the way forward at a U.N. CCW platform is highly unlikely. The Review Conference extended the GGE's mandate to continue deliberations on the emerging technologies in the area of LAWS, which many argued to be a rather low bar. A group of sixteen states parties to the Convention (including nine EU member states)¹⁹ expressed dissatisfaction in a joint statement accusing some states parties to CCW of having abused the consensus practice of the forum. The statement specifically pointed at the United States, the United Kingdom, India, and Russia. While some other states parties, including Estonia, share the view that there is no need for a new legal instrument to regulate LAWS. According to the Estonian position, the existing IHL is comprehensive enough to deal with emerging technologies. For instance, it provides effective guidance on cyber operations – a relatively new technology that did not exist when these principles and rules were incorporated into the body of international law.²⁰

Some states parties – and NGOs in particular – have interpreted the GGE's mandate extension as a failure and hinted at a possibility to move the process out of the CCW framework, with the goal of new legally binding instrument under the auspices of the U.N. General Assembly, where majority rule – not a consensus – would prevail. The concern is that the GGE format or the Geneva process on LAWS will not yield the desired results and that there is no prospect of negotiating a new CCW protocol or a stand-alone treaty, which may lead to an emergence of an alternative format to pursue this goal. The formula of taking the process of regulating certain weapons on humanitarian grounds out of the consensus-based CCW framework has already been tested earlier. This was the case with the process leading to agreements on anti-personnel landmines and cluster

munitions. The consensus condition was the main reason for taking the process out of the CCW framework. These alternative processes have been launched with active support from civil society groups; they deem LAWS as an existential threat to humanity and have been striving to negotiate a treaty prohibiting fully autonomous weapon systems and introduce regulations to maintain meaningful human control over the use of force.²¹

“The Campaign to Stop Killer Robots” unites hundreds of NGOs in dozens of countries that are devoted to eventually prohibiting LAWS. After the Sixth Review Conference, the organisation was hopeful that the treaty negotiations would begin in 2022, that a coalition of interested and committed states was taking shape, and that the “external process” will come to fruition.²² Further developments will, however, depend on the readiness of the states parties to the CCW to uphold the process outside the traditional U.N. frameworks on weapons regulation. The prospective candidates for the core group are 30 states parties to the CCW who have expressed their support for the pre-emptive legal ban on LAWS, including Austria, Mexico, and New Zealand, as well as several members of the Non-Aligned Movement.²³

The alternative process on LAWS will campaign for global support and rely on the opinions of technology and AI experts, researchers, academics, and faith leaders around the world to shape public opinion and governments' policies to support the new international treaty on LAWS.

²¹ “Our Policy Position,” Stop Killer Robots, accessed on 11 January 2023.

²² Isabelle Jones, “Historic opportunity to regulate killer robots fails as a handful of states block the majority,” Stop Killer Robots, 17 December 2021; Human Rights Watch, International Human Rights Clinic, Human Rights Program at Harvard Law School, *An Agenda for Action: Alternative Process for Negotiating a Killer Robots Treaty* (New York City: Human Rights Watch, International Human Rights Clinic, November 2022).

²³ Permanent Mission of the Bolivarian Republic of Venezuela to the United Nations Office and other international organizations in Geneva, *Reflections By The Bolivarian Republic Of Venezuela On Emerging Technologies In The Area Of Lethal Autonomous Weapons Systems And The Mandate Of The Group Of Governmental Experts* (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, September 2020); New Zealand Ministry of Foreign Affairs and Trade, *Autonomous Weapons Systems: New Zealand Policy Position and Approach for International Engagement*, ERS-21-MIN-0046 (Wellington: Cabinet External Relations and Security Committee, 16 November 2021).

¹⁹ These nations are Austria, Belgium, Finland, Germany, Ireland, Italy, Luxembourg, the Netherlands, and Sweden.

²⁰ Permanent Representation of Estonia, “Statement by Estonia.”

2.2. ALTERNATIVES TO LEGAL REGULATION

A legally binding international agreement on LAWS is not only politically unrealistic but also unnecessary and technically difficult to achieve. In order to ensure compliance of autonomous weapon systems with IHL and avoid unpredictable effects that those new capabilities may have, a pragmatic approach favours non-binding measures. One argument in their favour is the fact that for any legally binding agreement on banning or regulating LAWS to be effective, it will require credible verification measures. As reports about the use of armed drones in ongoing conflicts have already demonstrated, it is incredibly complicated to verify whether the weapons employed were autonomous – as opposed to

A legally binding international agreement on LAWS is not only politically unrealistic but also unnecessary and technically difficult to achieve

having been used in remotely controlled mode in their critical functions – with a high degree of certainty.

Various solutions have been circulating: political declarations, national or international guidelines, and codes of conduct, as well as strengthening the existing requirements for weapon reviews to ensure the legality of new weapon systems.²⁴ Some states proposed national policies outlining the rules of conduct and self-restraint measures concerning the development of AWS with certain characteristics. Others introduced norms and principles for private contractors who are involved in the development of AWS.

Some states are ready to compromise in order to agree on the interim measures – such as a political declaration on LAWS upon which the national legislation to govern emerging

technologies could be based – and impose a moratorium on some AWS-related activities.²⁵ Whereas those not in favour of moratoriums prefer a non-binding code of conduct which would outline the rules that participating countries should follow when dealing with AWS.²⁶

A widely supported measure is reinforcing the existing Article 36 of Additional Protocol I to the 1949 Geneva Convention that states:

In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its 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.²⁷

Since the Article 36 reviews are national procedures that lack established international standards and may demand significant technical and financial resources, they may not be affordable to every country and thus require closer cooperation between parties.²⁸

The UK proposed drafting a GGE Guiding Document which was meant to help ensure compliance with existing IHL but avoid hampering the development and application

²⁴ Group of Governmental Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons, [Draft Report of the 2019 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems](#), GGE.1/2019/CRP.1/Rev.2 (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, 21 August 2019).

²⁵ Permanent Representation of the Federal Republic of Germany to the Conference on Disarmament in Geneva, [National Statement by Germany Group of Governmental Experts on 'Emerging Technologies in the Area of Lethal Autonomous Weapons Systems \(LAWS\)'](#) (Geneva: CCW/GGE on Emerging Technologies in the area of Lethal Autonomous Weapons Systems, 3 August 2021).

²⁶ U.S. Mission to the International Organizations in Geneva, [Convention on CCW Group of Governmental Experts on emerging technologies in the area of LAWS. Opening Statement As Delivered by Joshua Dorosin](#) (Geneva: U.S. Mission to the International Organizations, 3 December 2021).

²⁷ International Committee of the Red Cross (ICRC), ["Article 36 – New Weapons"](#) in Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 1125 UNTS 3 (Geneva: Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law applicable in Armed Conflicts, 8 June 1977).

²⁸ Vincent Boulanin, ["Implementing Article 36 Weapon reviews in the Light of Increasing Autonomy in Weapon Systems,"](#) *SIPRI Insights on Peace and Security* No. 2015/1 (Solna: November 2015).

of emerging technologies.²⁹ The idea was grounded in a common understanding that IHL fully applies to LAWS; however, applying these principles in the context of emerging technologies may need some further guidance, which could be outlined, for instance, in a GGE-approved manual. The UK's Proposal referred to *The Tallinn Manual* with guidelines for the application of existing international law in cyberspace or *The Montreux Document on Private Military and Security Companies*.³⁰

Legally non-binding measures – such as codes of conduct – could be more successful in guiding states towards developing and planning to deploy AWS more responsibly. For these norms are voluntary and legally non-binding, they are, therefore, faster and more flexible in managing the risks entailed. Critics, however, argue that voluntary measures are complementary to internationally binding rules, and not a replacement thereof. They further claim that such measures are difficult to enforce and, therefore, should rather be interpreted as “aspirational statements of a standard of behaviour” that states seek to follow.³¹

Some states have established domestic rules to govern the application of emerging technologies, including AI in weapon systems. In 2012, the U.S. was the first country to regulate autonomy in weapon systems with the *Department of Defense Directive No. 3000.09*. It establishes the “DoD policy and assigns responsibilities for the development and use of autonomous and semi-autonomous functions in weapon systems,” as well as the “guidelines designed to minimize the probability and consequences of failures [...] that could lead

to unintended engagements.”³² It is the DoD policy that “[h]uman-supervised autonomous weapon systems may be used to select and engage targets, with the exception of selecting humans as targets.”³³

As future military capabilities with autonomous functions are highly sophisticated and increasingly based on AI and machine learning, national AI strategies (or ethical guidelines issued by the governments) are critical to provide some advice and directive for their responsible application.³⁴ Achieving public acceptance of emerging – and disruptive – technologies in the military is another goal of such documents.

Organisations with shared values and mutual interests could be better suited to reaching a common understanding

3. A VALUE-BASED FRAMEWORK TO REGULATE EMERGING AND DISRUPTIVE TECHNOLOGIES

Organisations with limited membership, shared values, and mutual interests – such as the EU and NATO – could be better suited to reaching a common understanding on standards of technological innovation and principles of responsible use of AWS.³⁵ NATO and the EU are both engaged in technological modernisation and development of military capabilities based on the new technologies, which are considered to be critical for security and defence of their members, and therefore are contemplating standards and rules to ensure their ethical and lawful application.

²⁹ United Nations, [United Kingdom Proposal for a GGE Document on the Application of International Humanitarian Law to Emerging Technologies in the Area of Lethal Autonomous Weapon Systems \(LAWS\)](#) (New York: United Nations Office for Disarmament Affairs (UNODA), March 2022).

³⁰ NATO Cooperative Cyber Defence Centre of Excellence (CCDCOE), *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations*, 2nd Edition (Cambridge: Cambridge University Press, February 2017); International Committee of the Red Cross (ICRC), *Montreux Document on Private Military and Security Companies* (Bern: Federal Department of Foreign Affairs, August 2009).

³¹ Louk Faesen, Tim Sweijts, Alexander Klimburg, Conor MacNamara, and Michael Mazarr, [From Blurred Lines to Red Lines: Countermeasures and Norms in Hybrid Conflict](#) (The Hague: The Hague Centre for Strategic Studies, 22 September 2020).

³² U.S. Department of Defense, *Directive No. 3000.09*, 1.

³³ U.S. Department of Defense, *Directive No. 3000.09*, 3.

³⁴ [DOD Adopts Ethical Principles for Artificial Intelligence](#),” U.S. Department of Defense, 24 February 2020. A DoD AI Ethics Principles, Feb 2020; U.S. Department of Defense, [U.S. Department of Defense Responsible Artificial Intelligence Strategy and Implementation Pathway](#) (Washington, DC: DoD Responsible AI Working Council, June 2022).

³⁵ Louk Faesen et al, *From Blurred Lines to Red Lines*.

3.1. NATO AS A NORM BUILDER

NATO is a defence alliance whose ability to perform its core tasks depends on its ability to maintain the technological edge and encourage military innovation. For this goal, it has identified seven key areas for cooperation in capabilities development in emerging and disruptive technologies (EDTs): AI, data and computing, autonomy, quantum-enabled technologies, biotechnology, hypersonic technology, and space.

NATO member states have been drafting their national AI strategies and designing policies, which have to take into account potentially sensitive aspects of EDTs, to stimulate military innovation. Ethical and regulatory questions may overshadow their development and application. To avoid the consequential implications for cooperation in NATO and the EU in the future, these legal, ethical, and political challenges should be addressed in a coherent manner, with responsible authorities providing guidance on how to mitigate the risks that the new military EDTs may pose.³⁶

NATO, as an agency, may not be well positioned to force its member states to act in a particular way, but it can offer an opportunity to collaborate when aligning normative frameworks for EDT development. But as an alliance of like-minded nations, “NATO is exceptionally well placed to be a global driver of value-based innovation agenda” and a norm builder.³⁷

The Alliance has recently approved *The NATO Artificial Intelligence Strategy* and is now preparing to compile such strategies for all seven technology areas.³⁸ These strategies will have one shared objective: to promote interoperability by setting standards across all these technology areas and provide guidance on responsible use in accordance with international law.³⁹ NATO’s AI Strategy

offers a common policy basis in order to support the adoption of AI-enabled systems by the allies and introduces six principles of responsible use of AI that all NATO nations are expected to follow. These principles include lawfulness, responsibility and accountability, explainability and traceability, reliability (which implies that the capabilities will be subject to testing through established NATO and national certification procedures), governability (which will allow for appropriate human machine interaction and the ability to avoid unintended consequences), and bias mitigation.⁴⁰

The listed principles could be operationalised through NATO or national measures. NATO could serve as a platform for testing, evaluating, validating, and verifying respective capabilities to ensure their compliance with the principles of responsible use and IHL. The recently launched Defence Innovation Accelerator for the North Atlantic (DIANA), which will concentrate on the areas of technology affecting defence innovation, will host specialised test centres.⁴¹ The latter could be used to guarantee that the principles of responsible use will be respected and common standards followed when allies develop and deploy new capabilities. By adopting these strategies, NATO sends a message to the member states’ domestic audiences that the Alliance is committed to international law.

3.2. THE EU LEGISLATIVE UMBRELLA

The European Union has set up new cooperation frameworks to promote defence innovation in the member states. The objective is to develop a technologically advanced European defence capable of responding to new challenges while upholding its fundamental values. The recently adopted EU Strategic Compass mentions EDTs as a priority in maintaining advantages over the competitors, whose commitment to international norms and regulations is questionable.⁴²

³⁶ Tomas Jermalavicius and Martin Hurt, “[Defence innovation: New Models and Procurement Implications / The Estonian Case](#),” *Armament Industry European Research Group (ARES) Policy Paper* no. 71 (September 2021).

³⁷ NATO, *NATO Advisory Group on Emerging and Disruptive Technologies. Annual Report 2020* (Brussels: Emerging Security Challenges Division 2020), 7.

³⁸ “[On Thursday \(21 October 2021\), NATO Defence Ministers agreed to NATO’s first-ever strategy for Artificial Intelligence \(AI\)](#),” NATO, 22 October 2021.

³⁹ Vivienne Machi, “[Artificial intelligence leads NATO’s new strategy for emerging and disruptive tech](#),” *Defense News*, 15 March 2021.

⁴⁰ “[Summary of the NATO Artificial Intelligence Strategy](#),” NATO, 22 October 2021.

⁴¹ “[NATO sharpens technological edge with innovation initiatives](#),” NATO, 7 April 2022.

⁴² Council of the European Union, *EU Strategic Compass for Security and Defence* (Brussels: General Secretariat of the Council, 21 March 2022).

The European Commission is now in the process of identifying the technology areas, which are critical to long-term security and defence and where closer cooperation is needed.⁴³ Autonomous systems of defence, with special attention to AI and machine learning, are highlighted as a priority. These are the areas where the EU is lagging behind its close competitors in promoting research and development.⁴⁴ In recent years, the EU has drawn up several documents on AI that emphasise a “human-centric” and rights-based approach together with an ambition to be the leader in global norm-setting and ethical use.⁴⁵

The EU successfully exercises its legislative power when laying down the eligibility rules for financing the development of autonomous weapon systems. The regulation establishing the European Defence Fund stipulates that “actions relating to products or technologies the use, development or production of which is prohibited by international law should not be supported by the Fund.” Specifically, it excludes funding for the “development of lethal autonomous weapons without the possibility for meaningful human control over selection and engagement decisions when carrying out strikes against humans.” The regulation draws a legal line when excluding autonomous weapon systems with certain characteristics, as not “eligible for support from the Fund.”⁴⁶

The European Parliament (EP) has also exhibited an interest in issues related to AI and the application of emerging technologies in defence innovation.⁴⁷ The EP called on

the Council of the European Union to take a position on LAWS “that ensures meaningful human control over the critical functions of weapon systems” and to launch negotiations on a legally binding instrument to prohibit fully autonomous weapon systems.⁴⁸

So far, there has been no common position within the Council itself, with members having conflicting views on LAWS and how such weapon systems should be regulated. Some states (e.g., Austria) either explicitly supported a legal ban or endorsed it as a policy goal in coalition agreements, while others strongly opposed the idea.

The situation is quite unusual: the EP’s position on characteristics and regulation of LAWS is based on the views promoted by NGOs and non-European states parties to the CCW. It has been codified in the EU regulatory papers, which the EU institutions and member states are supposed to implement.⁴⁹ This development is welcomed by those who are pursuing international prohibition of LAWS. Civil society groups see this regulation as granting the European Defence Fund a bigger role in drawing a legal line in order to exclude certain autonomous weapons that cannot be meaningfully controlled by humans from financing via the Fund. Despite the fact that the concepts are used in the GGE discussions, ‘meaningful human control’ or ‘appropriate human judgement’ are still too vague and leave room for interpretation.

Since autonomy in future weapon systems will be AI-based, updates to the EU policies on AI may have a far-reaching impact on the development of such capabilities within the union. In April 2021, the European Commission came out with a legislative proposal on AI – *The Artificial Intelligence Act* (The AI Act). The bill seeks to set AI standards to ensure that the technology used in the EU will be transparent and respectful of the fundamental

⁴³ European Commission, [Roadmap on critical technologies for security and defence](#), Communication from the Commission to The European Parliament, the Council, the European Economic and Social Committee And The Committee of the Regions, COM(2022)61 (Strasbourg: European Commission, 15 February 2022).

⁴⁴ European Commission, Roadmap on critical technologies.

⁴⁵ European Commission, [White Paper. On Artificial Intelligence – A EU approach to excellence and trust](#), COM(2020) 65 final (Brussels: European Commission, 19 February 2020).

⁴⁶ European Parliament and Council of the European Union, [Regulation \(EU\) 2021/697 of the European Parliament and of the Council of 29 April 2021 establishing the European Defence Fund and repealing Regulation \(EU\) 2018/1092](#) (Brussels: Official Journal of the European Union, 12 May 2021), 151.

⁴⁷ European Parliament, [AIDA Working Paper on ‘The External Policy Dimensions of AI’](#) (Brussels: Special Committee on Artificial Intelligence in a Digital Age, March 2021); Anja Dahlmann and Marcel Dickow, “[Preventive Regulation of Autonomous Weapon Systems, Need for Action by Germany at Various Levels](#),” *German Institute for International and Security Affairs (SWP) Research Paper* no. 2019/RP 03 (2019).

⁴⁸ European Parliament, [European Parliament resolution of 12 September 2018 on autonomous weapon systems \(2018/2752\(RSP\)\)](#) (Strasbourg: European Parliament, 12 September 2018); European Parliament, [European Parliament resolution of 3 May 2022 on artificial intelligence in a digital age \(2020/2266\(INI\)\)](#) (Strasbourg: European Parliament, 3 May 2022).

⁴⁹ European Parliament, *AIDA Working Paper*.

rights of citizens.⁵⁰ Critics of this proposal indicate that such a regulation could hamper some commonplace AI research in the EU, thus impeding technological innovation and working against the EU ambition to become a leader in this area.⁵¹ Therefore, the assessment, that there is discrepancy between the EU ambition of ‘technological sovereignty’ or ‘human-centric’ and ‘value-driven’ visions of AI development is justified.⁵²

The AI Act – as a legislative proposal addressed to the Council and the EP – advances a complete ban on some AI applications and certain restrictions on others, which it defines to be of “high risk” to the “safety or fundamental rights of persons.”⁵³ Military applications are not mentioned among the products with high risk; the proposed law does not cover military uses of AI. When approved, the AI Act may extend to the military applications of AI as well. The EDF regulation only allows funding the projects that are in full compliance with the international, EU, and national legislation, as well as ethical principles therein.⁵⁴ Hence, it might affect the research and development in military robotics and capabilities with AI-enabled autonomous functions by imposing further limitations on future cooperation projects.

4. AUTONOMOUS WEAPONS AND PUBLIC OPINION

Public acceptance of EDTs, particularly in LAWS, may pose a challenge to military innovation in democratic societies if the development of some capabilities with autonomous functions becomes politically sensitive due to the civil society’s backlash. Public opinion has the

potential to influence decisions regarding financing and thus discourage the industry from participating in certain defence-related projects. Public pressure has proved capable of forcing tech companies to withdraw from their defence contracts: as it happened to *Google* in 2018, after protests by its employees.⁵⁵ In a worst-case scenario, similar developments may weaken the positions of democracies in comparison to their more autocratic or less responsible strategic competitors.

The NGOs, which are actively involved in the ongoing debate under the U.N. CCW framework, keep the issue of the so-called ‘killer robots’ high on the public agenda and consistently generate public pressure on the governments to support a legal ban on LAWS. As the European Parliament’s long-standing position demonstrates, public campaigning can be quite successful.⁵⁶ Polls suggest that public sentiment in western societies tends to incline against the application of autonomy in lethal weapon systems. This mood is oftentimes shared by prominent scientists and business leaders, who sign public letters warning of the application of AI in weapon systems and urging the world to ban autonomous weapons.⁵⁷

Reference to such broad public opposition is part of the argument in favour of the ban on LAWS. Considerations of public conscience, drawn from the ‘Martens Clause’ in the “Preamble” of the Hague Conventions of 1899 and 1907,⁵⁸ later appear in the Additional

⁵⁰ European Commission, [Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules for AI \(Artificial Intelligence Act\) and Amending Certain Union Legislative Acts](#), COM(2021)206 final 2021/0106(COD) (Brussels: European Commission, 21 April 2021).

⁵¹ “The EU’s approach to artificial intelligence,” *Strategic Comments* vol. 27, 6 (8 September 2021): 10-12.

⁵² Anu Bradford and Raluca Csernatonu, “[Toward a Strengthened Transatlantic Technology Alliance](#)” in *Working With the Biden Administration: Opportunities for the EU* (Brussels: Carnegie Europe, 26 January 2021).

⁵³ European Commission, *Artificial Intelligence Act*, 3.

⁵⁴ European Parliament and Council of the European Union, Regulation (EU) 2021/697.

⁵⁵ Nick Kolakowski, “[Will Google Employees Protest a Military Contract Again?](#),” *Dice*, 5 November 2021.

⁵⁶ European Parliament, [Resolution of 20 January 2021 on artificial intelligence: questions of interpretation and application of international law in so far as the EU is affected in the areas of civil and military uses and of state authority outside the scope of criminal justice \(2020/2013\(INI\)\)](#), 2021/C 456/04 (Brussels: Official Journal of the European Union, January 2021); European Parliament, [Resolution of 3 May 2022 on artificial intelligence in a digital age \(2020/2266\(INI\)\)](#) (Strasbourg: European Parliament, May 2022); European Parliament, [Resolution of 12 September 2018 on autonomous weapon systems \(2018/2752\(RSP\)\)](#) (Strasbourg: European Parliament, September 2018).

⁵⁷ Samuel Gibbs, “[Elon Musk leads 116 experts calling for outright ban of killer robots](#),” *The Guardian*, 20 August 2017.

⁵⁸ International Committee of the Red Cross (ICRC), “[Preamble](#)” in *Convention (III) with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 29 July 1899*, International Humanitarian Law (IHL) Databases, accessed on 12 January 2023; International Committee of the Red Cross (ICRC), “[Preamble](#)” in *Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 18 October 1907*, International Humanitarian Law (IHL) Databases, accessed on 12 January 2023.

Protocols I and II to *The Geneva Convention*, stating that:

In cases not covered by this Protocol or by any other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from dictates of public conscience.⁵⁹

Public opinion, as reflected in the polls, cannot be considered equal to public conscience but can be seen as a marker of considerations which have been driving the development of IHL.⁶⁰

Surveys commissioned by “The Campaign to Stop Killer Robots” and conducted by *Ipsos* market research company (in 2018 and 2020-21) revealed opposition in almost half of 19 000 respondents in 28 countries.⁶¹ The biggest share of 78% was registered among respondents in Turkey, followed by Russia and the U.S. with 52% and 59%, respectively; in China, 52.5% were against such weapon systems. In contrast, the highest support levels were registered in India in 2020 and in Israel in 2018 – 56% and 41%, respectively.

The dominant reasons for opposing the development of LAWS are moral considerations, the accountability problem, and possible technical failures

The dominant reasons for opposing the development of LAWS are moral considerations, the accountability problem, and possible technical failures. 66% of respondents were of opinion that machines should not be allowed to take decisions pertaining to life and death. More than half (54%) were concerned with the accountability problem: machines cannot be considered accountable for their actions. Possible technical failures were the third

⁵⁹ International Committee of the Red Cross (ICRC), *Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I)*, 1125 UNTS 3 (Geneva: Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law applicable in Armed Conflicts, 8 June 1977).

⁶⁰ International Committee of the Red Cross (ICRC), *ICRC Ethics and autonomous weapon systems: An ethical basis for human control?* (Geneva: ICRC, 3 April 2018).

⁶¹ Chris Deeney, “Six in Ten (61%) Respondents Across 26 Countries Oppose the Use of Lethal Autonomous Weapons Systems,” IPSOS, 22 January 2019.

reason for public mistrust of AWS found in 42% of respondents.⁶²

These and other surveys of public attitudes conducted in recent years show that opposition to LAWS prevails. Hardly can it be taken as conclusive evidence of the ‘dictates of public conscience,’ from which international law could be derived. The results of such polls could be subject to framing, where the response depends on the context and wording of the question asked. When asked about the ‘killer robots,’ as opposed to ‘lethal autonomous weapons used to protect friendly troops,’ the respondents are likely to produce different answers. With additional context to a question (e.g., referring to other countries that develop AWS and may pose a threat to national security), the opposition to AWS would also be mitigated.⁶³

When interpreting the results of these surveys and negative public attitudes towards AWS, wider public scepticism of the emerging technologies, and of AI in particular, should be taken into account. For years now, risks connected to AI and machine learning have been a hot topic in public discussions and a cause for public concern. Globally, there is a regional and an east-west divide in attitudes towards AI applications. *The World Risk Poll* from 2019 revealed that 25% of respondents in Southeast Asia and 11% of respondents in East Asia were concerned about the possible harm from AI. In China, such scepticism was the lowest, only reaching 9%. However, in Europe and North America, 43% and 47% of respondents thought that AI could be harmful.⁶⁴

In western societies, new overhyped technological solutions and overblown expectations followed by disappointments are to blame for the public scepticism. The case in point was the outsized excitement over fully autonomous or self-driving cars, which vividly

⁶² “Global Survey Highlights Continued Opposition to Fully Autonomous Weapons,” IPSOS, 2 February 2021.

⁶³ Michael C. Horowitz, “Public opinion and the politics of the killer robots debate,” *Research and Politics* (January-March 2016): 1-8.

⁶⁴ Lisa-Maria Neudert, Aleksu Knuutila, and Philip N. Howard, *Global Attitudes Towards AI, Machine Learning & Automated Decision Making* (UK: Oxford Commission on AI & Good Governance, 2020), 10.

demonstrated the current risks and limitations of autonomous systems.

In western societies, new overhyped technological solutions and overblown expectations followed by disappointments are to blame for the public scepticism

Public trust towards AI is influenced by perceptions of how AI-based technologies work. Failures of machine learning, data bias, and opaque automated decision-making have emerged as issues of concern in public discussion. People feel uneasy when machines make decisions for or about them.

The latest *Special Eurobarometer 516* survey on “European citizens’ knowledge and attitudes towards science and technology” reveals that although Europeans, in general, are positive about the impacts of new technologies on their lives, their perceptions of AI and nuclear energy are the least enthusiastic.⁶⁵ In most EU member states (except Denmark and Estonia), more than half of respondents agree that science and technology can be a threat to human rights. Each failure in AI applications could have an impact on public sentiments and feed scepticism towards these solutions.

As trust is a fundamental aspect of public acceptance of AI-based technologies, lack thereof – also among the military – remains one of the main challenges to innovation. Therefore, it is crucial that governments can convince the public that AI-based solutions are applied in a responsible manner, especially in military capabilities.⁶⁶

5. TRAILBLAZING: THE CASE OF ESTONIA

Estonia has developed some strengths in its information and communications technology (ICT) sector, as well as in cybersecurity, AI,

robotics, sensors, and autonomous systems on which its defence innovation potential relies.

It excels in military ground robotics and autonomous systems, which are expected to be game changers in the battlefields of the future. Some companies have exhibited an interest in unmanned aerial systems such as loitering munitions and swarming technologies. Estonia has developed

unmanned aerial and ground vehicles, which have already been introduced in support units of the Estonian Defence Forces and are expected to have good export potential. It has been successful in making use of opportunities offered by the recently created EU and NATO cooperation mechanisms for military innovation. In addition to the technological and interoperability aspects, this cooperation provides a framework to jointly address the questions of legal, political, and ethical nature that arise with the application of AI and autonomy in military capabilities.

In the diplomatic arena, Estonia has contributed to international discussions under the U.N. auspices on possible challenges that autonomy in weapon systems may pose. Since 2017, it has been actively participating in the GGE meetings of the states parties to the CCW on emerging technologies in the area of LAWS by communicating its positions on a number of issues during the debates. Estonia is among the countries that share the view that existing IHL applies to all weapon systems, including LAWS, which imposes concrete obligations on states and parties to armed conflicts, as well as individuals; therefore, there is no need for an additional legal instrument. Being a supporter of a wider approach to human control of autonomous weapon systems, which takes into consideration all the phases of the life cycle (from designing, producing, deployment, use, upgrade, and decommissioning) of the weapon system, Estonia views the concept of a ‘fully autonomous weapon system’ irrelevant in terms of a discussion on characteristics or regulations.⁶⁷

⁶⁵ European Commission, *Special Eurobarometer 516. European citizens knowledge and attitudes towards science and technology* (Brussels: European Commission, September 2021).

⁶⁶ U.S. Department of Defense, “U.S. Department of Defense Responsible Artificial Intelligence Strategy.”

⁶⁷ Permanent Representation of Estonia to the UN and Other International Organisations in Geneva and Permanent Mission of Finland in Geneva, *Categorizing lethal autonomous weapons systems - A technical and legal perspective to understanding LAWS* (Geneva: CCW/GGE on emerging technologies in the area of Lethal Autonomous Weapons Systems, 27 August 2018).

5.1. SHOWING THE WAY FORWARD

Estonia views ‘weapon autonomy’ as a more complex matter, conceptually and technologically, than many other weapons that have been subject to specific regulation in the past. Therefore, attempts to draft a new legally binding pre-emptive ban on LAWS would be challenging.⁶⁸ Estonian experts involved in the development of AI and military robotics are convinced that a softer approach should be used to mitigate those risks. Lawyers are not enough to address these problems – engineers should be part of the solution.⁶⁹

Development of new technological solutions in the public – as well as the military – sector is increasingly dominated by private companies. It is vital for all participants in these projects to be aware of the ethical or legal questions that may arise when the EDTs are applied, especially in defence. The more sophisticated the weapon system, the greater the responsibility of the manufacturer. This means that companies involved in the development and production of autonomous weapon systems should also have high ethical standards translated into practical requirements for engineers.⁷⁰ Regulations can also be reinforced on organisational level by introducing a code of conduct or rules of behaviour for companies involved in design and development of autonomous weapon systems.

In addition to reducing some potential risks, these measures help to avoid a public rebuke and build trust in autonomy among citizens. Companies developing autonomous systems for the defence industry must signal to the general public that they are aware of the ethical and legal challenges involved. *Milrem Robotics* (a leading Estonian company that develops robotic systems, including for military purposes) formulated its “Policy of Ethical Development of Systems With Intelligent Functions,” with a goal to address the very concerns that are usually associated with

⁶⁸ Permanent Representation of Estonia to the UN and Other International Organisations in Geneva, [Statement by Estonia, Agenda Item 6\(a\). Possible options for addressing the humanitarian and international security challenges](#) (Geneva: CCW/GGE on emerging technologies in the area of Lethal Autonomous Weapons Systems, 27-31 August 2018).

⁶⁹ The author’s interview with an Estonian expert.

⁷⁰ Esther Chavannes, Klaudia Klonowska, and Tim Sweijjs, *Governing Autonomous Weapon Systems: Expanding the Solution Space, from Scoping to Applying* (The Hague: The Hague Centre for Strategic Studies, 2020).

autonomous systems and a “foundational ambition [...] achieved through commitment to the human safety and the quality assurance in design, production and life cycle management as well as through continuous dialogue with the society and partners on ethical use.”⁷¹ The company also adheres to the principle that:

Meaningful Human Control should always be maintained over any robotic systems. Meaningful Human Control is our rigorous requirement to all platforms and payloads: commitment to uphold this principle is demanded from Milrem’s personnel, our clients and partners. Milrem’s Ethics Policy prohibits the development of any system capable of firing a weapon without Meaningful Human Control.⁷²

This policy helped the company to get positive public attention as evidenced by its ‘highly responsible’ rank in a survey conducted by “PAX for Peace,” a civil society organisation whose report evaluated fifty companies producing weapon systems with autonomous functions.⁷³

At the time of this publication, Estonian companies working with military robotics were not developing systems that could qualify as ‘lethal autonomous weapons.’ Nevertheless, there has been a growing interest in international discussions on prospective regulations of such systems, which already has had some impact on the legal and political environment, and subsequently on research and development or access to financing. There is caution about the prospects in the legal environment of the EU that may affect the technology sector in Estonia, as well as in other member states.

5.2. A REASONABLY OPTIMISTIC SOCIETY

In Estonia, ‘weapon autonomy’ – or the AI-enabled technologies in general – has never been a hot-button issue in the national political discourse, unlike in some other countries such as Germany, where support for the treaty on regulating LAWS is mentioned among

⁷¹ “Policy of Ethical Development of Systems with Intelligent Functions,” Milrem Robotics, accessed on 12 January 2023.

⁷² “Policy of Ethical Development,” Milrem Robotics.

⁷³ Frank Slijper, *Slippery Slope. The arms industry and increasingly autonomous weapons* (Utrecht: PAX for Peace, November 2019).

the government's policy goals.⁷⁴ Similarly, problems related to self-driving autonomous vehicles, which have been a highly-debated topic in several countries, have been a 'non-issue' in Estonia. At large, Estonian society is 'technology friendly' and has a positive attitude towards innovation. For instance, Estonia was among the first countries to allow self-driving cars to be tested in public traffic.⁷⁵

Estonian society is 'technology friendly' and has a positive attitude towards innovation

A public opinion poll on autonomy in military capabilities was conducted in the context of Estonian participation in the EU-sponsored "Integrated Modular Unmanned Ground Systems" (iMUGS) project.⁷⁶ The survey revealed that, in comparison with the results of similar research projects, the attitudes in Estonians towards the military application of autonomy mostly overlap with those in other countries. Although there are only minor differences from the wider international trend, they can be explained by a rather pragmatic approach of the Estonian society to new technology – there are neither over-optimistic expectations nor a radical rejection thereof.

Although there are only minor differences from the wider international trend, they can be explained by a rather pragmatic approach of the Estonian society to new technology

As the phenomenon of new technology is manifold, and human interaction (as well as public attitudes) with it tends to be very complex, there are multiple inconsistencies in the responses. The majority of Estonians consider that technology has a positive effect

⁷⁴ SPD, Bündnis 90/Die Grünen and FDP, [Koalitionsvertrag 2021-2025 Zwischen Sozialdemokratischen Partei Deutschlands \(SPD\), Bündnis 90 / Die Grünen Und Den Freien Demokraten. Mehr Fortschritt Wagen Bündnis Für Freiheit Gerechtigkeit Und Nachhaltigkeit](#) [Coalition agreement 2021-2025 between the Social Democratic Party of Germany (SPD), Alliance 90 / The Greens and the Free Democrats. Dare More Progress Alliance for Freedom Justice And Sustainability] (Berlin: Gesetzesvorhaben Der Bundesregierung [Legislative projects of the federal government], 7 December 2021).

⁷⁵ "Estonia's Cleveron 701 is the first driverless vehicle in Europe licensed to drive on public roads across a country," Invest in Estonia, April 2021.

⁷⁶ The polling date referred is not publicly available. Estonian Military Academy, *Public Attitudes and Opinions About Unmanned Ground Vehicles: A Survey Study. Ethical, Social and Legal Aspects of iMUGS* (Tartu: Estonian Military Academy, January 2022).

on society, with 94% believing AI applications would be a normalised practice in the future. Yet it does not mean that the Estonian attitude is utopian about technological progress either. While 87% of respondents are positive about the impact of the new technology, they do not believe that technology can replace humans since human intelligence and artificial intelligence are incomparable. Nonetheless, 44% consider technology to be a threat. There is also some anxiety about the future of AI: 62% agree that it can become more dangerous than nuclear weapons. At the same time, AI is projected to be an inevitable part of future society.

The survey shows that the absolute majority (85%) do not trust the application of autonomy in military capabilities, meaning that machines will be given the right to distinguish civilians from combatants. On the ethical question of delegating life and death decisions to autonomous weapon systems, the attitude is clearly negative. The overwhelming majority (89%) deems this unacceptable. Although 56% agreed the AI- and big data-based decisions were always more correct than those based on intuition, 74% of respondents still favoured the human decisions-making due to the 'feelings' component of the process. The main problem with technology seems to be its fallibility; therefore, human supervision was deemed necessary to establish trust in machines by 83% of respondents.

On the development of unmanned ground vehicles with weapons, Estonians are pragmatic: 60% see it acceptable if strict regulations are in place. Only 20% of respondents support a ban on such systems, while the majority (77%) do not believe that the governments will be able to reach an agreement on the issue. At present, it may be unlikely that there will be much societal interest in the matters concerning the international developments around the regulation of LAWS in or outside of the U.N. framework. The attitude of Estonians towards public campaigning or building public pressure will likely be lukewarm. As the survey shows, Estonians tend to trust the expert opinion on these issues over that of organisations, institutions, or civil society. Moreover, less than 30% of respondents trust the information coming from NGOs, the EU, and the U.N.

CONCLUSIONS

The international debate on the military application of emerging technologies has so far been mainly focused on the humanitarian aspects of LAWS. Formal deliberations among states parties to the CCW have helped to shape some common understanding of LAWS. They produced the Guiding Principles, in which the states parties agreed that IHL applies to LAWS; humans remain responsible for the development, deployment, and use of these weapons; and human-machine interaction ensures compliance with the law. The discussions further revealed a disagreement on the prospects of regulation of LAWS between those who supported the introduction of new legal instruments and those who preferred improving existing IHL.

The Sixth Review Conference of the CCW has demonstrated that a consensus on international regulation is unlikely in the near future. This may encourage some states parties and NGOs to launch an alternative process outside the CCW framework. Many states – including most major military powers – consider legal regulations or a complete ban to be unnecessary and thus favour alternative regulative measures in some form of national or international soft-law instruments. For the time being, any attempt to negotiate a legally binding treaty on LAWS would be an excessive effort due to multiple conceptual – or definitional – problems and enforcement obstacles.

Autonomy and AI applications in weapon systems have so far been addressed from the humanitarian perspective. Whereas security and defence aspects, which are normally present in arms control debates, have been left aside despite the increasing strategic importance of EDTs. The more promising new technologies are, the less interested the countries involved in military innovation will be in regulating them, fearing it could hold back the development of autonomous and AI-based systems.

As cutting-edge technologies are increasingly part of the strategic competition, the right balance should be found between responsible development, fast application, and real-world deployment of innovative solutions. Therefore,

the EU should adhere to expert advice in order to strike balance between ethically driven policies and overregulating innovation. This is critical not only for competitiveness in security and defence but also for the technology sector as a whole, with the EU has been lagging. Input from experts on military robotics and EDTs will help to overcome mistrust of autonomous weapon systems and AI-enabled solutions.

As cutting-edge technologies are increasingly part of the strategic competition, the right balance should be found between ethically driven policies and overregulating innovation

On the U.N. level, the proposal on the GGE's CCW-approved document with guidelines on the implementation of IHL on emerging technologies in the area of LAWS could be the next tangible result, with value added to this format.

In democratic societies, public opinion has a huge impact on the political, legal, and economic environment. For the purposes of military modernisation and defence innovation, stakeholders – such as governments and industry representatives in Estonia, as well as in other interested countries – should use public communication to overcome popular preconceptions related to the application of autonomy in weapon systems. The public should be assured that the risks related to autonomous weapon systems are properly addressed in national policies, while safety measures are taken by regional and international organisations. Therefore, the AI strategies in NATO, the EU, and their member states should share a common goal: to build public confidence in new technologies and ensure that the state- or institution-level policies will be responsible so that humans will retain a critical role and control in development, deployment, and use of emerging technologies in the area of LAWS.

A communication strategy should also send a message that technological primacy will determine success on the battlefields of the future. As the war in Ukraine has demonstrated, skilful application of emerging technologies can give smaller armies a significant advantage over preponderant adversary forces.

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