

ANNEX A

Proposals Related to Emerging Technologies in the Area of Lethal Autonomous Weapons Systems

A Resource Paper

1. APPLICATION OF INTERNATIONAL HUMANITARIAN LAW (IHL)

<p>Elements for a Future Normative Framework Conducive to a Legally Binding Instrument to Address the Ethical Humanitarian and Legal Concerns Posed by Emerging Technologies in the Area Of (Lethal) Autonomous Weapons (LAWS)</p>	<p>Outline for a Normative and Operational Framework on Emerging Technologies in the Area of LAWS</p>	<p>Principles and Good Practices on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p>	<p>Roadmap Towards New Protocol on Autonomous Weapons Systems</p>	<p>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)</p>	<p>Working Paper submitted to the 2022 Chair of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS)</p>
<p>Recommendations towards a normative framework</p> <p>2. International Law, particularly IHL, International Human Rights Law, International Criminal Law, and the principles enshrined in the Charter of the United Nations, fully apply to the development and the use of AWS.</p> <p>3. The Martens Clause has proved to be an effective means of addressing the rapid evolution of military technology by prohibiting certain types of weapons, either due to their indiscriminate effects or because of the unnecessary suffering they could cause to combatants.</p>	<p>I. Normative Framework Preambular part</p> <p>A recognition that an appropriate balance should be struck between the necessity to allow progress in or access to these dual-use emerging technologies (as recalled by guiding principle j), and the importance of taking into account humanitarian considerations and challenges with regard to IHL in the development and use of such technologies (c.f. guiding principle k).</p> <p>“Operative” part</p> <p>2. The normative framework could then affirm a number of principles for the development and use of weapons systems in the area of LAWS.</p>	<p>Application of International Humanitarian Law</p> <p>7. International humanitarian law continues to apply fully with respect to weapons systems based on emerging technologies in the area of LAWS.</p> <p>8. The right of parties to an armed conflict to choose methods or means of warfare, including weapons systems based on emerging technologies in the area of LAWS, is not unlimited. (CCW preamble with insertion in bold) .</p> <p>9. In cases involving weapons systems based on emerging technologies in the area of LAWS not covered by the Convention and its annexed Protocols or by other international agreements, the civilian population and the</p>	<p>II. Elaborate these common grounds</p> <p><u>Introduction</u></p> <p>2. Recognize the risks and challenges posed by autonomous weapon systems to:</p> <p>2.1. compliance with international law, including IHL, international human rights law (IHRL), and international criminal law (ICL);</p> <p>5. Affirm that context-based human judgement and control is essential in order to ensure that the use of AWS is in compliance with international law, and in particular IHL.</p>	<p>ANNEX A - a possible outline</p> <p>International Humanitarian Law</p> <ul style="list-style-type: none"> • <u>Basic Rules of International Humanitarian Law:</u> The object of this section is to re-affirm the relevance and application of the core principles and rules of IHL. These principles and rules have general and continuous application in relation to the behavior of parties to armed conflict. No advanced method of warfare or autonomous weapons system permits the derogation or relaxation of the rules of IHL and it is imperative that states and parties to armed conflict ensure that their conduct conforms to these requirements in all circumstances and no matter what means or method of warfare is adopted. 	<p>2. Emphasise that human beings must make the decisions with regard to the use of force, exert control over weapons systems that they use, and remain accountable for decisions over the use of force in order to ensure compliance with International Law, in particular International Humanitarian Law.</p>

<p>This Clause, whose continuing existence and applicability is not to be questioned, is an affirmation that the principles and rules of humanitarian law apply to weapons systems based on emerging technologies in the area of AWS.</p> <p>4. In all cases and circumstances relating to AWS not covered by existing international agreements or custom, the Martens Clause—as contained in customary international law, and in the Preamble to the Convention on Certain Conventional Weapons — applies. Therefore, States shall ensure that the use of autonomous weapons systems do not contravene principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.</p> <p>5. The following IHL core legal obligations are of a universal nature and, therefore, shall necessarily be respected in the conduct of hostilities, including with regard to the use of AWS:</p> <p>5.1. to ensure distinction between military objectives and civilian objects, combatants and civilians, and active combatants and those hors de combat;</p>	<p>This “operative” part should build on the already endorsed 11 guiding principles, while elaborating further on the issue of human-machine interaction:</p> <p>a. Full applicability of International Law and in particular IHL to all weapons systems, including lethal weapons systems featuring autonomy (see guiding principle a);</p> <p>c. Agreement by the HCP that lethal weapons systems featuring autonomy must only be developed, produced, acquired, modified, deployed and used in accordance with the following provisions:</p> <ul style="list-style-type: none"> • Ensure compliance with international law when studying, acquiring, adopting or modifying (legal review – see guiding principle e) and using lethal weapons systems featuring autonomy. • Retain appropriate/ sufficient human control during the whole life-cycle of the system considered (see guiding principle c) by ensuring that humans will still be in a position to: 	<p>combatants shall at all times remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity, and from the dictates of public conscience. (2019 GGE Report ¶17g).</p> <p>Other Prohibitions or Restrictions on the Use of Weapons Systems Based on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p> <p>12. The potential use of weapons systems based on emerging technologies in the area of LAWS must be conducted in accordance with applicable international law, in particular international humanitarian law and its requirements and principles, including, inter alia, distinction, proportionality, and precautions in attack. (2019 GGE Report ¶17a).</p> <p>a. These international humanitarian law requirements and principles must be applied through a chain of responsible command and control by the human operators and commanders who use weapons systems based on emerging technologies in the area of LAWS. (based on 2019 GGE Report ¶17d).</p>	<p><u>Ethical Considerations</u></p> <p>15. Recall that the Martens’ Clause, which is a customary international law that brings together law and ethics, is particularly relevant in assessing new technologies and new means and methods of warfare and provides that civilians and combatants remain under the protection and authority of the principles of humanity and the dictates of public conscience in cases not addressed by existing treaties.</p>	<ul style="list-style-type: none"> • Distinction: Parties to an armed conflict must at all times distinguish between the civilian population and those hors de combat and between civilian objects and military objectives and shall direct their operations only against military objectives. The exercise of distinction requires the ability to observe, recognise and exercise situational judgement. The deployment of an autonomous system in a manner that does not have regard to these requirements is unlawful. • Proportionality: Parties to an armed conflict are prohibited from launching an attack that is expected to cause incidental harm to civilians that exceeds the direct military advantage anticipated from the attack. This principle of proportionality requires the individual taking a decision to attack to appreciate of the context and object of the attack before it is possible to assess the legality or the illegality of the action. The application of the principle requires qualitative, subjective and strategic appreciation of the military advantage and the expected impact of the attack. 	
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5.2. to determine whether an attack may be expected to cause incidental civilian casualties and damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated, as required by the rule of proportionality;

5.3. To cancel or suspend an attack if it becomes apparent that the target is not a military objective or is subject to special protection, or that the attack may be expected to violate the rule of proportionality, as required by the rules on precautions in attack.

– exercise their judgement with regard to compliance with IHL in the framework and context of an attack, and thus take critical decisions over the use of force.

I. Operational Framework

3. To operationalize the principles enshrined in the normative framework, the High contracting Parties could agree on a compilation of measures and policies, to be implemented at national level:

b. To operationalise the general provision 2c, an appropriate/sufficient scheme of human control considered during the whole life cycle of the system, must be put in place, taking into account the system's characteristics and its operational framework:

- Use. Set of measures enabling human operators to assess and ensure compliance with IHL – in particular principles of distinction, proportionality and precautions in attack – during operation: human approval for any substantial modification of the mission's parameters; communication links; ability to de-activate the system if and when necessary, unless technically not feasible.

b. Compliance with these international humanitarian law requirements and principles in the potential use of weapons systems based on emerging technologies in the area of LAWS requires, inter alia, that human beings make certain judgements in good faith based on their assessment of the information available to them at the time. (based on 2019 GGE Report ¶17f).

13. Distinction. Civilians and civilian objects must not be made the object of attacks involving the use of weapons systems based on emerging technologies in the area of LAWS. Attacks involving the use of weapons systems based on emerging technologies in the area of LAWS may only be directed against military objectives.

14. Proportionality. The expected loss of civilian life, injury to civilians, and damage to civilian objects incidental to attacks involving the use of weapons systems based on emerging technologies in the area of LAWS must not be excessive in relation to the concrete and direct military advantage expected to be gained.

• **Necessity:** The principle of military necessity permits measures, including measures and weapons which engage autonomous functions, which are necessary to accomplish a legitimate military purpose and are not otherwise prohibited by international humanitarian law.

• **Humanity:** Parties to an armed conflict are prohibited from the infliction of all suffering, injury or destruction which not necessary for achieving the legitimate purpose of a conflict. Compliance with the principle of humanity requires judgement and understanding as to the nature of human suffering and any use of an autonomous weapons system which fails to have regard to this requirement for judgement and understanding in a manner that is able to balance this against the legitimate purpose of the conflict is unlawful.

• **Martens Clause:** The right of parties to conflict to choose means and methods of warfare is not unlimited, IHL instruments that in cases not specifically covered by the provisions of its instruments, the civilian population and the combatants shall at all times remain under the protection and

		<p>15. Precautions in attack. Feasible precautions must be taken in planning and conducting attacks involving the use of weapons systems based on emerging technologies in the area of LAWS to spare, as far as possible, civilians and civilian objects from the loss of life, injury, and damage or destruction. Feasible precautions are those that are practicable or practically possible, taking into account all circumstances ruling at the time, including humanitarian and military considerations.</p>		<p>authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.</p> <ul style="list-style-type: none">• <u>Feasible precautions:</u> In the conduct of military operations, constant care must be taken to spare the civilian population, civilians and civilian objects. All feasible precautions must be taken to avoid, and in any event to minimize, incidental loss of civilian life, injury to civilians and damage to civilian objects. This obligation falls on persons who plan or decide upon an attack, autonomous systems may be engaged in realising this obligation, but the obligation cannot be divested onto the system.	
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2. WEAPONS PROHIBITIONS AND OTHER REGULATIONS/RESTRICTIONS

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<p>Recommendations on prohibitions and regulations</p> <p>1. Due to the challenges presented by the nature of AWS, in order to fully comply with key legal obligations and ethical precepts, States shall:</p> <p>1.1. Prohibit the development and the use of AWS that cannot be controlled by humans, therefore subject to cognitive and epistemological limitations, as well as algorithm bias.</p> <p>1.2. Prohibit the development and the use of AWS whose programming might remove human control over critical functions related to the use of force.</p>	<p>1. Normative Framework. “Operative” part</p> <p>2. The normative framework could then affirm a number of principles for the development and use of weapons systems in the area of LAWS. This “operative” part should build on the already endorsed 11 guiding principles, while elaborating further on the issue of human- machine interaction:</p> <p>b. Clear commitment by High Contracting Parties (HPC) not to develop, produce, acquire, deploy or use fully autonomous lethal weapons systems operating completely outside human chain of command and control. To that end, the HCP would agree to implement necessary measures at national level;</p>	<p>Weapons Prohibited from Use in All Circumstances</p> <p>10. A weapons system based on emerging technologies in the area of LAWS must not be used if it is of a nature to cause superfluous injury or unnecessary suffering, if it is inherently indiscriminate, or if it is otherwise incapable of being used in accordance with international humanitarian law. (Sixth RevCon Declaration ¶19).</p> <p>10. To prevent the development of such weapons systems based on emerging technologies in the area of LAWS that could not, under any circumstances, be used in compliance with international humanitarian law:</p> <p>a. Weapons systems must not be designed to be used to conduct attacks against the civilian population, including</p>	<p>1. Recognize the common grounds</p> <p>5. The fundamental starting point that AWS that cannot be used in accordance with International Humanitarian Law (IHL) must not be developed, deployed, or used and are de facto already prohibited, and that AWS that would select and engage targets without any human control would not only be unlawful, but they would also be questionable from an ethical point of view, particularly with regard to the need to uphold human dignity;</p> <p>6. The need to work collaboratively to prohibit or regulate AWS that are not sufficiently predictable or controllable to meet legal requirements and in a manner that sufficiently addresses relevant ethical perspectives;</p>		<p>3. Recognise the urgent need for adequate rules and limits on the development, deployment, and use of autonomous weapons systems to ensure sufficient human involvement and oversight.</p> <p>7. Emphasise that this determination is based on the shared view that there is an urgent requirement for the international community to address the particular risks and challenges posed by the integration of autonomy in weapons systems through the development of effective and multilaterally agreed rules, limits and other measures for such systems.</p> <p>9. Recognise as a fundamental starting point that autonomous weapon systems that cannot be used in accordance with international humanitarian</p>

<p>1.3 Prohibit the development and the use of AWS that cannot be used in compliance with IHL, including AWS that:</p> <p>1.3.1. Cannot be directed at a specific military objective;</p> <p>1.3.2. Cause superfluous injury or unnecessary suffering; or</p> <p>1.3.3. Have effects that cannot be limited as required by IHL.</p> <p>1.4. Prohibit the development and use of AWS whose effects cannot be sufficiently understood, predicted and explained.</p> <p>1.5. States shall prohibit the development and the use of AWS that preclude attribution of State and individual legal responsibilities for the consequences of their use.</p> <p>2. Positive obligations, in the form of regulations, should be developed to ensure humans exercise control in the use of AWS, in line with their obligations under IHL and ethical requirements, notably in terms of:</p> <p>2.1. Ensuring that sufficient human control is exercised over the critical functions of AWS of target</p>	<p>c. Agreement by the HCP that lethal weapons systems featuring autonomy must only be developed, produced, acquired, modified, deployed and used in accordance with the following provisions:</p> <ul style="list-style-type: none"> • Ensure compliance with international law when studying, acquiring, adopting or modifying (legal review – see guiding principle e) and using lethal weapons systems featuring autonomy; • Preserve human responsibility and accountability (see guiding principles b and d) at all times, in all circumstances and across the entire life cycle as basis for state and individual responsibility – human responsibility and accountability can never be transferred to machines. This requires spatial and temporal limits on such weapons systems that may vary according to the situation / context of their employment. • Retain appropriate/ sufficient human control during the whole life-cycle of the system considered (see guiding principle c) by ensuring that humans will still be in a position to: 	<p>attacks to terrorize the civilian population;</p> <p>b. Weapons systems must not be designed to cause incidental loss of civilian life, injury to civilians, and damage to civilian objects that would invariably be excessive in relation to the concrete and direct military advantage expected to be gained;</p> <p>c. The autonomous functions in weapons systems must not be designed to be used to conduct attacks that would not be the responsibility of the human command under which the weapon system would be used;</p> <p>d. Weapons systems are to be developed such that their effects in attacks can be anticipated and controlled, as may be required, in the circumstances of their use, by the principles of distinction and proportionality and such that attacks conducted with reliance upon their autonomous functions will be the responsibility of the human command under which the system was used.</p>	<p>7. The need to work collaboratively to identify and agree on limits and other regulations to uphold the rules of IHL;</p> <p>9. the value of voluntary measures such as the sharing of national policy and standards and good practice guidance, which can act as confidence building measures that complement, but are not replacement for, and without prejudice to, international rules and regulations on AWS;</p> <p>II. Elaborate these common grounds</p> <p><u>Introduction</u></p> <p>1. Recall the objectives and purposes of the CCW, specifically “the need to continue the codification and progressive development of the rules of international law applicable in armed conflict.”</p> <p>3. Recognize that new legally binding rules and principles are needed to safeguard against such risks and challenges.</p> <p><u>General commitments</u></p> <p>16. Agree to prohibit the development, production, possession, acquisition, deployment, transfer or use under any circumstances of AWS if:</p>		<p>law, must not be developed, deployed or used and are de facto already prohibited. Also recognise that autonomous weapons systems that would select and engage targets without any human control, would not only be unlawful; they would also be questionable from an ethical point of view, particularly with regard to human dignity.</p> <p>10. Commit to work collaboratively to prohibit autonomous weapons systems that are not sufficiently predictable or controllable to meet legal requirements, and in a manner that addresses ethical imperatives.</p> <p>11. Commit to work collaboratively to identify and agree on limits and other regulations to uphold the rules of international humanitarian law for other types of autonomous weapons systems, including through, for example:</p> <ul style="list-style-type: none"> – Limits on the type of target; – Limits on the duration, geographical scope and scale of use; – Requirements for human-machine interaction/human control to ensure effective oversight of a weapon system and allow for timely intervention and deactivation;
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<p>selection and application of force throughout the development and use of the weapon.</p> <p>2.2. While recognizing that the nature and degree of human control may vary during all/different stages of a weapon’s development and use, a human agent shall:</p> <p>2.2.1. Be certain that there are adequate environmental limits in place, including spatial and temporal limits;</p> <p>2.2.2. Be fully aware and approve any decision on determining the operational context through a sufficient level of situational awareness;</p> <p>2.2.3. Be certain on the reliability and predictability in the identification, selection and engagement of targets;</p> <p>2.2.4. Take the necessary precautions during the conduct of operations to ensure that a weapons system is not able to change mission parameters without human validation.</p>	<ul style="list-style-type: none"> - understand - depending on their role and level of responsibilities - the systems’ way of operating, effect and likely interaction with its environment; - evaluate and monitor the reliability of the systems; - validate the usability/ serviceability of the systems; - define and validate rules of use and rules of engagement; - define and validate a precise framework for the mission assigned to the system (objective, type of targets, restrictions in time and space, etc.); - exercise their judgement with regard to compliance with IHL in the framework and context of an attack, and thus take critical decisions over the use of force. 	<p>Other Prohibitions or Restrictions on the Use of Weapons Systems Based on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p> <p>12. The potential use of weapons systems based on emerging technologies in the area of LAWS must be conducted in accordance with applicable international law, in particular international humanitarian law and its requirements and principles, including, inter alia, distinction, proportionality, and precautions in attack. (2019 GGE Report ¶17a).</p> <p>a. These international humanitarian law requirements and principles must be applied through a chain of responsible command and control by the human operators and commanders who use weapons systems based on emerging technologies in the area of LAWS. (based on 2019 GGE Report ¶17d).</p> <p>b. Compliance with these international humanitarian law requirements and principles in the potential use of weapons systems based on emerging technologies in the area of LAWS requires, inter alia, that human beings make certain judgements in on good faith based on their assessment of the information available to them at the time. (based 2019 GGE Report ¶17f).</p>	<p>16.1. its autonomous functions are designed to be used to conduct attacks outside a responsible chain of human command and control; and</p> <p>16.2. its use cannot comply with principles of IHL or the dictates of public conscience. This includes systems that:</p> <p>16.2.1. are incapable of distinguishing between civilians, enemy combatants and combatants hors de combats;</p> <p>16.2.2. Are of a nature to cause superfluous injury or unnecessary suffering or are inherently indiscriminate.</p> <p>18. Recognize the need to prevent the development of AWS that cannot be used in accordance with IHL by ensuring, inter alia, that:</p> <p>18.1. Weapon systems are not designed to be used to conduct attacks against the civilian population, including attacks against civilian population and attacks to terrorize the civilian population;</p> <p>18.2. Weapon systems are not designed to cause incidental loss of civilian life, injury to civilians, and damage to civilian objects expected to be gained;</p>		<ul style="list-style-type: none"> - Clear procedures to ensure that human operators are informed and empowered to effect or control autonomous weapon systems. <p>13. Acknowledge that voluntary measures, such as the sharing of national policy standards and good practice guidance, can act as confidence building measures that complement, but are not a replacement for, and are without prejudice to, international rules and regulations on autonomous weapons systems.</p>
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<p>2.2.5. Allow for constant human supervision and ensure intervention where necessary as to be able to:</p> <p>2.2.5.1. Interrupt and deactivate the weapon during its operation phase.</p> <p>2.2.5.2. Verify that auto-deactivation functions as intended when this would be required in the legal assessment of the user.</p> <p>2.2.6. It is the responsibility of commanders and operators to ensure that they can comply with their legal obligations in the deployment and use of AWS.</p>		<p>13. Distinction. Civilians and civilian objects must not be made the object of attacks involving the use of weapons systems based on emerging technologies in the area of LAWS. Attacks involving the use of weapons systems based on emerging technologies in the area of LAWS may only be directed against military objectives.</p> <p>14. Proportionality. The expected loss of civilian life, injury to civilians, and damage to civilian objects incidental to attacks involving the use of weapons systems based on emerging technologies in the area of LAWS must not be excessive in relation to the concrete and direct military advantage expected to be gained.</p> <p>15. Precautions in attack. Feasible precautions must be taken in planning and conducting attacks involving the use of weapons systems based on emerging technologies in the area of LAWS to spare, as far as possible, civilians and civilian objects from the loss of life, injury, and damage or destruction. Feasible precautions are those that are practicable or practically possible, taking into account all circumstances ruling at the time, including humanitarian and military considerations.</p>	<p>that would invariably be excessive in relation to the concrete and direct military advantage and</p> <p>18.3. the autonomous function in weapon systems must not be designed to be used to conduct attacks that would not be the responsibility of the human commander under which the weapon systems would be used.</p> <p>19. Recognize the need to implement regulations to ensure that all weapon systems incorporating autonomy must be used with meaningful human control.</p>		
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3. APPLICATIONS OF INTERNATIONAL HUMAN RIGHTS LAW (IHRL) AND INTERNATIONAL CRIMINAL LAW (ICL)

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<p>Recommendations towards a normative framework</p> <p>2. International Law, particularly IHL, International Human Rights Law, International Criminal Law, and the principles enshrined in the Charter of the United Nations, fully apply to the development and the use of AWS.</p>			<p>II. Elaborate these common grounds</p> <p><u>Introduction</u></p> <p>2. Recognize the risks and challenges posed by autonomous weapon systems to:</p> <p>2.1. Compliance with international law, including IHL, international human rights law (IHRL), and international criminal law (ICL);</p> <p><u>General commitments</u></p> <p>21. Reaffirm that the conduct of a state’s organs such as its agents and all persons forming part of its armed forces, is attributable to that state. In accordance with IHL, IHRL, and ICL, this includes any such acts and omissions involving the use of AWS.</p>		

4. CHARACTERIZATION

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<p>Recommendations towards a normative framework</p> <p>9. We fully agree with the ICRC which has considered “autonomous weapon systems” an umbrella term encompassing any weapon system with autonomy in the critical functions of selecting and attacking targets. In other words, the user does not choose the specific target. The fundamental characteristic would be the role of the human user, avoiding technical definitions that might be soon outdated and might lead to unnecessary sub-classifications not needed for effective regulation and possibly outdated from a technological perspective as well.</p>	<p>Normative Framework “Operative” part</p> <p>2. The normative framework could then affirm a number of principles for the development and use of weapons systems in the area of LAWS. This “operative” part should build on the already endorsed 11 guiding principles, while elaborating further on the issue of human- machine interaction:</p> <p>b. Clear commitment by High Contracting Parties (HPC) not to develop, produce, acquire, deploy or use fully autonomous lethal weapons systems operating completely outside human chain of command and control. To that end, the HCP would agree to implement necessary measures at national level.</p>	<p>Characteristics and Concepts</p> <p>3. The role and impacts of autonomous functions in the identification, selection, or engagement of a target are among the essential characteristics of weapons systems based on emerging technologies in the area of LAWS. (based on 2019 GGE Report ¶19a).</p> <p>4. Emerging technologies in the area of LAWS can include novel advancements in the field of Artificial Intelligence.</p> <p>5. These principles and good practices may be of particular relevance when considering uses of weapons systems based on emerging technologies in the area of LAWS in which the system operator relies on autonomous functions to select and engage targets with lethal force and, before activation, the system operator does</p>	<p>II. Elaborate these common grounds</p> <p><u>Characterization</u></p> <p>6. Recognize that an exact technical definition of AWS is not required for the elaboration, development, and negotiation of any normative and operational framework in the context of the Convention, bearing in mind that autonomy exists on a spectrum and purely technical characteristics may alone not be sufficient to characterize AWS in view of rapid evolution in technology.</p> <p>7. Recognize that a working characterization is a useful starting point and that such characterization should focus on the human element and human-machine interaction since these are essential to addressing the issue of attribution of responsibility.</p>		<p>9. Recognise as a fundamental starting point that autonomous weapon systems that cannot be used in accordance with international humanitarian law, must not be developed, deployed or used and are <i>de facto</i> already prohibited. Also recognise that autonomous weapons systems that would select and engage targets without any human control, would not only be unlawful; they would also be questionable from an ethical point of view, particularly with regard to human dignity.</p>

not identify a specific target or targets for intended engagement.

6. The following considerations may continue to aid the identification of characteristics and concepts relevant to emerging technologies in the area of LAWS and to the application of these principles and good practices:

a. Characterization, or working definitions, should neither predetermine nor prejudge policy choices; they should be universally understood by stakeholders. (2018 GGE Report ¶22a).

b. Purely technical characteristics such as physical performance, endurance, or sophistication in target acquisition and engagement may alone not be sufficient to characterize LAWS, especially in view of rapid evolution in technology. (2018 GGE Report ¶22b).

c. Attempting to define a general threshold level of autonomy based on technical criteria alone could pose difficulty because autonomy exists on a spectrum, understandings of autonomy change with shifts in the technology frontier, and different

8. Affirm that a weapon system may be characterized as an AWS if it incorporates autonomy into the critical functions of selecting and engaging to apply force against targets, without human intervention. This means that a target is selected and force is applied based on the processing of sensor data, rather than direct human inputs.

9. Affirm that lethality is not an intrinsic characteristic of a weapon system but an effect or manner of use, and that any weapon system can be contrary to international law regardless of whether it is lethal or not.

		<p>functions of a weapons system could have different degrees of autonomy. (based on 2018 GGE Report ¶22c).</p> <p>d. A focus on characteristics related to the human element in the use of force and its interface with machines is necessary in addressing accountability and responsibility. (based on 2018 GGE Report ¶22f)</p>			
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5. HUMAN-MACHINE INTERACTION/HUMAN CONTROL

Elements for a Future Normative Framework Conducive to a Legally Binding Instrument to Address the Ethical Humanitarian and Legal Concerns Posed by Emerging Technologies in the Area Of (Lethal) Autonomous Weapons (LAWS)	Outline for a Normative and Operational Framework on Emerging Technologies in the Area of LAWS	Principles and Good Practices on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems	Roadmap Towards New Protocol on Autonomous Weapons Systems	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)	Working Paper submitted to the 2022 Chair of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS)
<p>General Introductory remarks</p> <p>[...] a holistic, multidimensional understanding of technology and specifically of the interdependency of new technologies is sorely needed, in order to fully grasp its shaping, annulation and magnifying effects over human agency.</p> <p>Recommendations towards a normative framework</p> <p>6. Meaningful human control shall be ensured so that the use of such systems is compliant with applicable international law, in particular with international humanitarian law.</p> <p>7. In determining the quality and extent of human control, a range of</p>	<p>I. Normative Framework “Operative” part</p> <p>2. c. Agreement by the HCP that lethal weapons systems featuring autonomy must only be developed, produced, acquired, modified, deployed and used in accordance with the following provisions</p> <ul style="list-style-type: none"> • Preserve human responsibility and accountability (see guiding principles b and d) at all times, in all circumstances and across the entire life cycle as basis for state and individual responsibility – human responsibility and accountability can never be transferred to machines. This requires spatial and temporal limits on such weapons systems that may vary according to the situation/context of their employment. 	<p>Characteristics and concepts</p> <p>6. The following considerations may continue to aid the identification of characteristics and concepts relevant to emerging technologies in the area of LAWS and to the application of these principles and good practices:</p> <p>d. A focus on characteristics related to the human element in the use of force and its interface with machines is necessary in addressing accountability and responsibility. (based on 2018 GGE Report ¶22f).</p>	<p>I. Recognize the common grounds:</p> <p>1. The importance of the centrality of the human element in the use of force and the recognition that AWS raise important challenges with respect to human control and judgment over the use of force is important;</p> <p>2. The importance of ensuring that human beings retain decisions with regard to the use of force, exert control over weapon systems that they use, and remain accountable for decisions over the use of force;</p> <p>II. Elaborate these common grounds Introduction</p> <p>4. Affirm that responsibility and accountability for decisions on the use of force must be retained by humans, since this cannot be transferred to machines,</p>	<p>ANNEX A - a possible outline</p> <p>Research and Development</p> <p>Human understanding:</p> <ul style="list-style-type: none"> • What levels are acceptable and how could it be measured or assessed? Could an end user understand the concept for use? What level of understanding is required by each individual within the authority chain of weapon deployment? <p>Training and planning for use</p> <p>Linked to the above section, this would set out how states might best ensure a system is understood by those who would operate it. Potential areas for further clarification could include:</p>	<p>1. Acknowledge the centrality of the human element in the use of force and recognise that autonomous weapons systems raise important challenges with respect to human control and judgement over the use of force as well as serious concerns from humanitarian, legal, security and ethical perspectives.</p> <p>2. Emphasise that human beings must make the decisions with regard to the use of force, exert control over weapons systems that they use, and remain accountable for decisions over the use of force in order to ensure compliance with International Law, in particular International Humanitarian Law.</p>

factors should be considered, during all/different stages of a weapon's development and use, the operational context and the characteristics and capabilities of the autonomous weapons systems as a whole. Possible interactions with other AWS or technologies must also be taken into consideration.

8. Choices made exclusively by algorithms integrated in autonomous weapons systems, with regard to the selection of targets or the use of force, shall never be considered tantamount to human control.

9. We fully agree with the ICRC which has considered "autonomous weapon systems" an umbrella term encompassing any weapon system with autonomy in the critical functions of selecting and attacking targets. In other words, the user does not choose the specific target. The fundamental characteristic would be the role of the human user, avoiding technical definitions that might be soon outdated and might lead to unnecessary sub-classifications not needed for effective regulation and possibly outdated from a technological perspective as well.

- Retain appropriate/sufficient human control during the whole life-cycle of the system considered (see guiding principle c) by ensuring that humans will still be in a position to:

- Understand - depending on their role and level of responsibilities - the systems' way of operating, effect and likely interaction with its environment;

- Evaluate and monitor the reliability of the systems;

- Validate the usability/serviceability of the systems;

- Define and validate rules of use and rules of engagement;

- Define and validate a precise framework for the mission assigned to the system (objective, type of targets, restrictions in time and space, etc.);

- Exercise their judgement with regard to compliance with IHL in the framework and context of an attack, and thus take critical decisions over the use of force.

Other Prohibitions or Restrictions on the Use of Weapons Systems Based on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems

12. a. These international humanitarian law requirements and principles must be applied through a chain of responsible command and control by the human operators and commanders who use weapons systems based on emerging technologies in the area of LAWS. (based on 2019 GGE Report ¶17d).

b. Compliance with these international humanitarian law requirements and principles in the potential use of weapons systems based on emerging technologies in the area of LAWS requires, inter alia, that human beings make certain judgements in good faith based on their assessment of the information available to them at the time. (based on 2019 GGE Report ¶17f).

Responsibility and Accountability

16. General Considerations. The following principles related to accountability and responsibility, although

5. Affirm that context-based human judgement and control is essential in order to ensure that the use of AWS is in compliance with international law, and in particular IHL.

Meaningful human control

10. Recognize that meaningful human control is context-based, dynamic, multidimensional, and situation-dependent. Meaningful human control must ensure that a human can make moral and legal judgement over the acceptability of the effects of an attack. It must also ensure that there is a human user who is legally and morally responsible for the effects of an attack.

11. Recognize that meaningful human control consists of the elements of human judgment and human intervention. Human judgment refers to the application of human agency in undertaking decisions regarding the use of any weapon. Human intervention, on the other hand, refers to the ability of the operators to effectively supervise any weapon, to undertake the necessary interaction that could either be directive or preventive, and to deactivate, terminate, or abort the operation of the weapon altogether.

- How is best training developed? How do varying levels of autonomy change this at both individual and collective levels?

- How does training prepare the force for the use of AI enabled systems under the most stressing scenarios (this might include situational complexity, uncertainty, high workload, high tempo etc)?

- How does training address the procedural, C2 and safety precautions that support compliance with IHL?

- How is complexity managed? What levels of understanding are acceptable?

- How does this enable adequate understanding of a system and allow calibration of appropriate trust? How is 'adequate' determined?

Deployment and use

This section would set out agreements and good practices for how operators and commanders can ensure compliance with IHL when using systems with autonomy in operations. Potential areas for further clarification could include:

- How accountability and responsibility are determined, agreed and set out

3. Recognise the urgent need for adequate rules and limits on the development, deployment, and use of autonomous weapon systems to ensure sufficient human involvement and oversight.

11. Commit to work collaboratively to identify and agree on limits and other regulations to uphold the rules of international humanitarian law for other types of autonomous weapons systems, including through, for example::

- Requirements for human-machine interaction/human control to ensure effective oversight of a weapon system and allow for timely intervention and deactivation;

- Clear procedures to ensure that human operators are informed and empowered to effect or control autonomous weapon systems.

10.2. Decisions on the use of AWS shall be made within an established chain of human command and control, so as to allow for legal assessments regarding conduct, intent and causality, before, during and after the use of AWS.

Recommendations on prohibitions and regulations:

1. Due to the challenges presented by the nature of AWS, in order to fully comply with key legal obligations and ethical precepts, States shall:

1.1. Prohibit the development and the use of AWS that cannot be controlled by humans, therefore subject to cognitive and epistemological limitations, as well as algorithm bias.

1.2. Prohibit the development and the use of AWS whose programming might remove human control over critical functions related to the use of force.

2. Positive obligations, in the form of regulations, should be developed to ensure humans exercise control in the use of AWS, in line with their obligations under IHL and ethical requirements, notably in terms of:

II – Operational Framework

3. To operationalize the principles enshrined in the normative framework, the High Contracting Parties could agree on a compilation of measures and policies, to be implemented at national level:

a. To operationalise the general provision related to preserving human responsibility and accountability:

- doctrines and procedures defined for the use of lethal weapons systems featuring autonomy;
- adequate training for human decision makers and operators to understand the system’s effect and its likely interaction with its environment;
- human responsibility for decisions to deploy and for the definition and validation of the rules of operation, use and engagement;
- operation of the system within a responsible chain of human command and control ;
- accountability in the event of IHL violations:

– measures enabling an after action review of the system to assess compliance with IHL of a system, unless technically or operationally not feasible;

not exhaustive, should be considered across the entire life cycle of weapons systems based on emerging technologies in the area of LAWS:

- a.** Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. (Guiding Principle (b)).
- b.** Humans must at all times remain accountable in accordance with applicable international law for decisions on the use of force. (Sixth RevCon Declaration ¶20 / 2018 GGE Report ¶23a).

Good Practices Related to Human-Machine Interaction

19. Human-machine interaction, which may take various forms and be implemented at various stages of the life cycle of a weapon, should ensure that the potential use of weapons systems based on emerging technologies in the area of LAWS is in compliance with applicable international law, in particular international humanitarian law. In determining the quality and extent of human-machine interaction, a range of factors should be considered including the

12. Recognize that the application of machine learning could have implications on the maintenance of meaningful human control over an AWS.

13. Affirm that any weapon system in which the system operator relies on autonomous functions to select and engage targets with lethal force and, before activation, the system does not identify target and targets for intended engagement are by definition outside the scope of meaningful human control.

General commitments

16. Agree to prohibit the development, production, possession, acquisition, deployment, transfer or use under any circumstances of AWS if:

16.1. its autonomous functions are designed to be used to conduct attacks outside a responsible chain of human command and control;

19. Recognize the need to implement regulations to ensure that all weapon systems incorporating autonomy must be used with meaningful human control.

– how this changed from previous conclusion earlier in the cycle?

- Are operational limits or parameters needed – how are these best determined and defined?
- When might commanders wish to abort the use of such systems? What considerations should be taken into account? How should this be this handled in practice?
- How is situational understanding passed between human and system?
- Where must human control be present or absent, or what degrees of control are necessary?

Human-Machine Interaction

This would be an overarching theme throughout the whole document. The document would need to address the level of human involvement is necessary to achieve the IHL ends. How does this involvement vary across different systems and in different environments in order to meet the best outcomes in terms of applying the principles of IHL? Equally what are the implications of autonomous systems for chains of accountability and the need for humans to be accountable for IHL outcomes?

2.1. Ensuring that sufficient human control is exercised over the critical functions of AWS of target selection and application of force throughout the development and use of the weapon.

2.2. While recognizing that the nature and degree of human control may vary during all/different stages of a weapon's development and use, a human agent shall: .

2.1. Be certain that there are adequate environmental limits in place, including spatial and temporal limits;

2.2.2. Be fully aware and approve any decision on determining the operational context through a sufficient level of situational awareness;

2.2.3. Be certain on the reliability and predictability in the identification, selection and engagement of targets;

2.2.4. Take the necessary precautions during the conduct of operations to ensure that a weapons system is not able to change mission parameters without human validation.

– mechanisms to report violations, investigation by States of credible allegations of IHL violations by their armed forces, their nationals or on their territory;

– disciplinary procedures and prosecution of suspected perpetrators of grave breaches of IHL as appropriate.

b. To operationalise the general provision 2c, an appropriate/ sufficient scheme of human control considered during the whole life cycle of the system, must be put in place, taking into account the system's characteristics and its operational framework:

- Overall. Humans must have sufficient assurance that weapons systems, once activated, act in a foreseeable manner in order to determine that their actions are entirely in conformity with applicable national and international law, rules of engagement, and the intentions of its commanders and operators. For this purpose, developers, commanders and operators must have a sufficient understanding of the weapons systems' way of operating, which enable the commanders and operators to predict (prospective focus) and explain (retrospective) the behavior of the weapons systems.

operational context, and the characteristics and capabilities of the weapons system as a whole. (Guiding Principle (c)).

20. At various stages of the life-cycle of a weapon, the following good practices related to human-machine interaction can strengthen compliance with international humanitarian law, strengthen accountability, and mitigate risks in the use of weapons systems based on emerging technologies in the area of LAWS:

a. Conducting legal reviews (2019 GGE Report ¶23b), including the practices described in paragraph 24;

b. Conducting rigorous testing and evaluation of systems (2019 GGE Report ¶23b), such as to ensure that they function as anticipated in realistic operational environments;

c. Providing for physical security and appropriate non-physical safeguards, including cyber security against hacking or data spoofing (Guiding Principle (f));

d. Incorporating readily understandable human-machine interfaces and controls (2019 GGE Report ¶23b);

<p>2.2.5. Allow for constant human supervision and ensure intervention where necessary as to be able to:</p> <p>2.2.5.1. Interrupt and deactivate the weapon during its operation phase.</p> <p>2.2.5.2. Verify that auto-deactivation functions as intended when this would be required in the legal assessment of the user.</p> <p>2.2.6. It is the responsibility of commanders and operators to ensure that they can comply with their legal obligations in the deployment and use of AWS.</p> <p>[...] Any further recommendations shall be grounded so as to preserve human control and to avoid any accountability gap.</p>	<ul style="list-style-type: none"> • Development. Testing and certification procedures to assess the reliability and the predictability of the system and its potential interaction with the environment of use and to allow for the required legal review; • Deployment. Definition or validation by the human command of a precise set of parameters for the system's mission (objective, type of targets, restrictions in time and space, etc.); • Use. Set of measures enabling human operators to assess and ensure compliance with IHL – in particular principles of distinction, proportionality and precautions in attack – during operation: human approval for any substantial modification of the mission's parameters; communication links; ability to de-activate the system if and when necessary, unless technically not feasible. 	<p>e. Establishing policies, doctrine and procedures (based on 2019 GGE Report ¶23b), such as guidance on the ethical development and use of emerging technologies;</p> <p>f. Training personnel (2019 GGE Report ¶23b), such as training to enable system operators and commanders to understand the functioning, capabilities, and limitations of the system's autonomy in realistic operational conditions;</p> <p>g. Ensuring a domestic legal framework under which a State can hold its personnel accountable;</p> <p>h. Circumscribing weapons use through appropriate rules of engagement (2019 GGE Report ¶23b);</p> <p>i. Conducting operations under a responsible command;</p> <p>j. Reporting incidents that may involve violations;</p> <p>k. Conducting assessments, investigations, or other reviews of incidents that may involve violations; and</p> <p>l. Taking measures to mitigate the risk of unintended engagements, such as those described in paragraph 29.</p>			
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6. RESPONSIBILITY AND ACCOUNTABILITY

<p>Elements for a Future Normative Framework Conducive to a Legally Binding Instrument to Address the Ethical Humanitarian and Legal Concerns Posed by Emerging Technologies in the Area Of (Lethal) Autonomous Weapons (LAWS)</p>	<p>Outline for a Normative and Operational Framework on Emerging Technologies in the Area of LAWS</p>	<p>Principles and Good Practices on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p>	<p>Roadmap Towards New Protocol on Autonomous Weapons Systems</p>	<p>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)</p>	<p>Working Paper submitted to the 2022 Chair of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS)</p>
<p>Recommendations towards a normative framework</p> <p>10. International responsibility rules shall apply to the use of weapons systems based on emerging technologies in the area of AWS. States and individuals shall remain responsible for violations of international law, including international humanitarian law, incurred during the development and use of those weapons systems.</p> <p>10.1. In the development and use of AWS, States shall take measures to ensure that responsibility can be attributed to States and individuals throughout the development and use of AWS, from the definition of military, strategic and operational-level</p>	<p>I. Normative Framework. “Operative” part</p> <p>2. The normative framework could then affirm a number of principles for the development and use of weapons systems in the area of LAWS. This “operative” part should build on the already endorsed 11 guiding principles, while elaborating further on the issue of human-machine interaction:</p> <p>c. Agreement by the HCP that lethal weapons systems featuring autonomy must only be developed, produced, acquired, modified, deployed and used in accordance with the following provisions:</p> <ul style="list-style-type: none"> • Preserve human responsibility and accountability (see guiding principles b and d) at all times, in all circumstances and across 	<p>Responsibility and Accountability</p> <p>16. General Considerations. The following principles related to accountability and responsibility, although not exhaustive, should be considered across the entire life cycle of weapons systems based on emerging technologies in the area of LAWS:</p> <p>a. Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. (Guiding Principle (b)).</p> <p>b. Humans must at all times remain accountable in accordance with applicable international law for decisions on the use of force. (Sixth RevCon Declaration ¶20 / 2018 GGE Report ¶23a).</p>	<p>I. Recognize the common grounds</p> <p>2. The importance of ensuring that human beings retain decisions with regard to the use of force, exert control over weapon systems that they use, and remain accountable for decisions over the use of force.</p> <p>11. the need to ensure that, in accordance with the principle of state responsibility, every internationally wrongful act of a state, including such other actions or omissions involving the use of AWS, entails the international responsibility of that state;</p>		<p>2. Emphasis that human beings must make the decisions with regard to the use of force, exert control over weapons systems that they use, and remain accountable for decisions over the use of force in order to ensure compliance with international law, in particular International Humanitarian Law</p>

objectives, to the research and development, design, manufacturing, deployment and use.

10.2. Decisions on the use of AWS shall be made within an established chain of human command and control, so as to allow for legal assessments regarding conduct, intent and causality, before, during and after the use of AWS.

Recommendations on prohibitions and regulations

3. In order to comply with the obligation that States must prosecute and punish crimes under international law, States should ensure that there are means to conduct effective investigations, prosecution and punishment for violations incurred during the use of AWS, so as to ensure state and individual responsibilities and prevent an accountability gap.

the entire life cycle as basis for state and individual responsibility – human responsibility and accountability can never be transferred to machines. This requires spatial and temporal limits on such weapons systems that may vary according to the situation/context of their employment.

II. Operational Framework

3. To operationalize the principles enshrined in the normative framework, the High Contracting Parties could agree on a compilation of measures and policies, to be implemented at national level:

a. To operationalise the general provision related to preserving human responsibility and accountability:

- Doctrines and procedures defined for the use of lethal weapons systems featuring autonomy;
- Adequate training for human decision makers and operators to understand the system's effect and its likely interaction with its environment;
- Human responsibility for decisions to deploy and for the definition and validation of the rules of operation, use and engagement;

17. Responsibility and International Humanitarian Law. International humanitarian law imposes obligations on States, parties to armed conflict, and individuals, not machines. (2019 GGE Report ¶17b).

a. States, parties to armed conflict, and individuals remain at all times responsible for adhering to their obligations under applicable international law, including international humanitarian law.

b. States must also ensure individual responsibility for the employment of means or methods of warfare involving the potential use of weapons systems based on emerging technologies in the area of LAWS in accordance with their obligations under international humanitarian law. (2019 GGE Report ¶17c).

18. *State Responsibility.* Under principles of State responsibility:

a. Every internationally wrongful act of a State, including such conduct involving the use of a weapons system based on emerging technologies in the area of LAWS, entails the international responsibility of that State.

II. Elaborate these common grounds

Introduction

4. Affirm that responsibility and accountability for decisions on the use of force must be retained by humans, since this cannot be transferred to machines.

General Commitments

20. Reaffirm that every internationally wrongful act of a state, including such conduct involving AWS, entails the international responsibility of that state.

21. Reaffirm that the conduct of a state's organs such as its agents and all persons forming part of its armed forces, is attributable to that state. In accordance with IHL, IHRL, and ICL, this includes any such acts and omissions involving the use of AWS.

	<ul style="list-style-type: none"> • Operation of the system within a responsible chain of human command and control ; • Accountability in the event of IHL violations: <ul style="list-style-type: none"> - Measures enabling an after action review of the system to assess compliance with IHL of a system, unless technically or operationally not feasible; - Mechanisms to report violations, investigation by States of credible allegations of IHL violations by their armed forces, their nationals or on their territory; - Disciplinary procedures and prosecution of suspected perpetrators of grave breaches of IHL as appropriate. 	<p>b. The conduct of a State's organs such as its agents and all persons forming part of its armed forces, is attributable to the State. This includes any such acts and omissions involving the use of a weapons system based on emerging technologies in the area of LAWS, in accordance with applicable international law.</p>			
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7. LEGAL REVIEWS

<p>Elements for a Future Normative Framework Conducive to a Legally Binding Instrument to Address the Ethical Humanitarian and Legal Concerns Posed by Emerging Technologies in the Area Of (Lethal) Autonomous Weapons (LAWS)</p>	<p>Outline for a Normative and Operational Framework on Emerging Technologies in the Area of LAWS</p>	<p>Principles and Good Practices on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p>	<p>Roadmap Towards New Protocol on Autonomous Weapons Systems</p>	<p>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)</p>	<p>Working Paper submitted to the 2022 Chair of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS)</p>
<p>Recommendations on prohibitions and regulations</p> <p>4. As a complimentary measure to those referred in sections 1, 2 and 3, regulations on the review of AWS, must include an assessment that allows for the understanding of their attributes and effects, in particular:</p> <p>4.1. Its design and characteristics;</p> <p>4.2. Its technical performance, including in terms of reliability and predictability and whether its foreseeable effects are capable of being limited to military objectives and controlled in time and space;</p> <p>4.3. Its intended or expected use; and</p>	<p>II. Operational Framework</p> <p>3. To operationalize the principles enshrined in the normative framework, the High Contracting Parties could agree on a compilation of measures and policies, to be implemented at national level:</p> <p>c) With regard to legal reviews:</p> <ul style="list-style-type: none"> • An encouragement to States that have not yet done so to join Additional Protocol I to the Geneva Conventions or to recognize the obligation to conduct legal weapon reviews on a unilateral basis. • An encouragement to voluntary exchanges of information and good practices within the committee of technical experts as a confidence building measure. 	<p>Legal Reviews</p> <p>21. In accordance with States' obligations under international law, in the study, development, acquisition, or adoption of a new weapon, means, or method of warfare, including such potential weapons systems based on emerging technologies in the area of LAWS, determination must be made whether its employment would, in some or all circumstances, be prohibited by international law. (based on Guiding Principle (e)).</p> <p>22. Legal reviews, at the national level, in the study, development, acquisition, or adoption of a new weapon, means, or method of warfare are a useful tool to assess nationally whether potential weapons</p>	<p>I. Recognize the common grounds</p> <p>8. The importance of the obligation of states to conduct national weapons review to determine, in the study, development, acquisition, or adoption of a new weapon, means, or method of warfare, whether its employment would, in some or all circumstances, be prohibited by international law;</p> <p>II. Elaborate these common grounds</p> <p><u>National weapons review</u></p> <p>23. Reaffirm that states have obligations under international law whereby, in the study, development, acquisition, or adoption of a new weapon, means or method of warfare,</p>	<p>ANNEX A - a possible outline</p> <p>Article 36 Weapon Reviews</p> <ul style="list-style-type: none"> • In the context of autonomous systems what information and level of understanding is necessary to inform an effective weapons review? • Does the inclusion of AI functionality make a difference in relation to the scope of the review or the resulting authorisation? • Does machine learning necessitate re-review and authorisation? If so how is this built into the review process and operationalised to ensure that the system does not exceed authorities? 	<p>12. Recall the obligation for States to conduct national weapon reviews, as codified in Article 36 of Additional Protocol I to the Geneva Conventions, to determine, in the study, development, acquisition or adoption of a new weapon, means or method of warfare, whether its employment would, in some or all circumstances, be prohibited by international law.</p> <p>While not sufficient to deal with all issues autonomous weapons systems raise, weapon reviews play an important complementary role and there is value in strengthening such reviews.</p>

4.4. The placement of adequate limits on tasks and types of targets, in particular there must be certainty that they are not prejudiced by technological or social biases.

4.5. Whether its employment in some or all circumstances would be prohibited under international humanitarian law and international law.

5. Legal reviews of AWS should adopt a precautionary approach and deny authorization when there might be less than full certainty of all the characteristics listed in the paragraph above.

Understanding the unviability of full disclosure by States of every aspect of a legal weapons' review due to strategic, defense, intellectual property and other considerations, there should be a parallel process to determine the specific characteristics that weapons systems reviews should have related to the use of emerging technologies. As such, a GGE within the CCW might be established to consider this issue.

Taking into account technological advancements which impact weapons systems

systems based on emerging technologies in the area of LAWS would be prohibited by any rule of international law applicable to that State in all or some circumstances. States are free to independently determine the means to conduct legal reviews, although the voluntary exchange of best practices could be beneficial, bearing in mind national security considerations or commercial restrictions on proprietary information. (2019 GGE Report ¶17i).

23. Weapons systems based on emerging technologies in the area of LAWS under development, or modification that significantly changes the use of existing weapons systems, must be reviewed as applicable to ensure compliance with international humanitarian law. (based on 2018 GGE Report ¶23(c)).

24. Legal reviews of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems can include the following good practices:

a. The legal review considers whether the weapon is of a nature to cause superfluous injury or unnecessary suffering, or if it is inherently indiscriminate, or is otherwise

determination must be made whether its employment would, in some or all circumstances, be prohibited by international law.

24. Recognize that legal weapon reviews at the national level are a useful tool to assess nationally whether potential weapons systems based on emerging technologies in the area of lethal autonomous weapons systems would be prohibited by any rule of international law applicable to that state in all or some circumstances.

25. Reaffirm that, where feasible and appropriate, interdisciplinary perspectives must be integrated in research and development, including through independent ethics review, bearing in mind national security considerations and restrictions on commercial proprietary information.

• How should the approval parameters applied to the system as a result of a weapons review be best effected through the authorisations process and through into Rules of Engagement (RoE)?

<p>based on emerging technologies, States may need to identify additional recommendations, provided that such additions are guided by the principles of humanity and the dictates of public conscience.</p> <p>Such recommendations may include additional prohibitions and regulations on weapons systems based on emerging technologies in the area of AWS, including elements of an effective verification mechanism.</p>		<p>incapable of being used in accordance with international humanitarian law. (Building on and implementing paragraph 10 above).</p> <p>b. If the use of the weapon is not prohibited, the legal review considers whether the use of the weapon is subject to the rules in any CCW Protocols or other rules applicable to certain types of weapons, applicable to the State in question.</p> <p>c. The legal review is conducted with an appropriate understanding of the weapons' capabilities and limitations, its planned uses, and its anticipated effects in those circumstances.</p> <p>d. The legal review advises on potential practical measures that would assist in ensuring compliance with international humanitarian law, such as the practices described in paragraph 20.</p>			
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8. RISK MITIGATION

<p>Elements for a Future Normative Framework Conducive to a Legally Binding Instrument to Address the Ethical Humanitarian and Legal Concerns Posed by Emerging Technologies in the Area Of (Lethal) Autonomous Weapons (LAWS)</p>	<p>Outline for a Normative and Operational Framework on Emerging Technologies in the Area of LAWS</p>	<p>Principles and Good Practices on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p>	<p>Roadmap Towards New Protocol on Autonomous Weapons Systems</p>	<p>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)</p>	<p>Working Paper submitted to the 2022 Chair of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS)</p>
<p>Conclusions</p> <p>Innovation and regulation need not be at odds. The history of technological innovation shows that the innovation in and of itself is not what matters: on the one hand you have the risks generated by hardware and software, but on the other hand -and the most important risk factor hinges on two questions: why and how we use it. At its core the main concern must be how we embed our fundamental values in each and every step of the development and deployment of the systems.</p>	<p>II. Operational Framework</p> <p>2. d. Commitment by the HCP to adopt and implement tailored risk mitigation measures and appropriate safeguards regarding safety and security (see guiding principles f and g).</p> <p>e. Establishment of a committee of technical experts within the CCW to monitor technological evolutions related to emerging technologies in the area of lethal autonomous weapons systems [see proposal from the Franco-German non-paper shared at the November 2017 GGE].</p>	<p>Good Practices Related to Human-Machine Interaction</p> <p>20. At various stages of the life-cycle of a weapon, the following good practices related to human-machine interaction can strengthen compliance with international humanitarian law, strengthen accountability, and mitigate risks in the use of weapons systems based on emerging technologies in the area of LAWS: [...]</p> <p>c. Providing for physical security and appropriate non-physical safeguards, including cyber security against hacking or data spoofing (Guiding Principle (f));</p>	<p>I. Recognize the common grounds</p> <p>4. The importance of relevant ethical perspectives in addressing these risks and challenges;</p> <p>12. The importance of ensuring physical security and appropriate non-physical safeguards, including cybersecurity against hacking or data spoofing, and of considering the risk of acquisition by terrorist groups and the risk of proliferation.</p> <p>II. Elaborate these common grounds</p> <p><u>Introduction</u></p> <p>2. Recognize the risks and challenges posed by autonomous weapon systems to:</p>	<p>ANNEX A - a possible outline</p> <p>Testing And Evaluation</p> <p>This section would set out what might be involved in the robust assessments of a system, and what practices help to provide confidence in its performance within the intended context of use. Acknowledging the through-life process, activities within this section would focus on compliance with the requirements documents, and legal, regulation and certification requirements. Potential areas for further clarification could include:</p> <ul style="list-style-type: none"> • How can bias and unintended harms, whether through their original rollout or as they learn, change and are redeployed, be identified and eliminated? 	<p>6. Recall the renewed determination, as expressed in the Final Declaration of the 6th CCW Review Conference, to intensify multilateral efforts to address the risks of emerging technologies in the area of autonomous weapons systems, taking into consideration, inter alia, the legal, military and technological aspects bearing in mind ethical perspectives.</p> <p>7. Emphasise that this determination is based on the shared view that there is an urgent requirement for the international community to address the particular risks and challenges posed by the integration of autonomy in weapons systems through the development of effective and multilaterally agreed rules, limits and other measures for such systems.</p>

SECTION II – OPERATIONAL FRAMEWORK

To operationalize the principles enshrined in the normative framework, the High Contracting Parties could agree on a compilation of measures and policies, to be implemented at national level:

3. d. With regard to appropriate safeguards:

- Adoption of measures to prevent the diversion of lethal weapons systems featuring autonomy (i.e. by regulating the production, acquisition and transfers of such systems)
- Implementation of measures to increase resilience against cyberattacks and, unless technically not feasible, procedures or mechanisms enabling the human operator to deactivate the system/self-deactivation/self-destruction mechanisms if the system overrides the framework of its mission without human validation.

Risk Assessments and Mitigation Measures

25. Risk assessments and mitigation measures should be part of the design, development, testing, and deployment cycle of weapons systems based on emerging technologies in the area of LAWS. (based on Guiding Principle (g)).

26. During the design, development, testing, and deployment of weapons systems based on emerging technologies in the area of LAWS, the risks, inter alia, of civilian casualties, as well as precautions to help minimize the risk of incidental loss of life, injuries to civilians, and damage to civilian objects must be considered. Other types of risks should be considered, as appropriate, including but not limited to the risk of unintended engagements, risk of loss of control of the system, risk of proliferation, and risk of acquisition by terrorist groups. (2019 GGE Report ¶23a).

27. Where feasible and appropriate, verifiability and certification procedures covering all likely or intended use scenarios must be developed.

2.1. Compliance with international law, including IHL, international human rights law (IHRL), and international criminal law (ICL);

2.2. ethical considerations, including undermining of human dignity, loss of human agency and erosion of moral responsibility and accountability in the use of force;

2.3. Humanitarian considerations; and

2.4. Non-proliferation and the maintenance of international peace and security, including thresholds for armed conflict and new arms races.

3. Recognize that new legally binding rules and principles are needed to safeguard against such risks and challenges. General commitments

17. Recognize the need to address the risks and challenges posed by LAWS that rely on data sets that can perpetuate or amplify unintentional social biases, including gender and racial bias.

- How is risk best calculated?
- How are systems best regulated or certified?
- What is good practice in identifying and implementing appropriate constraints?
- How is complexity best managed? What levels of understanding are acceptable? Would we need to consider T&E at a system of systems level as well as at the individual system level?

Training and planning for use

Linked to the above section, this would set out how states might best ensure a system is understood by those who would operate it. Potential areas for further clarification could include:

- How are unforeseen circumstances mapped?
- How are necessary constraints identified and implemented?
- How might different interactions (based on geography, time) be accounted for?

The experience of applying such procedures should be shared, bearing in mind national security considerations and restrictions on commercial proprietary information. (based on 2018 GGE Report ¶23d).

28. Where feasible and appropriate, interdisciplinary perspectives must be integrated in research and development, including through independent ethics reviews, bearing in mind national security considerations and restrictions on commercial proprietary information. (2018 GGE Report ¶23b).

29. Measures to mitigate the risk of unintended engagements (e.g., engagements against civilians, civilian objects, or unintended military targets) involving weapons systems based on emerging technologies in the area of LAWS, can include measures across the life-cycle of the weapons system to:

a. control, limit, or otherwise affect the types of targets that the system can engage;

b. control, limit, or otherwise affect the duration, geographical scope, and scale of the operation of the weapons system, such

Risk mitigation

26. Affirm that, when developing or acquiring new AWS, physical security, appropriate non-physical safeguards, including cyber-security against hacking or data spoofing, the risk of acquisition by terrorist groups and the risk of proliferation should be considered.

27. Affirm that, during the design, development, testing and deployment of AWS, the risks inter alia of civilian casualties, as well as precautions to help minimize incidental loss of life, injuries to civilians and damage to civilian objects must be considered. Other types of risks should be considered, as appropriate, including but not limited to the risk of unintended engagements, risk of loss of control of the system, risk of proliferation, and risk of acquisition by terrorist groups.

28. Agree that risk mitigation measures to help minimize incidental loss of life, injuries to civilian and damage to civilian objects resulting from the use of AWS may include, inter alia: (a) incorporating self-destruct, self-deactivation, or self-neutralization mechanisms into weapon systems; (b) measures to control the types of targets that the system can engage;

		<p>as the incorporation of self-destruct, self-deactivation, or self-neutralization mechanisms into munitions and weapons systems;</p> <p>c. reduce automation bias in system operators as well as unintended bias in artificial intelligence capabilities relied upon in connection with the use of the weapon system; and</p> <p>d. otherwise enhance control or improve decision-making over the use of force, including relating to timing, precision, and accuracy.</p>	<p>(c) measures to control the duration and geographical scope of the weapons system; and (d) clear procedures for trained human operators to activate or deactivate functions in weapons systems.</p> <p>29. Agree that risk assessments and mitigation measures should be part of the design, development, testing and deployment and use cycle of emerging technologies in any weapons systems, including weapons systems based on emerging technologies in the area of lethal autonomous weapons systems.</p>		
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9. ETHICAL CONSIDERATIONS

<p>Elements for a Future Normative Framework Conducive to a Legally Binding Instrument to Address the Ethical Humanitarian and Legal Concerns Posed by Emerging Technologies in the Area Of (Lethal) Autonomous Weapons (LAWS)</p>	<p>Outline for a Normative and Operational Framework on Emerging Technologies in the Area of LAWS</p>	<p>Principles and Good Practices on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems</p>	<p>Roadmap Towards New Protocol on Autonomous Weapons Systems</p>	<p>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)</p>	<p>Working Paper submitted to the 2022 Chair of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS)</p>
<p>General Introductory remarks</p> <p>From a broad perspective, as with most of all emerging technologies, lethal autonomous weapons systems raise various ethical and societal questions, which have remained, to a large extent, at the outskirts of the current debate. Nevertheless, precisely because of their impact on the right to life and human dignity, the use of force, increasingly mediated through technology, must consider ethical considerations and their societal implications as the main parameters on which to confront these challenges. The question is not if we “can” but if we should remove meaningful human control from the decision to kill or injure/harm another human being.</p>	<p>I. Normative Framework Preambular part</p> <p>This part of the normative framework could include:</p> <ul style="list-style-type: none"> – A general reference to international law (in particular IHL) and the “relevant ethical perspectives” which have guided the works of the HCP ; 	<p>Preamble and Introduction</p> <p>Reaffirming that international law, in particular the United Nations Charter and International Humanitarian Law (IHL) as well as relevant ethical perspectives, should guide continued consideration and elaboration, by consensus, of possible measures and options related to the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems (LAWS);</p> <p><u>Good Practices Related to Human-Machine Interaction</u></p> <p>20. At various stages of the life-cycle of a weapon, the following good practices related to human-machine interaction can strengthen</p>	<p>I. Recognize the common grounds</p> <p>4. The importance of relevant ethical perspectives in addressing these risks and challenges;</p> <p>II. Elaborate these common grounds</p> <p><u>Introduction</u></p> <p>2. Recognize the risks and challenges posed by autonomous weapon systems to:</p> <p>2.2. Ethical considerations, including undermining of human dignity, loss of human agency and erosion of moral responsibility and accountability in the use of force;</p> <p><u>Ethical considerations</u></p> <p>14. Recognize that autonomous weapon systems could raise three main ethical concerns, namely</p>	<p><u>Introduction</u></p> <p><i>CCW High Contracting Parties have long agreed the need for substantial progress in the area of Lethal Autonomous Weapons Systems. Central to this is the need to increase understanding and agreement of the ways in which systems with autonomy can be developed and used ethically, responsibly and in compliance with International Humanitarian Law (IHL).</i></p> <p><u>The Document - Possible Structure and Contents</u></p> <p>Best practice and commentary may also address questions of ethics in an applied and context appropriate manner. This prevents the ‘ethics issue’ becoming an intangible catch-all which defies inclusion in either consideration of the legal framework or as a matter of</p>	<p>9. Recognise as a fundamental starting point that autonomous weapon systems that cannot be used in accordance with international humanitarian law, must not be developed, deployed or used and are de facto already prohibited. Also recognise that autonomous weapons systems that would select and engage targets without any human control, would not only be unlawful; they would also be questionable from an ethical point of view, particularly with regard to human dignity.</p> <p>10. Commit to work collaboratively to prohibit autonomous weapons systems that are not sufficiently predictable or controllable to meet legal requirements, and in a manner that addresses ethical imperatives.</p>

Ethical concerns are of paramount importance with regard to emerging technologies in the area of AWS. The development and the use of AWS brings into question the fundamental ethical question of whether decision-making on the use of force, and, more specifically, on matters of life and death, should be retained by humans or could be taken by machines, regardless of the capacity of the latter components, particularly algorithms and sensors.

Beyond the very real concerns regarding the technical capacity of autonomous weapons systems to function within legal and ethical constraints (vg. issues of predictability and reliability), the ethical perspective should guide the work of the GGE on retaining human agency and intent in the decisions to use force, ensuring state responsibility as well as individual accountability, and upholding the principles of humanity and human dignity.

compliance with international humanitarian law, strengthen accountability, and mitigate risks in the use of weapons systems based on emerging technologies in the area of LAWS:

e. Establishing policies, doctrine and procedures (based on 2019 GGE Report ¶23b), such as guidance on the ethical development and use of emerging technologies;

the possible loss of human dignity in the process of using force, the possible loss of human agency in the decision to use force, and the erosion of moral responsibility and accountability for decisions to use force.

15. Recall that the Martens' Clause, which is a customary international law that brings together law and ethics, is particularly relevant in assessing new technologies and new means and methods of warfare and provides that conscience in cases not addressed by existing treaties.

practice. Rather it frames, as far as possible, ethical concerns at each stage of the weapon's lifecycle and informs best practice on the basis of the concern. An ethical concern in relation to research methodology and an ethical concern in relation to command accountability are two entirely different concepts, both of which can benefit from a conceptual application through development of best practice guidelines.

Recommendations on prohibitions and regulations:

1. Due to the challenges presented by the nature of AWS, in order to fully comply with key legal obligations and ethical precepts, States shall:

1.1. Prohibit the development and the use of AWS that cannot be controlled by humans, therefore subject to cognitive and epistemological limitations, as well as algorithm bias.

Procedural Recommendations

3. To provide the GGE with a mandate to negotiate a normative framework for emerging technologies in the area of lethal autonomous weapons systems, conducive to a legally binding instrument, in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONFV/10). [...] The negotiations should focus on establishing prohibitions and regulations and other appropriate measures, to ensure the respect of the legal and ethical considerations with regard to these types of weapons.

Conclusions

The considerations mentioned above stem from the substantive discussions within the Group of Governmental Experts on Emerging Technologies in the Area of (Lethal) Autonomous Weapons Systems for the past years. They provide a basis for a framework that ensures the full applicability of international law, including IHL, as well as the need to develop additional legally binding norms based on ethical standards, with regards to AWS.

A future normative framework must strike a balance between military necessity, humanitarian considerations and ethical concerns. [...]

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10. PEACEFUL USES OF AI

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	<p>I. Normative Framework Preambular part</p> <p>A recognition that an appropriate balance should be struck between the necessity to allow progress in or access to these dual-use emerging technologies (as recalled by guiding principle j), and the importance of taking into account humanitarian considerations and challenges with regard to IHL in the development and use of such technologies (c.f. guiding principle k).</p>	<p><i>Reaffirming</i> without prejudice to the result of future discussions, the following guiding principles, which were affirmed by the High Contracting Parties: (j) Discussions and any potential policy measures taken within the context of the CCW should not hamper progress in or access to peaceful uses of intelligent autonomous technologies.</p>	<p>I. Recognize the common grounds</p> <p>4. The principle that progress in or access to peaceful uses of intelligent autonomous technologies should not be hampered.</p> <p>II. Elaborate these common grounds</p> <p><u>General Commitments</u></p> <p>22. Agree that any discussion and any policy measure or instrument on AWS taken within the context of the Convention should not hamper the inalienable right of each High Contracting Party to access, development, research, production, and use of artificial intelligent technologies for peaceful purposes without discrimination.</p>		<p>4. Recall and acknowledge the value of the conclusions and recommendations of the Group of Governmental Experts (GGE) on emerging technologies in the area of Lethal Autonomous Weapons (LAWS); the reports and summaries of the Chairs of the GGE; and the endorsement by the High Contracting Parties of the CCW in 2019 of the 11 Guiding Principles on LAWS.</p>

