

## U.S. Proposals

As described in the Discussion Paper submitted by Australia, Canada, Japan, the United Kingdom, and the United States, the Convention on Certain Conventional Weapons (CCW) Group of Governmental Experts (GGE) on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems (LAWS) has already reached a significant number of consensus conclusions under the four elements that numerous delegations have proposed to serve as the focus for organizing the GGE's consensus recommendations in relation to the clarification, consideration and development of aspects of the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems.

The United States believes that the GGE can accomplish even more in these four areas, and this paper provides U.S. proposals for further conclusions under each element: A) [application of international humanitarian law \(IHL\)](#); B) [human responsibility](#); C) [human-machine interaction](#); and D) [weapons reviews](#).

These proposals are also available in the [U.S. Commentaries on the Guiding Principles](#) adopted by the CCW GGE, which the United States submitted in 2020.

### A. U.S. proposals on the Application of IHL

Clarifying how IHL requirements apply to three general scenarios for the use of autonomous functions in weapon systems: 1) homing munitions that involve autonomous functions; 2) decision support tools that that can inform decision-making about targeting; and 3) relying on autonomous functions in weapon systems to select and engage targets

1. Consistent with IHL, autonomous functions may be used to effectuate more accurately and reliably a commander or operator's intent to strike a specific target or target group.
  - a. The addition of autonomous functions, such as the automation of target selection and engagement, to weapon systems can make weapons more precise and accurate in striking military objectives by allowing weapons or munitions to "home in" on targets selected by a human operator.
  - b. If the addition of autonomous functions to a weapon system makes it inherently indiscriminate, *i.e.*, incapable of being used consistent with the principles of distinction and proportionality, then any use of that weapon system would be unlawful.
  - c. The addition of autonomous functions to a weapon system can strengthen the implementation of IHL when these functions can be used to reduce the likelihood of harm to civilians and civilian objects.
2. Consistent with IHL, emerging technologies in the area of LAWS may be used to inform decision-making.

- a. When making a decision governed by IHL, commanders and other decision-makers must make a good faith assessment of the information that is available to them at the time.
  - b. IHL generally does not prohibit commanders and other decision-makers from using tools to aid decision-making in armed conflict. Whether the use of a tool to aid decision-making in armed conflict is consistent with IHL may depend on the nature of the tool, the circumstances of its use, as well the applicable rules and duties under IHL.
  - c. Reliance on a machine assessment to consider a target to be a military objective must be compatible with the decision-maker's duty under IHL to exercise due regard to reduce the risk of harm to civilians and civilian objects. Such compatibility depends on the relevant circumstances ruling at the time, including:
    - i. how accurately and consistently the machine performs in not mischaracterizing civilian objects as military objectives (*i.e.*, false positives);
    - ii. the decision-maker giving the machine assessment appropriate weight relative to other information relevant to whether the target was a military objective (*e.g.*, operational context, intelligence reporting of the threat identified by the system); and
    - iii. the urgency to make a decision (*e.g.*, whether the decision occurred in combat operations or in the face of an imminent threat of an attack, or whether more time could be taken before making a decision).
3. Consistent with IHL, weapons systems that autonomously select and engage targets may be used where the human operator has not expressly intended to strike a specific target or group of targets when activating the weapon system.
- a. The commander or operator could act consistently with the principle of distinction by:
    - i. Using weapon systems that autonomously select and engage targets in areas that constitute military objectives; or
    - ii. Using weapon systems that autonomously select and engage targets with the intent of making potential targets constituting military objectives (*e.g.*, potential incoming projectiles in an active protection system) the object of attack, provided that the weapon systems perform with sufficient reliability (*e.g.*, an active protection system consistently selecting and engaging incoming projectiles) to ensure that force is directed against such targets.

- b. The expected loss of civilian life, injury to civilians, and damage to civilian objects incidental to the employment of weapons systems that autonomously select and engage targets must not be excessive in relation to the concrete and direct military advantage expected to be gained.
  - i. The expected loss of civilian life, injury to civilians, and damage to civilian objects is to be informed by all available and relevant information, including information about: (i) the presence of civilians or civilian objects within the area and during the time when the weapon system is expected to be operating; (ii) the performance of the weapon's autonomous functions in selecting and engaging military objectives; (iii) the risks posed to civilians and civilian objects when the weapon engages military objectives; (iv) the incidence of military objectives that could be engaged by the weapon system in the operational area; and (v) the effectiveness of any precautions taken to reduce the risk of harm to civilians and civilian objects.
  - ii. The concrete and direct military advantage expected to be gained is to be informed by all available and relevant information, which may include information about how the employment of the weapon system: (i) threatens military objectives belonging to the adversary; (ii) contributes to the security of the operating forces; (iii) diverts enemy resources and attention; (iv) shapes or diverts the movement of enemy forces; and (v) supports military strategies and operational plans.
- c. Feasible precautions must be taken in use of weapon systems that autonomously select and engage targets to reduce the expected harm to civilians and civilian objects. Such precautions may include:
  - i. Warnings (*e.g.*, to potential civilian air traffic or notices to mariners);
  - ii. Monitoring the operation of the weapon system; and
  - iii. Activation or employment of self-destruct, self-deactivation, or self-neutralization mechanisms (*e.g.*, use of rounds that self-destruct in flight or torpedoes that sink to the bottom if they miss their targets).

Examples of ways in which emerging technologies in the area of LAWS could be used to reduce the risks to civilians in military operations

CCW GGE Guiding Principle (h) (“***Consideration should be given to the use of emerging technologies in the area of lethal autonomous weapons systems in upholding compliance with IHL and other applicable international legal obligations***”) should be implemented during legal reviews of new weapons, during the formulation of military strategies and plans, and during the planning and conduct of military operations. To facilitate such consideration and to encourage innovation that furthers the objects and purposes of the CCW, the GGE should develop examples

of specific practices that those involved in these activities could consider. For example, the GGE could begin this workstream by cataloging examples of ways in which emerging technologies in the area of LAWS could be used to reduce risks to civilians in military operations, such as by:

1. incorporating autonomous self-destruct, self-deactivation, or self-neutralization mechanisms into munitions;
2. increasing awareness of civilians and civilian objects on the battlefield;
3. improving assessments of the likely effects of military operations;
4. automating target identification, tracking, selection, and engagement to improve speed, precision, and accuracy; and
5. reducing the need for immediate fires in self-defense.<sup>1</sup>

## **B. U.S. proposals on Human Responsibility**

### Legal responsibility

1. Under principles of State responsibility, every internationally wrongful act of a State, including such acts involving the use of emerging technologies in the area of LAWS, entails the international responsibility of that State.<sup>2</sup>
2. A State remains responsible for all acts committed by persons forming part of its armed forces, including any such use of emerging technologies in the area of LAWS, in accordance with applicable international law.
3. An individual, including a designer, developer, an official authorizing acquisition or deployment, a commander, or a system operator, is responsible for his or her decisions governed by IHL with regard to emerging technologies in the area of LAWS.
4. Under applicable international and domestic law, an individual remains responsible for his or her conduct in violation of IHL, including any such violations involving emerging technologies in the area of LAWS. The use of machines, including emerging technologies in the area of LAWS, does not provide a basis for excluding legal responsibility.

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<sup>1</sup> These practices are discussed in the U.S. Working Paper, *Humanitarian Benefits of Emerging Technologies in the Area of Lethal Autonomous Weapon Systems*, March 28, 2018, [CCW/GGE.1/2018/WP.4](#). For a discussion of other potential humanitarian benefits, in addition to reducing the risk of civilian casualties in military operations, see paragraph 15 of the U.S. Working Paper, *Implementing International Humanitarian Law in the Use of Autonomy in Weapon Systems*, March 28, 2019, [CCW/GGE.1/2019/WP.5](#).

<sup>2</sup> Adapted from Article 1 of the International Law Commission's Draft articles on Responsibility of States for Internationally Wrongful Acts.

5. The responsibilities of any particular individual in implementing a State or a party to a conflict's obligations under IHL may depend on that person's role in the organization or military operations, including whether that individual has the authority to make the decisions and judgments necessary to the performance of that duty under IHL.
6. Under IHL, a decision, including decisions involving emerging technologies in the area of LAWS, must be judged based on the information available to the decision-maker at the time and not on the basis of information that subsequently becomes available.
7. Unintended harm to civilians and other persons protected by IHL from accidents or equipment malfunctions, including those involving emerging technologies in the area of LAWS, is not a violation of IHL as such.
8. States and parties to a conflict have affirmative obligations with respect to the protection of civilians and other classes of persons under IHL, which continue to apply when emerging technologies in the area of LAWS are used. These obligations are to be assessed in light of the general practice of States, including common standards of the military profession in conducting operations.

#### Accountability practices

1. The following general practices help ensure accountability in military operations, including operations involving the use of emerging technologies in the area of LAWS:
  - a. Conducting operations under a clear operational chain of command.
  - b. Subjecting members of the armed forces to a system of military law and discipline.
  - c. Establishing and using procedures for the reporting of incidents involving potential violations.
  - d. Conducting assessments, investigations, or other reviews of incidents involving potential violations.
  - e. Disciplinary and punitive measures as appropriate.
2. The following practices with respect to the use of weapons systems, including those based on emerging technologies in the area of LAWS, can promote accountability:
  - a. Rigorous testing of and training on the weapon system, so commanders and operators understand the likely effects of employing the weapon system.
  - b. Establishing procedure and doctrine applicable to the use of the weapon system, which provide standards for commanders and operators on responsible use and under which they can be held accountable under the State's domestic law.

- c. Using the weapon system in accordance with established training, doctrine, and procedures and refraining from unauthorized uses or modifications of the weapon system.

### **C. U.S. proposals on Human-Machine Interaction**

1. Weapons systems based on emerging technologies in the area of LAWS should effectuate the intent of commanders and operators to comply with IHL, in particular, by avoiding unintended engagements and minimizing harm to civilians and civilian objects. This can be effectuated through the following measures:
  - a. Weapons systems based on emerging technologies in the area of LAWS should be engineered to perform as anticipated. This should include verification and validation and testing and evaluation before fielding systems.
  - b. Relevant personnel should properly understand weapons systems based on emerging technologies in the area of LAWS. Training, doctrine, and tactics, techniques, and procedures should be established for the weapon system. Operators should be certified by relevant authorities that they have been trained to operate the weapon system in accordance with applicable rules.
  - c. User interfaces for weapons systems based on emerging technologies in the area of LAWS should be clear in order for operators to make informed and appropriate decisions in engaging targets. In particular, the interface between people and machines for autonomous and semi-autonomous weapon systems should: (i) be readily understandable to trained operators; (ii) provide traceable feedback on system status; and (ii) provide clear procedures for trained operators to activate and deactivate system functions.

### **D. U.S. Proposals on Weapons Reviews**

#### Guidelines and good practices for militaries to consider using in conducting legal reviews of weapons systems based on emerging technologies in the area of LAWS

1. Legal advisers should be consulted regularly in the development or acquisition process as decisions that could pose legal issues are being made so that legal issues can be identified and more in-depth reviews can be conducted where necessary.
  - a. A weapon system under modification should be reviewed to determine whether the modification poses any legal issues.
  - b. New concepts for the employment of existing weapons should also be reviewed, when such concepts differ significantly from the intended uses that were considered when those systems were previously reviewed.

2. The nature of the legal review and advice should be tailored to the stage of the process of developing or acquiring the weapon.
  - a. Providing legal advice early in the development or acquisition process allows IHL considerations to be taken into account early in the life cycle of the weapon.
  - b. At the end of the development or acquisition process, formal legal opinions can memorialize relevant conclusions and analysis while also being useful to consider in subsequent reviews.
3. The legal review should consider the international law obligations applicable to the State intending to develop or acquire the weapon system, including prohibitions or other restrictions applicable to specific types of weapons, and whether the intended or expected uses of the weapon system can be consistent with those obligations under IHL.
4. The legal review should consider whether the weapon is illegal per se, *i.e.*, whether the use of the weapon is prohibited in all circumstances.
  - a. The legal review should consider whether the weapon is of a nature to cause superfluous injury or unnecessary suffering, or if it is inherently indiscriminate, or is otherwise incapable of being used in accordance with the requirements and principles of IHL.
  - b. Analyzing whether a weapon is “inherently indiscriminate,” should consider whether the weapon is capable of being used in accordance with the principles of distinction and proportionality.
  - c. In considering whether a weapon with new autonomous features or functions is consistent with the prohibitions against weapons calculated to cause superfluous injury or against weapons that are inherently indiscriminate, it may be useful to compare the weapon to existing weapons not falling under these prohibitions.
5. The legal review should advise those developing or acquiring the weapon system or its concepts of employment to consider potential measures to reduce the likelihood that use of the weapon will cause harm to civilians or civilian objects.
6. Persons conducting the legal review should understand the likely effects of employing the weapon in different operational contexts. Such expectation should be produced through realistic system developmental and operational test and evaluation.
7. Bearing in mind national security considerations or commercial restrictions on proprietary information, States should share good practices on weapons reviews or legal reviews of particular weapons where appropriate.