

Discussion Paper – Building on Chile’s Proposed Four Elements of Further Work for the Convention on Certain Conventional Weapons (CCW) Group of Governmental Experts (GGE) on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems (LAWS)¹

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At the request of the Chair of the Group of Governmental Experts (GGE) on April 26, 2021, this discussion paper builds on the four elements that Chile has 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 (LAWS): 1) application of international humanitarian law; 2) human responsibility; 3) human-machine interaction; and 4) weapons reviews.

Under each topic, this paper identifies the relevant guiding principles and consensus conclusions already adopted by the GGE. These principles and conclusions, in our view, should be included as part of the GGE’s consensus recommendations to the Sixth CCW Review Conference. This paper also suggests areas for developing new GGE consensus recommendations or for further work in 2021 and beyond. This paper is without prejudice to the form that such consensus recommendations may take.

Application of International Humanitarian Law

Relevant Guiding Principles:

- International humanitarian law continues to apply fully to all weapons systems, including the potential development and use of lethal autonomous weapons systems. (Guiding Principle (a)).
- 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. (Guiding Principle (h)).

Relevant Consensus Conclusions of the GGE:

- IHL imposes obligations on States, parties to armed conflict and individuals, not machines. (2019 Report ¶17b).
- A weapons system based on emerging technologies in the area of lethal autonomous weapons systems must not be used if it 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. (2019 Report ¶17h).
- The potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems must be conducted in accordance with applicable

¹ This paper is without prejudice to other proposals that any of these countries may deem appropriate to propose or join.

international law, in particular IHL and its requirements and principles, including inter alia distinction, proportionality and precautions in attack. (2019 Report ¶17a).

- The IHL requirements and principles including inter alia distinction, proportionality and precautions in attack 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 lethal autonomous weapons systems. (2019 Report ¶17d).
- Human judgement is essential in order to ensure that the potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems is in compliance with international law, and in particular IHL. (2019 Report ¶17e).
- Compliance with the IHL requirements and principles, including inter alia distinction, proportionality and precautions in attack, in the potential use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems 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. (2019 Report ¶17f).
- In cases involving weapons systems based on emerging technologies in the area of lethal autonomous weapons systems not covered by the CCW and its annexed Protocols or by other international agreements, the civilian population and the 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 Report ¶17g).

Potential Areas for Further GGE Consensus Recommendations or Work:

- *Further clarifying how IHL requirements (e.g., distinction, proportionality, and precautions) apply to the use of emerging technologies in the area of LAWS, for example, by considering possible, relevant military applications, such as*
 - *homing munitions that involve autonomous functions;*
 - *decision support tools that that can inform a commander or operator's decision-making about targeting; and*
 - *relying on autonomous functions in weapon systems to select and engage targets.*
- *Identifying examples of ways in which emerging technologies in the area of LAWS could be used to reduce the risks to civilians in military operations.*

Human Responsibility

Relevant Guiding Principles:

- Human responsibility for decisions on the use of weapons systems must be retained since accountability cannot be transferred to machines. This should be considered across the entire life cycle of the weapons system. (Guiding Principle (b)).
- Accountability for developing, deploying and using any emerging weapons system in the framework of the CCW must be ensured in accordance with applicable international law, including through the operation of such systems within a responsible chain of human command and control. (Guiding Principle (d)).

Relevant Consensus Conclusions of the GGE:

- Humans must at all times remain accountable in accordance with applicable international law for decisions on the use of force. (2018 Report ¶23a).
- Responsibility for the deployment of any weapons system in armed conflict remains with States. States must ensure accountability for lethal action by any weapon system used by the State's forces in armed conflict in accordance with applicable international law, in particular international humanitarian law. (2017 Report ¶16c).
- States, parties to armed conflict and individuals remain at all times responsible for adhering to their obligations under applicable international law, including IHL. 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 lethal autonomous weapons systems in accordance with their obligations under IHL. (2019 Report ¶17c).
- Accountability for the use of force in armed conflict must be ensured in accordance with applicable international law, including through the operation of any emerging weapons systems within a responsible chain of command and control. (2018 Report ¶23e).
- Human responsibility for the use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems can be exercised in various ways across the life-cycle of these weapon systems and through human-machine interaction. (2019 Report ¶21).

Potential Areas for Further GGE Consensus Recommendations or Work:

- *Articulating how well established international legal principles of responsibility apply to the use of emerging technologies in the area of LAWS.*
- *Identifying good practices at various stages of the life-cycle to help ensure accountability in military operations involving the use of emerging technologies in the area of LAWS.*

Human-Machine Interaction

Relevant Guiding Principles:

- 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 lethal autonomous weapons systems is in compliance with applicable international law, in particular IHL. In determining the quality and extent of human-machine interaction, a range of factors should be considered including the operational context, and the characteristics and capabilities of the weapons system as a whole. (Guiding Principle (c)).

Relevant Consensus Conclusions of the GGE:

- Touch points in the human-machine interface include: (0) political direction in the pre-development phase; (1) research and development; (2) testing, evaluation and certification; (3) deployment, training, command and control; (4) use and abort; (5) post-use assessment. (2018 Report ¶23).

- Necessary investments in human resources and training should be made in order to comply with IHL and retain human accountability and responsibility throughout the development and deployment cycle of emerging technologies. (2018 Report ¶23g).
- Human responsibility for the use of force must be retained. To the extent possible or feasible, this could extend to intervention in the operation of a weapon if necessary to ensure compliance with IHL. (2018 Report ¶23f).

Potential Areas for Further GGE Consensus Recommendations or Work:

- *Identifying good practices for human-machine interaction, including such practices identified in academic research or developed in industry, that can strengthen compliance with international humanitarian law when using weapon systems based on emerging technologies in the area of LAWS.*
- *Analyzing existing practice in using weapon systems and emerging technologies to elaborate on the range of factors that should be considered in determining the quality and extent of human-machine interaction under Guiding Principle (c).*
- *Identifying the various decisions, activities, and processes across the life-cycle that would collectively contribute towards and enable appropriate human-machine interaction with weapons systems based on emerging technologies in the area of lethal autonomous weapons systems. Analyzing the interaction between these various decisions, activities, and processes and how they should vary based on the operational context and the characteristics and capabilities of the weapons system.*

Weapons Reviews

Relevant Guiding Principles:

- In accordance with States' obligations under international law, in the study, development, acquisition, or adoption of a new weapon, means or method of warfare, determination must be made whether its employment would, in some or all circumstances, be prohibited by international law. (Guiding Principle (e)).
- When developing or acquiring new weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, 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. (Guiding Principle (f)).
- Risk assessments and mitigation measures should be part of the design, development, testing and deployment cycle of emerging technologies in any weapons systems. (Guiding Principle (g)).

Relevant Consensus Conclusions of the GGE:

- 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 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. 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 Report ¶17(i)).

- Weapons systems under development, or modification which significantly changes the use of existing weapons systems, must be reviewed as applicable to ensure compliance with IHL. (2018 Report ¶23(c)).
- During the design, development, testing and deployment of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, 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 Report ¶23a).
- Risk mitigation measures can include: rigorous testing and evaluation of systems, legal reviews, readily understandable human-machine interfaces and controls, training personnel, establishing doctrine and procedures, and circumscribing weapons use through appropriate rules of engagement. (2019 Report ¶23b).
- Where feasible and appropriate, verifiability and certification procedures covering all likely or intended use scenarios must be developed, the experience of applying such procedures should be shared bearing in mind national security considerations or commercial restrictions on proprietary information. (2018 Report ¶23d)
- Where feasible and appropriate, inter-disciplinary 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 Report ¶23b).

Potential Areas for Further GGE Consensus Recommendations or Work:

- *Identifying 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.*
- *Further identifying potential risks and mitigation measures that could be considered in the design, development, testing, and deployment of weapons systems based on emerging technologies in the area of LAWS.*