

**Convention on Prohibitions or Restrictions on the
Use of Certain Conventional Weapons Which May
Be Deemed to Be Excessively Injurious
or to Have Indiscriminate Effects**

8 November 2019

English only

**Group of Governmental Experts of the High Contracting Parties
related to emerging technologies in the area of lethal autonomous
weapons systems**

2019 Session

Geneva, 25–29 March 2019 and 20–21 August 2019

Item 2 of the provisional agenda

Adoption of the agenda

**Report of the 2019 session of the Group of Governmental Experts on
Emerging Technologies in the Area of Lethal Autonomous Weapons
Systems**

Addendum

**Chair's summary of the discussion of the 2019 Group of Governmental
Experts on emerging technologies in the area of lethal autonomous
weapons systems**

I. Part I: Background

1. This document summarizes the proceedings of the Group of Governmental Experts (GGE) on emerging technologies in the area of lethal autonomous weapons systems (LAWS) during its work in 2019, from the Chair's point of view. It consists of three parts. Part I provides the background context, highlighting a trajectory of consensus knowledge of potential normative value. Part II begins where the Conclusions section of the GGE's 2019 Report (CCW/GGE.1/2019/3) ends: with points that were discussed during the work of the GGE, that still require further clarification to be ready for consensus. Part III offers the Chair's views on the road ahead, drawing on the conclusions and recommendations of the Group from this year as well as the GGE's work from previous years.

2. The Group's mandate was provided in Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention on Certain Conventional Weapons (CCW) (CCW/CONF.V/10), consistent with CCW/CONF.V/2. Prior to 2019, the Group met in 2017 and 2018, agreeing substantive consensus reports each year (CCW/GGE.1/2017/3 and CCW/GGE.1/2018/3). In 2019, the agenda items from the previous two years were kept, with an additional item that aims to explore challenges to International Humanitarian Law (IHL).

3. At the conclusion of its work in 2019, the GGE recommended to the CCW High Contracting Parties the endorsement of the eleven Guiding Principles affirmed by the Group, as well as a trajectory of expert work from the present to the Review Conference in 2021 on legal, military and technological aspects. The Group also presented a series of conclusions



that are the result of several iterations of formal and informal meetings and that embody its advancement in knowledge and common understanding.

4. The work of the GGE was, throughout, rooted in IHL language and concepts, enabling a precise normative discussion. The CCW itself, as Guiding Principle (k) affirms, “offers an appropriate framework for dealing with the issue of emerging technologies in the area of lethal autonomous weapons systems within the context of the objectives and purposes of the Convention, which seeks to strike a balance between military necessity and humanitarian considerations.” Therefore, the questions proposed by the Chair (Annex III of the Report) at the beginning of the year aimed to deconstruct the complexities that arise from new technologies with the toolbox provided by IHL.

5. These questions can be further explored; for instance, the Group has, over the years, gone a great distance to understand what autonomy means — that it may be viewed as a spectrum, with difficulties delineating between such concepts of automation, semi- or fully-autonomous — and that the term covers a wide range of technical capabilities. All but the simplest of weapon systems, are made up of subsystems, which may themselves be technically sophisticated and used during targeting. This makes it difficult not only to characterize LAWS precisely, but also to fully understand how autonomy may impact the ability of parties to a conflict to apply IHL principles or requirements — such as distinction, proportionality and precautions — in carrying out attacks. This is also true in properly understanding how a weapon’s foreseeable tasks, its intended targets, scope of movement and operational environments affect the type and degree of human involvement required to ensure compliance with IHL. All such questions should be kept in mind when formulating adequate policy options, but a critical issue remains what is required of States, parties to conflict and — importantly — humans in carrying out attacks that may involve these new technologies.

6. In informal discussions at the beginning of the year, delegations requested focus on an intergovernmental, outcome-oriented discussion. The Programme of Work reflects this request, opting to omit a “General Debate” item in its agenda. The work of the GGE was thus interactive, technical and focused.

7. The result was a high degree of granularity around very complex and novel security issues related to emerging technologies in the area of LAWS. This detail is a reflection of the comprehensive nature of the proceedings that involved technical work, an IHL framework in which to conduct the discussion, and military and diplomatic considerations. In approaching these novel and complex issues, lawyers, military personnel, technological experts, diplomats and civil society participants contributed their points of view from, both, a national and an international perspective. Part II of this summary reflects this and complements “Chapter III: Conclusions” of the Report of the 2019 session of the GGE.

II. Part II: Summary of Discussions

Agenda item 5 (a): An exploration of the potential challenges posed by emerging technologies in the area of lethal autonomous weapons systems to international humanitarian law

8. This year, the Chair proposed the addition of this item, drawing on the chapeau paragraph of the Guiding Principles that notes that there may be potential challenges posed by emerging technologies in the area of LAWS to IHL. This section, thus, is complementary to paragraphs 17 and 18 of the Report, aims to provide additional clarification as summary of the discussions had this year and builds on the work of the GGE from previous years.

9. Delegations reaffirmed their conviction that IHL continues to apply fully to all weapons systems, including any potential LAWS. Some delegations thought that emerging technologies in the area of LAWS could pose potential uncertainties and challenges for IHL. Other delegations were of the view that current IHL was sufficient to deal with any possible challenges raised by LAWS.

10. Many delegations underlined that only humans can comply with IHL and that human responsibility for the use of force must be retained. The centrality of human judgement to the application of IHL principles was underscored by many. There was also a view expressed that human judgements need to be proximate in time with attacks for that judgement to be meaningful or appropriate. There were divergent views on whether autonomy in weapons systems could lead to an accountability gap regarding violations of applicable international law.

11. The value of weapons reviews for seeking compliance with IHL and other applicable international law was underscored by many. A few States also outlined the role of national systems in this regard. The need to verify reliability and predictability through testing and verification was noted. Some delegations highlighted the unique nature of LAWS, including potential for self-learning and associated unpredictability, that could pose novel challenges to weapons review processes. Some called for greater transparency in the conduct of weapons reviews, as well as information-sharing on best practices.

12. Several delegations recalled earlier discussion on the potential for LAWS to improve IHL implementation. Conversely, several delegations referred to the Martens clause, with some noting that some potential LAWS would be incompatible with the principles of humanity and the dictates of public conscience. The importance of ethical considerations to the work of the Group was noted. There was a range of views on the relevance to the discussions of the Group of legal regimes other than IHL, including international human rights law and international criminal law.

Agenda item 5 (b): Characterization of the systems under consideration in order to promote a common understanding on concepts and characteristics relevant to the objectives and purposes of the Convention

13. This section is complementary to paragraphs 19 and 20 of the Report, aims to provide additional clarification as summary of this year's discussions and builds on the work of the GGE from previous years.

14. Delegations built on previous years' discussions to further explore salient characteristics of lethal autonomous weapons systems. Many delegations were of the view that a technology-neutral approach, focusing on the human element in the use of force, would be more fruitful than taking forward detailed discussions on technical characteristics. Some delegations chose to address the issue of definitions, with several different views on the need for definitions — working or otherwise — to make further progress in the work of the Group. The concept of autonomy being a spectrum, and the difficulty of defining a clear point between semi- and fully autonomous systems was underlined.

15. Questions were raised concerning data bias including the possibility that the data sets used in algorithm-based programming relevant to emerging technologies in the area of lethal autonomous weapons systems may diminish, perpetuate or amplify social biases, including gender and racial bias, with potential implications for compliance with IHL by a party to a conflict.

16. Several delegations directly addressed the questions posed by the Chair under this agenda item. On the question of the importance of characteristics from the perspective of IHL and the CCW, delegations highlighted aspects such as: self-learning and evolution, that is, the ability to redefine missions or objectives independently; nature of communications links with human operator or chain of command; whether intervention in the system's operation would be possible once activated; reliability and predictability; and the ability to impose operational constraints on a weapon-system. Concerning autonomy: should it be considered a function of a system or something that can exist or not in different functions of a system, delegations addressing the issue emphasized that autonomy could reside in one function, such as navigation or sensors, and not another, such as target selection. Delegations continued to note that the Group should focus on autonomy in the critical functions of target selection and engagement. Limitations concerning a system's scope of operations was pertinent from an IHL perspective and several delegations did see the relevance of this notion, including,

according to them, the maintenance of human control over weapons and ensuring that the use of weapons was consistent with IHL; many emphasized the context-dependent nature of the use of force. Finally, on the question of the utility of the anti-material and anti-personnel categories, a range of views were expressed, with the possibility of moving from anti-materiel to anti-personnel in the use of autonomous systems noted. In this connection, some delegations argued that the concept of lethality was not central to the work of the Group.

Agenda item 5 (c): Further consideration of the human element in the use of lethal force; aspects of human-machine interaction in the development, deployment and use of emerging technologies in the area of lethal autonomous weapons systems

17. This section is complementary to paragraphs 21 and 22 of the Report, aims to provide additional clarification as summary of this year's discussions and builds on the work of the GGE from previous years.

18. Many delegations favoured a human-centred focus as the best way to take forward the work of the Group. Delegations reaffirmed their strong conviction that human responsibility for decisions on the use of force must be retained and that this responsibility can be exercised at various stages of a weapon system's life cycle. Many delegations maintained that the use of force must reflect human agency and human intention — the judgements required to authorize the use of armed force must be made by humans.

19. The human element continued to be a central concern. Many argued that meaningful human control over the use of force and weapons systems was necessary for compliance with IHL and other applicable international law. Some delegations called for direct human control, both through design and in use, though there were divergent views on the need for real-time supervision during the operation of a weapons system. Some delegations highlighted the fact that many existing weapons systems do not allow for real time supervision during their operation. The necessity of ensuring all weapons systems continue to operate within a responsible chain of human command and control was nevertheless underscored. Different elaborations of the concept of human control were explored, but there was not agreement on a shared understanding of the concept that was considered useful and unproblematic to all: some delegations continued to question whether it was useful to focus on "human control" given the divergent interpretations of the term and the range of issues that could be posed by human-machine interaction even when there was full human control. It was also highlighted by some that the appropriate level of control depends on operational context, which demands consideration of the environment and how it may impact human-machine interaction.

20. Several referred to the touchpoints of human-machine interaction explored by the Group in 2018. The ability to constrain a system through limitations on, among other things, its duration of operation, range of operation and the functions that can operate autonomously, and hence determine whether the weapon-system's use could be lawful, were considered as relevant by several delegations. Some delegations noted such control must be fully informed to be effective. Human operators and commanders need a sufficient understanding of the machines they operate and the algorithms that inform their decisions to exercise appropriate judgement and ensure that the use of weapon systems is consistently within applicable international law. There also needs to be an understanding of the operational environment. Several delegations felt that human control was contingent on the ability to intervene in the operation of a weapon, once activated. Others noted that there was always a point after which human intervention in a weapon's operation was not possible. Finally, it was noted that human judgement needed to be reasonably temporally proximate to an attack, to remain valid.

Agenda item 5 (d): Review of potential military applications of related technologies in the context of the Group's work

21. This section is complementary to paragraphs 23 and 24 of the Report, aims to provide additional clarification as summary of this year's discussions and builds on the work of the GGE from previous years.

22. Delegations discussed how militaries might adopt and use autonomous technologies, with the view expressed that these would complement, not replace, existing systems. Possible benefits and risks for IHL compliance were covered, with some highlighting the need to weigh benefits against risks, while others pointed to a potential slippery slope of such reasoning.

23. Some underlined the distinct challenges for IHL compliance posed by using autonomy in weapon systems, including the possibility of bias in underlying algorithms and data and the black box nature of current artificial intelligence systems that rely on machine learning. In this vein, many delegations emphasized that IHL compliance necessitates the retention of human control over the critical functions of weapons systems and decisions over the use of force. A few delegations discussed the possibility of autonomy leading to improved compliance with IHL: they argued that such systems may be less susceptible to error or more accurate than previous systems, with conceivably positive outcomes with regard to efforts to reduce civilian harm in armed conflict. Several delegations noted that autonomous systems could complement — but never replace — human decision-making processes in applying IHL principles. Some were of the opinion that autonomous functions should allow humans to focus on those aspects of decision-making in which they are essential or have abilities superior to autonomous systems. A few delegations discussed reasons why militaries may see value in employing weapons systems with autonomous functions, including the potential for them to operate more efficiently and with less limitations related to time and geographical scope of operation than non-autonomous systems.

24. The possibility of reduced risk to military personnel leading to a reduction of the threshold for resorting to the use of armed force was also underlined by several delegations. On the other hand, it was also noted that the possibility of reduced risk to military personnel could lessen risks of escalation because there would not be a perceived imperative to take immediate action in self-defence or in response to the loss of life. Other possible security implications involved the possibility for an arms race and unconstrained proliferation, including non-State actors. A few delegations outlined how national policies and procedures were in place for the control over the use of force and weapons systems at various stages of their lifecycle. Details on specific deployed weapons systems with some autonomous functions were also covered. The dual use nature of the underlying technology was noted, as was the importance of the Group taking care not to hinder civilian development and applications.

Agenda item 5 (e): Possible options for addressing the humanitarian and international security challenges posed by emerging technologies in the area of lethal autonomous weapons systems in the context of the objectives and purposes of the Convention without prejudging policy outcomes and taking into account past, present and future proposals

25. This section is complementary to paragraph 25 of the Report, aims to provide additional clarification as summary of the year's discussions and builds on the work of the GGE from previous years. There were several concrete policy options for addressing the challenges raised by emerging technologies in the area of lethal autonomous weapons systems before the Group.

26. Some called for negotiation of a legally binding instrument containing prohibitions, regulations, positive obligations or a combination of these; this could take the form of a CCW protocol or a standalone treaty. Some called for a moratorium on the development and use of autonomous weapons in the interim.

27. Some called for negotiation of a political declaration containing non-binding commitments, possibly based on the Guiding Principles, and possibly leading to a non-binding code of conduct.

28. Some called for improved implementation of legal weapons reviews, as well as information sharing by States on best practices or an annual review mechanism through the CCW.

29. Some held that no further legal measures were needed, if the view that IHL is fully applicable and sufficient to deal with any possible challenges raised by LAWS is considered.

30. There was a new proposal this year for the GGE to negotiate a non-legally binding technical outcome comprising a compilation of existing applicable international law and identifying associated good practices for States, which could follow the approach of the 2008 Montreux Document regarding private military and security companies during armed conflict. It was noted that this may have similarities to the proposed code of conduct mentioned previously.

31. A call was made for technical, military, and legal expert working groups to share best practices for responsible use and development, and for using those expert inputs to continue developing, refining, and elaborating the eleven Guiding Principles recommended by the GGE for adoption by the High Contracting Parties.

32. Along the lines of working groups, and in discussing the future work of the Group, a broader notion of discrete working groups or work streams was explored. Many delegations found utility in the notion of defining discrete legal, technological and military work streams, bearing in mind ethical considerations, and noting the need for cross-fertilization across the three and the desirability of each stream incorporating relevant technical expertise. Consensus could not, in the end, be reached regarding the details of this idea, with delegations agreeing, instead, to take forward the notion of working on the legal, technological and military aspects, with days of official work of the GGE focused on each aspect.

33. It was noted that the policy options are not mutually exclusive. Many delegations continued to affirm the suitability of the CCW for considering the implications of emerging technologies in the area of LAWS. Efforts were thus made to find common ground.

34. Regardless of the legal or political nature of any eventual instrument, the question of how to define the type and degree of human responsibility, judgement or control that would be required or appropriate was further explored as an important element in any policy option. For instance, would there be a requirement or recommendation for direct human control with specific exceptions? Or should there, alternatively, be a requirement or recommendation for meaningful (or another adjective) human control with specific prohibitions? Delegations noted the importance of achieving further granularity on these and other relevant concepts in light of IHL principles and requirements.

35. Delegations discussed the utility of work to further operationalize the guiding principles, through their practical implementation at the national level, and international cooperation and development in this regard. The Chair's Non-Paper of Conclusions provided ahead of the informal meeting in May, was structured with the points of conclusion under negotiation structured as sub-points to each of the Guiding Principles. The Chair's Non-Paper of Conclusions provided ahead of the informal meeting in June, then proposed a slightly different structure, with some points proposed to be discussed as possible new Guiding Principles. Both exercises showed a great degree of correlation between the Guiding Principles and the newly adopted conclusions — a correlation that may be used in any potential consideration, clarification, and development of aspects of the normative and operational framework, and as one potential way of starting to operationalize the Guiding Principles.

36. There was also extensive discussion of the specific output(s) of work of the Group over 2020-2021, with a view to inputs to the 2021 CCW Review Conference. While the notion of working on aspects of the normative and operational framework on emerging technologies in the area of LAWS enjoyed consensus, there was an extensive debate on the nature of that work — specifically whether it would include development of the framework. Ultimately, the decision whether to include "development" — in addition to clarification and consideration — of the normative and operational framework was left to the Meeting of High Contracting Parties of the CCW, with a strong momentum toward consensus in this regard.

III. A Way Forward

37. The Group said that it would explore and come to consensus on possible recommendations on options related to emerging technologies in the area of LAWS over the next two years, and that in so doing it would consider the legal, technological and military aspects, as well as the interaction between them, bearing in mind ethical considerations.

38. The Group further agreed it would use as inputs: (i) the Guiding Principles, which it may further develop and elaborate; (ii) the aforementioned work on the legal, technological and military aspects; and (iii) the conclusions of the Group in 2017, 2018 and 2019, as a basis for the clarification, consideration and possible development of aspects of the normative and operational framework on emerging technologies in the area of LAWS.

39. The full Report offers an abundance of consensus-based material that can be used in the future in the clarification, consideration and potential development of aspects of the normative and operational framework. Some, such as paragraphs 17, 19, 21 and 23 of the Report enjoyed consensus on ideas and concepts as worded. Others, such as paragraphs 18, 20, 22 and 24 indicate points that require further work. Still others, contained in Part II of the Chair's summary, were discussed during the work of the GGE but around which consensus could not be reached. All can provide a helpful roadmap and material for work of the GGE in the future, especially in the two years leading up to the 2021 Review Conference.

40. The Chair, thus, submits for consideration the following:

- Consideration, clarification, *and* development of aspects of the normative and operational framework reflects a hard-won space for consensus among many policy options that is also fully aligned with the mandate noted in paragraph 2 above, and should form the framework of the work over the next two years. High Contracting Parties to the CCW are strongly encouraged to make the consensus decision to take this process forward as such.
- The group may wish to focus on the legal (under which there were discussions to include ethical considerations), technological and military work aspects in 2020, bearing in mind the human element, and seeking to engage with relevant technical experts. It may be useful to devote two-fifths of its official days toward this goal.
- The group may then turn to consideration, clarification, and development of aspects of the normative and operational framework in 2021 with a view to making concrete recommendations to the 2021 Review Conference. It may need three-fifths of its mandated work for the two years on this in 2021, with the final one-fifth focused solely on negotiation.
- The aspects of the normative framework may seek to delineate the boundaries — if possible, and whether toward exceptions or prohibitions — on acceptable types and degrees of autonomy in the critical functions of weapons systems, taking into account the context-dependent nature of the use of force, and grounding this delineation in the human element of the use of force.
- The aspects of the operational framework may focus on sharing and articulating best practices in ensuring weapons systems that employ autonomy within the aforementioned bounds of acceptability are designed, deployed and used consistently within applicable international law.