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# 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

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## Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons System

Geneva, 3–13 August, 24 September–1 October and 2–8 December 2021

Item 7 of the agenda

Adoption of the report (last session only)

## Report of the 2021 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems

### I. Introduction

1. The 2019 Meeting of High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or Have Indiscriminate Effects (hereinafter “the Convention”), held in Geneva from 13 to 15 November 2019, decided, as contained in its final document (CCW/MSP/2019/9):

“To endorse the guiding principles affirmed by the Group, as contained in Annex III of this Report.

The Group of Governmental Experts related to emerging technologies in the area of lethal autonomous weapons systems in the context of the objectives and purposes of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons will meet for a total of ten days in 2020 and between ten to twenty days in 2021, to be decided by the Meeting of the High Contracting Parties in 2020, in Geneva in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), consistent with CCW/CONF.V/2 and subject to the financial situation of the Convention.

The rules of procedure of the Review Conference will apply *mutatis mutandis* to the Group. The Group will conduct its work and adopt its reports by consensus, one of which is to be submitted to the meeting of High Contracting Parties in 2020, and the other submitted to the 2021 Sixth Review Conference. In accordance with the goals of the CCW Sponsorship Programme, the Meeting encouraged the widest possible participation of all High Contracting Parties.

In this period, the group is to explore and agree on possible recommendations on options related to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention, taking into account all proposals (past, present and future) and the agenda items as reflected in paragraph 11 and annex I of the Report. In its discussions under each agenda item the Group shall consider the legal, technological and military aspects and the interaction between them, and bearing in mind ethical considerations. Delegations are encouraged to include legal, technological and military experts.



The Group is to consider:

- the guiding principles, which it may further develop and elaborate;
- the work on the legal, technological and military aspects;
- the conclusions of the Group, as reflected in its reports of 2017, 2018 and 2019,

and use them as a basis for its 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, in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), consistent with CCW/CONF.V/2. The Group's recommendations will be reported, as appropriate, for consideration at the 2020 Meeting of High Contracting Parties and 2021 Sixth Review Conference.

In 2020, the Group will be chaired by Mr. Jānis Kārklīņš, Ambassador Extraordinary and Plenipotentiary of Latvia. The Chairperson for the meetings of the Group in 2021 will be designated by the 2020 Meeting of the High Contracting Parties to the Convention, taking into account the principle of equitable geographical rotation.”

The Meeting decided to organize in 2020, in accordance with the relevant decisions taken by the Twenty-first Annual Conference of the High Contracting Parties to Amended Protocol II and the Thirteenth Conference of the High Contracting Parties to Protocol V, and subject to available resources<sup>1</sup>, the following CCW related activities, inter alia: The Group of Governmental Experts of the High Contracting Parties related to emerging technologies in the area of lethal autonomous weapons systems (LAWS) from 22 to 26 June 2020, and from 10 to 14 August 2020. The meeting also adopted the relevant cost estimates for 2020 as contained in CCW/MSP/2019/4. The document will be re-issued as document CCW/MSP/2019/4/Rev.1 to provide cost estimates for 2021.”

2. Due to the extraordinary circumstances related to the COVID-19 pandemic, the meetings of the Group of Governmental Experts of the High Contracting Parties related to emerging technologies in the area of lethal autonomous weapons systems and the 2020 Meeting of the High Contracting Parties did not take place. On 14 April 2021, the High Contracting Parties decided:<sup>2</sup>

“To organize in 2021, in accordance with the relevant decisions taken by the High Contracting Parties to Amended Protocol II and to Protocol V, and continuing the work of the GGE on emerging technologies in the area of lethal autonomous weapon systems (LAWS), in line with paragraph 31 of the final report of the 2019 CCW Meeting of High Contracting Parties (CCW/MSP/2019/9) and subject to available resources, the following CCW related activities:

(a) The Group of Governmental Experts of the High Contracting Parties related to emerging technologies in the area of lethal autonomous weapons systems (LAWS) for 20 days as follows: from 28 June to 5 July 2021, from 3 to 13 August 2021, and from 27 September to 1 October 2021, with flexibility on the exact venue to be determined by High Contracting Parties in case the pandemic does not allow in-person meetings in Geneva.

[...]

Taking into account the extraordinary circumstances related to the COVID-19 pandemic and without prejudice to the format of future meetings, the meetings

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<sup>1</sup> Subject to the continued availability of rooms and subject to adjustment of dates in full consultation with the High Contracting Parties.

<sup>2</sup> CCW/2020/1

<sup>3</sup> Pending a final decision on the tenth Review Conference of the Treaty on the Non-Proliferation on Nuclear weapons.

referred to under (a) [...] will be held in in-person format in accordance with the regular practice under the CCW [...]

To adopt the relevant cost estimates contained in Annex II,

...

To elect Ambassador Marc Pecsteen de Buytsverve, Permanent Representative of Belgium, as Chairperson of the 2021 Group of Governmental Experts of the High Contracting Parties related to emerging technologies in the area of lethal autonomous weapons systems (LAWS).”

3. Due to the extraordinary circumstances related to the COVID-19 pandemic, the High Contracting Parties decided by written silent procedure to hold the meetings of the Group of Governmental Experts of the High Contracting Parties related to emerging technologies in the area of lethal autonomous weapons systems from 3 to 13 August 2021, from 24 September to 1 October 2021, and from 2 December to 8 December 2021.

## II. Organization and work of the Group of Governmental Experts

4. On Tuesday, 3 August, the session was opened by the Chairperson, Marc Pecsteen de Buytsverve of Belgium. Izumi Nakamitsu, High Representative for Disarmament Affairs, delivered a video statement.

5. At the same meeting, the Group adopted its agenda<sup>4</sup>, as contained in Annex I, confirmed the Rules of Procedure, as adopted by the Fifth Review Conference<sup>5</sup>, and adopted its programme of work<sup>6</sup>, as orally amended, as contained in Annex II. Heegyun Jung, Political Affairs Officer, UNODA, served as the Secretary of the Group, and was assisted by Juliana Helou van der Berg, Associate Political Affairs Officer, UNODA.

6. The following High Contracting Parties to the Convention participated in the work of the Group: Algeria, Argentina, Australia, Austria, Belarus, Belgium, Brazil, Bulgaria, Burkina Faso, Burundi, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cuba, Czech Republic, Denmark, Dominican Republic, Ecuador, Estonia, Finland, France, Georgia, Germany, Greece, Guatemala, Holy See, Honduras, Hungary, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Japan, Jordan, Kazakhstan, Korea (Republic of), Kuwait, Latvia, Lao People's Democratic Republic, Lebanon, Lithuania, Luxembourg, Madagascar, Malta, Mexico, Montenegro, Morocco, Netherlands, New Zealand, North Macedonia, Norway, Pakistan, Palestine (State of), Panama, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Serbia, Sierra Leone, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States, Uruguay, Venezuela (Bolivarian Republic of).

7. The following Signatory States to the Convention participated in the work of the Group: Egypt and Nigeria.

8. The following States not party to the Convention participated as observers: Angola, Iran, Namibia, Singapore.

9. The representatives of the European Union, the International Committee of the Red Cross (ICRC) and the United Nations Institute for Disarmament Research (UNIDIR) participated in the work of the Group in accordance with the rules of procedure.

10. The representatives of the following non-governmental organizations participated in the work of the Group: Campaign to Stop Killer Robots (Amnesty International, Article 36, Human Rights Watch, Mines Action Canada, PROTECTION, Red de Seguridad Humana para América Latina y el Caribe, Women's International League for Peace and Freedom, World Council of Churches), Center for Humanitarian Dialogue, Future of Life Institute

<sup>4</sup> CCW/GGE.1/2021/1.

<sup>5</sup> CCW/CONF.V/4.

<sup>6</sup> CCW/GGE.1/2021/2.

(FLI), Geneva Centre for Security Policy (GCSP), International Panel on the Regulation of Autonomous Weapons (iPRAW), Norwegian Peace Association, PAX, Pax Christi International, Plataforma CIPÓ, Sokka Gakkai International (SGI), and Soldiers of Peace International Association.

11. The representatives of the following entities also participated in the work of the Group: Alan Turing Institute, Centre for War Studies at the University of Southern Denmark, German Institute for International and Security Affairs (SWP), Institute for Peace Research and Security Policy, Institut Français des Relations Internationales (IFRI), Johns Hopkins Applied Physics Laboratory, Oslo New University College, Oxford Institute for Ethics, Law and Armed Conflict (ELAC), Oxford Internet Institute, Peace Research Center Prague at Charles University, Peace Research Institute Frankfurt, R&D Institute of Robotics and Control at Southern Federal University (SFedU), School of Social and Political Science at the University of Edinburgh, Stockholm International Peace Research Institute (SIPRI), and the University of Oxford.

12. In accordance with its Programme of work, the Group considered the following agenda items:

5(a) An exploration of the potential challenges posed by emerging technologies in the area of Lethal Autonomous Weapons Systems to International Humanitarian Law;

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;

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;

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

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.

13. Preparation of the report for consideration at the Sixth Review Conference of the CCW in accordance with the decision of the High Contracting Parties in 2019 (paragraph 31 CCW/MSP/2019/9):

“... explore and agree on possible recommendations on options related to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention, taking into account all proposals (past, present and future) and the agenda items as reflected in paragraph 11 and annex I of the Report. In its discussions under each agenda item the Group shall consider the legal, technological and military aspects and the interaction between them, and bearing in mind ethical considerations. Delegations are encouraged to include legal, technological and military experts.

The Group is to consider the guiding principles, which it may further develop and elaborate, the work on the legal, technological and military aspects, the conclusions of the Group, as reflected in its reports of 2017, 2018 and 2019 and use them as a basis for its 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, in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), consistent with CCW/CONF.V/2”.

14. The Group met in Geneva in 2021, from 3 to 13 August, 24 September to 1 October and 2 to 8 December. Substantive discussion on agenda items 5 (a) to 5 (e) took place from 3 to 6 August and 24 to 27 September. Substantive discussion on agenda item 6 took place

from 6 to 13 August and 27 September to 1 October. From 2 to 8 December, the Group considered its draft final report.

### **III. Conclusions**

15. The Group explored and sought agreement on possible recommendations on options related to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention, taking into account all proposals (past, present and future) and the agenda items as reflected in paragraph 11 and annex I of the Report of its 2019 session.<sup>7</sup> In its discussions under each agenda item the Group considered the legal, technological and military aspects and the interaction between them, and bearing in mind ethical considerations.

16. Delegations presented different options related to emerging technologies in the area of LAWS in the context of the objectives and purposes of the Convention as set out in paragraph 28 of the report of the Group in 2018 (CCW/GGE.1/2018/3), including a legally-binding instrument, a political declaration, clarity on the implementation of existing obligations of international law in particular international humanitarian law, and the option that no further legal measures are needed. Other non-legally binding instruments were also presented. Their pros and cons were discussed.

17. Following the paragraph 31 of the 2019 Meeting of the High Contracting Parties final document (CCW/MSP/2019/9) the Group considered: (1) the guiding principles, which the Meeting of High Contracting Parties endorsed in 2019<sup>8</sup>, which may be further developed and elaborated, (2) the work on the legal, technological and military aspects and (3) the conclusions of the Group, as reflected in its reports of 2017, 2018 and 2019; as well as all proposals past and present; and it used them as a basis for its work in 2021 and its 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, in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), consistent with CCW/CONF.V/2.

18. The Group considered different proposals on how to reflect the deliberations including possible conclusions and recommendations of the Group, but no consensus was reached.

19. A summary of the discussions held during the meetings of the Group, prepared under the Chairperson's responsibility, is attached to this report as Annex III.

### **IV. Adoption of the report**

20. On 8 December 2021, the Group considered and adopted its final report, as contained in CCW/GGE.1/2021/CRP.1, as orally amended.

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<sup>7</sup> CCW/GGE.1/2019/3.

<sup>8</sup> CCW/GGE.1/2019/3, Annex III.

## Annex I

### Agenda for 2021 sessions

#### As adopted by the Group of Governmental Experts on 3 August 2021

1. Opening of the meeting.
2. Adoption of the agenda (first session only).
3. Confirmation of the rules of procedure (first session only).
4. Organization of the work of the Group of Governmental Experts.
5. Focus of work of the Group of Governmental Experts in 2021:
  - (a) An exploration of the potential challenges posed by emerging technologies in the area of Lethal Autonomous Weapons Systems to International Humanitarian Law;
  - (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;
  - (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;
  - (d) Review of potential military applications of related technologies in the context of the Group's work;
  - (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.
6. Preparation of the report for consideration at the Sixth Review Conference of the CCW in accordance with the decision of the High Contracting Parties in 2019 (paragraph 31 CCW/MSP/2019/9):

“... explore and agree on possible recommendations on options related to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention, taking into account all proposals (past, present and future) and the agenda items as reflected in paragraph 11 and annex I of the Report. In its discussions under each agenda item the Group shall consider the legal, technological and military aspects and the interaction between them, and bearing in mind ethical considerations. Delegations are encouraged to include legal, technological and military experts.

The Group is to consider the guiding principles, which it may further develop and elaborate, the work on the legal, technological and military aspects, the conclusions of the Group, as reflected in its reports of 2017, 2018 and 2019 and use them as a basis for its 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, in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), consistent with CCW/CONF.V/2”.
7. Adoption of the report (last session only).

## Annex II

### Programme of Work

#### As adopted by the Group of Governmental Experts on 3 August 2021

##### Tuesday, 3 August 2021

###### 10:00 – 13:00

1. Opening of the meeting
2. Adoption of the agenda
3. Confirmation of the rules of procedure
4. Organization of the work of the Group of Governmental Experts

###### 15:00 – 18:00

5. Focus of work of the Group of Governmental Experts in 2021:
  - 5 (a) An exploration of the potential challenges posed by emerging technologies in the area of lethal autonomous weapons systems to international humanitarian law

##### Wednesday, 4 August 2021

###### 10:00 – 13:00

- 5(a) continued
- 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 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

###### 15:00 – 18:00

- 5(b) continued
- 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

##### Thursday, 5 August 2021

###### 10:00 – 13:00

- 5(c) continued
- 5(d) Review of the potential military applications of related technologies in the context of the Group's work

###### 15:00 – 18:00

- 5(d) continued
- 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 prejudicing policy outcomes and taking into account past, present and future proposals

**Friday, 6 August 2021**

**10:00 – 13:00**

5(e) Continued

**15:00 – 18:00**

6. Preparation of the report for consideration at the Sixth Review Conference of the CCW in accordance with the decision of the High Contracting Parties in 2019 (paragraph 31 CCW/MSP/2019/9).

**Monday, 9 August 2021 – Friday, 13 August 2021**

**10:00 – 13:00**

6. Preparation of the report for consideration at the Sixth Review Conference of the CCW in accordance with the decision of the High Contracting Parties in 2019 (paragraph 31 CCW/MSP/2019/9).

**15:00 – 18:00**

6. Preparation of the report for consideration at the Sixth Review Conference of the CCW in accordance with the decision of the High Contracting Parties in 2019 (paragraph 31 CCW/MSP/2019/9).



## Annex III

### Chairperson's summary

*The Chair submits this summary, under his sole authority, with the intention of capturing his understanding of the work carried out in 2021 and to inform the work of the Group in 2022. The following paragraphs are the latest version of the draft conclusions and recommendations submitted by the Chair and discussed by the Group, on which no consensus was reached. It is the Chair's view that they reflect the work carried out in 2021 and could constitute a useful basis for future work.*

1. The Group explored and sought agreement on possible recommendations on options related to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention, taking into account all proposals (past, present and future) and the agenda items as reflected in paragraph 11 and annex I of the Report of its 2019 session.<sup>1</sup> In its discussions under each agenda item the Group considered the legal, technological and military aspects and the interaction between them, and bearing in mind ethical considerations.

2. Delegations presented different options to address the potential risks and challenges in the context of the objectives and purposes of the Convention. Their pros and cons were discussed, including a legally binding instrument, a political declaration, and clarity on the implementation of existing obligations under international law, in particular international humanitarian law, as set out in paragraph 28 of the report of the Group in 2018 (CCW/GGE.1/2018/3), as well as other non-legally binding documents. It was emphasized that these options were not necessarily mutually exclusive.

3. Following the mandate agreed in 2019, in this connection, the Group considered: (1) the guiding principles, which the Meeting of High Contracting Parties endorsed in 2019,<sup>2</sup> (2) the work on the legal, technological and military aspects and (3) the conclusions of the Group, as reflected in its reports of 2017, 2018 and 2019; as well as all proposals past and present; and it used them as a basis for its work in 2021 and its 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, in accordance with Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), consistent with CCW/CONF.V/2.

4. The Group recommends that the High Contracting Parties affirm the following elements in order to contribute 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.

### I. Introduction

5. Reaffirm the objectives and purposes of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects.

6. Reaffirm that the Convention 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.

<sup>1</sup> CCW/GGE.1/2019/3.

<sup>2</sup> CCW/GGE.1/2019/3, Annex III.

7. Recognize the potential risks and challenges posed by emerging technologies in the area of lethal autonomous weapons systems in ensuring respect in all circumstances for international humanitarian law.
8. Recognize the potential risks and challenges posed by emerging technologies in the area of lethal autonomous weapons systems in respecting other bodies of international law, as applicable, including international human rights law and international criminal law, as well as consideration of ethical considerations as they relate to legal considerations, non-proliferation and the maintenance of international peace and security, including thresholds for armed conflict and new arms races.
9. Reaffirm that consideration should be given to the use of emerging technologies in the area of lethal autonomous weapons systems in upholding compliance with international humanitarian law and other applicable international legal obligations.
10. Affirm that legal aspects of the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems also addresses ethical considerations, including in connection with legal considerations.
11. Affirm that discussions and any potential policy measures taken within the context of the Convention should not hamper progress in or access to peaceful uses of intelligent autonomous technologies.

## **II. Application of international law**

### **International humanitarian law and other applicable bodies of international law**

12. International humanitarian law continues to apply fully to all weapons systems, including the potential development and use of lethal autonomous weapons systems.
13. 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 international law, in particular international humanitarian law and its rules and principles, including *inter alia* those related to distinction, proportionality and feasible precautions.
14. In cases involving weapons systems based on emerging technologies in the area of lethal autonomous weapons systems not covered by the Convention 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.
15. The international humanitarian law rules and principles, including *inter alia* distinction, proportionality and precautions in attack must be respected through a chain of responsible command and control.
16. Compliance with the international humanitarian law rules 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 information from all sources reasonably available to them at the time of the use of force, including relevant context.
17. 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 international humanitarian law.

### **State responsibility**

18. 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. States must also ensure individual accountability 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 international humanitarian law.

19. Under principles of State responsibility, every internationally wrongful act of a State, including such other actions or omissions involving the use of emerging technologies in the area of lethal autonomous weapons systems, entails the international responsibility of that State.

20. A State remains responsible for, *inter alia*, all conduct of its organs such as its armed forces as well as all other actions or omissions attributable to the State, including any involving the use of emerging technologies in the area of lethal autonomous weapons systems, in accordance with applicable international law.

21. 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.

### **Human accountability**

22. Humans must at all times remain accountable in accordance with applicable international law for decisions on the use of force.

23. Accountability for developing, deploying and using any weapons systems based on emerging technologies in the area of lethal autonomous weapons system 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.

24. States must provide mechanisms to ensure accountability for any violations of their obligations under international law, in particular international humanitarian law, involving any weapon system based on emerging technologies in the area of lethal autonomous weapon systems, in accordance with applicable international law, including by providing for investigations of reasonable suspicions of violations bringing perpetrators to justice.

### **General commitments**

25. States should commit not to use, or to develop, produce, acquire, possess, deploy or transfer with a view towards use, any weapons system based on emerging technologies in the area of lethal autonomous weapons systems that can perform the critical functions of selecting and engaging to apply force against targets without further intervention by a human operator, if:

- (a) It is of a nature to cause superfluous injury or unnecessary suffering, or it is inherently indiscriminate; or
- (b) Its autonomous functions are designed to be used to conduct attacks outside a responsible chain of human command and control;
- (c) The incidental loss of civilian life, injury to civilians, and damage to civilian objects expected to result from the use of the weapon to conduct attacks cannot be reasonably foreseen or are not fully understood by a human operator; or
- (d) It is otherwise incapable of being used in accordance with international humanitarian law.

26. States should commit to exercise appropriate human involvement throughout the life-cycle of the weapons system that is sufficient to ensure human judgment and control necessary in the circumstances to comply with international humanitarian law over the use of all other types of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems. This may include, but is not limited to:

- (a) Limits on the type of target;
- (b) Limits on the duration, geographical scope and scale of use;
- (c) Requirements for human-machine interaction and necessary intervention or deactivation; or

- (d) Clear procedures to ensure that human operators are informed and capable of controlling the weapon systems.

### **Human-machine interaction**

27. 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 international humanitarian law. 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.

28. 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.

29. The following specific practices in human-machine interaction may contribute to the implementation of international humanitarian law, effective accountability and the mitigation of risks posed by weapon systems based on emerging technologies in the area of lethal autonomous weapon systems:

- (a) Human commanders and operators make decisions about the deployment and use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems with information reasonably available at the time to ensure that force will be used in accordance with international law, including information about the potential targets, the capabilities and characteristics of the weapon to be used and the context in which the weapon is deployed.
- (b) Human commanders and operators should be able to properly assess the effects of using a weapons system based on emerging technologies in the area of lethal autonomous weapons systems prior to use.
- (c) Human commanders and operators and other relevant personnel are trained, to ensure that the weapons systems based on emerging technologies in the area of lethal autonomous weapons systems are deployed and used in conformity with international humanitarian law.

30. It would be beneficial to identify and share on a voluntary basis good practices for human-machine interaction, which may include such practices identified in academic research or developed in industry, to strengthen compliance with international humanitarian law when potentially using weapons systems based on emerging technologies in the area of lethal autonomous weapons systems.

### **Legal weapon reviews**

31. 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. National reviews of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems are particularly important in light of the concerns about compliance with international humanitarian law these have raised.

32. 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. States are free to independently determine the means to conduct legal weapons reviews and the voluntary exchange of best practices could be beneficial, bearing in mind national security considerations or commercial restrictions on proprietary information.

33. All States that have not yet done so are encouraged to undertake legal weapon reviews.

34. Weapons systems under development, or modification which changes the effects or use of existing weapons systems, must be reviewed as applicable to ensure compliance with international humanitarian law.

35. It would be beneficial to identify and share on a voluntary basis information and good practices on the conduct of legal weapon reviews of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems.

36. Where feasible and appropriate, inter-disciplinary perspectives should be integrated in research and development of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, bearing in mind national security considerations and restrictions on commercial proprietary information.

### **Risk mitigation**

37. 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.

38. 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 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.

39. States should consider the concern that weapons systems based on emerging technologies in the area of lethal autonomous weapons systems rely on data sets that can perpetuate or amplify unintentional social biases, including gender and racial bias, and that can thus have implications for compliance with international law.

40. Risk mitigation measures to help minimize incidental loss of life, injuries to civilian and damage to civilian objects resulting from the use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems 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; (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.

41. 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.

### **The way forward**

42. The Group recommends that the High Contracting Parties, at their Sixth Review Conference:

- (a) endorse the recommendations of the Group of Governmental Experts
- (b) consider and adopt a political declaration, on the basis of this report
- (c) decide that the Group of Governmental Experts shall develop and adopt by consensus, as appropriate, an instrument on the regulation of weapons systems based on emerging technologies in the area of autonomous weapons systems, on the basis of the relevant paragraphs of this report, especially paragraphs 38 and 39.

43. The work of the Group could also benefit from further discussion and clarification of the following aspects, *inter alia*:

- (a) The role of operational constraints regarding tasks, target profiles, time-frame of operation, and scope of movement over an area and operating environment;
- (b) Possible bias in the data sets used in algorithm-based programming relevant to emerging technologies in the area of autonomous weapons systems;
- (c) Different potential characteristics and definitions of emerging technologies in the area of autonomous weapons systems, including: self-adaption; predictability; explainability; reliability; ability to be subject to intervention; ability to redefine or modify objectives or goals or otherwise adapt to the environment; and ability to self-initiate;
- (d) The possible effects of weapons systems based on emerging technologies in the area of autonomous weapons systems on regional and global security and stability, including thresholds for armed conflict, and compliance with international humanitarian law.
- (e) The contribution of ethical considerations in determining the acceptability of and limits on autonomous weapon systems.

44. The work of the Group is to be based on: (i) the guiding principles, which it may further develop and elaborate; (ii) the conclusions and recommendations of the Group in its reports of 2017, 2018, 2019 and 2021; (iii) all proposals past and present; (iv) the political declaration.

45. The Group should meet for an initial duration of [10 days] in 2022 in Geneva. The chairperson of the Group, in consultation with the High Contracting Parties, shall propose the duration, timing and location of subsequent sessions of the Group, as might be required for the completion of its work.

46. The rules of procedure of the Review Conference will apply mutatis mutandis to the Group. The Group will conduct its work and adopt its reports by consensus. In accordance with the goals of the CCW Sponsorship Programme, the Meeting encouraged the widest possible participation of all High Contracting Parties.

## Annex IV

### List of documents

<i>Symbol</i>	<i>Title</i>
CCW/GGE.1/2021/1	Provisional agenda for 2021 sessions
CCW/GGE.1/2021/2	Provisional programme of work
CCW/GGE.1/2021/2/Add.1	Provisional programme of work. Submitted by the Chairperson
CCW/GGE.1/2021/3	Report of the 2021 session of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems
CCW/GGE.1/2021/WP.1 English only	Considerations for the report of the Group of Governmental Experts of the High Contracting Parties to the Convention on Certain Conventional Weapons on emerging technologies in the area of Lethal Autonomous Weapons Systems on the outcomes of the work undertaken in 2017-2021. Submitted by the Russian Federation
CCW/GGE.1/2021/WP.2 English only	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). Submitted by Australia, Canada, Japan, the Republic of Korea, the United Kingdom, and the United States
CCW/GGE.1/2021/WP.3 English only	U.S. Proposals on Aspects of the Normative and Operational Framework. Submitted by the United States of America
CCW/GGE.1/2021/WP.4 English only	Possible consensus recommendations in relation to the clarification, consideration and development of aspects on the normative and operational framework on emerging technologies in the area of LAWS. Submitted by France
CCW/GGE.1/2021/WP.5 English only	Outline for a normative and operational framework on emerging technologies in the area of LAWS. Submitted by France and Germany
CCW/GGE.1/2021/WP.6 English only	Proposal for consensus recommendations in relation to the clarification, consideration and development of aspects of the normative and operational framework. Submitted by the International Committee of the Red Cross
CCW/GGE.1/2021/WP.7 English only	Joint Working Paper. Submitted by the Argentine Republic, the Republic of Costa Rica, the Republic of Ecuador, the Republic of El Salvador, the Republic of Panama, the State of Palestine, the Republic of Peru, the Republic of the Philippines, the

<i>Symbol</i>	<i>Title</i>
	Republic of Sierra Leone and the Eastern Republic of Uruguay
CCW/GGE.1/2021/WP.8 English only	Working paper. Submitted by the Bolivarian Republic of Venezuela on behalf of the Non-Aligned Movement (NAM) and Other States Parties to the Convention on Certain Conventional Weapons (CCW)
CCW/GGE.1/2021/WP.9/Corr.1 English only	Chairperson summary. Corrigendum
CCW/GGE.1/2021/WP.10 English only	The position on the status of the summary of the Chairperson of the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems. Submitted by the Russian Federation
CCW/GGE.1/2021/WP.11 English only	Written contributions on possible 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. Submitted by the United Kingdom
CCW/GGE.1/2021/INF.1 English/French/Spanish only	List of participants

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