
Group of Governmental Experts of the 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 to Have Indiscriminate Effects

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Item 6 of the agenda

Adoption of the report

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

I. Introduction

1. The 2018 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 (CCW), held in Geneva from 21 to 23 November 2018, decided, as contained in its final document (CCW/MSP/2018/11):

“The Group of Governmental Experts related to emerging technologies in the area of lethal autonomous weapons systems (LAWS) in the context of the objectives and purposes of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons, established by Decision 1 of the Fifth Review Conference of the High Contracting Parties to the Convention (CCW/CONF.V/10), shall meet for a duration of seven (5+2) days in 2019 in Geneva, consistent with document CCW/CONF.V/2.

The Rules of Procedure of the Meetings of the High Contracting Parties shall apply *mutatis mutandis* to the Group. The Group shall conduct its work and adopt its report by consensus which shall be submitted to the 2019 Meeting of the High Contracting Parties to the Convention. In accordance with the goals of the CCW Sponsorship Programme, the Meeting encouraged the widest possible participation of all High Contracting Parties.

The Group will be chaired by Mr. Ljupčo Jivan Gjorgjinski, Minister Counsellor, Chargé d'affaires a.i. of the former Yugoslav Republic of Macedonia.”

2. The Group of Governmental Experts met from 25 to 29 March and from 20 to 21 August 2019. The Group of Governmental Experts also held informal meetings on 15 May, 28 June and 19 August 2019.

II. Organization and work of the Group of Governmental Experts

3. On Monday, 25 March 2019, the session was opened by the Chairperson, Ljupčo Jivan Gjorgjinski of North Macedonia. Michael Møller, Director-General of the United Nations Office at Geneva delivered a statement on behalf of the Secretary-General of the United Nations.

4. At the same meeting, the Group adopted its agenda¹, as orally amended, as contained in Annex I, confirmed the Rules of Procedure, as adopted by the Fifth Review Conference², and adopted its programme of work³, as orally amended, as contained in Annex II. Peter Kolarov, Political Affairs Officer, UNODA, served as the Secretary of the Group, and was assisted by Amy Dowler, Mélanie Gerber, and Heegyun Jung, Political Affairs Officers, UNODA.

5. The following High Contracting Parties to the Convention participated in the work of the Group: Albania, Algeria, Argentina, Australia, Austria, Bangladesh, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cuba, Cyprus, Czechia, Denmark, Djibouti, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Holy See, Honduras, India, Iraq, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kuwait, Lao People's Democratic Republic, Latvia, Lebanon, Lithuania, Luxembourg, Mexico, Mongolia, Montenegro, Morocco, Netherlands, New Zealand, Nicaragua, North Macedonia, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Republic of Korea, Romania, Russian Federation, Saudi Arabia, Senegal, Serbia, Sierra Leone, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, State of Palestine, Sweden, Switzerland, Turkey, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela (Bolivarian Republic of).

6. The following Signatory State to the Convention participated in the work of the Group: Egypt and Sudan.

7. The following States not party to the Convention participated as observers: Mozambique and Myanmar.

8. 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.

9. The representatives of the following non-governmental organizations participated in the work of the Group: Amnesty International, Campaign to Stop Killer Robots, ConsciousCoders, and Future of Life Institute, Human Rights Watch, ICT4Peace Foundation, International Committee for Robot Arms Control (ICRAC), Mines Action Canada, Nobel Women's Initiative, Norwegian Peace Foundation, PAX, Pax Christi Ireland, Pax Christi Vlaanderen, Project Ploughshares, Protection, Pugwash Conferences on Science and World Affairs, Rete Italiana per il Disarmo, Seguridad Humana en Latinoamérica y el Caribe (SEHLAC), Women's International League for Peace and Freedom (WILPF), Conscious Coders, International Action Network on Small Arms, Pax Christi International, the Centre for a New American Security (CNAS) and Zonta International.

10. The representatives of the following entities also participated in the work of the Group: Birmingham City University, Cambridge University, CAN Center for Autonomy and Artificial Intelligence, Charles University, Centre for Emerging Technology Intelligence, Geneva Centre for Security Policy (GCSP), Graduate Institute Geneva, Harvard Law School, Hiroshima Peace Institute, ICT4Peace Foundation, Institute for European Studies, International Panel on the Regulation of Autonomous Weapons (iPRAW), St Mary's University College Belfast, Trier University, King's College London, National University of Ireland (Galway), RAND Corporation, Stockholm International Peace Research Institute (SIPRI), Quadriga University, University of Barcelona, University of China, University of Kent, University of Lyon, University of New South Wales Canberra University at the Australian Defence Force Academy, New South Wales Canberra University, Australian Defence Force Academy, University of North Carolina, University of Oxford, University Pablo de Olavide (Seville), University of Tampere, University of Tasmania, University of Zurich, Vienna School of International Studies, and the Vrije Universiteit Amsterdam.

¹ CCW/GGE.1/2019/1.

² CCW/CONF.V/4.

³ CCW/GGE.1/2019/2.

11. 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.

12. In order to better structure the discussion, the Chairperson submitted possible guiding questions, as contained in Annex III. The Chairperson was assisted in his work by Friends of the Chair from Argentina, Australia, Canada, Costa Rica, Estonia, Iraq, Mexico, Pakistan, South Africa, and Sweden.

13. The substantive discussion on agenda items 5 (a) to 5 (e) took place at its plenary meetings on 25 to 29 March and 20 August. On 20 and 21 August the Group considered its draft final report.

14. The Group considered the documents listed in Annex V. The Group noted with appreciation the contributions of those High Contracting Parties submitting Working Papers, presenting their national policies and positions, and the input of civil society, academia and industry.

III. Conclusions

15. The Group reaffirmed the guiding principles agreed by the Group in 2018, as contained in paragraph 21 of CCW/GGE.1/2018/3 and Annex IV of this report, and used the principles as a framework for guiding their work in 2019. In order to further elaborate the guiding principles, the Group focused on various potential additional principles, based on its four agenda items, as follows.

16. On the agenda item "An exploration of the potential challenges posed by emerging technologies in the area of lethal autonomous weapons systems to international humanitarian law" the Group concluded as follows:

- a. The potential use of emerging technologies in the area of lethal autonomous weapons systems must be conducted in accordance with applicable international law, in particular IHL and its requirements, including inter alia distinction, proportionality and precautions in attack.
- b. IHL imposes obligations on States, parties to armed conflict and individuals, not machines.
- c. States, parties to armed conflict and individuals remain at all times responsible for adhering to their obligations under applicable law, including IHL. States must also ensure individual accountability for decisions regarding the use of emerging technologies in the area of lethal autonomous weapons systems.
- d. The IHL requirements of distinction, proportionality and precautions apply, through a chain of responsible command, to the human operators and human commanders

who plan, decide upon or carry out attacks, including any attacks involving emerging technologies in the area of lethal autonomous weapons systems.

e. IHL requires that humans, through a responsible chain of command and control, make judgments on the use of force in the conduct of hostilities, including the conduct of hostilities using emerging technologies in the area of lethal autonomous weapons systems.

f. Human judgement is essential in order to ensure that the use of emerging technologies in the area of lethal autonomous weapons systems is in compliance with international law, and in particular IHL.

g. Parties to armed conflict, in their potential use of emerging technologies in the area of lethal autonomous weapons systems, must comply with the IHL principle of humanity, as well as to the requirements of distinction, proportionality and precaution, which require that human beings make certain judgements in good faith based on their assessment of the information available to them at the time, including, inter alia, information about the operational context.

h. In cases not covered by the CCW and its annexed Protocols or by other international agreements, including such cases involving emerging technologies in the area of lethal autonomous weapons systems, 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.

i. Any weapons system, including a weapon system based on emerging technologies in the area of lethal autonomous weapons systems, must not be employed if it is of a nature to cause superfluous injury or unnecessary suffering, or if it is indiscriminate, that is, incapable of being used in accordance with the principles of distinction and proportionality, or is otherwise incapable of being used in accordance with the principles and rules of IHL.

j. Legal review at the national level of the study, development, acquisition or adoption of a new weapons system is required to assess whether weapons, including potential weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, can be used in compliance with international law, including IHL. States are free to independently determine the mechanism 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. As with all weapons, such legal reviews should include an understanding of the characteristics of the weapons system, its intended and expected use, and whether there are one or more circumstances in which an operator can employ the weapons system in conformity with the rules of IHL.

k. Weapons systems under development, or modification must be reviewed as applicable to ensure that the weapons can be used consistent with IHL.

17. Under the same agenda item, the Group recognized the need for further work on the following aspects:

a. Ethical and moral perspectives continue to guide the work of the Group, although there are different views on the meaning of the Martens Clause.

b. Apart from IHL, there are a range of views on the relevance to the discussions of the Group of other legal regimes, notably International Human Rights Law and International Criminal Law, where applicable.

c. Delegations differed as to whether current IHL could address the challenges relating to emerging technologies in the area of lethal autonomous weapons systems or if further regulations, rules or clarifications were needed.

d. Further work is needed to build shared understanding on the role of operational constraints regarding tasks, target profiles, time-frame of operation, and scope of movement over an area and operating environment. There was not shared understanding on how constraints and capabilities could assist with compliance with IHL.

18. On the agenda item “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” the Group concluded as follows:

a. Autonomy in the identification, selection or engagement of a target is a central characteristic of weapons systems of core interest to the Group.

b. Identifying and reaching a common understanding among High Contracting Parties on the concepts and characteristics relevant to lethal autonomous weapons systems could aid consideration of the most suitable response for addressing the humanitarian and international security challenges posed by emerging technologies in the area of lethal autonomous weapons systems, but characteristics should not be identified in a way that prejudices policy decisions.

19. Under the same agenda item, the Group recognized the need for further work on the following aspects:

a. 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.

b. Various views were raised on different potential characteristics of emerging technologies in the area of lethal 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.

20. On the agenda item “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” the Group concluded as follows:

a. Human responsibility for the use of force can be exercised in various ways, including but not limited to through strategic direction in the pre-development stage and across the life-cycle of the weapon system.

b. Human involvement at the development stage of a weapon system based on emerging technologies in the area of lethal autonomous weapons system may not be sufficient to ensure compliance with IHL for attacks in armed conflict under all circumstances given the variable and unpredictable nature of real-world operational environments.

c. Human-machine interaction, which may take various forms and be implemented at various stages of the life cycle of a weapon, must ensure that the potential use of emerging technologies in the area of lethal autonomous weapons systems is in compliance with applicable international law, in particular IHL. In determining the necessary quality and extent of human-machine interaction, a range of factors should be considered including the operational context, the characteristics and capabilities of the weapon system and the performance and reliability of specific functions in the weapon system.

21. Under the same agenda item, the Group recognized the need for further work on the following aspects:

a. Although there is agreement on the centrality of the human element in the use of force, further work would be needed to develop shared understandings of this concept and its application.

b. Divergent views were expressed on the type and degree of human-machine interaction required, including elements of control and judgement, including at different stages of a weapon’s life cycle, in order to ensure compliance with IHL in relation to the use of weapons systems based on emerging technologies in the area of lethal autonomous weapons systems.

c. There were different views on the necessity of a human decision being reasonably temporally proximate to an attack to remain valid. Further exploration of the concept of “reasonably temporally proximate,” which is likely to be context-dependent, was suggested by some.

d. There were divergent views on the need for real-time supervision during the operation of a weapons system. Some delegations consider that many existing weapons systems do not allow for real time supervision during their operation. Some delegations called for direct human control, both through design and in use.

e. There was disagreement over whether and to what extent an ability to intervene in the operation of a weapon, once activated or launched, would be necessary to ensure compliance with IHL.

22. On the agenda item “Review of potential military applications of related technologies in the context of the Group’s work” the Group concluded as follows:

a. During the design, development, testing and deployment of potential weapons systems based on emerging technologies in the area of lethal autonomous weapons systems, the risks of unlawful casualties, as well as precautions to help minimize the risk of incidental loss of life, injuries to persons protected under IHL and damage to objects protected under IHL 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 to unauthorized parties, risk of proliferation, risk of acquisition by terrorist groups, and potential effects on international peace and security.

b. Risk mitigation measures can include: rigorous testing 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.

c. Consideration should be given to the possible effects of emerging technologies in the area of lethal autonomous weapons systems on national, regional and global security and stability, including thresholds for engaging in armed conflicts and risks of an arms race. Throughout further work of the Group, a balance should be struck between military necessity and humanitarian considerations.

d. Research and development of autonomous technologies should not be restricted based on the sole rationale that such technologies could be used for weapons systems. At the same time, given the dual use nature of the underlying technologies in the area of lethal autonomous weapons systems, it is important to promote responsible innovation and use of such technologies.

23. Under the same agenda item, the Group recognized the need for further work on the following aspects:

a. Some delegations argued that emerging technologies in the area of lethal autonomous weapons systems could aid the human operator in complex combat environments, and that a range of precautionary measures, including testing of the system, training and established procedures, could allow the use of the system in accordance with IHL. Other delegations expressed doubts that in complex operational environments, autonomous systems would perform tasks as expected or be capable of being used in accordance with IHL principles and rules requiring human judgement and context-based assessments.

b. There were divergent views on whether autonomy in critical functions challenged the maintenance and attribution of combatant and commander responsibility.

IV. Recommendations

24. The Group recommends that:

a. High Contracting Parties, at their 2019 Meeting, endorse the guiding principles agreed by the Group in 2018, as contained in paragraph 21 of CCW/GGE.1/2018/3 and in Annex IV of this report, and encourage High Contracting Parties to incorporate the guiding principles into national practices and policies as appropriate.

b. 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 shall meet in three sessions of five days each in both 2020 and 2021 (for a total of thirty days over the two-year period) 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.

c. The rules of procedure of the Review Conference shall apply *mutatis mutandis* to the Group. The Group shall conduct its work and adopt its report(s) by consensus. The widest possible participation of all High Contracting Parties is to be promoted in accordance with the goals of the CCW Sponsorship Programme. High Contracting Parties in a position to do so are encouraged to consider providing funding to assist other High Contracting Parties in bringing relevant technical experts to participate in the work of the Group.

d. In this period, the Group shall seek to elaborate the guiding principles, including by pursuing the following work streams:

Legal: to examine, inter alia, the areas for further work identified in paragraph 17 above, including by compiling existing applicable international law and clarifying how it applies to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention. The Chairperson of the Group is encouraged to make particular efforts to incorporate legal expertise in this aspect of the Group's work.

Technical: to examine, inter alia, the areas for further work identified in paragraphs 19 and 21, a. above. The Chair of the Group is encouraged to make particular efforts to incorporate academic and private sector technical expertise in this aspect of the Group's work.

Military: to examine, inter alia, the areas for further work identified in paragraphs 21, b.-e. and 23 above, drawing on national practice, including with respect to the implementation of legal weapons reviews. High Contracting Parties should make every possible effort to involve military personnel in this work stream.

e. The Group shall consider:

(i) the guiding principles, which it may further develop and elaborate;

(ii) the outputs of the three work streams, and

(iii) the agreed conclusions of the Group, as reflected in its reports of 2017, 2018 and 2019, and use these as a basis for its report for the consideration of the 2021 Sixth Review Conference, with a view to developing a normative framework on emerging technologies in the area of lethal autonomous weapons systems.

V. Adoption of the report

25. On 21 August 2019, the Group considered and adopted its final report, as contained in CCW/GGE.1/2019/CRP.1, as orally amended.

Annex I

Agenda

As adopted by the Group of Governmental Experts on 25 March 2019

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 2019:
 - (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. Adoption of the report (second session).

Annex II

Programme of Work⁴

As adopted by the Group of Governmental Experts on 25 March 2019

Monday, 25 March 2019

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
- 5 (d) Review of the potential military applications of related technologies in the context of the Group's work (presentations on experiences from High Contracting Parties invited)

15:00 – 18:00

- 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

Tuesday, 26 March 2019

10:00 – 13:00

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

15:00 – 18:00

- 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

Wednesday, 27 March 2019

10:00 – 13:00

- 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

15:00 – 18:00

Continuation of any list of speakers that have not been exhausted

Thursday, 28 March 2019

10:00 – 13:00

Continuation of any list of speakers that have not been exhausted

⁴ As reflected in paragraph 13 of the report, the plenary meetings on 20 and 21 August were dedicated to the consideration and adoption of the final report in accordance with agenda item 6.

15:00 – 18:00

Multi-stakeholder facilitated discussion

Friday, 29 March 2019

10:00 – 13:00

A consideration of any emerging elements and commonalities

15:00 – 18:00

Discussion on the way ahead

Annex III

Possible questions for the GGE to explore in 2019

Submitted by the Chairperson

1. On 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”
 - Does autonomy in the critical functions of weapons systems challenge the ability of States or parties to a conflict, commanders, and individual combatants to apply IHL principles on the conduct of hostilities (distinction, proportionality, precautions) in carrying out attacks in armed conflict?
 - Does autonomy in the critical functions of weapons systems challenge the maintenance of combatant and commander responsibility for decisions to use force?
 - What is the responsibility of States or parties to a conflict, commanders, and individual combatants in decisions to use force involving autonomous weapons systems, in light of the principles of international law derived from established custom, from the principles of humanity and the dictates of public conscience (Martens Clause)?
 - How can legal reviews of weapons with autonomous functions contribute to compliance with IHL? What are past or potential challenges in conducting weapons reviews of weapons with autonomy in their critical functions, and how can these challenges be addressed?
2. On 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”
 - Which characteristics of autonomous weapons systems would be important from the point of view of International humanitarian law (IHL) and 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 (CCW) specifically?
 - Is autonomy an attribute of a weapon system as a whole or should it be attached to different tasks of weapons systems?
 - Is the environment of deployment, specific constraints on time of operation, or scope of movement over an area, important from an IHL/CCW perspective?
 - Is a differentiation between anti-personnel and anti-materiel weapons meaningful from an IHL/CCW perspective?
3. On 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”
 - Specifically, what type and degree of human involvement (in the form of control, oversight and/or judgement) is required or appropriate when using weapons with autonomy in their critical functions to ensure compliance with IHL?

Including:

 - What is the form and degree, if any, of human supervision – such as the ability to intervene and abort – which, during the operation of a weapon that can autonomously select and attack targets, may be deemed sufficient for compliance with IHL?

- Is there a level of predictability and reliability that would be required or appropriate in the autonomous functions of such a weapons system, considering the weapon's foreseeable tasks and operational environment, for its use to be consistent with IHL? How has the level of predictability and reliability been assessed in practice?
 - How do factors such as a weapon's foreseeable tasks, its intended targets (e.g. materiel or personnel), scope of movement and its operational environments (e.g. populated or unpopulated area), affect the type and degree of human involvement required in order to ensure compliance with IHL?
 - Can IHL-compliant human-machine interaction be ensured in a weapons system with autonomy in its critical functions?
4. On agenda item 5 (d) "Review of the potential military applications of related technologies in the context of the Group's work" (presentations on experiences from High Contracting Parties invited)
- How and to what extent is human involvement in the use of force currently exercised with existing weapons that employ or can employ autonomy in their critical functions, over different stages of their life cycle?
 - How is responsibility ensured for the use of force with existing weapons that employ or can be employed with autonomy in their critical functions? Relevant existing weapons could include types of:
 - Air defence weapon systems with autonomous modes or functions;
 - Missiles with autonomous modes or functions;
 - Active protection weapon systems with autonomous modes or functions;
 - Loitering weapons with autonomous modes or functions;
 - Naval or land mines with autonomous modes or functions;
 - "Sentry" weapons with autonomous modes or functions.
5. On 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 prejudicing policy outcomes and taking into account past, present and future proposals"
- What are the advantages and disadvantages of the proposed approaches to ensuring compliance with IHL and responsibility for decisions on the use of weapons systems and the use of force?
 - legally binding instrument;
 - political declaration;
 - guidelines, principles or codes of conduct;
 - improving implementation of existing legal requirements, including legal reviews of weapons.
 - Given that these options are not necessarily mutually exclusive, and the common goal of ensuring compliance with IHL and maintaining human responsibility for the use of force, what are possible next steps to be taken by the GGE?
 - How can the GGE build upon the areas of convergence captured in the 'Possible Guiding Principles' agreed in 2018? How can those principles be operationalized?

Annex IV

Guiding Principles

As adopted by the Group of Governmental Experts on ... August 2019

It was affirmed that international law, in particular the United Nations Charter and international humanitarian law (IHL) as well as relevant ethical perspectives, should guide the continued work of the Group. Noting the potential challenges posed by emerging technologies in the area of lethal autonomous weapons systems to IHL,¹ the following were affirmed, without prejudice to the result of future discussions:

- a. International humanitarian law continues to apply fully to all weapons systems, including the potential development and use of lethal autonomous weapons systems.
- b. 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.
- c. 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.
- d. 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.
- 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 cybersecurity against hacking or data spoofing), the risk of acquisition by terrorist groups and the risk of proliferation should be considered.
- f. Risk assessments and mitigation measures should be part of the design, development, testing and deployment cycle of emerging technologies in any weapons systems.
- g. 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.
- h. In crafting potential policy measures, emerging technologies in the area of lethal autonomous weapons systems should not be anthropomorphized.
- i. Discussions and any potential policy measures taken within the context of the CCW should not hamper progress in or access to peaceful uses of intelligent autonomous technologies.
- j. The CCW 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.

Annex V

List of documents

CCW/GGE.1/2019/1	Provisional agenda. Submitted by the Chairperson
CCW/GGE.1/2019/2	Provisional Programme of Work. Submitted by the Chairperson
CCW/GGE.1/2019/3	Final Report
CCW/GGE.1/2019/WP.1	Potential opportunities and limitations of military uses of lethal autonomous weapons systems. Submitted by the Russian federation.
CCW/GGE.1/2019/WP.2/Rev.1	Australia's system of control and applications for autonomous weapon systems. Submitted by Australia
CCW/GGE.1/2019/WP.3	Possible outcome of 2019 Group of Governmental Experts and future actions of international community on Lethal Autonomous Weapons Systems. Submitted by Japan
CCW/GGE.1/2019/WP.4	Food-for-Thought Paper. Submitted by Belgium, Ireland and Luxembourg
CCW/GGE.1/2019/WP.5	Implementing International Humanitarian Law in the Use of Autonomy in Weapon Systems. Submitted by the United States of America
CCW/GGE.1/2019/WP.6	Questionnaire on the Legal Review Mechanisms of New Weapons, Means and Methods of Warfare. Submitted by Argentina
CCW/GGE.1/MISC.1	Provisional list of participants
CCW/GGE.1/2019/INF.1	List of participants
