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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.

a. The Group considered that the following conclusion should be elevated to the status of an additional guiding principle: 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 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 as a whole.

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 principles, including inter alia distinction, proportionality, precautions in attack, humanity and necessity.

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 means or method of warfare, including the use of emerging technologies in the area of lethal autonomous weapons systems.

d. The IHL principles of distinction, proportionality and precautions apply, through a chain of responsible command and control, 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 emerging technologies in the area of lethal autonomous weapons systems in the conduct of hostilities.

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 principles of distinction, proportionality, humanity, necessity 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 and other potentially relevant information, such as that provided by sensors or other technologies.

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 incorporating emerging technologies in the area of lethal autonomous weapons systems, must not be used if such employment would cause superfluous injury or unnecessary suffering, or if it is by nature indiscriminate, that is, incapable of being used in accordance with the prohibition on indiscriminate attacks, 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 essential to assess whether weapons, including potential weapons systems incorporating 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 means to conduct legal reviews although the voluntary exchange of best practices could be beneficial, bearing in mind national security considerations or commercial restrictions on proprietary information. 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 the intended use of the weapons system would be prohibited by the rules of IHL in all or some.

k. Weapons systems under development, or modification which significantly deviate from the use of existing weapons systems, 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 norms, regulations, rules or clarifications were needed.

d. There was not 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 reduce the likelihood of causing civilian casualties and thereby assist with implementation of IHL by parties to a conflict.

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 incorporating emerging technologies in the area of lethal autonomous weapons system will 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. Emerging technologies in the area of lethal autonomous weapons systems may be useful for enhancing the implementation of IHL applicable to attacks in armed conflict by a party to conflict given the potential for emerging technologies to reduce the rate of human error and to increase precision in attacks.

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 incorporating 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 emerging technologies in the area of lethal autonomous weapons systems, the risks of civilian 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, and risk of acquisition by terrorist groups.

b. Risk mitigation measures can include: rigorous testing and evaluation of systems, legal reviews, readily understandable human-machine interfaces and controls,
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training personnel, establishing doctrine and procedures, and circumscribing weapons use through appropriate rules of engagement.

c.

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 and evaluation 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 their understanding of IHL principles and rules requiring human discernment 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. As a first step, 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. High Contracting Parties are encouraged to incorporate the guiding principles into national practices and policies as appropriate, as well as to further discuss the issue with the possible elaboration of new guiding principles.

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 reach common understandings on elements of human control over critical functions of weapons system that are needed to ensure compliance with international law and ethical acceptability, including by elaborating and operationalizing the guiding principles, 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.
Technological: 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.

The incoming Chair of the Group shall propose a draft Programme of Work that includes consideration of cross fertilization of the work streams. The incoming Chair may make use of friends of the Chair who are expert in legal, technological and military matters to facilitate the work of each of the work streams.

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, to continue the clarification and development of normative and operational frameworks on emerging technologies in the area of lethal autonomous weapons systems, and specific recommendations that States may consider for implementation of these frameworks in their national policies and practices.