

Meeting 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 8 of the provisional agenda

Lethal autonomous weapons systems

Report of the 2014 informal Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS)

Submitted by the Chairperson of the Meeting of Experts

1. The 2013 Meeting of the High Contracting Parties to the Convention held on 14 and 15 November 2013 in Geneva decided, as contained in paragraph 32 of its final report (CCW/MSP/2013/10), “that the Chairperson will convene in 2014 a four-day informal Meeting of Experts, from 13 to 16 May 2014, to discuss the questions related to emerging technologies in the area of lethal autonomous weapons systems, in the context of the objectives and purposes of the Convention. He will, under his own responsibility, submit a report to the 2014 Meeting of the High Contracting Parties to the Convention, objectively reflecting the discussions held.” Mr. Jean-Hugues Simon-Michel, Ambassador of France, who served as Chairperson of the 2013 Meeting of the High Contracting Parties to the Convention, chaired the Meeting of Experts.

2. The following High Contracting Parties to the Convention participated in the work of the meeting: Argentina, Australia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Canada, Chile, China, Colombia, Croatia, Cuba, Cyprus, Czech Republic, Ecuador, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Guatemala, Holy See, India, Ireland, Israel, Italy, Japan, Jordan, Kuwait, Lao People's Democratic Republic, Latvia, Lesotho, Lithuania, Luxembourg, Madagascar, Mali, Mauritius, Mexico, Montenegro, Morocco, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Saudi Arabia, Serbia, Sierra Leone, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela (Bolivarian Republic of) and Zambia.

3. The following Signatory State to the Convention participated in the work of the meeting: Egypt.

4. The following States not parties to the Convention participated as observers: Ghana, Indonesia, Iraq, Lebanon, Libya, Malaysia, Myanmar, Oman, Singapore, Thailand, Yemen and Zimbabwe.

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5. The representatives of the European Union, United Nations Institute for Disarmament Research (UNIDIR) and the United Nations Office of Disarmament Affairs (UNODA) participated in the work of the meeting.
6. The representatives of the International Committee of the Red Cross (ICRC) participated in the work of the meeting.
7. The representatives of the following non-governmental organizations participated in the work of the meeting: Campaign to Stop Killer Robots, including Amnesty International, Article 36, Association for Aid and Relief, Japan, Facing Finance, Human Rights Watch, ICBL-CMC Austria, International Committee on Robot Arms Control (ICRAC), Mines Action Canada, Nobel Women's Initiative, PAX, Pugwash Conferences on Science and World Affairs, Women's International League for Peace and Freedom; Friends World Committee for Consultation (Quakers), Geneva International Centre for Humanitarian Demining (GICHD), , Pax Christi Ireland, Wildfire and World Council of Churches.
8. The representatives of the following entities also participated in the work of the meeting: Business Innovation Research Development, Geneva Academy of International Humanitarian Law and Human Rights, Institute of International and Comparative Law in Africa, International Institute of Humanitarian Law, International Studies Association (ISA), Nanzan University Japan, Graduate Institute of International Development Studies (IHEID), Peace Research Institute Frankfurt (PRIF), University of Strasbourg, New York University, and University of St. Gallen.
9. On Tuesday, 13 May 2014, the meeting was opened by Mr. Remigiusz A. Henczel, Ambassador of Poland, as Chairperson-designate of the 2014 Meeting of the High Contracting Parties to the Convention. The meeting heard a message from the Acting Director-General of the United Nations Office at Geneva, Mr. Michael Møller.
10. In accordance with its programme of work, as contained in the annex, the Meeting of Experts had interactive exchanges on the following issues: technical issues; ethics and sociological issues; international humanitarian law (IHL); other areas of international law; and operational and military aspects. The Meeting of Experts commenced with a general exchange of views.
11. Serving as Friends of the Chair were Mr. Michael Biontino, Ambassador of Germany on technical issues; Mr. Pedro Motta Pinto Coelho, Ambassador of Brazil on ethical and sociological issues; Ms. Aya Thiam Diallo, Ambassador of Mali, on international humanitarian law; and Ms. Yvette Stevens, Ambassador of Sierra Leone, on other areas of international law. The Chairperson presided over the discussions on operational and military aspects.
12. Each substantive session commenced with kick-off presentations from the following experts:
 - (a) Technical issues (Part I): Mr. Raja Chatila, Doctor, - The concept of autonomy; and Mr. Paul Scharre, Doctor, - Existing systems and technologies. Is there a trend towards increasing autonomy? Followed by a debate between Mr. Ronald Arkin, Professor, and Mr. Noel Sharkey, Professor, on the pros and cons of LAWS;
 - (b) Technical issues (Part II): Mr. Jean-Paul Laumond, Doctor, - Humanoid robotics; Mr. Hajime Wakuda, - Robotics and applications; and Mr. Yong Woon Park, Doctor, - The trend of autonomous technology for military robots (with robotic views of autonomy);
 - (c) Ethics and sociology: Mr. Dominique Lambert, Doctor, - The ethics of robotics and the human-machine interrelation; and Mr. Peter Asaro, Doctor, - Ethical questions raised by military applications of robotics;

(d) Legal aspects (Part I): International humanitarian law: Mr. Nils Melzer, Doctor, - Principle of humanity and the Martens Clause, Mr. Matthew Waxman, Professor, - Implementation of Article 36 and *jus in bello*; and Mr. Marco Sassoli, Professor, - LAWS - advantages and problems compared with other weapon systems from the point of view of international humanitarian law;

(e) Legal aspects (Part II): Other areas of international law: Mr. Thilo Marauhn Professor, - Responsibility and accountability; Mr. Christof Heyns, Professor, - Human rights law issues; and Mr. Nils Melzer, Doctor, - *Jus ad bellum*; and

(f) Operational and military aspects: Mr. Mark Hagerott, Doctor, - Offering a framework and suggestions on LAWS; Mr. Heigo Sato, Doctor, - Military implications of LAWS and possible ways to develop a risk management scheme; Mr. Olivier Madiot, Lieutenant Colonel, - Views of the Joint Staff; and Mr. Wolfgang Richter, Colonel, - Utility and limitations of the use of LAWS.

General debate

13. Pursuant to the decision taken by the 2013 Meeting of High Contracting Parties to the Convention, delegations met from 13 to 16 May 2014 to discuss the questions related to emerging technologies in the area of lethal autonomous weapons systems (LAWS).

14. Given the potential for rapid technological developments in autonomous weapons to radically transform the nature of warfare, which was raised by a number of delegations, the timely convening of the meeting and the multidisciplinary approach allowed by the CCW was welcomed.

15. Delegations welcomed the contribution of civil society to the work of the meeting and, more generally, their role in awareness-raising on the issue of LAWS.

16. As this was the first meeting ever organized on the issue of LAWS, a number of delegations underlined the very preliminary stage of the discussions and the need to assess the current state of play and the future trends in robotics. Even if most of the delegations emphasized the fact that this meeting would help to better understand the characteristics of LAWS, it was premature to determine where discussions would lead. In this regard, delegations were reminded that the mandate was about emerging technologies. A range of options were put forward, from the exchange of information, development of best practices, to a moratorium on research or a ban.

17. The issue of a definition was raised by a number of delegations. While some suggested that a clarification would be necessary at a certain stage if more substantial work were to be undertaken, most of the delegations indicated that it was too early to engage in such a negotiation.

18. A number of delegations stressed the necessity of recognizing the significance of the peaceful uses of autonomous technologies in the civilian field, and the importance to not undermine the current technological development efforts in this area.

Session on technical aspects

19. The concept of autonomy was discussed through presentations and interventions. A number of experts noted that there are different levels of autonomy depending on the degree of human control on the system. Discussions highlighted the fact that the degree of autonomy of a system can also depend on the environment in which it is supposed to operate, its functions and the complexity of the tasks envisioned.

20. Many interventions stressed the fact that, even if the elaboration of a definition was premature, some key elements appeared as pertinent to describe the concept of autonomy for LAWS, for example the capacity to select and engage a target without human intervention. Some experts highlighted the fact that autonomy should be measurable and should be based on objective criteria such as capacity of perception of the environment, and ability to perform pre-programmed tasks without further human action. Many interventions stressed that the notion of meaningful human control could be useful to address the question of autonomy. Other delegations also stated that this concept requires further study in the context of the CCW. The concept of human involvement in design, testing, reviews, training and use was discussed. The notion of predictability was also underlined by some delegations as a key issue.

21. The debate highlighted the fact that full autonomy had not yet been achieved, but that research activities were ongoing in this area. A few interventions stressed the fact that the development of LAWS depended on a range of applications that are not equally advanced.

22. Many interventions mentioned the fact that the technical components enabling autonomy were similar for military and civil applications because of the dual-use nature of such technologies. It was also mentioned that it was important to preserve research and development on peaceful applications of robotics given their foreseeable positive impact, for instance on health care, agriculture or rescue operations. In this regard, it was mentioned that it could be useful to focus on the critical functions of LAWS related to the use of force.

Session on ethical and sociological aspects

23. The discussions highlighted the fact that, despite the foreseeable progress on autonomous technologies, the systems will remain machines, acting according to pre-programmed elements. A significant number of interventions stressed the fact that the possibility for a robotic system to acquire capacities of “moral reasoning” and “judgment” was highly questionable.

24. The challenges posed by ethics of robotics were underlined, particularly concerning the capacity of LAWS to match human judgment, which is the basis for the respect of the principles of international humanitarian law. The capacity of autonomous systems to respond to a moral dilemma was challenged. The question of values, standards of ethics and common elements to be incorporated in the software were posed as well.

25. The issue of the interrelationships with humans and social acceptability of autonomous technologies was raised. The impact of the development of LAWS on human dignity was discussed. In this context, the delegation of the right to decide on life and death to a machine was underlined as a key ethical question. Some delegations emphasized that rather than the machine deciding on the application of lethal force, it was the commander or operator that made the decision to employ force.

Session on legal aspects (part 1)

26. The session examined the question of compatibility and compliance of LAWS with existing international law, in particular the principles of international humanitarian law (distinction, proportionality and precautions in attack), as well as with the 1949 Geneva Conventions, the Martens Clause and customary law.

27. Delegations and experts reaffirmed the necessity for any development and use of LAWS to be in compliance with international humanitarian law. There were various views on the possibility of LAWS being able to comply with such rules.

28. The adequacy of existing international law was also discussed with different views expressed. Some interventions noted that a potential definition of LAWS, and especially the definition of autonomy and the level of predictability of such systems, could have a significant impact in this area.

29. The necessity for legal reviews was stressed, especially when developing new weapons technologies. The question of transparency and information exchange on best practices in reviews was raised. The implementation of weapons reviews, including Article 36 of Additional Protocol I (1977) to the 1949 Geneva Conventions was suggested as an area where more discussions could be valuable.

Session on legal aspects (part 2)

30. A number of interventions questioned whether an accountability gap was created by the possible use of LAWS. In particular, the issue of responsibility was mentioned as an area to be further explored, including the possibility of engaging responsibility at the State level or at an individual level.

31. The discussions focused on whether one could establish responsibility for violations of international law and whether such cases incurred the responsibility of subordinates, programmers or manufacturers. The notion of negligence was also mentioned as an area which could be further explored.

32. Issues related to human rights law by the possible development and use of LAWS were also deliberated on, in particular the right to life, human dignity, the right to be protected against inhuman treatment and the right to a fair trial.

33. Regarding the possible impact of the development and use of LAWS on *jus ad bellum*, the question as to whether LAWS could change the threshold of use of force was raised.

Session on operational and military aspects

34. A number of experts and delegations mentioned again the potential of LAWS to be a real game changer in military affairs, even if some delegations indicated that there were no plans for developing such systems.

35. Some experts indicated that, in their view, there was little interest in deploying LAWS to replace humans in an operational context, given the necessity to keep control over the operations from the commander's point of view. The relevance of using autonomous technologies for a particular task was nevertheless mentioned, in particular for intelligence, rescue tasks, protection of armed forces and civilians, logistics and transportation.

36. The risks associated with the use of LAWS in an operational context were stressed by a number of experts and delegations, including vulnerability to cyber attacks, lack of predictability and difficulties of adaptation to a complex environment. The question of interoperability with allied forces was mentioned as well. The capacity of LAWS to comply with the rules of international law was again discussed.

37. Some experts underlined the need to think in terms of the environment in which the system would operate (air, land or sea) to determine the military relevance of LAWS and to carry out a proper risk assessment.

38. The impact of LAWS on international peace and security was discussed. The consequences on arms control were also raised.

Wrap-up session

39. A wrap-up session was held during which the Chairperson and Friends of the Chairperson presented the summaries of their sessions. There was a discussion on the way ahead.

40. Delegations underlined the fact that this meeting had contributed to forming common understandings, but that questions still remained. Some delegations stressed issues which, from their point of view, could be further explored, pursuant to the decision that will be taken during the next meeting of High Contracting Parties to the Convention. Many delegations expressed the view that the process should be continued.

41. On Friday, 16 May 2014, the Chairperson presented his report to the meeting.

Annex

Programme of work CCW informal Meeting Of Experts on Lethal Autonomous WeaponS Systems (LAWS) 13-16 May 2014

13 May 2014

10.00 – 13.00: General debate

Chair: France

Opening of the meeting and address by Mr Møller, Acting Director-General, United Nations Office in Geneva.

This session allowed a first general exchange of views.

15.00 – 18.00: Technical issues (Part 1)

Friend of the Chair: Germany

The main objective was to address the key issues of autonomous technology.

- What are the differences between autonomy and automaticity?
- What are the levels of autonomy and predictability in robotics?

Presentations

- Mr. Raja Chatila, Professor, Centre National de la Recherche Scientifique, France: The concept of autonomy
- Mr. Paul Scharre, Center for a New American Security, United States of America: Existing systems and technologies: is there a trend towards increasing autonomy?
- Debate between Mr. Ronald Arkin, Professor, Georgia Institute of Technology, United States of America and Mr. Noel Sharkey, Professor, University of Sheffield, United Kingdom: The pros and cons of LAWS

Interventions

14 May 2014

10.00 – 11.30: Technical issues (Part 2)

Friend of the Chair: Germany

This session addressed questions related to the existing systems and the foreseeable next steps in robotics technology.

Presentations

- **Mr. Jean-Paul Laumond, Doctor**, Centre National de la Recherche Scientifique, France: Humanoid Robotics
- Mr. Hajime Wakuda, Director for Defense Industry, Aerospace and Defense Industry Division, Manufacturing Industries Bureau, Ministry of Economy, Trade and Industry, Japan: Robotics and applications

- Mr. Yong Woon Park, Doctor, Director, Principal Researcher, Agency for Defense Development (Defense Unmanned Technology Centre), Republic of Korea: The Trend of Autonomous Technology for Military Robots (with robotic views of autonomy)

Interventions

11.30 – 13.00: Ethics and sociology

Friend of the Chair: Brazil

The aim of this session was to discuss issues such as:

- How the development of LAWS could impact humans?
- Could robotics be used in conflicts? If so, what ethical questions does it raise?
- Are LAWS socially acceptable?
- What is the relationship between humans and robots?

This discussion also included the experience of civilian robotics.

Presentations

- Mr. Dominique Lambert, Professor, Université de Namur, Belgium: The ethics of robotics and the human-machine interrelation
- Mr. Peter Asaro, Professor, International Committee for Robots Arms Control: Ethical questions raised by military applications of robotics

Interventions

15.00 – 18.00: Legal aspects (Part 1)

International humanitarian law Friend of the Chair: Mali

This session aimed to address the applicability of international law, including international humanitarian law, to LAWS through the following questions:

- What are the implications for the principle of humanity and the Martens Clause?
- What could be the impact of LAWS on the status of combatants?
- How could the use of LAWS impact on the principles of proportionality, distinction and precaution (Jus in bello)?
- Is the development, acquisition and deployment of LAWS compatible with Article 36 of Additional Protocol I 1977?

Presentations

- Mr. Nils Melzer, Doctor, Geneva Centre for Security Policy, Switzerland: Principle of humanity and Martens Clause
- Mr. Matthew Waxman, Professor, Columbia Law University, United States of America: Implementation of Art. 36 and jus in bello
- Mr. Marco Sassoli, Professor, Geneva Academy, Switzerland: LAWS - advantages and problems compared with other weapon systems from the point of view of international humanitarian law

Interventions

15 May 2014**10.00 – 13.00: Legal aspects (Part 2)****Other areas of international law Friend of the Chair: Sierra Leone**

This session aimed to address the following questions:

- What could be the impact of LAWS on responsibility and accountability for violations of international law?
- What are the implications of LAWS on international human rights law?
- What is the impact of the development of LAWS on the right to use force (*Jus ad bellum*)?

Presentations

- Mr. Thilo Marauhn, Professor, University of Giessen, Germany: Responsibility and accountability
- Mr. Christof Heyns, Professor, University of Pretoria, South Africa: Human rights law issues
- Mr. Nils Melzer, Doctor, Geneva Centre for Security Policy, Switzerland: *Jus ad bellum*

Interventions**15.00 – 18.00: Operational and military aspects****Chair: France**

This session focused on the relevance of LAWS in an operational context.

- What are the advantages and disadvantages of the use of LAWS?
- What are the limitations for military personnel and their impact on the conduct of military operations?
- What is the impact of the development of LAWS on international security and stability, and on military doctrines?

Presentations

- Mr. Mark Hagerott, Doctor United States Naval Academy, United States of America
- Mr. Heigo Sato, Doctor, Takushoku University, Japan: Military implications of LAWS and possible ways to develop a risk management scheme
- Mr. Olivier Madiot, Lieutenant Colonel, French Armed Forces: Views of the Joint Staff
- Mr. Wolfgang Richter, Colonel, Germany: Utility and limitations of the use of LAWS in military operations

Interventions

16 May 2014

10.00 – 13.00: Wrap up session

Chair: France

The wrap up session began with the Chair and Friends of the Chair summarizing orally their respective sessions.

Delegations had an opportunity to make statements.

15.00 – 18.00: Concluding session

Chair: France

The Chair circulated a preliminary version of the report, which he is required to issue in accordance with his mandate.

Delegations had an opportunity to make final statements.
