



**German commentary on “operationalizing all eleven guiding principles at a national level as requested by the chair of the 2020 Group of Governmental Experts (GGE) on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems (LAWS) within the Convention on Certain Conventional Weapons (CCW)**

**Introductory comment: Germany considers lethal autonomous weapons systems (LAWS) to be weapons systems that completely exclude the human factor from decisions about their employment. Emerging technologies in the area of LAWS need to be conceptually distinguished from LAWS. Whereas emerging technologies such as digitalization, artificial intelligence and autonomy are integral elements of LAWS, they can be employed in full compliance with international law. In Germany’s view, the Guiding Principles aim at contributing to an IHL compliant development, deployment and use of emerging technologies in the area of LAWS.**

(a) International humanitarian law continues to apply fully to all weapons systems, including the potential development and use of lethal autonomous weapons systems

**IHL governs primarily the conduct of hostilities in armed conflicts. The basic rules and principles of IHL, based particularly on the Geneva Conventions and customary international law relevant in the context of LAWS, are the prohibition of indiscriminate, including excessive, attacks and the principle of precaution, aimed at preventing indiscriminate attacks by requiring precautionary measures. These rules are effect-based, and thus do not address specific weapons systems, but apply to all weapons, means and methods of warfare without distinction.**

**Although IHL focuses primarily on the regulation of the concrete use of weapons during armed conflicts, there are certain provisions applicable already in peacetime. Particularly relevant is Art. 36 AP I, which addresses the acquisition and development of weapon systems. It obliges States to conduct legal reviews and to determine whether the use of the weapon system under consideration would in some or all circumstances be prohibited by applicable international law. This provision, reflected in Guiding Principle (e), is of utmost importance to potential legal challenges posed by emerging technologies in the area of LAWS.**

(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

**In Germany’s view, this Guiding Principle is meant to address potential future accountability gaps. Legal responsibility is norm-based and can vary across legal orders (national or international) and types of responsibility (administrative law, criminal law,**

**civil law). Since international law does not provide means to purport liability to machines, weapons systems or technologies in the context of autonomy, it is not clear whether this principle contains a call upon States to establish a new form of liability, or whether this principle rather aims at confirming the applicability of the general norms of responsibility of States, international and national criminal law, civil liability and/or other forms of accountability for internationally wrongful acts.**

**Germany holds the view that machines have no capacity of discernment and that this will likely remain the case with regard to emerging technologies in the area of LAWS. In any case, machines cannot be held liable for the actions they effect – neither morally, politically nor legally. As machines are developed, created, activated, and operated by human beings, humans remain responsible for the actions they effect throughout the entire life cycle. As multiple human actors will be involved in the different phases of a weapons system’s life cycle, the ultimate responsibility needs to be further elaborated. This is necessary in order to establish individual legal accountability/ liability in cases of a breach of applicable law, in particular international criminal law. This may vary between a joint responsibility and the responsibility of a single human operator.**

(c) 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 IHL. 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

**Germany’s position is that the human-machine interaction in future weapons systems needs to be designed in such a way that weapons systems remain subordinate to the humans deploying and operating it. The design needs to allow human decision makers and operators to have sufficient knowledge about the systems’ operation and actions, the operating environment and the likely interaction between these factors. Humans have to be continuously able to exercise control over the weapons systems and must remain the essential element in this interaction bearing the overall responsibility.**

**This does not necessarily mean that human intervention is required or humans must exercise physical control at all times. Rather, human control means the following: humans must have, at all times, sufficient assurance that the weapons system, once activated, acts in a foreseeable manner in order to determine that its actions are entirely in conformity with applicable law, rules of engagement, and the intentions of its operator(s)/ commander(s). If necessary, the weapons system will de-activate itself, or can be deactivated by humans. No weapons system may, on the strength of its algorithms, entail the risk of overriding a human de-activation command.**

**The required level of human control depends on the operational context and the characteristics and capabilities of a weapons system. Human control can be ensured by an appropriate design, by a sufficient degree of predictability (ensured through a set of given parameters within which the system must be operating as well as rigid testing and review), and by a commander’s and operator’s sufficient understanding of the weapons system, including its autonomous functions, which enable the commander and operator to predict (prospective focus) and explain (restrospective) the behavior of the weapons**

**system. Temporal and spatial restrictions or limits need to be applied to the operation of any such weapons system.**

**Military capability development with regard to future weapons systems must not aim at removing the human from the decision making process. Rather, it should enable the human to take decisions wherever necessary to exert and maintain a sufficient level of control. Any definition of military requirements with regard to the use of autonomy in weapons systems has to reflect a clear understanding of the human-machine relation in order to ensure that any research and development activities are geared towards weapons operating under sufficient levels of human control.**

(d) 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;

**In Germany's view, this Guiding Principle specifies Guiding Principle (b). Whereas Guiding Principle (b) notes in general terms that humans must remain responsible for the acts and omissions of a machine, Guiding Principle (d) requires to exercise oversight, not further specified regarding quantity or quality, over a weapons system during its entire life-cycle with the aim to ensure that its action and effects are in compliance with applicable international law. The integration of the respective handlers of the machine within a responsible chain of command is an essential element to ensure compliance with international law.**

**The German armed forces employ the doctrine of command responsibility. A commander must consider the applicable (international) legal framework when issuing orders and instructions or establishing procedures or delivering training and must take steps to prevent or report violations as well as initiate disciplinary action where necessary. Accordingly, should a violation of IHL result from the operation of a weapon or weapons system, processes are in place to conduct appropriate investigations and, if applicable, hold individuals accountable.**

(e) 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

**Germany reaffirms that Guiding Principle (e) underlines the importance of human responsibility during the phases preceding the deployment of a weapon system. Particularly for highly complex systems with autonomous functions, the development phase is of crucial importance since the configurations determining the behavior of the systems originate in this phase.**

**Guiding Principle (e) reflects Article 36 AP I to which Germany is bound. Germany implements this provision. The procedure of the weapons reviews is formalized in the armed forces' central service regulation. Central elements guaranteeing the quality of the review are 1) the inclusion of qualified legal, technical and military-operational experts and 2) at least a hierarchical independence of the reviewing authority from the**

**developer and the military user. The benchmark is public international law as it stands. However, this does not prevent States from integrating other considerations such as ethical or “law in development”.**

**In the context of emerging technologies in the area of LAWS, specific attention needs to be paid to modifications. Whenever modifications of a given system, for example in programming, are likely to change the behavior of the system in a way that affects the application of international law, a new weapon review is necessary.**

**In addition, the specific role of training data should be considered, when ‘AI’/machine learning is applied in the target selection and engagement since the data base or the way the algorithm interprets the data will substantially impact the predictability and reliability of the weapon system.**

(f) 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

(g) Risk assessments and mitigation measures should be part of the design, development, testing and deployment cycle of emerging technologies in any weapons systems

**A joint commentary is offered for Guiding Principles (f) and (g):**

**In Germany, all current and future development and procurement projects of weapons systems run in accordance with a detailed guideline. In line with this guideline, material solutions and services are provided in the form of projects. Project elements are the different areas in which a project is processed or the use of a product is controlled. "Physical security" and "non-physical safeguards" are important project elements of every project work. They are considered in the development and procurement process of each project. Appropriate concepts (e.g. on information security) are being developed in this context in order to mitigate possible risks.**

(h) 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

**This principle reaffirms that the use of emerging technologies in the area of lethal autonomous weapons systems should serve to improve the respect for international law by increasing, inter alia, precision and by mitigating the risk of human error during attack.**

**An area that merits further attention is the potential contribution of emerging technologies to enhancing arms-control instruments, verification methods in particular, including the use of open source intelligence.**

(i) In crafting potential policy measures, emerging technologies in the area of lethal autonomous weapons systems should not be anthropomorphized

**Policy measures aimed at regulating emerging technologies in the area of lethal autonomous weapons systems must always address human actors as the responsible agents for implementing rules and constraints. The content of any policy measure must not place inherently human characteristics on machines.**

(j) 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

**The CCW process on LAWS is geared towards contributing to an IHL compliant development, deployment and use of emerging technologies in the area of lethal autonomous weapons systems. Peaceful uses of intelligent autonomous technologies are outside the scope of the CCW.**

(k) 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.

**Given the unique composition of the CCW's GGE on LAWS as a forum that brings together diplomatic, military and scientific expertise from the CCW's 125 High Contracting Parties and which allows for participation of representatives from civil society and industry the CCW is ideally placed to build understanding and formulate options for policy measures ensuring an IHL compliant development, deployment and use of emerging technologies in the area of lethal autonomous weapons systems.**

Berlin, 24 June 2020