

An Analytical Framework for Control

Statement delivered by Dr. Marcel Dickow (Stiftung Wissenschaft und Politik (SWP) – German Institute for International and Security Affairs) on behalf of the International Panel on the Regulation of Autonomous Weapons (iPRAW) under agenda item 6b.

Thank you Mr. Chairman for the opportunity to speak on behalf of the International Panel on the Regulation of Autonomous Weapons (iPRAW). iPRAW is an independent group of international scientists from various fields ranging from philosophy to engineering. iPRAW is financially supported by the German Federal Foreign Office.

Mr. Chairman, humans exercise control in different ways and at different stages – through design choices, mission tasking, and mission execution. Deliberate design choices are crucial for enabling operators, teammates and commanders to maintain the desired and appropriate level of control during tasking and execution.

iPRAW suggests to use two categories for analysis: first control by design and control in use; second situational understanding and intervention.

Control by design focusses on the technical requirements. It refers to a specific hard- and software design which allows an operator to actually exercise control during the operation of the system. ‘Control by design’ calls for specific instruments in the human-machine interface and relevant procedures programmed into the system’s processes to enable human input and intervention. The concept of ‘control by design’ encompasses the possibility to set ‘probes’ to illustrate and assess the system’s state and actions in the various steps of the targeting cycle. It is a necessary condition for **control in use**, which encompasses the procedural requirements to maintain control over the systems during planning, tasking and operation.

A LAWS executing its mission would require a two-step approach to system design. It consists of (1) the ability of the human to understand the situation and its context including the state of the weapon systems as well as the environment, and (2) the option to appropriately intervene if necessary.

Situational understanding means that the human operator is aware of the environment and the mode of the system during the operation. The continuous awareness regarding the environment is necessary because battlespace situations change, for instance if civilians enter or if a combatant surrenders or is wounded and thus *hors de combat*. The supervision of the system itself is important to discover malfunctions or hacking before a catastrophic effect occurs. This also influences both the system’s design and interface, as it must present the operator with that information.

Intervention: To allow for actual control over the system’s actions, the human operator must be able to override the system, meaning that the human should be able to appropriately manipulate the machine at any point in time. In a maximalist version, that

would be realized in all steps of the targeting cycle – but at least during the target selection and engagement the human should intervene.

iPRAW uses these four proposed criteria to define a spectrum of control that ranges from very restrictive to very permissive. This spectrum can be used to analyze different technologies and situational contexts for their legal, ethical, and operational impacts.

You can find out more about this in iPRAW's latest report "Focus on the Human-Machine Relation in LAWS", which is available on our website ipraw.org.

Thank you, Mr. Chairman!