

**CCW Remarks**  
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**THANK YOU**

At the outset, please allow me to thank Ambassador Biontino for inviting me to speak here today. *My comments today will be given in my individual personal capacity—not as a representative of the United States government or delegation, the United States Army, or the United States Navy.*

**INTRODUCTION**

Article 36 of Additional Protocol I requires States party to review weapons in order to ensure their compliance with international law. International Humanitarian Law applies to autonomous weapons systems and imposes requirements on parties to a conflict before and during an attack. This includes a requirement that weapons be capable of being used consistent with IHL, and that persons conducting the attack must act in compliance with the rules of discrimination, proportionality, and precautions in attack. Autonomous weapons can operate in ways that raise questions regarding the application of these requirements and the role of the weapons review process in ensuring compliance.

My presentation today will first address the requirements of IHL and the ways in which autonomy can complicate the application of IHL, and then consider the role of weapons reviews in ensuring that autonomous weapon systems can be used consistent with IHL.

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**DISTINCTION**

Distinction requires parties to a conflict to distinguish between lawful targets (combatants, civilians taking direct part in the hostilities, and military objects) from unlawful targets (civilians, those *hors de combat*, civilian objects, and other protected persons and objects).

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**PROPORTIONALITY**

Even when a target is lawful, the person conducting the attack must comply with the rule of proportionality that prohibits an “attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.”

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## PRECAUTIONS IN ATTACK

Persons conducting attacks must take feasible precautions to reduce the risk of harm to civilians and other protected persons and objects. For States party to Additional Protocol I, this is operationalized in Article 57 which requires “constant care” be taken to “spare the civilian population, civilians and civilian objects.” The Protocol does not define “constant care,” but this phrase suggests something more than a one-time obligation.

Article 57—as applied to States parties—further requires that or who “plan or decide upon an attack...do everything feasible to verify that the objectives to be attacked are neither civilians nor civilian objects and are not subject to special protections but are military objectives...”

## WEAPONS REVIEW

Article 35 of Additional Protocol I reaffirms the longstanding proposition that the methods and means of warfare are not unlimited. This concept is operationalized by Article 36 of Additional Protocol I, which imposes on States Party an obligation to ensure they do not use unlawful weapons. The mechanism for this obligation is the weapons review process. While the Additional Protocol doesn’t mandate the form of the weapons review, it is widely accepted that a review should consider both the weapon itself and the planned and normal circumstances the weapon’s use.

Weapons reviews of autonomous systems can be complicated by three inter-related factors: (1) the complexity of the underlying technology; (2) the potential for unpredictable systems; and (3) the possibility that autonomous systems can learn and adapt. While not unique to autonomous weapons, the implicit technological sophistication of autonomous systems demands increasingly sophisticated means of testing the systems. This raises several issues,

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- How are technical results from tests translated into a narrative that a legal advisor can understand?
- How are tests designed for new technologies?
- How can tests replicate the planned and normal circumstances of use?
- How can a weapons review be conducted on a weapon that is so complex that it is physically impossible to test all lines of computer code?
- How does testing account for design and manufacturing errors?

International humanitarian law prohibits two broad categories of weapons as unlawful *per se*: those which cause superfluous injury or unnecessary suffering; and those which are inherently indiscriminate, including weapons which cannot be aimed or whose effects cannot be controlled.

Both categories of prohibitions reflect customary international law. Autonomous weapons systems are unlikely to run afoul of these provisions. There is nothing inherent in autonomous technologies that raise unique issues with regards to these prohibitions. A weapons review should, of course, consider these prohibitions, though they are unlikely to be violated by the autonomous aspect of the weapon.

Reviewing the lawfulness of an autonomous weapon in the context of its planned and normal circumstances of use, however, advances several questions. Consider, for instance, questions related to distinction that might arise in an autonomous weapons review:

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- How well can the system identify the military objective that is the object of attack? How is this quantified?
- How do changes in the *physical* environment (e.g., atmospheric conditions, time of day, and weather) affect the ability of the system to identify military objectives?
- How do changes in the *operational* environment (e.g., the persons and man-made structures which are physically present) affect the ability of the system to identify military objectives?

Significant questions too are raised when considering proportionality and precautions in attack:

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- To what extent is the system making proportionality calculations (as opposed to calculations being pre-programmed or made by a human operator)?
- If there are situations where the system is expected to calculate proportionality, is the system sufficiently sophisticated and reliable to do so? In such a situation, can the system account for changes to the military advantage?
- For States Party to Additional Protocol I,
  - Can the attack launched by the autonomous weapons system be canceled or suspended; and if so, who makes the determination, the system or the operator?
  - Would there be circumstances in the planned and normal circumstances of use where the system would have to perceive when a warning is required under Article 57(2)(c)? If so, is the system sufficiently sophisticated to make this determination?

- Would there be circumstances in the planned and normal circumstances of use where the system would be required to select among several similar military objectives so as to cause the least danger to civilian lives and civilian property? If so, is the system sufficiently sophisticated to make this determination?

The complexity of the weapons review will be a function of the sophistication of the technology, the geographic and temporal scope of use, and the nature of the environment in which the system is expected to be used. Plainly, some systems may be lawful for use in particular circumstances or in certain environments, and others will not. In all reviews, there are some best practices that should be considered.

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- The weapons review should either be a multi-disciplinary process or include attorneys who have the technical expertise to understand the nature and results of the testing process.
- Reviews should delineate the planned and normal circumstances of use for which the weapon was reviewed.

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- The review should provide a clear delineation between expected human and system roles.
- Optimally, the review should occur at three points in time. First, when the proposal is made to transition a weapon from research to development. Second, before the weapon is fielded. Finally, weapons should be re-reviewed periodically based upon feedback on how the weapon is functioning. This would necessitate the establishment of a clear feedback loop which provides information from the developer to the reviewer to the user, and back again.

In short, there are certainly aspects of weapons reviews in the context of autonomous weapons that need to be carefully considered. A robust weapons review is a fundamental aspect of ensuring autonomous weapons systems can be used consistent with international humanitarian law.

Thank you.