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International Discussions Concerning Lethal Autonomous Weapon Systems

Lethal autonomous weapon systems (LAWS), or weapons designed to independently select and engage targets without the need for manual human control, could enable military operations in communications-degraded or -denied environments where traditional systems may not be able to operate. LAWS are not yet in widespread development. However, as technology advances—particularly artificial intelligence (AI)—a larger number of countries may consider developing and operating LAWS. This could hold potential implications for congressional oversight, defense investments, military concepts of operations, treaty-making, and the future of warfare.

As has been the case throughout history, incorporation of new technology into weapons systems creates a number of potential legal, ethical, strategic, and operational problems. For this reason, some members of the international community seek through international discussions to constrain—if not ban—LAWS.

What Are LAWS?

Definitions. No single, universally accepted definition of LAWS is used in international discussions. However, Department of Defense Directive 3000.09, which establishes U.S. policy on autonomy in weapons systems, defines LAWS as "weapon system[s] that, once activated, can select and engage targets without further intervention by a human operator." This definition's principal characteristic is the role of the human operator with regard to target selection and engagement decisions.

Other countries such as the United Kingdom, however, have grounded their definition of LAWS on different characteristics, in particular the technological sophistication of the weapon system, such that LAWS are considered to be weapon systems capable of human-level cognition. Still others do not believe that a definition of LAWS is required—or desirable—for international discussions. Despite these differences, most parties to the LAWS discussions generally agree that the defining features of LAWS include full autonomy (no manual human control of the system) and the potential to produce lethal effects.

Status. Although the pursuit of LAWS is not yet widespread, some analysts have argued that Israel's Harpy loitering munition—which the weapon's manufacturer, IAI, describes as being fully autonomous—qualifies. Israel has exported the Harpy to Chile, China, India, South Korea, and Turkey. Similarly, former Secretary of Defense Mark Esper has noted that Chinese manufacturer Ziyan has advertised a fully autonomous system, the Blowfish A3 helicopter drone, which it has reportedly exported to the Middle East. In addition, according to a report by the Defense Innovation Board, the United States developed LAWS during the 1980s but no longer has LAWS in its inventory.

International Forum for LAWS Discussions

The international community examines the implications of LAWS in discussions held primarily under the auspices of the United Nations Convention on Certain Conventional Weapons (CCW), a multilateral arms control agreement to which the United States became a party in 1982. The CCW's purpose is to "ban or restrict the use of specific types of weapons that are considered to cause unnecessary or unjustifiable suffering to combatants or to affect civilians indiscriminately."

Since 2014, the CCW has convened annual meetings of States Parties, observers, and members of civil society to discuss the legal, ethical, technological, and military facets of LAWS. These meetings were elevated in 2017 from informal Meetings of Experts to a formal Group of Government Experts (GGE). After each session of the GGE, the session's chair produces a draft report that details session proceedings and offers conclusions and recommendations for future work. States Parties then adopt the final report by consensus.

In 2018, States Parties additionally agreed to a set of "guiding principles" for LAWS. States Parties agreed that international humanitarian law (IHL) would apply to LAWS, that humans must remain responsible for decisions about the use of force, and that states must consider the risks of LAWS acquisition by, or proliferation to, terrorists.

Table 1. State Stances on Preemptive LAWS Ban

Support		Oppose[b]	Other[c]
Algeria	Holy See	Australia	China
Argentina	Iraq	France	
Austria	Jordan	Germany	
Bolivia	Mexico	India	
Brazil	Morocco	Israel	
Chile	Namibia	Russia	
Colombia	New Zealand	South Korea	
Costa Rica	Nicaragua	Spain	
Cuba	Pakistan	Turkey	
Djibouti	Panama	United	
Ecuador	Peru	Kingdom	
Egypt[a]	Uganda	United States	
El Salvador	Venezuela		
Ghana[a]	Zimbabwe[a]		
Guatemala			

Source: CRS consolidation of data from multiple sources.
Notes: CCW discussions on LAWS exclude existing weapons systems. Therefore, States Parties consider any potential LAWS ban to be preemptive.

a. State is not party to the CCW.
b. States that oppose a preemptive LAWS ban do not necessarily share the same alternative approach to managing LAWS.
c. See section below on China.

Debate About Approaches to Managing LAWS

The CCW has considered proposals to ban LAWS, as well as proposals to regulate or issue political declarations about them. CCW States Parties have not reached a consensus on which of these approaches, if any, they will adopt.

Arguments Supporting Preemptive LAWS Ban. In addition to the states listed in **Table 1**, approximately 165 nongovernmental organizations have called for a preemptive ban on LAWS due to ethical concerns. These concerns include a perceived lack of accountability for use and a perceived inability to comply with the proportionality and distinction requirements of IHL. Some analysts have also raised concerns about LAWS's potential operational risks. For example, as Center for a New American Security analyst Paul Scharre has noted, risks could arise from "hacking, enemy behavioral manipulation, unexpected interactions with the environment, or simple malfunctions or software errors" and could potentially result in civilian or noncombatant casualties. Although such risks could be present in automated systems, they could be heightened in autonomous systems, in which the human operator would be unable to physically intervene to terminate engagements—potentially resulting in wider-scale or more numerous instances of fratricide, civilian casualties, or other unintended consequences.

Those supporting a preemptive ban on LAWS have additionally appealed to the Martens Clause, which appears in the 1899 Hague Convention preamble and states that weapons use should conform to the "principles of humanity and the dictates of the public conscience." These analysts believe that LAWS contravene that requirement; however, others have noted that the Martens Clause has not been used previously to ban a weapons system and, furthermore, that the legal status of the Martens Clause is questionable and instead constitutes "merely a recognition of 'customary international law.'"

Arguments Opposing Preemptive LAWS Ban. A number of countries have voiced their opposition to a preemptive ban on LAWS. These countries have noted the potential military utility of LAWS, which could operate in communications-degraded or -denied environments where traditional systems may not be able to operate. LAWS could also potentially enable new concepts of operations, such as *swarming*, in which large formations of autonomous vehicles could be deployed to overwhelm defensive systems. (Some proponents of a ban have argued that swarms of autonomous vehicles could alternatively provide states or terrorist organizations with comparatively inexpensive weapons of mass destruction.)

Countries opposing a preemptive ban have additionally noted the potential humanitarian benefits of LAWS, which may be able to "strike military objectives more accurately and with less risk of collateral damage or civilian casualties" than traditional systems. These countries contend that human operators will remain accountable for the deployment of the systems and for ensuring that the systems' use complies with IHL. Finally, some countries are concerned that a preemptive ban on LAWS could inhibit research into technologies that may provide civilian benefits (e.g. elder care robots).

Alternative Approaches to Managing LAWS. Other states have proposed that the CCW instead focus on enhancing transparency in weapons development and sharing best practices for weapons review processes. France and Germany, for example, have proposed issuing a non-legally binding political declaration that would affirm that international humanitarian law applies to LAWS and that "[States Parties] share the conviction that humans should continue to be able to make ultimate decisions with regard to the use of lethal force and should continue to exert sufficient control over lethal weapons systems they use." Similarly, the United States has proposed a nonbinding Code of Conduct to "help States promote responsible behavior and compliance with international law." France and Germany have additionally proposed the establishment of a consultative committee of technical experts to advise the CCW on relevant technological developments.

Positions of the United States, Russia, and China

Although the CCW operates by consensus, the United States, Russia, and China—as leading military powers—are likely to be particularly influential in determining the trajectory of international discussions of LAWS.

United States. The U.S. delegation to the CCW has consistently opposed any preemptive ban on LAWS, arguing that LAWS could potentially provide a humanitarian benefit and that existing IHL is sufficient to govern the development and use of LAWS.

Russia. The Russian delegation to the CCW has also opposed a preemptive ban on LAWS, noting that LAWS could "ensure the increased accuracy of weapon guidance on military targets, while contributing to lower rate of unintentional strikes against civilians and civilian targets." It has also argued there is no proper legal precedent for a preemptive international ban on an entire class of weapons.

China. The Chinese delegation has stated that China supports a ban on the use—but not development—of LAWS, which it defines to be indiscriminate, lethal systems that do not have any human oversight and cannot be terminated. China is the only country that defines LAWS in this manner, and analysts note that such a weapon would be unable to comply with IHL and therefore would be inherently illegal. Some analysts have argued that China is maintaining "strategic ambiguity" about its position on LAWS.

Potential Questions for Congress

- Is the executive branch keeping Congress adequately informed about developments, both international and domestic, concerning LAWS and their regulation?
- What role should the United States play in UN CCW discussions of LAWS? Should the United States support the status quo, propose a political declaration, or advocate regulation of or a ban on LAWS?
- To what extent are potential U.S. adversaries developing LAWS? How, if at all, should this affect U.S. LAWS research and development or the United States' UN CCW position on LAWS?

Kelley M. Sayler, Analyst in Advanced Technology and Global Security

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