International Journal of Security Studies

Volume 2 | Issue 1 Article 2

2020

The Future of Wars: Artificial Intelligence (AI) and Lethal Autonomous Weapon Systems (LAWS)

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Abstract

Lethal Autonomous Weapon Systems (LAWS) are a special class of weapons systems that, once activated, can identify and engage a target without further human intervention. Semi-autonomous weapons are currently in use today, but the transfer of the decision to kill to machines inevitably raises novel ethical, legal, and political concerns. This paper examines the current ethical debate concerning LAWS-use during wartime and outlines the potential security benefits and risks associated with the development of LAWS and other autonomous artificial intelligence (AI) technology. Allowing moral considerations to play a role in the development of AI weapons systems is crucial to upholding the principles of international humanitarian law. Depending on the degree of autonomy that a weapon has, it can pose distinct advantages and disadvantages that must be considered prior to deployment of the technology in dynamic combat settings. The transformative potential of LAWS in warfare cannot be ignored.

I. Introduction

Artificial intelligence (AI) is a swiftly evolving field that poses significant future impacts to global security because of its multitude of potential advantages (Wan, 2018). Leading nations like the United States, the United Kingdom, France, Germany, China, and Russia are currently researching novel AI applications for the purpose of maintaining an asymmetric advantage over adversaries. The U.S. military, for example, has already incorporated AI into military operations in the Middle East via a strategy called Project Maven, which uses advanced computer algorithms to pinpoint targets from massive amounts of moving or still imagery (Pellerin, 2017). Owing to the current state of global affairs, it is likely that more investments in AI research will be made; technological advancements in public and military spheres will follow.

The incorporation of AI software and learning algorithms into commercial hardware has opened new channels for the application of AI into all sectors of society. Sustained innovation has essentially made many technological novelties ordinary. Considering the speed of innovation, it is paramount to examine some of the implications related to the convergence of technology and security policy, as well as the development of modern weaponry with the potential to alter the way warfare is conducted.

Progress in military technology today is often measured by a device's ability to keep service members away from the area of conflict and its capacity for force-multiplication; these capabilities serve to reduce costs associated with waging war (Gentry & Eckert, 2014). Lethal Autonomous Weapon Systems (LAWS)—colloquially known as *'killer robots'*—are of particular interest. LAWS are a "special class of weapons systems that utilize sensor suites and computer algorithms to identify and engage a target without manual human control of the system" (Liu & Moodie, 2019; Horowitz & Scharre, 2015; Lucas, 2016; Sayler, 2019a; Scharre,

Horowitz, & Sayler 2015). In other words, LAWS are designed to make independent decisions regarding the use of lethal force. The transfer of decisions to automated weapons inevitably brings up several issues such as liability, proportionality, unintended escalation as a consequence of imminent accidents, ethical dilemmas, and more. Consideration of these issues points toward a fundamental change in the nature of warfare when humans yield the decision to use lethal force to machines.

LAWS are an element of the Department of Defense's (DoD) third offset strategy, which entails the formulation and integration of tactics that ensure that the U.S. maintains its asymmetric power advantage over adversaries worldwide (Pellerin, 2016). However, no statute currently governs the deployment of LAWS. Department of Defense Directive 3000.09, which establishes guidelines for the development and use of autonomous weapons systems has, in effect, become the domestic policy on military-grade autonomous weaponry (Lucas, 2016). The lack of congressional guidance elicits many political and moral anxieties, considering the potential antipersonnel lethality of the technology.

While LAWS raises several ethical, legal, political, and security concerns, this paper examines the current ethical debate associated with the development and use of lethal autonomous weaponry. The paper is divided into four parts. The first part will define several key terms necessary for better understanding LAWS. The second part considers some of the plausible (security-related) benefits and risks inherent in LAWS research and use in order to aid the moral concerns examined in the succeeding section. The third part will simultaneously consider ethical issues and supporting and opposing arguments concerning the desire for an international LAWS ban. Finally, the fourth part will offer recommendations for nation-states going forward and a few concluding remarks.

II. Defining AI, Autonomy, and Autonomous Weapons

Debate concerning the expansion of AI has grown more complex in recent years. The language used to depict robots is often ambiguous due to the interdisciplinary nature of the subject. Before delving into the potential advantages and risks of LAWS, it is first necessary to establish a working definition of AI and the related subject of autonomy, which is part of what differentiates LAWS from other autonomous weapon systems (AWS). On February 11, 2019, President Donald J. Trump issued Executive Order (EO) 13859 on Maintaining American Leadership in Artificial Intelligence. EO 13859 states that, "artificial intelligence (AI) promises to drive growth of the United States economy, enhance our [U.S] economic and national security, and improve our quality of life" (Executive Order 13859). On § 9 of EO 13859, artificial intelligence means "the full extent of Federal investments in AI, to include: R & D of core AI techniques and technologies; AI prototype systems; application and adaptation of AI techniques; architectural and systems support of AI; and cyberinfrastructure, data sets, and standards for AI" (EO 13859).

Owing to distinct approaches of research in AI, no universal definition of it exists. However, H.R. 5515 (115th Congress) or the FY 2019 U.S. National Defense Authorization Act (NDAA) does provide a framework for the purpose of the bill. NDAA § 238, defines artificial intelligence as:

(1) Any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to data sets.

(2) An artificial system developed in computer software, physical hardware, or other context that solves tasks requiring human-like perception, cognition, planning, learning, communication, or physical action.

(3) An artificial system designed to think or act like a human, including cognitive architectures and neural networks.

(4) A set of techniques, including machine learning, that is designed to approximate a cognitive task.

(5) An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision-making, and acting.

As outlined above, AI encompasses a range of technologies with assorted capabilities, many of which have the potential to advance military operations in several areas. AI applications for defense are diverse. They have proven useful for reconnaissance and surveillance missions, and have marked potential to speed-up cyberspace operations (Sayler, 2019b). For example, the 2016 Cyber Grand Challenge hosted by the U.S. Defense Advanced Research Project Agency (DARPA) exhibited the budding aptitude of future AI-enabled cyber tools by challenging participants to develop an AI algorithm that could detect and patch software vulnerabilities in seconds instead of months (Fraze, 2016; Sayler, 2019b). AI-enhanced cyber tools have marked potential to detect derived viruses, suspicious nodes in networks, and identify system oddities (Asiru, Dlamini, Blackledge, 2017; Kubovič, Košinár, & Jánošík, 2018). AI technology is also being incorporated into military vessels to communicate with other vehicles, navigate routes, determine distance between vehicles and surrounding objects, and improve safety and vehicle performance. (Canis, 2018). Similarly, offensive applications of AI also vary. They may boost the destructive competencies of legitimate military forces or third party attackers. A hacker group's intrusion capability, for example, may be augmented by AI applications that allow its

members to generate new evasive malware variants, combine attack techniques, disseminate propaganda, and implement automatic self-destruct mechanisms in case of detection (Kubovič, Košinár, & Jánošík, 2018). In other words, according to James S. Johnson, a postdoctoral research fellow at the James Martin Center for Nonproliferation Studies (CNS) at the Middlebury Institute of International Studies, "AI is best understood, therefore, as a potentially powerful force multiplier of these developments" (Johnson, 2020).

Assistant Professor Rebecca Crootof (2015) in her article, "The Killer Robots Are Here: Legal and Policy Implications," asserts that "autonomy carries vastly different meanings in different fields" and due to these mixed understandings, experts can often speak past each other. For the purpose of this paper, we will use the definition of autonomy provided by the U.S. Army Robotic and Autonomous System Strategy (2017), which states that, "[autonomy is] the condition or quality of being self-governing to achieve an assigned mission based on the system's own situational awareness (integrated sensing, perceiving, analyzing) planning and decision-making." The U.S. Army Robotic and Autonomous System Strategy (2017) further emphasizes that independence is "a point on a spectrum that can be tailored to the specific mission, level of acceptable risk, and degree of human-machine teaming." According to this view, autonomy can thus be seen as a continuum and not a dichotomy. Weapon systems occupy different points according to how broadly they can identify and engage a specified target as well as their degree of self-governance over their pre-programmed or machine-learned actions. Technology on the lower end of the autonomy spectrum (i.e. semi-autonomous weapons) are currently employed by the U.S. military. The Phalanx Close-In Weapons System (CIWS), for example, which has been used by the U.S. Navy since the 1980s. CIWS provides battleships with a mechanized defense system. It can automatically "detect, evaluate, engage, and perform kill

assessments against anti-ship missiles (ASM) and high-speed aircraft threats" (U.S. Navy: Fact File, 2019).

Similar to AI, there is no internationally acceptable definition of AWS. Moreover, these weapons cannot be easily categorized because they incorporate a diverse range of technologies (Patrick, 2019). U.S. DoD Directive 3000.9, however, identifies two types of weapon systems according to their level of autonomy—autonomous and semi-autonomous. LAWS fall under the first category, which refers to a system that, once started, can engage targets without further human intervention. Unlike other countries, the U.S. definition of autonomous weapons specifies the inclusion of human-supervised AWS; this is a system designed to provide people with the ability to terminate operation of the weapon system following activation. Emphasis on possible human intercession is necessary to assuage concerns related to the use of LAWS in a combat environment.

III. Potential (Security) Benefits and Risks

Automation has been a boon to all segments of society. It has not only made lives easier, but also paved the way for technological revolutions in both the public and private sectors. Benefits in progress related to automation are numerous. From a national security perspective, classically automated non-lethal systems have already had profound effects on the way the U.S. conducts war. Automation provides an immediate force-multiplier effect because of the machine's ability to conduct basic tasks such as product assembly, material handling, and palletization, thereby removing the need to hire and train personnel for those duties (Lucas, 2016). But the potential benefits of lethal automation are even greater. During instances of armed conflict, complex technologies that employ intricate tools and algorithms allow for the

mechanization of more numerous and difficult tasks. Using a maximally autonomous weapon in combat may also be advantageous in environments with poor or broken down communication links, since they have the capacity to continue operating on their own.

AI are generally capable of reacting faster than humans; this would ultimately suit the quickening pace of combat spurred by technological innovation. The quick reaction times of AWS may result in an overwhelming advantage in the field at the beginning of a conflict (Sharkey, 2018). In certain circumstances, AI may even supersede the decision-making processes of humans (Surber, 2018). Owing to the absence of negative emotions related to personal gain, self-interest, and loss, AI may also make more objective choices in times of crisis that could save lives (ICRC, 2011; Sassóli, 2014). Furthermore, machines are not subject to the same endurance limitations as people, so LAWS would have the potential to operate in combat settings for extended periods of time or until its termination.

Depending on the system's design, LAWS could feasibly replace combatants, thereby eliminating the need for human deployments in high-risk areas. In other words, it can reduce the risk to American lives without diminishing U.S. combat capabilities. This feature of AWS, according to Nathan Leys (2018) in his article, Autonomous Weapon Systems and International Crises, "may reduce U.S. domestic political opposition to military interventions, especially in humanitarian contexts without an immediately apparent U.S. national interest." This could prove useful for long-term political strategies, although that is based on the assumption that leaders restrain themselves from waging war only because of military casualties or the derived social consequences that arise from it. If that is the case, then development of LAWS might also encourage aggression (Bocherty, 2012; Wallach, 2015).

Alexander Kott (2018), Chief Scientist of the Army Research Laboratory, stated that one of the many remarkable features of AI is its ability to make things "individually and collectively more intelligent." But at the same time, it also makes situations more volatile. Future deployment of LAWS presents several security challenges such as hacking of the system or unanticipated failure, particularly if the system utilizes machine learning applications. LAWS are expected to enhance a military's lethal force, so issues following their deployment can have mighty consequences. Since many AI systems are first developed in the public sphere, and then repurposed for military use, integration errors can occur once the system is transferred to a combat environment (Sayler, 2019b). Consequences will be dependent on the type of failure that occurs. For example, unintended escalation in a crisis may occur if LAWS engage targets other than what the human operator intended or if adversaries deliberately introduce data that produces an error in the system. Human mistakes are typically contained to a single individual. But errors in complex AI systems, especially if they are deployed at scale, risk simultaneous—perhaps even inevitable—failure (Scharre, 2017). Moreover, the danger of machines producing unconventional outcomes that cannot be immediately terminated—if the outcome can be terminated at all—may result in a destabilizing effect if the system spirals out of huma0n control.

Another conceivable risk is that LAWS might trigger an arms race among nation-states because of their immense tactical advantage. At present, global reactions to LAWS are divided, despite the fact that no such weapons have been fully developed (Lewis, 2015). However, many countries currently utilize semi-autonomous weapons and continue to devote resources to the development of fully autonomous technology. For example, the U.S. has long repurposed unmanned systems like drones to target members of international terrorist organizations. In these operations, a human operator always gives the order to kill (Stone, 2013). Autonomous weapons

also use comparable technology to those in the public sector, which suggests that countries can indirectly develop tools for AWS as they support the advancement of civilian-based AI (Schroeder, 2016).

Saliency of LAWS has reached a point where over 60 non-governmental organizations (NGOs) have banned together to promote a movement called Campaign to Stop Killer Robots. Advocates of this campaign have urged several governments and the United Nations (UN) to enact a global ban on lethal autonomous weapons. International stances, however, remain split. Although the majority of nation-states support a preemptive LAWS ban, those that oppose it have more clout on the international stage as shown in Table 01.

Table 1: Nation Stances on LAWS Ban

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

[a] Countries most capable of developing LAWS

[b] Supports a ban on the development, but not the use of LAWS

Source: Liu, Z., & Moodie, M. (2019). International Discussions Concerning Lethal Autonomous Weapon Systems. *Congressional Research Service.*

Rushed development of LAWS may result in failures to comply with international laws of war, since these weapons are fundamentally different from any prior form of weaponry in that they make independent decisions about how to act. The complexity of these systems may make it impossible for people to predict what they will do in every possible situation. LAWS therefore presents a gap in the existing legal order by underscoring the inadequacy of the current established means of holding an individual or state liable for actions conducted during wartime (Crootof, 2016). Additionally, proliferation may amplify the offensive competencies of small countries—possibly even independent actors. Rapid, disproportionate increases in the military capabilities of relatively small nation-states can have detrimental effects on the current global state of affairs. Should these nation-states opt to hire technically capable individuals from third parties that have the skills to gradually develop or hack LAWS or similar sophisticated weaponry, then global security may be undermined.

There is the possibility that current hazards and outside pressure from NGOs to establish limits on autonomy in weapon systems will overwhelm arguments in favor of continued development of LAWS, but for the moment, the Convention on Certain Conventional Weapons (CCW)—which works to ensure the protection of civilians from particularly inhumane weapons of war—has yet to produce any specific policy recommendations for their member states about limiting the potential use or development of LAWS. This is partially due to the fact that many of their larger members opted to postpone any tangible verdicts regarding LAWS even after a discussion about the moral, political, and legal issues, as well as the prospective advantages and disadvantages of using them in combat (Acheson, 2017). Regardless of whether an international

agreement restricting LAWS is reached, a contingency plan against such technology is essential (Price, Walker, & Wiley, 2018).

In sum, the progression of LAWS poses a number of unique benefits and risks. Rushed incorporation of AWS into military strategies without proper consideration of the perils that come with them can result in disastrous consequences. It is also important to note that, while it is possible to predict some of the potential dangers and vulnerabilities of LAWS—and, in turn, take steps to avoid or counter them—unpredictable outcomes may still arise once the systems are introduced to combat settings. Captain Michael Ferguson (2019), an intelligence officer at the U.S. Army Intelligence Center of Excellence, stated that, "Advocates of militarized AI often dismiss concerns under the assumption that kinks will be worked out by the time the technology is operationalized for military application… [but it is more likely that] the military will be forced to adapt to these kinks mid-conflict, which presents a broad spectrum of perilous dilemmas to the joint force."

Recognizing the necessity of combining strategy and technological development is only the first step. To assess LAWS, it is vital to consider both civilian and military development, as well as errors that could result from machines being transferred to different environments prior to their use. Additionally, policymakers, manufacturers, and relevant security agencies must work in tandem to consider how any scientific leaps in the field might change future diplomatic relations. The overall influence that the development of LAWS will have on modern methods of warfare will depend heavily on the extent to which nation-states can maximize the equipment's potential advantages, while simultaneously minimizing its risks.

IV. Ethical Implications

The possibility of LAWS rendering the final decision to apply lethal force has sparked worldwide discussion regarding fundamental issues related to the value of human life, accountability for operations, and human dignity. Advocates of a preemptive LAWS ban posit that autonomous weapon systems contravene every human beings inherent right to life under Article 6 § 1 of the International Covenant on Civil and Political Rights (ICCPR), which states that, "Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life" (OHCHR, n.d.). The ICCPR was adopted by the U.N. General Assembly in 1966 to ensure that its parties acknowledge and respect the rights of individuals; it is crucial for global human rights laws. Similarly, the Geneva Conventions and its Additional Protocols lie at the center of international humanitarian practices by limiting the cruelty of warfare. Organizations like Human Rights Watch (2014) have argued that abiding by the prerequisites for lawful force outlined within the Geneva Conventions articles, LAWS would require immense data regarding an infinite number of situations. The sheer amount of possible scenarios means that machines will likely not be able to adequately respond to every circumstance they might face.

International security researchers Anja Dahlmann and Marcel Dickow from the German Institute for International and Security Affairs argue that, "machines do not understand what it means to kill a human being" (2019). One of LAWS' greatest advantages—that is, their lack of emotion—is also a central flaw. A robot's inability to reflect over its actions or to comprehend the value of an individual's life and the significance of loss essentially turns the humans targeted into little more than data points or objects (Dahlmann & Dickow, 2019; Docherty, 2014; Purves, Jenkins, & Strawser, 2015). The value of human life is, in essence, diminished. Naturally, this breaches the dignity of the person, which some describe as the underlying principle of the

international law of human rights (Docherty, 2014; Heyns, 2013). In the same vein, proponents of a LAWS ban argue that by their nature, machines are not moral actors (Lucas, 2016). Therefore, they cannot be held responsible for their actions. Should a machine perform an illegal action in combat—or, essentially, a war crime—it would be impossible to effectively punish or deter the weapon. Unless LAWS can be developed to possess certain human qualities, then no amount of technological improvements can remedy these issues.

Alternatively, other scholars argue that LAWS might enhance respect for the value of human life because of their potential ability to distance human soldiers from combat zones (Williams & Scharre, 2015). Although service members agree to risk their lives for the interests of the state, their government also has a responsibility to protect and respect their rights as citizens. Opponents of a preemptive LAWS ban also maintain that the ethical arguments put forth are based on lopsided anthropomorphism of autonomy (Kanwar, 2011; Singer, 2009; Sparrow, 2016). This may stem, in part, from the lack of tangible development of the technology. The result is that LAWS are treated as irregular wartime participants, rather than sophisticated weapons used to amplify human action, similar to predator drones, fire-and-forget missiles, or tools developed for cyber-operations, which all have the capacity to separate human agents and cause immense damage. Viewing LAWS in this manner counters the argument that the use of LAWS violates human dignity because the algorithm that prompts the weapon's "decision to kill" is not ethically meaningful (Sparrow, 2016). Rather, it can be likened to the launching of a missile by a soldier ordered to do so by a superior officer. In other words, looking beyond the weapon to the human agent(s) responsible may mitigate certain ethical concerns. Furthermore, it would be helpful to examine the intent of the manufacturers and the parameters that the superior

in the chain of command put in place prior to deployment of LAWS to mollify fears regarding liability in the event of system failure.

The decision to kill an enemy combatant has been debated upon countless times over the decades. The dawn of LAWS, however, has been essential to transforming present discourse by centering the concept that the verdict to employ lethal force is part of an intricate decision-making process with disseminated responsibility on all levels. Allies determinations, political relations, standing rules of engagement, orders from a superior, and ability to distinguish friend from foe in "the fog of war"[1] are all factors in the decision to end a life, regardless if the one carrying out the action is man or machine. To judge how morally meaningful relinquishing the decision to apply lethal force to military-grade robotics is, then more profound international discussion, in addition to consensus regarding how the potential dangers of LAWS might outweigh their tactical benefits are necessary. Robert Sparrow (2016), one of the founding members of the International Committee for Robot Arms Control, suggests that ultimately, the strength of an ethical case for a LAWS treaty depends on assessments concerning "the weight of consequentialist and deontological considerations in the ethics of war . . . if our main consideration is to reduce the number of noncombatant deaths, it becomes easier to imagine AWS being ethical."

There is a strong justification for approaching the continued research of LAWS with caution, bearing in mind the technology's potential disruptive impact on international security. In fact, similar moral arguments were made concerning nuclear weapons before they were prohibited (Johnson & Axinn, 2013; Szilard, 1945). Past events impart the necessity of establishing ethical positions of LAWS prior to their physical development, but enforcing a total

[1] Von Clausewitz, C. (1832). *On War.* (p. 89). London: Kegan Paul, Trench, Trubner, & Co.

ban may be viewed as premature. Efforts to completely bar LAWS could impose limits on other AI applications, stunting development of new machinery usable not only in military contexts, but also in the civilian sphere. As Paul Scharre, a LAWS expert at the Center for a New American Security, stated in his 2017 testimony to the UN, "If we agree to foreswear some technology, we could end up giving up some uses of automation that could make war more humane. On the other hand, a headlong rush into a future of increasing autonomy, with no discussion of where it is taking us, is not in humanity's interests either."

Most of the ethical issues associated with the use of LAWS stems from concerns pertaining to a machine's ability to appraise human life and its overall technological sophistication. To allow moral considerations to play an appropriate role in the development of these systems, policymakers would need to clearly define key terms such as autonomy and agency; express their stance regarding who—or what—is responsible for fatal actions carried out by LAWS; clarify priorities in autonomous weapons development; and be as transparent as possible regarding progress in the field. It is imperative that legislators ensure that future policies drive technological development and not stifle it (Hall, 2017).

V. Conclusion

As technology advances, nation-states will ultimately decide whether to employ LAWS in combat settings. There are distinct advantages and disadvantages to complex automated weaponry, from increased military capabilities to unpredictable actions that could lead to run-away escalation. Many of the criticisms that LAWS faces are related to its projected use (Hall, 2017). The failure or loss of control of a fully autonomous weapon could lead to mass slaughter, unintended casualties, and conflict escalation (Scharre, 2016). Utilizing LAWS, as well as other

broad incorporations of AI technology for military operations, means acknowledging these potential risks.

Central to the debate regarding LAWS are the various ethical, legal, and political consequences that they might have on the international stage. Ethical issues are primarily related to accountability, decision-making, and whether granting machines the power to automatically engage and eliminate a target demeans human life. Depending on the individual's interpretation of human dignity and their view of autonomy as it pertains to weaponry, LAWS may be seen as compromising some of the basic tenets of humanitarian law (Sharkey, 2018). This is primarily due to a machine's lack of emotion. An automated weapon's inability to comprehend the significance of human life can be both an advantage and a flaw during wartime.

Currently, global stances involving an international LAWS ban are divided. Many NGOs have formed a coalition in support of a ban, and organizations like the International Committee of the Red Cross (ICRC) have issued reports stating that countries should establish "limits on autonomy in weapon systems" (2018). There are also several nation-states that seek to regulate the use of LAWS, while others strive to prohibit LAWS research completely. The latter, however, is next to impossible without a dominant international institution capable of enforcing such an agreement (Saad & Gosal, 2019). Notably, the countries most capable of developing LAWS are either against a ban or desire to postpone a decision regarding one. Regardless of these differences, the lack of international action translates into ambiguity concerning the ongoing development of AWS. It is incumbent on nation-states to establish an international body dedicated to evaluating the interdisciplinary implications of LAWS, exercising oversight over breakthroughs in AI, and cooperating to develop common expectations and operating procedures for future destabilizing weaponry. A comprehensive legal framework and norms should be

developed and formalized before innovation can outpace current rules of war. Creating international structures, however, can be a politically fraught and lengthy process. In the meantime, nation-states might opt to develop domestic committees that ensure greater oversight, execute national defense strategies, and define benchmarks that measure the performance of new AI weaponry.

To avoid perilous outcomes, it is vital for states to acknowledge that they cannot unilaterally address the dangers of advancements in automated military technology. For countries that have a stake in an international treaty regarding LAWS, the public image of automated weaponry and associated technology will be critical to future issue development, since brisk changes in mass perception often herald waves of mobilization. One way of influencing international discussion of LAWS is by specifying how these technologies can be used to boost public security or to support citizens in the commercial sector. An AI's ability to rapidly comb through a vast amount of data, for example, would be useful in both military and civilian contexts. Other methods of multilateral involvement include engaging with key allies to promote humanitarian objectives, participating in international forums to discuss domestic policy differences, and stressing additional key points—such as fatal aptitude—that bring diverse perspectives into the overarching dialogue (CNA, n.d.; Trumbull, 2019).

In today's globalized world, cooperation is essential to crafting effective regulatory structures and international norms that can help manage the strategic risks associated with the imminent operation of LAWS and other emerging technologies. Without a supervisory framework in place, we risk another overdue response similar to what occurred following the use of the first atomic bomb. According to M.A. Thomas, professor at the U.S. Army School of Advanced Military Studies, "AI will likely create vulnerabilities as well as advantages. It may be

error prone or biased, unpredictable, unreliable, opaque, and less capable of fine discrimination" in the different operational and strategic levels of warfare (Thomas, 2020). Despite its technological uncertainties, AI is here to stay. As Johnson succinctly states, "In today's multipolar geopolitical power . . . relatively low-risk and low-cost AI-augmented AWS capability—with ambiguous rules of engagement and absent a robust normative and legal framework—will become an increasingly enticing asymmetric option to erode an advanced military's deterrence and resolve (Johnson, 2020). As U.S. Air Force Major General Robert H. Latiff (2017) argues, "The modern milieu is a toxic brew of global instability, economic upheaval, political polarization, and rapid *technological change* on a scale not seen in several generations, perhaps ever." In conclusion, we can ignore the advancement of AI, LAWS, and AWS at our peril.

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