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CDR Charles Gough, JAGC, USN

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Writing & Teaching Excellence Center
Naval War College
686 Cushing Road
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14. ABSTRACT

Lethal Autonomous Weapon Systems (LAWS) represent and offer a potential revolution in military affairs on par with the development of precision weapons, perhaps even armed aircraft. While there are legitimate concerns about the safety and efficacy of these systems, the best way to address them is for the U.S. to drive forward their development, both internally and among its allies. The U.S. may need to bear some reputational costs in pursuing this end, but they are worth bearing given the context and stakes. By advocating and actively working toward developing, testing, training, and exercising autonomous systems, particularly among its allies, the U.S. can lead in the development of LAWS. This includes implementing safety measures and identifying scenarios for employment that comply with the principles of the Law of Armed Conflict (LOAC) and international law.

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Why the U.S. Needs to Lead in Lethal Autonomous Weapon Systems Development.

INTRODUCTION

The United States should actively lead the international community in developing Autonomous Weapon Systems (AWS), specifically Lethal Autonomous Weapon Systems (LAWS). While the U.S. has thus far opposed international attempts to "ban killer robots,"[1] it is not doing enough to promote procurement, testing, and development of doctrine for LAWS internally or amongst its allies. This paper will argue that failing to address this shortcoming risks ceding a potentially asymmetric battlefield advantage to adversaries in an emerging field that is both potentially militarily game-changing and inexorable. Additionally, it will contend that by advocating and actively working toward developing, testing, training, and exercising autonomous systems, particularly among its allies, the U.S. can lead in the development of LAWS. This includes implementing safety measures and identifying scenarios for employment that comply with the principles of the Law of Armed Conflict (LOAC) and international law. The paper will then evaluate the counterargument that a continued conservative approach would buy international credibility and legitimacy from a world already profoundly skeptical about U.S. drone usage over the past 20 years but conclude that the risks of inaction are too significant to justify a laissez-faire approach.[2]

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[1] Bonnie Lynn Docherty, *Heed the Call: A Moral and Legal Imperative to Ban Killer Robots* (Cambridge, MA: Human Rights Watch; International Human Rights Clinic, 2018).

[2] Of note, as the literature reveals little to no discussion within the highest levels of U.S. defense or diplomatic establishments advocating for a total ban on LAWS, I will not directly address this potentially straw man position in my counterargument. Rather, I will distinguish between the current approach, which I characterize as conservative, versus a more liberal approach, for which I will advocate.

BACKGROUND

Before addressing the merits of the appropriate U.S. position on using AWS, it is worth defining the terms used in this paper, examining the existing international efforts to ban or limit their development, and articulating existing U.S. policy on LAWS.

Terms. There are generally three broad levels of human control over AWS articulated in the literature, colloquially referred to as "in the loop," "on the loop," and "out of the loop."[3] An in-the-loop machine is semi-autonomous; the machine requires human approval to complete a given action. An 'on the loop' machine is autonomous but under human supervision; it will complete said action absent human intervention. "Out of the loop" machines, once activated, will perform a given task without the need or even opportunity for human intervention. This last out-of-the-loop paradigm is also frequently referred to as "LAWS," particularly in the United Nations (UN), while NGOs advocating for their ban use the term "killer robots." The U.S. Department of Defense (DoD) somewhat confusingly refers to both "On-the-Loop" and "Out-of-the-loop" systems as "AWS."[4] Michael Horowitz and Paul Scharre, leading authors on LAWS, define the term as "(A) weapon system that, once activated, is intended to select and engage targets where a human has not decided those specific targets are to be engaged."[5] For this paper, I will adopt this definition and use "LAWS" when I mean a lethal "out-of-the-loop" weapon

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[3] Paul Scharre, "Autonomous Weapons and Operational Risk," Center for New American Security, *Ethical Autonomy Project*, (February 2016)., http://www.cnas.org/sites/default/files/publications-pdf/CNAS_Autonomous-weapons-operational-risk.pdf.

[4] See Lauren Kahn. "Decoding the Defense Department's Updated Directive on Autonomous Weapons," *Lawfare*," accessed April 10, 2023, https://www.lawfareblog.com/decoding-defense-departments-updated-directive-autonomous-weapons. And also Department of Defense, *Autonomy in Weapon Systems*, DoD Directive 3000.09 (Washington, DC: Department of Defense, 2023).

[5] Michael C. Horowitz, "When Speed Kills: Lethal Autonomous Weapon Systems, Deterrence and Stability," *Journal of Strategic Studies* 42, no. 6 (September 19, 2019): 764–88, https://doi.org/10.1080/01402390.2019.1621174., at 768.

system. Otherwise, I will specify when I mean semi-autonomous on human-monitored on-the-loop systems.

There are potential operational and strategic applications of Artificial Intelligence (AI), such as outsourcing control of nuclear weapons, operational-level cyber capabilities, and/or Jus ad Bellum decisions. These macro-level manifestations of AI in warfare raise profound questions but are beyond the scope of this paper. Instead, I focus on developing *tactical weapons platforms* capable of autonomously selecting and engaging targets *inside* the context of active hostilities.

LAWS Capabilities. The U.S. does not currently have any LAWS fielded. However, it incorporates both "in-the-loop" and "on-the-loop" functionality into offensive and defensive systems. Point-defense systems, such as naval Close-in-Weapon Systems (CIWS), can operate in either mode and track, triage, and engage incoming missiles or shells without human intervention. Moreover, they will do so orders of magnitude faster and more accurately than said humans could if they were manually operating the system.

Similarly, once launched, homing missiles can autonomously target and engage heat or radar emissions without humans "in the loop." Militaries worldwide have fielded both technologies since the Cold War, so while there has been significant debate about LAWS over the past ten years, fielded, algorithm-enabled machines have been capable of identifying and destroying targets with some amount of autonomy for scores of years. Outside the U.S., various outlets have claimed that the Turks and/or Israelis have developed and, in the case of the former,

employed actual LAWS drones in combat.[6] Additionally, Chinese and Russians are assessed to be rapidly working to incorporate AI into autonomous systems.[7]

Killer Robots. There is a well-organized and publicized effort, primarily led by non-governmental organizations (NGOs), to preemptively ban LAWS, which they characterize as "killer robots." The most prominent manifestation is Human Rights Watch's (HRW) campaign "Heed the Call,"[8] which started in 2013 and counts over 200 NGOs and 70 nations, mainly from the Global South, who support the campaign for a preemptive treaty banning LAWS on moral and legal grounds.[9] On this latter count, HRW and others assert that LAWS are inherently incapable of complying with the LOAC principle of Humanity, on the theory that machines are "not sentient beings capable of feeling compassion" and are "incapable of respecting human dignity."[10] Others point out that ensuring LAWS abide by the principles of Proportionality and Necessity could be equally problematic, mainly on the premise that machines are incapable of making potentially complex ethical judgments on the value of the military objective vs. potential civilian harm.[11]

LAWS Internationally and at the U.N. Internationally, LAWS have been discussed within the U.N. Convention on Certain Conventional Weapons (U.N. CCW) and specifically the

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[6] Celien De Sterke, "To Ban or Not to Ban. Analyzing the Banning Process of Autonomous Weapon Systems," *Journal of Science Policy & Governance*, accessed April 13, 2023, https://www.sciencepolicyjournal.org/article_1038126_jspg210102.html.
[7] Michael Hirsh, "How AI Will Revolutionize Warfare," *Foreign Policy* (blog), April 11, 2023, https://foreignpolicy.com/2023/04/11/ai-arms-race-artificial-intelligence-chatgpt-military-technology/.
[8] Docherty, "Heed the Call: A Moral and Legal Imperative to Ban Killer Robots."
[9] Mary Wareham, "Latin America and Caribbean Nations Rally Against Autonomous Weapons Systems," *Human Rights Watch* (blog), March 6, 2023, https://www.hrw.org/news/2023/03/06/latin-america-and-caribbean-nations-rally-against-autonomous-weapons-systems. Of note, HRW's assertion on the number of countries and NGOs calling for an outright LAWS ban is disputed. The Congressional Research Office, for example, asserts the number of nations is approximately 35 and NGOs 165.
[10] Docherty, *Heed the Call. Moral and Legal Imperative to Ban Killer Robots*, at 2.
[11] See Neil Davison, "A Legal Perspective: Autonomous Weapon Systems under International Humanitarian Law," *UNODA Occasional Papers, No. 30,* (United Nations, January 23, 2018), https://doi.org/10.18356/29a571ba-en. See also Alexander Blanchard "Jus in bello Necessity, The Requirement of Minimal Force, and Autonomous Weapons Systems," *Journal of Military Ethics*, 21:3-4, 286-303, 11 Jan 2023.

"Group of Governmental Experts" GGE for nearly a decade. Though there have been many proposals, they have yet to result in a formal treaty or motion before the Security Council or General Assembly. However, the U.N. CCW High Contracting parties adopted 11 "Guiding Principles" in 2019.[12] These principles broadly state that autonomous weapon systems must comply with existing LOAC, including the requirement for legal review of weapon systems, and that human accountability must be preserved through the entire lifecycle of weapon systems. Recently, numerous Latin-American Caribbean countries signed a communique advocating for urgent negotiations on a binding treaty with prohibitions and regulations on autonomous weapon systems, and the Non-Aligned Movement asserted the position to the GGE of the UN CCW in 2021 that autonomous weapons systems must always remain under the control and supervision of humans.[13] The U.N. Secretary-General called LAWS "morally repugnant" and asserted they "should be prohibited by international law."[14]

Current U.S. Position on LAWS. The United States has resisted calls for a preemptive LAWS ban but occasionally issued contradictory public statements. Specifically, in 2018, it submitted a white paper to the GGE which laid out the various utilities and existing applications of autonomous weapon systems (though not LAWS per se), including improved awareness, reduced Civilian Casualties (CIVCAS) due to precision, improved military efficacy, and obviating the need for lethal self-defense fires.[15] It prescribed avoiding a stigmatizing ban while

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[12] United Nations, "Background on LAWS in the CCW – UNODA," (New York, New York) accessed April 12, 2023, https://www.un.org/disarmament/the-convention-on-certain-conventional-weapons/background-on-laws-in-the-ccw/.
[13] Wareham, "Latin America and Caribbean Nations Rally Against Autonomous Weapons Systems."
[14] CFR, "Laying Down the LAWS: Strategizing Autonomous Weapons Governance," Council on Foreign Relations, accessed April 12, 2023, https://www.cfr.org/blog/laying-down-laws-strategizing-autonomous-weapons-governance.
[15] U. S. Mission Geneva, "U.S. Statement on LAWS: Potential Military Applications of Advanced Technology," U.S. Mission to International Organizations in Geneva, March 26, 2019, https://geneva.usmission.gov/2019/03/26/u-s-statement-on-laws-potential-military-applications-of-advanced-technology/.

encouraging innovation in AWS to further the ends of the CCW.[16] A 2022 proposal at the same body, in which the U.S. was joined by Australia, Canada, Japan, the Republic of Korea, and the United Kingdom, reiterated the same policy positions from the 2018 working paper. [17]

However, the U.S. has indicated a reluctance to develop and field LAWS elsewhere. The former DoD Joint Artificial Intelligence Center Director stated in 2019 that "I'm not going to go straight to 'lethal autonomous weapons systems," but that the DoD "would use AI in their weapon systems to give a competitive advantage."[18] In its 2023 update to "DoD Directive 3000.09: Autonomy in Weapon Systems," the DoD did not proscribe LAWS but required the same "senior level review" contained in the earlier directive. It also added ethical requirements (including avoiding unintended AI bias). Critically, it retained the same onerous senior-level review requirement mandating that "weapon systems with both autonomous and semi-autonomous modes of operation" must be approved by the Under Secretary of Defense for Policy (USD(P)), the Under Secretary of Defense for Research and Engineering (USD(R&E)), and the Vice Chairman of the Joint Chiefs of Staff (VCJCS) *before development*, with additional reviews required before fielding.[19]

A 2022 Congressional Research Service (CRS) report stated, "the United States is not currently known to be developing any LAWS, and no weapon system is known to have gone through the senior level review process" which the DODD lays out.[20] The updated directive makes it no easier to develop, test, or exercise LAWS than it was ten years ago when the DoD issued the original directive; it merely added more requirements and considerations before an

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[16] Ibid.
[17] U.S. Mission Geneva, "U.S. Statement on LAWS: Potential Military Applications of Advanced Technology."
[18] Hirsh, "How AI Will Revolutionize Warfare."
[19] Department of Defense, Autonomy in Weapon Systems.
[20] Kelly M. Sayler, *Defense Primer: U.S. Policy on Lethal Autonomous Weapon Systems*," CRS Report No. IF11150, (Washington, DC: Congressional Research Service, 2022), 1.

autonomous or semi-autonomous system could work its way through to the highest levels of the DoD bureaucracy for approval, a heretofore unachieved task.

ARGUMENT

Military Advantage. The first and most important argument why the United States should embrace a more liberal policy and lead its allies on the development of LAWS is their potential game-changing military utility. There are three primary advantages that LAWS could provide a combatant in the future, though these three are by no means an exhaustive list.

The first advantage is that it would "enable military operations in a communications-degraded or denied (environment) in which traditional systems may not be able to operate."[21] Unmanned systems already play a significant role on the modern battlefield, capitalizing on recouped space required to accommodate (and keep alive) human operators and eliminating concerns about the death or capture of said humans. However, armed drones currently require constant communications via secure electronic networks with a remote human operator, with all the technical infrastructure required. This paradigm works well in non-international armed conflicts (NIACs) like Iraq and Syria but will be infinitely more challenging against a near-peer with robust jamming and cyber capabilities, particularly within the envelope of Anti-Access/Area-Denial defense systems. Iran, lacking anywhere near the sophistication of Russia or China, infamously brought down an advanced American RQ-170 drone by hacking and severing its link to its remote operator. A drone capable of operating *autonomously*, primarily via systems not predicated on GPS, would be able to operate and fight in such a contested communications environment and do so globally.[22]

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[21] Ibid.

[22] While systems can be hardened against jamming to try and maintain a secure link, the cost of reliably doing so quickly becomes cost and space prohibitive. Moreover, against a peer adversary, the satellites themselves (from which the signals are being transmitted) will be vulnerable.

The second advantage LAWS could offer is that "swarms" of drones could operate without the required backend human operators and infrastructure. This could significantly reduce manpower requirements needed to use armed unmanned systems and enable introduction at a scale (e.g., thousands of low-cost armed unmanned autonomous vehicles (UAVs) that would be infeasible without autonomation. Moreover, it could allow militaries to become significantly less manpower intensive, particularly in high-demand, low-volume skillsets like pilots, surface warfare operators, or submariners. While there will likely always be a place for manned, multi-mission capable platforms, including those exercising C2 over other autonomous or semi-autonomous systems, LAWS complement the existing human infrastructure and enable persons to make the decisions machines are unable or not permitted to. Given the recruiting challenges that the U.S. and its allies face, particularly in sustaining highly-skilled, all-volunteer forces, a significant reduction in manpower requirements offers enormous upside to those that seize the opportunity. As one author summarizes the literature, "when the resources needed are compared to the return on investment, AWS seem more financially, efficiently, and effectively attractive than human soldiers."[23]

Fielded LAWS would also allow the U.S. or its allies to fight an advanced adversary with a significantly reduced risk of servicemember casualties, to the benefit of both servicemember morale and popular support. The American public and the publics of its various allies have grown accustomed to either no armed conflict or conflicts with relatively few casualties. LAWS could enable the successful prosecution of war aims without necessitating putting entire carrier strike groups or brigade/division-sized elements at risk. This could increase U.S. staying power, political resolve, and perceived credibility of the articulated threat of military action, increasing

[23] Celien De Sterke, "To Ban or Not to Ban. Analyzing the Banning Process of Autonomous Weapon Systems," at 4.

its effective deterrent power. For example, if the PRC believed that the U.S. could credibly deny a successful PRC invasion of Taiwan relying on unmanned LAWS systems (driving down expected U.S. casualties), it would make the implied threat of actively defending Taiwan more credible and therefore conflict potentially less likely.

The third military advantage LAWS offers would be systems capable of "fighting at machine speed."[24] A LAWS could outfight and outperform a human adversary by making decisions in milliseconds or microseconds, operating well inside even the best-trained humans' OODA loop, and executing engagements with machine precision while accounting for myriad variables.[25] There may come a point, where, like in playing chess or Go or solving a Rubix Cube, a computer will always defeat a human in specific combat scenarios. Moreover, in addition to vastly increased speed of decision making, automated systems can already offer better accuracy[26] in employing precision fires than human-only systems. Thus, as the U.S. pointed out at various times in the context of the GGE, the use of LAWS could reduce, rather than increase, the risks of harm to civilians and civilian objects.[27]

Enabled Allies. The second argument that the U.S. needs to take a more assertive and liberal position is to encourage U.S. allies to similarly develop LAWS systems and accompanying doctrine, rules, and infrastructure to ensure interoperability. The same battlefield advantages discussed above that LAWS could confer on the U.S. will be equally if not more advantageous to her allies, who lack high-end manned platforms in quantity and quality.

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[24] Horowitz, "When Speed Kills," at 769.
[25] In 2021 U.S. developed AI famously (or infamously) bested an F16 fighter pilot in a simulator by a score of 5-0. https://www.nbcnews.com/think/opinion/military-ai-vanquishes-human-fighter-pilot-f-16-simulation-how-ncna1238773
[26] An example of this are the various semi-autonomous CROWS (Common Remotely Operated Weapon Station) which can put multiple.50 cal rounds into the same hole at significant stand-off distances and tracking and adjusting fire to engage moving targets.
[27] U.S. Mission Geneva, "U.S. Statement on LAWS: Potential Military Applications of Advanced Technology," at 4-6.

Given the U.S.-NATO alliance and series of bilateral alliances in the Pacific, any future U.S. conflict with Russia or China would likely involve allied coalition partners. While many of these partners lack the economic and technological wherewithal to field 5th or 6th-generation manned fighters or bombers, lower-cost armed autonomous UAVs, unmanned surface vehicles (USVs), and unmanned underwater (UUVs) could be fielded, particularly if the U.S. were to share necessary software to operate said systems. These would not need to be complex, multi-mission capable platforms. Rather, they could operate in single domains and execute bespoke functions/mission sets. An example might be a LAWS UUV that could identify and engage a Chinese People's Liberation Navy (PLA(N)) surface combatant in port based on detecting specific emissions. Such a platform might be feasible for Taiwan, the Philippines, or Thailand to develop in quantity. Shared developing, training, exercising, and doctrine development of LAWS would make a more lethal, effective, and coherent coalition. Moreover, it could significantly increase the effective contribution of smaller or less economically-developed partners.

Sets and Reps. The Third argument for the U.S. to adopt a more liberal posture on LAWS is that only in rapidly developing, testing, and fielding (though not necessarily employing) LAWS will the U.S. garner the requisite data to make informed decisions about when, where, and how to employ them in a way consistent with U.S. LOAC obligations and national interests. Unless the U.S. actively encourages bottom-up development and testing of potential LAWS internally and amongst its allies, they will perpetuate a knowledge gap and enable the prophets of "killer robots" to contend that LAWS are unworkable given the absence of evidence to the contrary. The fact that no LAWS have been developed, nor even made it through the DoD's Senior level review process in the past ten years, means that the U.S. cannot

test or demonstrate their reliability in a meaningful way. Moreover, developing and fielding LAWS will enable the U.S. to lead, set the perimeters, and develop customary international law and norms that suit its values and interests.

COUNTERARGUMENT

A counterargument to the thesis above is that by actively developing and advocating for LAWS, the U.S. risks jeopardizing the perceived international legitimacy which undergirds much of its global soft power. This legitimacy was already severely strained by the Global War on Terror and the invasion of Iraq, where over the past 20 years, perceived indifference to international laws and norms, civilian casualties, human rights abuses, and perhaps most saliently, prolific use of drones for targeted killings undermined U.S. standing in the world. This was particularly true among Islamic countries and in Western Europe. Autonomous killer robots, particularly if seen causing unintended civilian deaths or fratricide, would further alienate significant parts of the world, complicating the U.S.'s ability to achieve policy aims in other areas. It could effectively squander the relative reputational bump that Chinese and Russian regional aggression has afforded the U.S. and undermine its ability to be seen and act as a leader within the global community.

Moreover, strident advocacy for LAWS could encourage other nations less concerned about or capable of designing systems that comply with LOAC principles to rush to the field and develop their own fully autonomous weapons, creating a sort of arms race where prudential concerns about safety, morality, or legality were cast aside. We may already be experiencing this arms race.[28] This position could lead to the very democratization and proliferation of unsound, unsupervised, LOAC-violating autonomous weapons, which opponents of LAWS have long

[28] Hirsh, "How AI Will Revolutionize Warfare." Hirch cites Michael Klare and a report he did for the Arms Control Association in Feb 2023.

prophesized. Finally, the international, domestic, and legal backlash to a high-profile failure of a LAWS, either in training or actual combat, would serve as a severe setback to the development of useful autonomous weapon systems both for the U.S. and its allies, particularly if manifest in a U.S. legislative prohibition. Much better, per this line of argument, to advocate a conservative course internationally and a top-down approach internally to better assess how the technology, law, and international attitudes toward LAWS develop than rush to failure. This position would not advocate for a preemptive global ban or an internal prohibition on the development of weapons but rather to continue the exploration of LAWS, their effectiveness, and their legality at a deliberate pace, prioritizing avoiding failure over achieving success in LAWS development.

REBUTTAL

The rebuttal to the above is threefold. First, China, Russia, and others will stridently continue developing AI and LAWS regardless of the U.S. position. As retired Air Force Lt General David Deptula put it, "Even if we stopped autonomy research and other AI military development, the Chinese and, to a lesser extent, the Russians will certainly continue their AI research… both have shown little interest in pursuing future arms control agreements."[29] Thus, a conservative approach will not slow down America's most significant competitors. Instead, it risks ceding them a head start in a critical area of battlefield technology.

Second, developing weapon systems and doctrine on a time-sensitive, ad hoc basis has always been, and will always be, suboptimal. World War II is a case study of various nations fielding immature weapon systems and doctrines, resulting in enormous costs of blood and treasure before corrections or deficiencies were identified.[30] The poor use and/or sorry state of

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[29] Ibid.

[30] In the case of the French, poor doctrine, communications, air forces, and employment of its (superior) tanks resulted in their total defeat at the hands of their greatest enemy. On the American side, examples include the

development by various nations of aircraft carriers, battleships, torpedoes, tanks, radios, close air support, and heavy bombers in the early days of the war underscore the criticality of identifying, developing, testing, and developing doctrine for employment of the weapons that will matter in the "next war."

A recent and relevant example of this is the use of armed drones. Discomfort with armed unmanned platforms at the turn of the 20th century meant that only after viewing Osama Bin Laden for over 4 hours from an unarmed predator in 2000 did the U.S. decide to subsequently arm certain drones. Yet caution and concern about this novel method of warfighting meant that in the year leading to 9/11, the U.S. military still had not fielded any armed drones; it was not until the invasion of Afghanistan, when testing still was incomplete, that armed predators were rushed into active service for the CIA and later DoD. Suppose LAWS will provide significant, potentially asymmetric advantages to those that best develop and employ them in the future war. In that case, the U.S. and its allies must press for experimentation and refinement of this new capability *before* the shooting starts to mitigate the very risks its opponents raise. To do otherwise is to invite the exact costs in blood and treasure that the Allies endured from 1939-1942.

CONCLUSION

LAWS represent and offer a potential revolution in military affairs on par with the development of precision weapons, perhaps even armed aircraft. While there are legitimate concerns about the safety and efficacy of these systems, the best way to address them is for the U.S. to drive forward their development, both internally and among its allies. The U.S. may need to bear some reputational costs in pursuing this end, but they are worth bearing given the

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inherent inferiority of U.S. torpedoes, naval aviation, and night fighting capability vs those of Imperial Japan in 1941 and well into 1942.

context and stakes. Merely pushing back against efforts to ban by citing the potential to reduce CIVCAS is not enough. Not having a single system go through the senior-level review process is certainly not enough. The U.S. needs to amend its internal regulations to encourage and expedite bottom-up development of LAWS so that it can test, evaluate, and improve their performance. It should work with allies to develop its systems and conduct multilateral exercises to assess the efficacy and best employment of said systems. Doing so will enable the U.S. to truly lead in the development of LAWS, comply with current and shape future existing customary and codified international law, and ensure its forces maintain its current advantage over its adversaries.

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