

Lethal Autonomous Weapon Systems & The Ethics of  
Robo-Killing:  
The Potential Effects of Intelligent Weapons on 'Jus Ad  
Bellum' and 'Jus in Bello' Compliance by States in Future  
Conflicts

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Introduction

After a several-decade long hiatus from serious geopolitical manoeuvring and superpower rivalry, in which time the West shifted its attention away from countering the Soviet Union, and towards the terrorist threats posed by various non-state actors in the Middle East, recent events have demonstrated that 'old-fashioned power plays are back in international relations.'<sup>1</sup> The Pax Americana and sole-superpower status that the United States enjoyed since the end of the Cold War has been replaced by a new era of brinkmanship, increasingly defined by a multi-polar great power competition between the US, Russia, and China. Importantly, the global redistribution of power has not only become divided between multiple poles of influence, but is also manifesting itself across numerous domains, to include military confrontations, the formation of new diplomatic linkages between states, and races for dominance over emerging technologies, in the pursuit of broadened spheres of influence and global hegemony.<sup>2</sup>

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\* The views expressed in this article are those of the author and do not reflect the official policy or position of the Department of Defense or the US Government.

<sup>1</sup> Walter Russell Mead, 'The Return of Geopolitics: The Revenge of Revisionist Powers' (*Foreign Affairs*, 17 April 2014) <[www.foreignaffairs.com/articles/china/2014-04-17/return-geopolitics](http://www.foreignaffairs.com/articles/china/2014-04-17/return-geopolitics)> accessed 10 March 2019.

<sup>2</sup> Bruce Jones, 'Order from Chaos: The New Geopolitics' (*Brookings*, 28 November 2017) <[www.brookings.edu/blog/order-from-chaos/2017/11/28/the-new-geopolitics](http://www.brookings.edu/blog/order-from-chaos/2017/11/28/the-new-geopolitics)> accessed 10 March 2019.

Artificial intelligence (AI) and autonomous systems are of particular interest to all three powers: these systems are being rapidly developed by digital technology firms and notably the governments of the US and China in an effort to gain asymmetric advantages over their adversaries in military and economic affairs.<sup>3</sup> As an example, in October 2016 the US successfully conducted a test of its autonomous swarm technology with '103 Perdix drones launched from three F/A-18 Super Hornets. The micro-drones demonstrated advanced swarm behaviours such as collective decision-making, adaptive formation flying, and self-healing,' marking a major step forward for American military robotics capabilities.<sup>4</sup> Within days, China responded to this test with its own demonstration of an even larger number of similar fixed-wing autonomous drones, operating as a swarm.<sup>5</sup>

Comparable development has occurred for sea and land-based unmanned autonomous vehicles as well. The US government's Defense Advanced Research Projects Agency (DARPA) has conducted several successful tests of a fully autonomous submarine-hunting surface vessel known as the 'Sea Hunter,' while Russia has already deployed its remote controlled Uran-9 Unmanned Ground Combat Vehicle on the battlefields in Syria.<sup>6</sup> The rapid development and fielding of these weapon systems is indicative of a growing trend towards automation in military systems and the increasing importance of machine intelligence and independence as a tool for national power projection.

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<sup>3</sup> Reva Goujon, 'AI and the Return of Great Power Competition' (*Stratfor*, 2 August 2018) <[worldview.stratfor.com/article/ai-and-return-great-power-competition](http://worldview.stratfor.com/article/ai-and-return-great-power-competition)> accessed 27 May 2019.

<sup>4</sup> US Department of Defense, 'Department of Defense Announces Successful Micro-Drone Demonstration' (9 January 2017) <[dod.defense.gov/News/News-Releases/News-Release-View/Article/1044811/departments-of-defense-announces-successful-micro-drone-demonstration/](http://dod.defense.gov/News/News-Releases/News-Release-View/Article/1044811/departments-of-defense-announces-successful-micro-drone-demonstration/)> accessed 28 March 2019.

<sup>5</sup> Chris Baraniuk, 'US military tests swarm of mini-drones launched from jets' (*BBC News*, 29 March 2019) <[www.bbc.co.uk/news/technology-38569027](http://www.bbc.co.uk/news/technology-38569027)> accessed 29 March 2019.

<sup>6</sup> Paul Scharre, *Army of None: Autonomous Weapons and the Future of War* (W W Norton & Co 2019) 79, 114-116.

The emergence of autonomous technologies and the growing capabilities of AI have led to the creation of lethal autonomous weapon systems (LAWS), which have the authority to 'select (ie search for or detect, identify, track, select) and attack (ie use force against, neutralise, damage or destroy) targets without human intervention.'<sup>7</sup> Modern LAWS have in fact already been developed, exported to several states, and used in combat. In 2016, Azerbaijan deployed a Harpy 2 loitering munition developed by Israel Aerospace Industries in support of its forces engaged in the Nagorno-Karabakh conflict. Without any human oversight of its targeting decision-making or the opportunity to override the strike, the drone 'slammed into a bus carrying Armenian volunteer soldiers and killed seven people.'<sup>8</sup> As such, LAWS are a current reality, not a future concern for the international community, and are poised to significantly alter the character of modern warfare by introducing new strategic, as well as ethical risks and benefits.

This paper will argue that LAWS offer states the opportunity to improve compliance with jus in bello and reduce risks to combatants and civilians, but only if the major technological powers intentionally develop systems that compel the surrender of enemy forces rather than annihilating them, and program them to be conservative in their employment of lethal force. Meanwhile, the impact on jus ad bellum as a result of LAWS development may well be negative, since automation further de-humanises combat, lowering the barriers to entry for war via the creation of psychological and physical distance between decision-makers and death. Similarly, LAWS may blur the lines between intelligence, reconnaissance, and combat activities even more than existing unmanned systems have, potentially extending the lengths of future conflicts. Thus, autonomous weapons will likely have destabilising effects on the international order, due to the multipolar state of

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<sup>7</sup> International Committee of the Red Cross (ICRC), 'International humanitarian law and the challenges of contemporary armed conflicts' (32<sup>nd</sup> International Conference of the Red Cross and Red Crescent, Geneva, December 2015) <[www.icrc.org/en/document/international-humanitarian-law-and-challenges-contemporary-armed-conflicts](http://www.icrc.org/en/document/international-humanitarian-law-and-challenges-contemporary-armed-conflicts)> 44.

<sup>8</sup> Raf Sanchez, "'Suicide drone' used for first time in fighting between Azerbaijan and Armenia' (*The Telegraph*, 8 April 2016) <[www.telegraph.co.uk/news/2016/04/08/suicide-drone-used-for-first-time-in-fighting-between-azerbaijan/](http://www.telegraph.co.uk/news/2016/04/08/suicide-drone-used-for-first-time-in-fighting-between-azerbaijan/)> accessed 26 May 2019.

global affairs and the novel advantages that LAWS offer military commanders. However, once hostilities begin, lethal autonomous weapon systems may be a force for good, thanks to the increased targeting precision and loitering capabilities of unmanned and computerized military hardware, and the unemotional nature of robots. Ensuring that LAWS behave in a conservative manner on the battlefield could be mandated by an additional protocol to the 1980 Convention on Certain Conventional Weapons (CCW), in line with the principle of avoiding unnecessary suffering in war.

### 1. What are LAWS?

Before discussing examples of autonomous weapons or their potential impacts on ethical risks in warfare, it is important to establish an understanding of precisely what LAWS are. This is made difficult, however, by the fact that '[t]here is no internationally agreed definition of autonomous weapon systems.'<sup>9</sup> For its part, the Campaign to Stop Killer Robots defines 'fully autonomous weapons' as robotic devices that would 'decide who lives and dies, without further human intervention.'<sup>10</sup> Meanwhile, Directive 3000.09 of the US Department of Defence offers distinct definitions for autonomous and semi-autonomous weapons, but also states that both types 'shall be designed to allow commanders and operators to exercise appropriate levels of human judgment over the use of force,' an intentionally vague statement that could be interpreted in myriad ways to suit the strategic needs of the American government.<sup>11</sup>

For the purposes of this paper, LAWS will be conceptualised based on simple definitions for each constituent portion of the term itself. They are 'lethal' in that they possess the capacity to kill human beings; 'autonomous' if they

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<sup>9</sup> ICRC (n 7) 44.

<sup>10</sup> Campaign to Stop Killer Robots, 'The Threat of Fully Autonomous Weapons' (*Campaign to Stop Killer Robots*, 2018) <[www.stopkillerrobots.org/learn/](http://www.stopkillerrobots.org/learn/)> accessed 27 February 2019.

<sup>11</sup> US Department of Defense, 'Directive Number 3000.09' (*US DoD*, 21 November 2012) <[www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/300009p.pdf](http://www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/300009p.pdf)> accessed 14 March 2019.

have the authority delegated to them to independently accomplish military tasks in combat scenarios, or if 'there is no need for other human or artificial agents to monitor [their] behaviour and govern [their] functioning' once activated and provided with a general goal<sup>12</sup> and 'weapon systems' in that they combine data sensors, a decision-making system, and means for the employment of force against a target.<sup>13</sup> This simple definition allows broad consideration of the risks posed by LAWS.

## 2. Historical Development and Use of LAWS

Though the term 'autonomous weapon' often conjures images of futuristic Terminator-style humanoid robots seeking to subjugate the human race for their ends, the reality is quite different. Arguably, anti-personnel land mines count as LAWS, since they are lethal, employ a simplistic binary decision-making architecture and have full authority over the use of force, and are undoubtedly a weapon system of sorts. Autonomy in weapons is therefore not a particularly new concept, since mines have been used in support of various military and para-military operations, from the Russo-Japanese war of 1904-1905 until the present.<sup>14</sup> However, mines 'can sense and act on their own, but do not search for targets,' meaning that they have autonomy in time, but not in space.<sup>15</sup> As a result, many scholars distinguish between these 'automatic' weapons, and more advanced LAWS that additionally possess spatial forms of autonomy. Nevertheless, anti-personnel mines have had devastating humanitarian consequences, leading to the creation of the 1997

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<sup>12</sup> Giovanni Sartor and Andrea Omicini, 'The autonomy of technological systems and responsibilities for their use' in Nehal Bhuta, Susanne Beck, Robin Geiß, Hin-Yan Liu and Claus Kreß (eds), *Autonomous Weapons Systems: Law, Ethics, Policy* (CUP 2016) 39.

<sup>13</sup> Scharre (n 6) 43.

<sup>14</sup> Richard Dunley, 'Mines: the original "autonomous weapons" and the failure of early 20th century arms control' (*History & Policy*, 18 July 2018) <[www.historyandpolicy.org/opinion-articles/articles/mines-the-original-autonomous-weapons-and-the-failure-of-early-20th-century](http://www.historyandpolicy.org/opinion-articles/articles/mines-the-original-autonomous-weapons-and-the-failure-of-early-20th-century)> accessed 14 March 2019.

<sup>15</sup> Scharre (n 6) 51.

Ottawa Treaty prohibiting their use by all states-parties to the agreement in warfare.<sup>16</sup>

Notably, fully autonomous weapons were also in military arsenals decades ago. The United States Navy deployed the Tomahawk Anti-Ship Missile (TASM) aboard its submarines and surface vessels in the 1980s, and it had the capability to 'hunt for, detect, and engage Soviet ships on its own.'<sup>17</sup> In fact, the 'TASM was intended to be launched over the horizon at possible locations of Soviet ships, then fly a search pattern over a wide area looking for their radar signatures. If it found a Soviet ship, TASM would attack it,' constituting a great deal of independence and autonomy in both space and time.<sup>18</sup> The TASM was never used in combat, since the Cold War never saw direct naval confrontations between the USSR and the US. However, it was still the first operational type of fully autonomous weapon in any nation's arsenal, despite the missile's relatively primitive machine intelligence capabilities, as compared to modern intelligent weapon systems.<sup>19</sup>

### 3. Contemporary LAWS & Future Development

A variety of LAWS are presently in the arsenals of states around the world, and even more advanced autonomous weapons are in development. Israel developed the aforementioned Harpy drone in the 1990s and 2000s, and has exported the device to a variety of countries including China, which has allegedly 'reverse engineered [its] own variant' of the weapon.<sup>20</sup> In the US, following the vision outlined in the DoD's Third Offset Strategy of 'robotics, autonomy, and human-machine teaming,' the Defense Advanced Research Projects Agency (DARPA) created the Sea Hunter autonomous ship to independently navigate the oceans and detect enemy submarines.<sup>21</sup> Russia

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<sup>16</sup> Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction (adopted 18 September 1997 UNGA Res 52/38/A, entered into force 1 March 1999).

<sup>17</sup> Scharre (n 6) 49.

<sup>18</sup> *ibid* 49.

<sup>19</sup> *ibid*.

<sup>20</sup> *ibid* 47.

<sup>21</sup> *ibid* 59, 79.

and the United Kingdom have developed unmanned ground vehicles (UGVs) with autonomous capabilities, and South Korea has deployed a force of SGR-A1 'machine-gun wielding robots, built by a subsidiary of Samsung' with heat and motion-detectors for target identification along its border with North Korea.<sup>22</sup> As of today, the SGR-A1 maintains a human in the loop and therefore does not possess the authority to use force independently, but that could change with the simple addition of a few lines of computer code.<sup>23</sup>

Autonomy is clearly the way of the future, in the eyes of the world's military strategists. LAWS are attractive to states since they offer increased speed, stealth, and the promise of novel military tactics to commanders, while increasing the precision of strikes and decreasing the need for human soldiers to be put in harm's way.<sup>24</sup> Put otherwise, military robots are ideal for 'completing national security tasks that are dull, dirty and dangerous' without risking a soldier's life, and allowing their time to be spent on other tasks.<sup>25</sup> However, LAWS and other forms of militarised-AI will remain narrow in scope for the foreseeable future, despite 'grave misperceptions' that the US 'in a back laboratory somewhere in the basement of a building, has got a free-will agent AGI -- artificial general intelligence -- that's going to roam indiscriminately across the battlefield.'<sup>26</sup> As such, humans will define broad military goals, and machines will be handed the authority to accomplish them via independently-selected tactics, and increasingly with

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<sup>22</sup> Mark Prigg, 'Who goes there? Samsung unveils robot sentry that can kill from two miles away' (*Daily Mail*, 15 September 2014) <[www.dailymail.co.uk/sciencetech/article-2756847/Who-goes-Samsung-reveals-robot-sentry-set-eye-North-Korea.html](http://www.dailymail.co.uk/sciencetech/article-2756847/Who-goes-Samsung-reveals-robot-sentry-set-eye-North-Korea.html)> accessed 28 March 2019.

<sup>23</sup> *ibid.*

<sup>24</sup> Alexandra Brzozowski, 'Autonomous weapons, AI are future of defence but require ethical debate, says expert' (*EurActiv*, 10 September 2018) <[www.euractiv.com/section/defence-and-security/interview/autonomous-weapons-ai-are-future-of-defence-but-require-ethical-debate-says-expert/](http://www.euractiv.com/section/defence-and-security/interview/autonomous-weapons-ai-are-future-of-defence-but-require-ethical-debate-says-expert/)> accessed 24 March 2019.

<sup>25</sup> Patrick Lin and Shannon Ford 'I, Spy Robot: The ethics of robots in national intelligence activities' in Jai Galliot and Warren Reed (eds), *Ethics and the Future of Spying: Technology, national security and intelligence collection* (Routledge 2016) 145.

<sup>26</sup> Lauren C Williams, 'DOD AI chief: 'Grave misperceptions' about military programs' (*FCW – The Business of Federal Technology*, 27 March 2019) <[fcw.com/articles/2019/03/27/military-ai-shanahan.aspx](http://fcw.com/articles/2019/03/27/military-ai-shanahan.aspx)> accessed 28 May 2019.

the permission to kill without direct human approval of particular targets. It is these technological capabilities that will be examined through the lens of international humanitarian law (IHL) in the remainder of this paper.

#### 4. LAWS on the Battlefield: the 'Jus in Bello' Effects

An underlying assumption of this section is that once warfare begins, rightness of actions is primarily determined by their outcomes, in line with utilitarian ethics. This school of thought in morality acts as the foundation for the axioms of *jus in bello*: distinction, and proportionality.<sup>27</sup> As such, once armed conflict begins, the goal of IHL is to minimise harm and unnecessary suffering to both combatants and civilians, while recognising that the accomplishment of military objectives will often, by its very nature, bring about injury or death. In line with this approach, and recognising the fact that warfare has already become automated and mechanised to a high degree, the notion of human dignity being in peril as a result of independent robo-killing in war will not be addressed deeply, as it is simply not relevant to a pragmatic analysis of LAWS on the battlefield from a harm minimisation perspective. Such concerns are grounded primarily in deontological approaches to morality, which are largely discarded by the tenets of *jus in bello* and by states engaged in open hostilities. Further, claims that soldiers possess a 'right to life' unless an enemy human soldier consciously chooses to kill them are also questionable, given that all lawful combatants are legal targets in war by virtue of their contributions to an armed conflict on behalf of a state, and IHL makes no distinction between a robot or human ultimately choosing to pull the trigger.<sup>28</sup>

For the foreseeable future, robots will not be independently determining the major strategic goals of states engaged in armed conflict, however, their tactical actions on the battlefield will become increasingly autonomous. Importantly, this would not necessarily result in a more dangerous state of affairs than warfare under the status quo, which is dirty, dangerous, and

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<sup>27</sup> Alexander Moseley, 'Just War Theory' (*Internet Encyclopaedia of Philosophy*, 2019). <[www.iep.utm.edu/justwar/#H3](http://www.iep.utm.edu/justwar/#H3)> accessed 29 May 2019.

<sup>28</sup> Scharre (n 6) 258, 288.

filled with countless fatal human mistakes. In fact, machines possess particular technological capabilities that make them better than humans at key tasks used regularly in the process of selecting and engaging with targets. As an example, in 2015, Microsoft 'created a deep neural network that for the first time surpassed human performance in visual object identification,' achieving an error rate of only 3.57%, compared to the average individual's 5.1% error rate.<sup>29</sup> More recently, in 2017, the ImageNet classification algorithm achieved error rates as low as 2.3% when tasked with identifying and categorizing thousands of types of objects in images, after being trained on datasets with conventional supervised reinforcement learning techniques.<sup>30</sup>

At present, semi-supervised reinforcement learning techniques are being developed to improve the training of visual identification algorithms. These improved algorithms would enable future artificial intelligences to better comprehend the contexts of objects in images, track moving targets much more accurately in live video streams, and achieve semantic representation capabilities that are significantly closer to human levels than previous AIs.<sup>31</sup> Coupling these advances in image recognition with additional data sources available to LAWS, such as synthetic aperture radar (SAR) images, thermal imaging, and satellite-based location tracking of enemy convoys and troop movements will very likely push military automatic target recognition (ATR) algorithms to levels of performance and accuracy far above that of human soldiers thanks to the computational speed and sensor-fusion capabilities of modern military systems leveraging machine learning capabilities. This would yield significant tactical advantages for states with advanced LAWS and AI capabilities, but would also enable greater discrimination between targets, reducing risks to civilians and those hors de combat. If human operators cooperate with LAWS during targeting processes, harnessing the innate human capacity for interpreting complex

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<sup>29</sup> *ibid* 87.

<sup>30</sup> Andrew Zisserman 'Self-Supervised Learning' (*French Institute for Research in Computer Science and Automation*, July 2018)  
<[project.inria.fr/paiss/files/2018/07/zisserman-self-supervised.pdf](http://project.inria.fr/paiss/files/2018/07/zisserman-self-supervised.pdf)> accessed 29 May 2019, 3.

<sup>31</sup> *ibid* 7-11, 114-122.

contextual information, alongside the speed and processing power of AI-powered LAWS, 'it should be possible [...] to ensure that the partnership between human and machine is more humanitarian than machines or humans operating alone.'<sup>32</sup>

Even if LAWS were unleashed on the battlefield with humans out of the loop, it may still be possible to ensure greater compliance with *jus in bello* than with human soldiers, so long as the algorithms governing the robots' behaviour are programmed with the correct reward functions, which numerically define the goals of an autonomous agent as it interacts with an environment by associating particular combinations of states and selected actions with positive or negative rewards,<sup>33</sup> to ensure precise, lawful, and conservative autonomous decision-making. LAWS 'do not need to have self-preservation as a foremost drive, if at all' and can therefore be used in a self-sacrificing manner by commanders.<sup>34</sup> Since they are unemotional and non-sentient, LAWS would not protest or fail to comply with a strategy of 'first-do-no-harm,' or revert to a 'shoot first, ask questions later' approach out of fear.<sup>35</sup> This could transfer the risk of harm that non-combatants currently face to robots programmed to act as martyrs unless they are directly fired upon by an adversary.

A conservative LAWS would therefore not choose to kill an unarmed young girl scouting for the enemy, despite her status as a lawful target, the precise example that Scharre gives in the introduction of his book to highlight the importance of human decision-making in war drawn from his experiences

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<sup>32</sup> Noel Sharkey, 'Staying in the loop: human supervisory control of weapons' in Nehal Bhuta, Susanne Beck, Robin Geiß, Hin-Yan Liu and Claus Kreß (eds), *Autonomous Weapons Systems: Law, Ethics, Policy* (CUP 2016) 37.

<sup>33</sup> Richard S. Sutton and Andrew G Barto, *Reinforcement Learning: An Introduction* (MIT Press 1998) 3-4.

<sup>34</sup> Ronald Arkin, 'Warfighting Robots Could Reduce Civilian Casualties, So Calling for a Ban Now Is Premature' (*IEEE Spectrum: Technology, Engineering, and Science News*, 5 August 2015) <[iee.org/automaton/robotics/artificial-intelligence/autonomous-robotic-weapons-could-reduce-civilian-casualties](http://iee.org/automaton/robotics/artificial-intelligence/autonomous-robotic-weapons-could-reduce-civilian-casualties)> accessed 8 March 2019.

<sup>35</sup> *ibid.*

in Afghanistan.<sup>36</sup> Autonomous systems encoded with 'the explicit aim of eliminating civilian casualties and enabling the surrender of combatants' are therefore feasible, and could render modern warfare more humane.<sup>37</sup>

Notably, precedent exists for the regulation of emerging technologies via IHL so as to limit their potential for unnecessarily injurious effects on the battlefield, while allowing for their use elsewhere by militaries. In 1975 when laser technology was still relatively new, 'Sweden and the ICRC, in particular, alerted the international community to the fact that many existing and currently developed laser systems might well be used to blind enemy combatants. They argued that intentional blinding causes unnecessary suffering,' and on those grounds pushed for a ban on 'the use of lasers for blinding as a method of warfare.'<sup>38</sup> This effects-based approach to the regulation of emerging laser technology was humanitarian in its end goal and mode of implementation, and allowed for the development of non-blinding laser systems which, among other applications, have drastically increased the precision of air-to-ground missile and bomb strikes, as well as optical laser sights on rifles, enabling soldiers to more easily discriminate between legitimate targets and civilians in combat.<sup>39</sup>

Crucially, additional Protocol IV to the CCW successfully, and preemptively addressed the humanitarian risks of blinding lasers weapons, while allowing for the legitimate development and use of laser technology in other military and civilian contexts.<sup>40</sup> As such, conservative behaviours could be mandated for LAWS within an additional protocol to the CCW,

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<sup>36</sup> Scharre (n 7) 2-4.

<sup>37</sup> Sharkey (n 33) 37.

<sup>38</sup> Markus C Zöckler, 'Commentary on Protocol IV on Blinding Laser Weapons' in TMC Asser Institute Staff, *Yearbook of International Humanitarian Law*, vol 1 (Asser Press 1998) 333-334.

<sup>39</sup> Hemani Kaushal and Georges Kaddoum, 'Applications of Lasers for Tactical Military Operations' [2017] 5(1) IEEE Access

<[ieeexplore.ieee.org/document/8048469](http://ieeexplore.ieee.org/document/8048469)> accessed 29 May 2019.

<sup>40</sup> Human Rights Watch, 'Precedent for Preemption: The Ban on Blinding Lasers as a Model for a Killer Robots Prohibition' (*HRW*, 8 November 2015)

<[www.hrw.org/news/2015/11/08/precedent-preemption-ban-blinding-lasers-model-killer-robots-prohibition#\\_ftn9](http://www.hrw.org/news/2015/11/08/precedent-preemption-ban-blinding-lasers-model-killer-robots-prohibition#_ftn9)> accessed 26 May 2019.

allowing for the development of potentially beneficial autonomous military technologies, while restricting the acceptable rules of engagement governing their use of force against human targets.

#### 5. The Instigation & Ending of Conflicts by States Armed with LAWS: The Jus Ad Bellum Effects

While robots on the battlefield may transfer risks upon themselves at the tactical level, 'distance warfare deployed by technologically powerful states can generate a morally problematic "radical asymmetry" between nations in possession of LAWS, and those without them'.<sup>41</sup> The continued development of AI and LAWS by technologically rich countries like the US and China will likely exacerbate the trend set by the mechanisation of warfare, which was furthered by the advent of drone aircraft, concentrating power within wealthy nations that already possess significant economic and military advantages. Crucially, however, LAWS would drastically reduce the need for deployed human soldiers in future conflicts for the side that possesses them, increasing the psychological distance between both weapons operators and national decision-makers, and the battlefields of tomorrow.

The historical record supports the notion that conflict at a distance made possible via advanced military technology lowers the barriers to engaging in warfare, regardless of political leanings. Turning to the US as an example, 'Obama embraced the US drone programme, overseeing more strikes in his first year than Bush carried out during his entire presidency. A total of 563 strikes, largely by drones, targeted Pakistan, Somalia and Yemen during Obama's two terms, compared to 57 strikes under Bush.'<sup>42</sup> LAWS will almost certainly further empower the US and other technologically advanced states, particularly because they could allow for significantly increased and efficient

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<sup>41</sup> Jai Galliot, 'Emerging Technologies, Asymmetric Force and Terrorist Blowback' in Jai Galliot and Warren Reed (eds), *Ethics and the Future of Spying: Technology, national security, and intelligence collection* (Routledge 2016) 158.

<sup>42</sup> Jessica Purkiss and Jack Serle, 'Obama's covert drone war in numbers: ten times more strikes than Bush' (*The Bureau of Investigative Journalism*, 17 January 2017) <[www.thebureauinvestigates.com/stories/2017-01-17/obamas-covert-drone-war-in-numbers-ten-times-more-strikes-than-bush](http://www.thebureauinvestigates.com/stories/2017-01-17/obamas-covert-drone-war-in-numbers-ten-times-more-strikes-than-bush)> accessed 27 May 2019.

military capability with greatly reduced human planning and manpower requirements at the tactical and operational levels. This would essentially hand free reign over the use of force to the major technological powers at the expense of less digitally-advanced adversaries, putting the notions of *causus belli*, or 'just cause, right intention, and proper authority' within *jus ad bellum* into peril.<sup>43</sup>

From a similar perspective, LAWS have the potential to extend conflicts far beyond the confines that they would have been restricted to if only human soldiers were involved in combat. By transferring risk as an aggregate from one state to another, LAWS may decrease the incentives to ending wars that are strategically advantageous for the technologically-superior belligerent, since so few of their military members' lives may be at stake. Further, the 'causal distance' between national leaders and kinetic effects carried out by LAWS may 'make it difficult to change one's mind about killing,' enabling states to prolong conflicts that they may have reconsidered if faced with the harsh brutality of combat deaths up close.<sup>44</sup> Put otherwise, autonomous weapon systems will increase the obscurity of 'the causal chains that we typically rely upon to attribute responsibility [... with] the ones and zeros of digital computing.'<sup>45</sup> Thus, automation in warfare will likely continue the trend of interminable, protracted conflict seen in the proxy wars of the Cold War era, and on the various fronts of the ongoing Global War on Terror where war, peacekeeping, and security operations have become conflated and blurred by drones and lengthy kill lists.

### Conclusion

As with all new technologies, lethal autonomous weapon systems offer both benefits and risks to states, combatants, civilians, and the international

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<sup>43</sup> Galliot (n 41) 165.

<sup>44</sup> Alex Leveringhaus, 'Autonomous weapons mini-series: Distance, weapons technology and humanity in armed conflict' (*International Committee of the Red Cross*, 6 October 2017) <[blogs.icrc.org/law-and-policy/2017/10/06/distance-weapons-technology-and-humanity-in-armed-conflict/](https://blogs.icrc.org/law-and-policy/2017/10/06/distance-weapons-technology-and-humanity-in-armed-conflict/)> accessed 4 April 2019.

<sup>45</sup> Galliot (n 41) 158-159.

community as a whole. By virtue of the de-humanising nature of robotic weapons and conflict at a distance, LAWS are poised to lower the barriers to conflict, introducing greater risks to the principles of jus ad bellum and the timely cessation of hostilities between belligerents. Protracted conflicts have become normalised in recent years: the Global War on Terror has, after all, raged since the September 11, 2001 attacks on the US, and the modern tele-operated weaponry in the arsenals of the US and its allies have enabled them to fight deadly campaigns while keeping many of their soldiers far from the battlefields and out of harm's way. This spatial separation between military operators and their targets has shifted the balance of risk in modern warfare, allowing military commanders and national decision makers to extend the duration of combat operations in order to further their foreign policy and security goals, without greatly increasing the dangers to their armed forces. LAWS will compound this effect by introducing a new level of psychological separation between technologically-advanced militaries and their adversaries. Not only will targets be geographically distant from military commanders employing LAWS, but each tactical decision made autonomously, up to and including the use of lethal force, will occur outside the purview of human decision-making, further de-humanising and distancing entire conflicts in the minds of LAWS-wielding military and national leaders.

However, when wars begin, LAWS may be a force for greater humanity on the battlefield by increasing the precision of military strikes, and locally transferring risk upon themselves. Ensuring that autonomous weapons respect a conservative set of rules of engagement for human targets could potentially be mandated by an additional protocol to the CCW, in a similar manner to the regulations set forth on blinding laser weapons. This approach would allow for the restricted development and use of LAWS technology, which could relieve some of the burdens of life-or-death and emotionally charged decisions currently placed on human soldiers in combat, who are tasked with accomplishing military objectives and operating within the confines of IHL under conditions of intense mental and physical duress, and significant levels of uncertainty.

As such, LAWS may hinder IHL compliance by altering the international balance of power, ultimately prompting states to engage in conflict more readily and for greater durations, while simultaneously reducing risks to non-combatants and the overall human cost of warfare. Ultimately, the broader effects of military autonomy are in the hands of the policy makers and national leaders of today, as LAWS have already demonstrated their effectiveness and dangers in contemporary conflicts. Whether states will be willing to cooperate and uphold a norm or craft additional international law requiring a set of conservative rules of engagement for LAWS in combat will ultimately determine the course of future weapons development, and the character of future wars.