Abstract: There is growing concern in some quarters that the drones used by the United States and others represent precursors to the further automation of military force through the use of lethal autonomous weapon systems (LAWS). These weapons, though they do not generally exist today, have already been the subject of multiple discussions at the United Nations. Do autonomous weapons raise unique ethical questions for warfare, with implications for Just War Theory? This paper describes and assesses the ongoing debate, focusing on the ethical implications of whether autonomous weapons can operate effectively, whether human accountability and responsibility for autonomous weapon systems is possible, and whether delegating life and death decisions to machines inherently undermines human dignity. It concludes that the category of LAWS is extremely broad and it may make sense to separate LAWS into three categories: munition, platforms, and operational systems.
Introduction

The growing use of drones on today’s battlefields raises important questions about targeting and the threshold for using military force. Over 90 militaries and non-state actors have drones of some kind and almost a dozen have armed drones. Over the last year, Pakistan shot down an Indian drone in the disputed Kashmir region, Turkey shot down a drone near its border with Syria, and both Nigeria and Pakistan used armed drones for the first.¹

The use of drones by the United States and others has led to an array of questions about the appropriateness of so-called remote-control warfare. Yet on the horizon is something that many fear even more – the rise of lethal autonomous weapon systems (LAWS).² At the 2015 Convention on Certain Conventional Weapons (CCW) in Geneva, over 100 countries and non-governmental organizations spent a week discussing potential autonomous weapon systems. An NGO umbrella group, the Campaign to Stop Killer Robots, has echoed calls by Elon Musk, Stephen Hawking, and scientists around the world to prohibit autonomous weapons before they are ever created.³

Two essential questions underlie the debate about autonomous weapons. First, is there something inherently wrong (or right) – from an ethical and/or moral perspective – with autonomous weapons that either requires their development or justifies their prohibition. Critics worry specifically that the use of LAWS could make establishing responsibility and accountability for the use of force impossible, and violate our basic responsibility to ensure human dignity in warfare. Second, would autonomous weapons be more or less effective than non-autonomous weapon systems?

This paper examines the ethical and moral issues surrounding LAWS, especially as they relate to Just War Theory, focusing in on those issues that are potentially unique to LAWS, as opposed to other types of weapon systems, in an attempt to lay out some of the key topics for thinking about LAWS moving forward. Most generally, this paper finds that the ethical challenges associated with autonomous weapons may vary significantly depending on the type of weapon. While concerns may be overstated for LAWS that will be most akin to next-generation munitions,

² For the purposes of this paper, I use the phrases autonomous weapon, autonomous weapon system, and lethal autonomous weapon system interchangeably.
when thinking about autonomous weapon platforms or operational systems for managing wars, LAWS generate more important challenges. Caution and a realistic focus on maintaining the centrality of the human in decision about war will be critical.

What are autonomous weapons and how are they unique?

It is a mistake to miss the military robotics forest for the drone strike trees. Given the use of drones by the United States and others against terrorists and insurgents around the world, however, there is a tendency to conflate the category of military robotics with specific case of drone strikes. Yet, current platforms like the RQ-40 Global Hawk and next generation experimental technologies like the X-47B (US) and Sharp Sword (China) demonstrate, that not only do drones do much more than strike, next generation drones may engage in an even larger category of military missions. Moreover, the focus on drone strikes presumes that military robotics are only useful in the air. There are a variety of missions, from uninhabited truck convoys to the Knifefish sea mine detection system to Israel’s unmanned surface patrol vehicle, the Protector, where robotic systems can play a significant role outside the context of airborne-targeted killings.4

This paper focuses on one specific type of military robotics – autonomous weapons. Militaries around the world already use autonomy extensively in areas including autopilot, identifying and tracking potential targets, guidance, and weapons detonation.5 Moreover, simple autonomous weapons are already possible. Actors can program vehicles to drive to an area, detect human-like heat signatures, and fire on them. That would be a violation of the law of war, of course, because it would almost certainly violate the principles of discrimination and proportionality. More important, militaries do not want to develop weapons they cannot control. Such a weapon would have far less military utility than many existing weapon systems.


There is vast uncertainty about the state of the possible when it comes to artificial intelligence and its application to militaries. While robots that can discriminate between a military warship and a civilian trawler (or between a person holding a rifle and a person holding a stick) still seem on the horizon, technology is advancing quickly. How quickly technology will develop is an open question.\(^6\)

A small number of weapon systems have human-supervised autonomy now. Many variants of the Close-In Weapon Systems (CIWS) deployed by the US military and more than two dozen militaries around the world, for example, have an automatic mode.\(^7\) Normally, the system works by having a human operator identify and target enemy missiles or planes, and fire at them. However, if the number of incoming threats is so large that a human operator cannot target and fire against them effectively, the operator can activate an automatic mode whereby the computer targets and fires against the incoming threats. There is also an override switch the human can use to stop the system.

Nearly all discussing autonomous weapons, from international organizations to governments to the Campaign to Stop Killer Robots, agree that LAWS viewed as potentially problematic differ from the weapons that militaries employ today.\(^8\) While simple at first glance, this point is critical and should shape discussions of autonomous weapons. It means, when considering the ethical and moral challenges associated with autonomous weapons, the category only includes weapons that operate in ways *appreciably different from the weapons of today*.\(^9\)

From a common sense perspective, defining an autonomous weapon as a weapon system that selects and engages targets on its own makes intuitive sense. At the extremes, moreover, it is easy to describe what constitutes a LAWS. A “dumb” bomb launched by a B-29 in World War II is not a LAWS. A hunter-killer drone making decisions about who to target and when to fire weapons is a LAWS. In between these extremes, however, is a vast gulf. Whether the weapons under discussion are incremental advances on the precision guided weapons of today or humanoid robots

\(^7\) US military examples include the Phalanx and C-RAM.
\(^9\) It is possible, of course, to use today’s weapons in ethically problematic ways, but that is beyond the scope of this paper.
stalking the Earth may matter for thinking about the ethical and moral challenges associated with LAWS and the implications for Just War Theory.

In 2012, the US Department of Defense (DoD) defined an autonomous weapon as “A weapon system that, once activated, can select and engage targets without further intervention by a human operator.”\(^{10}\) DoD further distinguished between autonomous weapons, human-supervised autonomous weapons (e.g. autonomous weapons where a human is “on the loop” and possess an override switch), and semi-autonomous weapons, or “A weapon system that, once activated, is intended to only engage individual targets or specific target groups that have been selected by a human operator.”\(^{11}\) NGO groups such as Human Rights Watch have adopted very similar definitions.\(^{12}\)

This paper considers lethal autonomous weapon systems as weapon systems that, once activated, are designed to select and engage targets not previously designated by a human.\(^{13}\) While that might seem reasonably clear, defining what it means to select and engage targets is complicated. For example, if homing munitions are considered to “select and engage” targets, autonomous weapons have existed since World War II.

Resolving the definitional debate is beyond the scope of this paper, but breaking down LAWS into three “categories” of potential autonomous weapons can potentially help move the discussion forward. Even if there is not clear agreement on exactly what constitutes an autonomous weapon, comparing different general categories of systems can help reveal the ethical, moral, and strategic issues that might exist for each.

Actors could possibly develop LAWS at the munitions level. An example of a lethal autonomous munition that arguably exists today is the Israeli Harpy, a loitering cruise missile designed to detect a certain type of radar and then hone in to destroy that radar upon detection.\(^{14}\)

There are also many semi-autonomous munitions today. The Advanced Medium Range Air-to-Air

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\(^{11}\) Ibid., 14

\(^{12}\) Human Rights Watch.

\(^{13}\) This builds on the definition in Scharre and Horowitz, "An Introduction to Autonomy in Weapon Systems," 16.

Missile (AMRAAM) deployed by the United States and several militaries around the world is a “fire and forget” missile, meaning after it is launched, it has internal navigation and radar to find and destroy a target. AMRAAM engagements generally happen beyond visual range, with the pilot making the decision to launch an AMRAAM based on long-range radar data, not visual cues. The AMRAAM is not considered inherently problematic from an ethical perspective, nor is it considered an autonomous weapon.15

At the next level of military system aggregation is the platform. There are almost no autonomous weapon platforms currently deployed. The CIWS systems that protect ships and military bases from attack are an exception. Like the AMRAAM, countries have used these weapon systems decades without opposition.

An example of a platform-level LAWS that does not currently exist – nor does any military appear to be planning to build it – is an autonomous version of the MQ-9 Reaper (US) or CH-4 (China) drone. Imagine a drone identical from the exterior, but with software that allows it, after activation by a human operator, to fly around the world and target a particular individual or groups of individuals and fire missiles at them, much as human-piloted drones do today.16

The broadest type of LAWS would be a military operations planning system that substitutes, in a way, for military leaders and their staff in planning operations. No LAWS at the operational level appear to exist, even in research and development. In this scenario, upon deciding to fight a war – or perhaps even when deciding whether to fight a war – a human would activate an autonomous battle system that could decide the probability of winning a war and whether to attack, plan an operation, and then direct other systems – whether human or robotic – to engage in particular attacks. This category is the furthest away from reality in terms of technology and the one that most invokes images of autonomous weapon systems in movies such as the Terminator or the Matrix.

Assessing the debate about autonomous weapons

The unique facet distinguishing LAWS from non-LAWS is that the weapon system, not a person, selects and engages targets. In the broadest sense, the key ethical questions to think about regarding

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15 This discussion is similar to Scharre and Horowitz, 11.
16 The X-47B, a US Navy experimental drone, has autonomous piloting, but not weapon systems.
autonomous weapons are whether it is possible to design LAWS that comply broadly with the protection of life in war, a core ethical responsibilities for the use of force; whether LAWS can be used in ways that guarantee accountability and responsibility for the use of force; and whether there is something uniquely problematic about machines selecting and engaging targets that makes them ethically problematic. Given the centrality of these issues in debates about Just War Theory, it therefore makes the issue of LAWS relevant for Just War Theory as well.

Due to the focus of this paper on ethical debates surrounding autonomous weapons, it does not engage with every legal argument surrounding LAWS, such as whether international humanitarian law implies that humans must make every individual life-or-death decision, or whether LAWS violate the Martens Clause of the Hague Convention by violating the dictates of the human conscience. Moreover, different opponents of LAWS make different arguments, as do different critics of those opponents, so there are undoubtedly subcomponents of each argument not discussed here.

The potential (in)effectiveness of autonomous weapons

The fundamental effectiveness concern is that it will be inherently difficult to use autonomous weapons in ways that discriminate between combatants and noncombatants and only take life when necessary, violating Just War Theory as well as the law of war. Some worry that autonomous weapons will be inherently uncontrollable – prone to errors and less able to operate predictably. Moreover, even if LAWS meet basic law of war requirements, they could create safety and control problems. Their very strength – the reliability of their programming, relative to humans – could make them fragile when facing operating environments outside of their programming. At the extreme, unpredictable algorithms interacting if multiple countries deploy autonomous weapons

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18 Human Rights Watch.
could risk the military version of the 2010 stock market “flash crash” caused by high-frequency trading algorithms.19

Additionally, opponents of LAWS argue that autonomous weapons will necessarily struggle with judgment calls, because they are not human, making some kinds of war crimes more likely.20 For example, a human soldier might have empathy and use judgment to not kill a lawful combatant putting down a weapon or who looks like they are about to give up, while a robotic soldier might follow its order and kill the combatant. This would make it harder to use LAWS justly.21

Autonomous weapons do potentially raise *jus in bello* questions concerning conduct in war from a Just War perspective. For example, LAWS unable to respect benevolent quarantine for prisoners would violate core Just War principles, though their inability to comply means responsible militaries would not deploy them in those situations. This is precisely why it makes the most sense to think about autonomous weapons in comparison with existing weapons in realistic scenarios.

These are also empirical questions— and ones where convincing evidence is not possible to gather because these weapon systems generally do not exist today. Moreover, even beyond uncertainty about the technological range of the possible, many of these arguments can be made in both directions. For example, critics can argue that the argument above worries about unlikely scenarios, because militaries are unlikely to deploy inherently unpredictable weapons, since they would less likely to successfully accomplish missions than non-LAWS systems.22

Critics might also argue that militaries would design LAWS for the point of discriminating and following the law of war. There are also arguments for why LAWS might be more effective and ethical on the battlefield than alternatives. Human soldiers unnecessarily kill on the battlefield, up to and including war crimes, for a variety of reasons, including rage, revenge, and errors from fatigue. One theoretical benefit of LAWS is that as machines that do not get tired or have rage, LAWS would almost certainly fire more accurately and discriminate perfectly according to their programming. This could make the types of war crimes and killing of civilians committed by human soldiers less likely, according to scholars like Ronald Arkin.23

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22 This is particular true given that drones and other remotely piloted military robotics options exist.
How would these benefits and drawbacks stack up? Again, it is almost impossible to know given the current state of the technologies in question. We can, however, probably identify the extent to which these matters are likely to be more or less serious for the three possible categories of autonomous weapon systems described above. If LAWS were inherently indiscriminate or disproportionate, like biological weapons, they would be problematic from a Just War perspective because they would violate existing understandings of *mala in se*.

For munitions, LAWS are less likely to create inherent effectiveness challenges beyond those of current weapons in terms of controllability. There is still a human operator launching the munitions and making a decision about the necessity of a target or set of targets. Autonomy may help ensure the weapon hits the right target – or gets to the target, if it allows a missile to avoid counter-measures. There is not a significant different between a LAWS in this case, a semi-autonomous weapon, or even a bullet from an ethical perspective, because a person is making the choice to launch the munition based on what is presumably sufficient information. For example, Israel’s Harpy may be problematic because the system will destroy its target whether that target is on top of a school or on a military base, but it is not executing a complicated algorithm that makes it inherently unpredictable. Practically, militaries are also very unlikely to use LAWS at the munitions level unless they are demonstrably better than semi-autonomous weapons, precisely for reasons of controllability.

It is, of course, possible to imagine futuristic versions of munitions that might be more complicated. Autonomous cruise missiles that can loiter for days, instead of hours, and travel around the world, programmed to target particular individuals or ships, could raise other questions.

It is at the platform and the operational level that disquiet about discrimination and controllability becomes more complex. A LAWS platform deployed in a confined geographical space in a clear war zone (depending on the programming) may not be inherently problematic, but there are other mission sets – like patrolling autonomous drones searching for insurgents – that would lead to much greater risk from a controllability perspective. Essentially, complications, and thus the potential for fragility, will increase as the machine has to do more “work” in the area of discrimination. At the operational battle management level, it is difficult to imagine militaries having enough trust to delegate fundamental operational planning roles to machines. Delegating those roles, however, could create large-scale ethical concerns from the consequences of those actions, in part because they might be harder to predict. Operational management LAWS, could make choices or
calculate risks in novel ways, leading to actions that seem logical to them, but are not predictable from their original programming or to humans carrying out those orders.

**Responsibility and Accountability with Autonomous Weapons**

One of the most important arguments made by LAWS opponents is that, because LAWS lack meaningful human control, they create a moral (and legal) accountability gap.\(^\text{24}\) If they malfunction or commit war crimes, there is no single person to hold accountable the way a drone operator, pilot in the cockpit, or ground team would be accountable today. Moreover, this is potentially unique to LAWS. Remotely piloted military robotics do not appear to create excessive moral distance from war. For example, new research shows that drone pilots actually suffer from post-traumatic stress disorder at similar rates to pilots in the cockpit.\(^\text{25}\)

There is still nervousness, however, that for political leaders, drones already make war too “easy.” Autonomous weapons raise similar fears, just as indirect artillery and manned airpower did in the past.\(^\text{26}\) The core fear is that LAWS will lead to leaders and soldiers not feeling ethically responsible for using military force because they do not understand how the machine makes decisions and they are not accountable for what the machine does.

LAWS here are substituting for a human soldier, but cannot be held accountable the way a human soldier is held accountable.\(^\text{27}\) Imagine, for example, deploying a robot soldier in a counter insurgency mission to clear a house that suspected insurgents might be hiding in, instead of a human soldier. If that robotic soldier commits a war crime, who is responsible? The responsible party could

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be the programmer, but what if the programmer never imagined the situation? The responsible party could be the commander who ordered the activation of the weapon, but what if the weapon behaved in an unpredictable way the commander could not have reasonably anticipated?

On the other side of the debate, it is imagining LAWS as agents, as opposed to tools, that is part of the problem. The human operator that fires a LAWS munition or activates a LAWS platform still has an obligation to ensure the system will perform in an ethically appropriate fashion to the best of anyone’s ability to predict. Thus, planning and training becomes critical to avoiding a responsibility gap. By ensuring that potential operators of LAWS understand how they operate – and feel personally accountable for their use – militaries can avoid offloading moral responsibility for the use of force.

Formal rules could also ensure technical accountability. One solution in the case of the ground combat situation described above is to hold the commander accountable for war crimes committed by the robotic soldier, just as commanders today are generally held accountable for war crimes committed by their unit. This leads to fairness considerations – if the robotic soldier malfunctions, and it is not the fault of the commander, is it fair to hold the commander accountable? Arguably not, though commander accountability for LAWS would create a strong incentive for commanders to only use LAWS in situations where the commander has a high degree of confidence in its operations. Analogies from legal regimes such as vicarious liability could also prove useful. Thus, while accountability and responsibility issues are relevant topics, it is not clear they are irresolvable.

Additionally, accidents happen today with non-autonomous and semi-autonomous weapons, raising accountability questions. In a 2003 incident in which a US Patriot missile battery shot down allied aircraft, no one was personally held accountable for the system malfunction. Should the accountability requirements for LAWS should be higher than for other weapon systems?

Given the possibility to make this argument in both directions, it makes sense again to see how these concerns might vary across types of LAWS. At the munitions level, ensuring legal accountability and moral responsibility should be relatively close, if not identical to the use of semi-autonomous weapons today. There will still be human operators firing the munitions in ways they believe are legitimate, the guidance systems for the munitions would just operate somewhat differently. Adaptations of existing guidance therefore seems plausible.

28 Horowitz and Scharre, "The Morality of Robotic War."
29 This can vary depending on the specific situation, but the general point is clear.
The platform level will place the largest amount of stress on potential training and planning to avoid offloading accountability when using LAWS. While there is still a person that will have to activate and launch a LAWS weapons platform, if that person lacks sufficient understanding of the mission or how the LAWS will operate to complete the mission, it could lead to a responsibility gap. Such a gap does not seem inevitable, however, presuming the construction of clear rules and training.

At the operational management level, the use of LAWS creates a real and significant risk of moral offloading. Operational planning conducted by algorithm – rather than the algorithm being an input into a human judgment – is precisely the type of situation where human accountability for war would decline and humans might cease to feel responsible for the casualties caused by war. This is a significant ethical concern on its own and would raise large questions in terms of Just War theory.

Establishing the line at which the human is so removed from the targeting decision that it makes the use of force *a priori* unjust is complex from a Just War perspective, however. Imagine a case where the human is entirely removed from the targeting and firing process, but the outcome is a more precise military engagement. On the one hand, such an engagement would almost certainly meet basic *jus in bello* requirements, but one might also argue that the removal of human agency from the process is ethically defective, in thinking of how humans should treat each other, in a way that makes such an activity inherently problematic. This is a tricky question, and one worth further consideration.

*Human dignity and autonomous weapons*

The last major ethical argument about LAWS is whether they might be inherently problematic because they dehumanize their targets. All human life is precious and has intrinsic value, so having machines select and engage targets arguably violates fundamental human dignity – people have the right to be killed by someone who made the choice to kill them. Since machines are not moral actors, automating the process of killing through LAWS is also by-definition unethical because “Justice itself cannot be delegated to automated processes.”30 LAWS might therefore be thought of as *mala in se*, or evil in themselves, under Just War theory.

30 Asaro, "On Banning Autonomous Weapon Systems", 701
If a machine without intentions or morality makes the decision to kill, it makes us question why the victim died. This argument has natural moral force. As Heyns argues, “Decisions over life and death in armed conflict may require compassion and intuition.” There is something that feels different, even if it is hard to describe, about the idea of machines making the decision to kill.

The United Nations Institute for Disarmament Research describes “[A]n instinctual revulsion against the idea of machines “deciding” to kill humans.” The concern by opponents of LAWS is that machines making decisions about killing leads to a “vacuum of moral responsibility.” A simpler version of this argument is that there is a lack of dignity when a machine kills a person, and a more complex version is that a machine weighing the military necessity of killing someone is a subjective decision that should inherently be made by humans.

On the other side, everyone that enters the military knows that there is the potential to die – and arguably it does not make a difference once you are dead. While in an esoteric sense, the idea that there is something undignified about dying at the hands of a machine resonates, why is being shot through the head or heart and instantly killed by a machine necessarily worse than being bludgeoned, lit on fire, or killed by a cruise missile strike? The dignity argument has emotional resonance, which is why it is important to take it seriously, but it may romanticize warfare. Humans have engaged in war on an impersonal, industrial scale since at least the 19th century – from the 60,000 British casualties the first day of the Battle of the Somme to the firebombing of Tokyo.

Looking at the three levels of possible LAWS again reveals potential differences between them with regards to the human dignity question. At the munitions level, LAWS seem unlikely to generate significant human dignity questions beyond existing weapon systems, at least based on the current technological world of the possible. Since the decision-making process for the use of force would be close, if not identical, to the use of force today, the connection between the individual firing the weapon and those effected would not change.

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33 UNIDIR, 7-8
34 Heyns, 17
35 This is arguably why munitions-based LAWS may not really be LAWS at all, depending on the definition.
At the platform level, LAWS again require deeper consideration, because it is with LAWS platforms that the system begins calculating whether to use force. The extent to which they may be problematic from a human dignity perspective may also again depend on how they are used. The use of platforms LAWS in an anti-material role against adversary ships or planes on a clear battlefield would be different than in an urban environment. Moreover, as the sophistication of LAWS grow, they could lead to a greater risk of dehumanization. Returning to the case of Harpy missile, at present, it is clearly up to the person launching a Harpy to make sure there is a lawful radar target that the Harpy can engage. A future system with the ability to make choices about whether the radar is a lawful target (e.g. is the radar on top of a school) would be better at discrimination, making it more ethically preferable in some ways, but therefore could raise questions from the perspective of the human dignity argument; it is the machine, rather than a person, making the targeting decision.36

The human dignity argument arguably also applies less to platforms that defend a fixed position from attack. Electric fences are not thought of as ethically problematic as a category if labeled clearly and in areas where any intrusion is almost by definition a hostile action.37 For example, South Korea deploys a gun system called the SGR-1 pointed at the demilitarized zone with North Korea. The system has some automatic targeting features, though the specifics are unclear. However, since the system is deployed in a conflict zone and can only aim at targets that would almost certainly be lawful combatants, this is arguably less problematic than LAWS platforms employed as part of an assault operation.

At the operational system level, LAWS create the largest challenges from a human dignity perspective, though the relationship to Just War Theory is fuzzier. An operational-level LAWS making decisions about whether and how to conduct a military operation certainly involves offloading moral responsibility for the use of force to a machine, meaning those targeted would not be targeted by a person making a conscious choice. Oddly, though, imagine a case where an operational-level LAWS designed a battle plan implemented by humans. In that case, the machine is taking the place of a high-level military commander, but humans are doing the selection and engagement of targets on the individual level. Would this be less problematic, ethically, than a hunter-killer drone searching for individuals or groups of insurgents? It sounds odd, but this example points to the complexities it is necessary to think through when assessing these issues.

36 Thanks to Paul Scharre for making this point clear. Personal conversation.
37 Johnson and Axinn, "The Morality of Autonomous Robots.", 131
Conclusion

The debate about autonomous weapons is just beginning. After two years of discussions in the CCW at the United Nations, the Campaign to Stop Killer Robots broke into the public consciousness with a public call for a ban on autonomous weapons signed by luminaries such as Stephen Hawking and Elon Musk. This paper attempts to address the broad ethical issues potentially associated with the development of autonomous weapons, a class of weapons that generally do not exist today. While technological trends suggest artificial intelligence is rapidly improving, it is still long from being ready to use for weapon systems. How quickly the technology will develop is a matter of debate.

Do autonomous weapons create novel issues from an ethical perspective, especially regarding Just War theory? Outside technologically implausible scenarios of autonomous operational battle systems deciding to go to war, autonomous weapons are unlikely to lead to *jus ad bellum* problems from a traditional Just War perspective, excluding the risk that LAWS will make going to war so easy that political leaders view war as costless and start unjust wars. One could argue that since machines cannot have intentions, they cannot satisfy the *jus ad bellum* requirement for right intentions. Yet, broad swaths of precision-guided modern semi-autonomous weapons that dramatically reduce civilian suffering in war violate the individual intentionality proposition, given the use of computerized targeting and guidance. Yet, presumably no one would rather the world return to the age of “dumb bombs” in World War II.

Critical for understanding the autonomous weapons debate is that LAWS are, at their core, defined based on whether it is a person or a machine selecting and engaging targets. This means that there is the possibility for significant diversity within the subset of autonomous weapons.

At the level of the munition, where LAWS might represent missiles programmed to attack particular classes of targets (e.g. amphibious landing craft) in a given geographic space, the relevant ethical issues appear similar to those regarding today’s weapons. The process of using force – and responsibility for using force – will look much the same as it does today for drone strikes or the use of other platforms that launch precision-guided munitions. The key will be how munitions-based LAWS are used.

It is at the platform level that the ethical challenges of LAWS begin to come into focus. Autonomous drones, for example, flying thousands of miles and deciding whom to target themselves, risk the moral offloading of responsibility and undermining human dignity, even if they
behave in ways that comply with the law of war. While it is possible to address this issue through training, accountability rules, and restricting the scenarios for using autonomous weapon platforms, this area requires further investigation.

Autonomous battle systems using algorithms to decide whether to fight and how to conduct operations, besides being closest to the dangerous robotic weapon systems of movies and television, could create significant moral quandaries. Given full authority (as opposed to supplementing human judgment), battle system LAWS would make humans functionally irrelevant, from an ethical perspective, in major wartime decision-making. Fortunately, these types of systems are far from the technological range of the possible, meaning the real world systems that require deeper thought over the next several years are more the possibility of LAWS at the munition and platform level.

Finally, Just War Theory provides an interesting lens for thinking about LAWS, especially in thinking about a world in which humans are more removed from the process of warfare than ever before – but warfare may become more process and involve less unnecessary suffering. These are complicated questions regarding the appropriate role for humans in war, and it will be important to consider how to balance evaluating LAWS based on a logic of consequences versus ensuring that the human element remains a central part of warfare.