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Content

INTRODUCTION

Some Reflections on Autonomous Weapon Systems
Gentian Zyberi
Fredrik Heldal

ARTICLES

The Concept of Autonomy and the Changing Character of War
John O Birkeland

So Man Created Robot in His Own Image: The Anthropomorphism of Autonomous Weapon Systems and the Law of Armed Conflict
Sigrid Redse Johansen

Autonomous Weapons Systems and the Rights of Victims: Compensation Claims under Norwegian Law for Violations Committed through the Use of Autonomous Weapons
Daniel Elias Quiñones Møgster
Some Reflections on Autonomous Weapon Systems

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INTRODUCTION

This special issue on autonomous weapon systems is the result of a conference entitled ‘The Ethical and Legal Challenges Posed by Autonomous Weapons Systems’ organised on 19 April 2017 by the Norwegian Peace Association and the Norwegian Centre for Human Rights, through the Faculty of Law Research Group on Human Rights, Armed Conflicts, and the Law of Peace and Security. The increased military use of unmanned armed vehicles over the past decade, and the possible advent of fully autonomous weapons systems have contributed to what many view as a dramatic change in how we think about and conduct warfare.1 As Neil Davison has put it, ‘the risks of functionally delegating complex tasks—and associated decisions—to sensors and data-driven algorithms is one of the central issues of our time, with serious implications across sectors and societies. Nowhere are these more acute than in relation to decisions to kill, injure and destroy.’2 Technological developments have continuously affected our thinking on the conduct of warfare, but


the introduction of fully autonomous weapon systems would transfer for the first time ultimate life-death decisions from humans to machines. While this paradigm change in the conduct of warfare is not imminent or unavoidable, the fact that countries like the US, Russia, the UK, China, South Korea, and Israel are in the process of developing military systems with steadily increasing levels of autonomy means that this stage will be reached in the near future.

SOME CONTEXT ON THE ISSUE OF AUTONOMOUS WEAPONS SYSTEMS

Over the past four years, the issue of autonomy in weapon systems has been discussed, first in informal expert meetings, then by a Group of Government Experts, by the State parties to the UN Convention on Certain Conventional Weapons. The purpose of these meetings has been to shed light on what a possible fully autonomous weapon system could look like, and what legal, moral and security implications the development, use and spread of these types of weapons might have. A fully autonomous weapon is, in this context, understood as a weapon system capable of identifying, selecting and attacking a target without human intervention. In terms of responsibility, the EU in its Lethal Autonomous Weapons Systems (LAWS) Statement noted that with regard to cutting-edge emerging technologies, the onus must be on the scientists, industry, military and political decision-makers to stay within the legal framework that the international community has established. Three specific areas of law are especially relevant here, namely international humanitarian law, international human rights law, and the law on international responsibility.

While proponents of higher levels of autonomy in weapons point to the increasing need for speed, accuracy and information processing capabilities these systems would provide, opponents claim that lethal, fully autonomous weapons systems would not be able to comply with international law, would create an accountability gap, and could lower the threshold for policy makers to go to war. Some have also raised the question of whether it would be morally acceptable to outsource a decision to take human lives to a machine. One of the main points raised by civil society organizations like Amnesty International, Human Rights Watch and Article 36, all in favor of an international ban on lethal autonomous weapon systems, is that these types of weapons would not be able to distinguish between civilians and combatants; nor would they be able to judge whether the military advantage achieved by an attack would outweigh the potential civilian casualties caused by the attack.

Yet others point to the potential threat to strategic stability posed by a fully autonomous weapon system, given a likely combination of high speed, lack of human oversight, and the inherent unpredictability of complex systems with a high level of autonomy.

Among those who have expressed concern regarding the development and use of fully autonomous weapon systems, we find highly regarded scientists, entrepreneurs and executives, including the late Stephen Hawking, Elon Musk, Noam Chomsky and Stuart Russell. Many States have already deployed weapon systems with considerable degrees of autonomy, and others are under development. Although fully autonomous lethal systems have, supposedly, not yet been deployed, some roboticists claim that it could only be a matter of years before they are a reality.

Given the significance of the topic and the high stakes, it is not surprising that high-level political and technical discussions are held at many important international and regional forums. These discussions could benefit not merely from focusing on fully autonomous systems, but also on systems that are already in use, labeled semi-autonomous. Even in these types of weapons, it is not always clear what role humans have in the control over the weapons system, and at what point this control ceases to be meaningful. These, and other issues, are addressed in the three articles that form part of this special issue.

THE TOPICS ADDRESSED IN THE SPECIAL ISSUE

In the first article, John Birkeland discusses the fundamental aspects of autonomy in weapons systems, some of the challenges that the military hopes autonomy will help overcome, and modern warfare concepts that are facilitated by autonomy in weapons systems, in particular flying autonomous systems.

In the second article, Sigrid Redse Johansen engages with the question of how autonomous weapon systems can be used in accordance with existing rules. She does so from the perspective of the legal framework governing the conduct of hostilities, the ‘Law of Armed Conflict’ (LOAC).

In the third article, Daniel Møgster addresses the question of how the use of autonomous weapons systems would influence victims’ right to reparation under domestic Norwegian law for breaches of international human rights law (IHRL) and/or humanitarian law (IHL) during international military operations.

In their entirety, these three articles provide important insights on key issues concerning autonomous weapons systems, especially the concept of autonomy, the application of these systems in aerial warfare, their compatibility with international humanitarian law, and the law on responsibility and reparations.
The Concept of Autonomy and the Changing Character of War¹

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ABSTRACT
There has been an immense development in unmanned aircraft technology in the past three decades or so. The percentage of unmanned versus manned aircraft in combat operations is only predicted to grow in the future. The public’s aversion to risk and the endurance facilitated by modern unmanned systems have both played important roles in the growth of unmanned aircraft in modern warfare. Increasingly complex warfare scenarios call for increasingly complex weapons systems, and autonomous aircraft are predicted to play a crucial role in meeting tomorrow’s operational challenges. The article argues that even though autonomous systems will be able to make tactical decisions by themselves, these decisions will not be acted upon in a vacuum – even autonomous machines will be a part of the military and political chain-of-command. Operational concepts such as ‘loyal wingman’, Manned-Unmanned Teaming, motherships and swarming are the beginning of a new autonomous way of warfare. It is important that we tailor our autonomous machines to operate inside the realm of military and political control. It is thus crucial to have a broad debate among policy makers, technology developers, scholars and civil society in order to decide how the weapons of the future will be programmed and the place and scope that human control should play therein.

Key Words
Autonomy, military operations, operational concepts, chain of command

¹. This article is partly based on the two chapters by John O Birkeland and Gjert Lage Dyndal, ‘Autonome droner og våpensystemer: endres måten vi fører krigen på?’ and ‘Fremtidens autonome droneteknologier og konsept’ in Tor Arne Berntsen, Gjert Lage Dyndal and Sigrid Redse Johansen (eds), Når Dronene Våkner (Cappelen Damm Akademiske 2016) 31–59 and 61–87.
1. INTRODUCTION

Autonomous unmanned aircraft attacking in swarms, huge motherships sending out smaller aircraft to execute missions, submarines releasing drones from the abyss and flying them deep inside enemy territory to gather information. These are not ideas from a sci-fi novel, but military tactics being currently implemented or planned for the near future. Several inter-related questions arise from the advent of fully autonomous weapons systems. Are autonomous weapons changing the way we fight wars? Is the new technology revolutionary? Will autonomous weapons systems take over and render the military chain-of-command obsolete? The military requirement for autonomy in weapons systems is based on real challenges that must be overcome by military units in future wars. Such autonomy is expected to help meet many of these challenges.

This article will discuss the fundamental aspects of autonomy in weapons systems and some of the challenges that the military hopes autonomy will help overcome. In the latter context, the article will provide some insights on modern warfare concepts that are facilitated by autonomy in weapons systems, in particular flying autonomous systems. The controversial targeted killings are not discussed in this article, but some of the operational concepts that are facilitated by autonomy are. While not addressing in detail the moral and ethical aspects of leaving decision making to machines with regards to applying lethal power, this article will touch on the context in which such decisions will be made.

The second chapter discusses briefly some of the factors that form the background of the development of unmanned systems as we know them today. The third chapter discusses what autonomy is, and where it fits into the discussion of command and control in military operations. The fourth chapter then gives a short presentation of some of the challenges that modern militaries are seeing, and a few of the operational concepts that autonomy is facilitating. Finally, the fifth chapter concludes by presenting a few thoughts on the way ahead for autonomy in military operations.

2. THE DEVELOPMENT OF UNMANNED AIRCRAFT TECHNOLOGY

There has been an immense development in unmanned aircraft technology in the past three decades or so. Although unmanned aerial systems have been around to support warfare for almost as long as manned aircraft, the scope of utilisation and the number of assets involved in combat in later years are unequalled in history. The percentage of unmanned versus manned aircraft in combat operations is only predicted to grow in the future. There are two important factors that have played a critical role as premises for this growth in focus, use, and development of unmanned systems in the past couple of decades, namely risk and endurance.

The first important underlying factor for the development of unmanned technology is the general public’s and the politicians’ lack of willingness to accept risk to one’s own military forces in the application of military power. Initiated by the first Gulf War in 1991, where a large part of the world was able to follow the developments in the war through the television in their living rooms, the 1990s seem to have shaped a psyche in the West with expectations of short wars with little, or preferably no casualties of one’s own. The first
Gulf War created somewhat of a modern precedent with regard to how many losses the public was willing to accept, and how quickly the war was to be executed. Even the Chinese write admiringly about the Gulf War of 1991 in their doctrinal writings. But then came the slaying of American soldiers in Mogadishu in 1993, whereby the Clinton administration suffered such a backlash in public opinion that it did not intervene in Rwanda the following year. In 1999, NATO intervened militarily in Kosovo through its operation Allied Force, enforcing a hard requirement for military aircraft to stay above 15,000 feet in order to avoid being shot down by the sophisticated Serbian air defence systems. The 1990s were thus instrumental in shaping a collective psyche in the West, with demands for short wars with little or no human losses. This led to both implicit and explicit demands for low risk in military operations. This collective low-risk psyche and understanding of the demands from the public have shaped the demand for unmanned aircraft that, by way of their characteristics, come with little to no risk to our own soldiers.

Another significant factor is the requirement for endurance by surveillance assets. Modern surveillance demands significant presence over time above the object being targeted in order to facilitate sufficient situational awareness and understanding. The way asymmetric warfare has developed puts an increasing demand on intelligence and a timely tactical, operational, and strategic foundation for decision making. There are several reasons for intelligence, surveillance and reconnaissance (ISR) being given such a prominent place in asymmetric warfare. One factor is that many clashes between own troops and the enemy often take place in areas with many civilians present, such as cities and other densely populated areas. In such cases there are obvious requirements for accuracy within targeting in order to avoid collateral damage and loss of civilian lives. Another factor is the common *modus operandi* of insurgents and terrorists of deliberately blending into the civilian populace and activities. This gives significant challenges to ISR assets and entities with regards to building a pattern-of-life and a general understanding of the enemy’s movements and actions. This means that surveillance assets must be above the target under surveillance for as much time as possible in order to build the required situational awareness.

The development of unmanned systems is now focussing on improved sensors, increased endurance, higher speed, reduced radar cross section, and possibly most of all the integration of unmanned systems into warfare. The factor that will increasingly facilitate this integration is rising levels of autonomy.

3. WHAT IS AUTONOMY?

In order to better grasp and analyse the concept of autonomous weapons systems, we must have a common understanding of what autonomy is. By reading articles in the media, popular science magazines, or descriptions by weapons systems manufacturers, one may...
get the impression that there are already weapons systems operating autonomously. This stretches the definition, if not being an outright falsehood. If the degree of automation in a system is significantly encompassing, we tend to describe the system as something more than automatic – and the tendency seems to be to designate the system autonomous. The US Air Force describes several of their unmanned systems as partly autonomous or semi-autonomous, where elements of the system function autonomously. One example is the stabilisation of unstable aircraft, which is done by computers in modern aircraft. The computer will assist the pilot in flying the aircraft, in order for him or her to focus on operational tasks, rather than having the inherent instability of the aircraft demanding the pilot’s full attention simply to fly. The stabilising effort is carried out by the computer, and some will claim that the aircraft is autonomously stabilising itself. In the debate to find the appropriate common definition of autonomy, there are in principle two schools of thought. On the one side, the US view is that the system is autonomous if it is capable of operating without human input. NATO also operates with this understanding, where a distinction is made between automatic actions and processes, defined as ‘the execution of a predefined process or event that requires UAV system crew initiation’, and autonomous actions and processes, defined as ‘the execution of predefined processes or events that do not require direct UAV system crew initiation and/or intervention’.4 The delineation is thus between whether an action or process has been initiated or directed by an operator or not.

On the other side, the British view is that the system is autonomous only if it is:

capable of understanding higher level intent and direction. From this understanding and its perception of its environment, such a system is able to take appropriate action to bring about a desired state. It is capable of deciding a course of action, from a number of alternatives, without depending on human oversight and control, although these may still be present. Although the overall activity of an autonomous unmanned aircraft will be predictable, individual actions may not be.5

In this case we have a system that operates based on its own understanding of the circumstances and surroundings. The system understands its surroundings and its place within these, and it is this understanding, rather than pre-programmed algorithms, that facilitate the framework for action. This definition is much closer to artificial intelligence, and demands a contextualised grasp of superior entities’ higher intent for the mission, as is the case with any human, military operator. This is the terrain we are exploring when discussing what systems the future will bring about, and where the responsibility for actions executed by machines belongs. To further confuse matters, there are on-going discussions on scales of automatics and partial autonomy on our way towards full autonomy. If we

compare current systems with the ones we can expect in the future, we see a continuum from the first-generation unmanned systems, where every single action is being controlled from afar, to modern systems that are partially autonomous, to what we see might come in the future with fully autonomous weapons systems, in the sense of the British definition above.

To underline the differentiation between automatic and autonomous systems, Gary Schaub and Jens Kristoffersen at the Centre for Military Studies, University of Copenhagen, have presented a simple model, as depicted below.

![Figure 1. Remote control towards autonomy continuum](https://cms.polsci.ku.dk/publikationer/in-on-or-out-of-the-loop/In_On_or_Out_of_the_Loop.pdf)

The clear delineation and high threshold for describing any system as truly autonomous raises important matters of transparency, responsibility, and accountability for lethal autonomous weapons systems. This article will not go into this discussion (it being addressed in some detail by Møgster in his article in this issue of the Oslo Law Review), but it seems fundamental to have a grasp of what autonomous operations really entail before venturing into discussing the problematic ethical, moral, and legal aspects of such operations. What is the foundation for a given weapons system’s decision making? Can we understand the rationale or not? If we are able to, we can program it otherwise, if required, and we can direct it, change it, and so on. If we cannot understand the basis for undertaking an action, especially in situations where the system is executing lethal operations, we must be very careful indeed with respect to utilising such systems in operations. But as it stands today, there are no systems in war that operate free from specific algorithms pre-programmed by humans, which in turn means that although the algorithms may be complex, we have full overview of the system’s programming and potential actions.

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A reason for discussing a scale of automatics is that a drone will not necessarily be limited to one level of autonomy, but will be capable of being adjusted to suit different scenarios. If there is a high level of trust towards the system in a given scenario, a higher level of autonomy can be given to the system. A higher degree of trust in the system will facilitate more complex operations, which demand a higher degree of autonomy from the respective systems. From a military-philosophical, leadership standpoint, we can exemplify this distinction through distinguishing between detailed micro-management and mission command. The former entails a superior officer or entity directing a military unit’s every move, whereas in the latter case only overarching direction and guidance is given. Autonomous weapons will operate in the mission command context, but the decision whether humans should be in, on, or out-of-the-loop in deciding to apply lethal power through the use of autonomous weapons is still up to us, including the politicians, the developers, the military, the public, and more generally humanity as a whole.7

A continuum from direct remote control to full autonomy covers everything from a system where every single action is being initiated and directed by an operator on the ground, to a system that is able to manoeuvre, orient itself, and make its own decisions, based on its understanding of its surroundings, its mission, and the higher intent of its superiors. But will the drones of the future make up their own decisions on life and death at their own discretion? It is hard to imagine a targeting scenario where we are operating outside the framework of a targeting list that has been explicitly approved by humans, and in which a prioritisation of what will be targeted will be set by the chain-of-command. In the future we will continue to operate with very specific attack criteria that explicitly state the level of certainty required for finding the right target and the acceptable level of collateral damage, which also will be set by the chain-of-command. But it is likely that the framework for these decisions will change from one conflict to another, and from one phase of the conflict to another. A fighter pilot is also in many respects operating autonomously in operations today, but he or she has very strict and specific limitations as to what has been ordered, and restraints and constraints with regards to these orders. Even if technology would allow it, it does not seem operationally advisable, nor politically palatable, to remove the human from the loop altogether. No military units are exempt from command and control – the application of military power is by definition under political control and authority, and no military unit is outside this chain. All military units and personnel must operate within the framework and rules of engagement that direct any given operation or mission they are taking part in, and no single person or entity has the authority to make decisions on life and death at his, her, or its own discretion.

One fundamental question thus becomes what ability and capacity to make such decisions, within the military chain-of-command, we want to give autonomous systems. Autonomous systems will, through significant control and programming of the framework for an operation, be able to identify, understand and execute their assigned mission on the level of, and in the future better than, human operators and manned systems. We can adjust the level of autonomy allowed in a system and can retain the authority to apply lethal power

7. For further discussion on this, see for example Birkeland and Dyndal (n 1) 58.
at a higher level, or as a minimum be able to remove such possibility from the system if necessary. In 2012, the United States Department of Defence issued a policy with regards to autonomous systems and their ability to apply lethal power, stating that ‘all autonomous systems must be constructed to facilitate commanders and operators to exercise appropriate levels of judgment over the use of force.’

War is inherently a human activity, and one would expect that few people would want to move away from having humans responsible for a military mission, even if that mission is executed by an autonomous system – just like any other military mission executed by humans and manned platforms. Some claim that without human oversight and control, applying the principles of necessity, proportionality, distinction, minimisation of collateral damage and avoidance of unnecessary suffering is problematic. This is where the discussion of the concept of meaningful control comes in. With different levels of automatics and autonomy come varying levels of control. But when it comes to decisions of life and death, this control must necessarily be meaningful in order to give legitimacy to the delegation of decision-making from the human to the machine.

Heather Roff and Richard Moyes underline some key elements of meaningful control in the context of autonomous weapons systems, namely:

- Predictable, reliable and transparent technology;
- Accurate information for the user on the outcome sought, operation and function of technology, and the context of use;
- Timely human action and a potential for timely intervention;
- Accountability to a certain standard.

The main challenge seems to lie in the transparency into the technology that is working towards ‘the outcome sought’ and combining this with the predictability that seems to work against the very definition, at least in the strictest sense, of autonomy. As Schaub and Kristoffersen point out, the main concern is that ‘only if the technology is designed in such a way to permit a typical user to understand its operation can they make informed, conscious, and meaningful decisions about the use of the weapon system.’

The design of autonomous systems must thus include options for meaningful control by humans if we are to be able to make any meaningful policies for the use of autonomous weapons at all.

Furthermore, we must discuss regimes of validation and verification, before we allow the use of fully autonomous systems in military operations. In short, the concept of validation and verification is about our threshold for claiming trust in the system, not only as an

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10. Schaub and Kristoffersen (n 6) 22.
operator, but as the owner of the system. Are we able to trust that the autonomous drone will operate in accordance with the tasks assigned and its legal framework? When we arrive at the point where we can call a system fully autonomous, the system shall be so complex, and the algorithms so comprehensive, that what we consider to be sufficient operational testing and evaluation of new systems today will only cover a small fraction of the infinite choices of actions that come with autonomous systems.

Today’s regimes for validation and verification are directly related to the very specific technical and operational requirements that were presented ahead of system production and procurement. Future systems will be so complex that there is simply no way of testing every single functionality and option for the system with regards to full autonomy. We will be able to build test scenarios that will challenge the system to a very high degree, but we will not be able to stimulate the system to make the same decision every time. Validation and verification is about what we need to have validated and verified of the system without being able to validate and verify everything. The discussion surrounding the necessary regime for validation and verification focusses on where the threshold should be for us to claim trust in the system without having tested all the possible actions. A new approach to testing, validation and verification of the autonomous weapons systems of the future in order to enable them to operate, is thus required. Developers even claim that it is possible today to implement a fairly high degree of autonomy in systems; however, the lack of a regime for proper testing, validation and verification of the system prevents a high level of autonomy from being fully implemented.\textsuperscript{12} Here we touch on an interesting intersection between what is possible and what is necessary: It is conceivable that in the near future we may confront an adversary that has lowered his threshold for testing, validation and verification of autonomous systems, in order to gain the upper hand in a conflict. We can thus risk fighting autonomous systems that apply lethal power based on more vague or ill-defined attack criteria, with less respect for collateral damage than what we demand from our own troops and weapons systems. We have to recognise the complexity of autonomous systems, which in turn will demand a new approach to testing, validation, verification, and implementation of systems into an operational context. The question, therefore, does not seem to be \textit{whether} we will get there, but how our legal and operational framework should be construed for operating such systems.

4. WHY AUTONOMY? NEW OPERATIONAL CONCEPTS

In order to engage in the discussion on the dangers, and even the suggested (potential) ban on, autonomous weapons, it seems beneficial to have an understanding of the background for the military requirements for such systems. The requirement, or desire, for autonomous weapons systems is driven by strategic military and political considerations. There are complex technological and tactical challenges that must be overcome in modern warfare, especially in high density conflicts and international peer-to-peer wars, the possi-
bility of which cannot be discarded. The immense technological development of the past three decades, especially within the processing capability of information, has led to astonishing systems, be they military or civilian. Famous military systems such as the Predator and Global Hawk drones have been facilitated by capable processors, satellite communications technology and an ever-evolving sensor resolution capability. However, these systems have operated mainly in benign environments, where the threat to the systems themselves has been negligible. The future, however, looks different. Future airborne weapons systems must be capable of operating in environments with a constant threat to themselves from the enemy, and with continuous threats to and disruption of the utilisation of the electromagnetic spectrum. Gone are the days where one could set up an unencrypted satellite link to a drone that would fly in circles over a perceived threat with impunity, mapping every move of the enemy. Contested environments, where the aspects of automated and autonomous systems are increasingly appreciated, are here to stay.

Every ten years the US Air Force issues its technological vision for the coming decade with respect to possibilities within technological development, operational requirements, and underutilised technological potential in modern warfare. In the vision for 2010-2030, autonomy is emphasised as the most prominent factor for the future with regards to operational capabilities, efficient manning of systems, and lowered costs.13 There is a momentum with military technological developers to move towards autonomy in systems not to bypass decision-makers, or to opt out from moral decision-making and target prioritisation, but to meet the increasing complexity of modern warfare with all available technological means. The following section will shortly discuss two of the main operational challenges that are currently experienced by military planners and operators and a few of the emerging operational concepts in which autonomy will in the future play a fundamentally facilitating role.

4.1 Sensor processing

Some of the background for the increased requirements for unmanned systems in modern warfare is the requirement for timely operational information. Intelligence in support of operations must be able to create an understanding for the adversary’s systems in network, be they electronic, urban, resource-based or informational. This type of understanding creates the basis for much of today’s warfare. Proper situational awareness requires the collection of so much data through the use of high-resolution sensors that operational units must utilise a significant amount of resources for sensor processing and structuring alone. The intelligence officer must build an understanding of human networks, local logistical connections for small groups of terrorists or gangs of organised crime, and must create a pattern-of-life for secondary and tertiary persons in order to understand the modus operandi of the primary person. These processes are time and resource demanding, especially in the form of information analysis.

These factors are the foundation for the requirement for autonomous sensor processing. The single field of research that receives the most attention within autonomy is therefore...
the systems’ ability to process sensor data on board, before it is transmitted to other units or to the ground station. Modern warfare and wars are so information intensive and, as a continuation of this, so personnel and resource demanding, that many nations are struggling to educate and develop sufficient numbers of analysts for sensor processing and analysis. Even the most basic task of the processing – the mere structuring of that incoming data in order to see if it is worth further investigating – demands specifically trained analysts on their respective sensor type. This is where many military organisations see the potential for approaching sensor analysis more efficiently. Sensor processing may sound technical and fascinating only to the IT enthusiast, but it is the potential in autonomous sensor processing that will lay the foundation for the decision-making of the drones that many fear will take place in the future.

Fully automatic – and then autonomous – sensor processing will provide the foundation for targeting and other crucial decisions and prioritisations in military operations. The advantage of autonomous sensor processing is that the machine will be able to process enormous quantities of data to find what is relevant. The machine will analyse this data, then decide what to communicate back to higher authorities, and make decisions based on this analysis. Knowing that one of the biggest challenges for communications in modern operations is the availability of bandwidth in satellites, it becomes evident that this provides a potential for scaling down the size and frequency of transmissions from and to drones on a surveillance and reconnaissance mission. The drone will process its own sensor data on board and decide by itself what to transmit back to its superior unit on the ground. This is entirely different from the current situation whereby drones usually transmit everything picked up by the sensors, raw and unprocessed. In summary, autonomous sensor processing will streamline and improve the decision-making process, especially in situations where time is of the essence. In addition, there is satellite bandwidth to be saved by reducing transmissions to the ground station down to the bare essentials. Finally, it is autonomous sensor processing that will be the foundation for drones assessing attack criteria, and ultimately attacking based on their own, collected, and analysed sensor data.

4.2 Denied areas

Operational and strategic planners are preparing for a future where we will operate in areas in which our adversary is either denying us access to an area (anti-access), or are denying the free utilisation of areas through, for example, disturbing the electromagnetic spectrum or placing a minefield to restrict movement (area denial). Denied areas and the adversary’s planned and deliberate tactics in this respect are often referred to as measures for anti-
access/area denial (A2/AD). Existing and future methods for a holistic approach to such denial of areas includes ‘jamming’, surface-to-air missiles, and denial of use of the electromagnetic spectrum. The threat to airborne assets flying in operations in, for example, Afghanistan in the early 2000s, was more or less negligible, and most of today’s unmanned aircraft are completely dependent on some sort of an electromagnetic connection, either direct line-of-sight communications, or communications via satellite systems, between the flying asset and the controlling ground station. Autonomous drones will be able to operate without inputs from ground control stations and will be able to fly into denied areas without being influenced by satellite communication being shut down. Autonomous drones will tackle the challenges set by denied areas through speed, manoeuvrability, endurance, and the ability to fly into areas that are contaminated by nuclear, chemical and biological elements. Radar is today the primary sensor for establishing an air picture by ground air defence units. Future drones will likely have varying degrees of stealth attributes and will be able to operate in denied areas more or less invisible to radar sensors. All these improved characteristics will facilitate a freedom of manoeuvre far beyond what the drones are capable of nowadays.

An autonomous system will be able to react to incoming threats in a significantly shorter time than what is considered humanly possible. A well-trained fighter pilot will spend around 0.3 seconds to react to any situation or stimulus, and approximately double that time to decide on the appropriate action to take. A robot is able to react and decide on a response within a millionth of a second. Installing laser weapons and other types of weapons on the drones of the future, means that the reaction times and efficiency of self-protection measures will be many times better than that of a manned system. Autonomous drones of the future will be capable of detecting incoming missiles and other threats far faster than any human would and, through manoeuvres that are damaging to the human body, will be able to evade the threat or neutralise it through the use of self-protection measures that require less time and power to be utilised. Key to this context is a willingness to accept risk, as we should expect that we will be increasingly willing to send a weapons system into denied areas both because it is unmanned, and because of the improved survival capability.

17. For a short introduction to the dependability of drones for communications links, see MoD (n 5) 28-29; for an interesting article on the communications link of drones being hacked by adversary forces, see Katia Moskvitch, ‘Are Drones the next Target for Hackers?’ (BBC, 6 February 2014) http://www.bbc.com/future/story/20140206-can-drones-be-hacked accessed 9 July 2018.
18. USAF (n 15) 39.
4.3 Manned-Unmanned Teaming (MUM-T)

An important early step towards autonomous drone warfare is improved integration through Manned-Unmanned Teaming operations. In such operations, both manned and unmanned systems fly together to carry out a mission. This can be an offensive, weapons carrying, manned platform, which requires assistance from an electronic warfare-capable, unmanned system, where the latter has to work autonomously because of the hostile electronic countermeasures in the area. We are likely to see an increase in these types of operations in the years to come. There are plans to develop communications options to be installed in the new fighter aircraft F-35, which a lot of Western countries are procuring, where the fighter pilot will be controlling drones in support of his or her own operations, either for information gathering or weapons delivery or other support measures. The concept of manned-unmanned collaboration includes the term loyal wingman, where one or more unmanned systems operate in close coordination and cooperation with a manned platform. Such unmanned systems will fly close to the manned aircraft and support with gathering of sensor data, will be able to carry weapons in addition to or instead of the manned platform, and some will be capable of functioning as an in-flight fuel station, flying in the rear of the operations area, supporting the manned platform with fuel in order to extend the endurance and operational time-window for the mission.

4.4 Multi-Aircraft Control (MAC)

The concept of Multi-Aircraft Control, where more than one drone flies under the control of a single human operator, is gaining increasing attention in operations. A basic example in use today is the transportation of more than one drone under the control of one person, where several drones are flown from point A (for example the factory airfield) to point B (for example the operational squadron). In order to streamline the utilisation of frequencies and reservation of airspace, this can be done in one operation. A more advanced example might be an operator that controls a mission with several drones in formation where the mission is to gather intelligence on a target from an area with several objects of interest. The drones will take care of vertical and horizontal separation themselves, and they will cue each other on movement and incidents that might be of interest to the other drones. The operator, however, is mainly focussed on monitoring the flight path or keeping the group within the operations assigned area. Today’s technology enables us to link up advanced, automated drones to each other. Advanced autonomy technology will further enhance the ability of drones to work in groups. This leads us to the concept of swarming, which will be discussed below.

20. USAF (n 15) 30.
22. For more examples, see for instance USAF (n 15).
4.5 Mothership

Several contractors are now constructing airborne systems where the drones are controlled by a parent aircraft, conceptually referred to as a mothership. Mothership concepts are about bigger, manned or unmanned systems that carry smaller unmanned systems into the operations area. These can be sent out to operate together with each other and/or the mothership. The smaller drones can, for example, perform ‘cueing’ against the main target for the mothership. In peacetime, manned aircraft may fly along the territorial border of a hostile country, sending out a drone to fly in over the border at a significant risk to investigate specific items or objects, a risk that would not be taken with manned aircraft. A maritime patrol aircraft can carry an anti-submarine drone and have the drone investigate a submarine contact over time, while the mothership flies to investigate another target of interest.23 Another example is a seagoing vessel, for example a submarine, that will send out autonomous underwater vehicles to support the main submarine; or the main submarine may send out flying drones under the water, which will ascend to the surface, take off, fly to a point of interest and gather information, fly back to a designated point of rendezvous, submerge, and re-enter the mothership.24

4.6 Swarming

The concept of swarming is gaining traction in visionary statements about future warfare and drone operations, and it concerns a group of partly or fully autonomous drones that cooperate to carry out a mission in a given area. The drones will create an internal network among themselves in order to avoid collision, optimise search angles, cue targets to each other, and process and analyse gathered information together. Drones in swarms will be able to attack targets in such great numbers and through such complex approach patterns that none of today’s self-defence systems will be able to handle them. Too many attacking units will simply overwhelm hostile air defence radar and missile systems, both through sheer numbers and complex modus operandi. Swarms of drones will also be able to function as communications relays, creating flying information networks that accumulate data. Information that has been collected by one drone in the swarm will immediately be available to the other drones, which creates redundancy in case one or more drones should be neutralised. Drones that cooperate in this manner will also be able to cover a much larger area in a much shorter time than what is possible by both manned and unmanned systems today. Several institutions are utilising swarms of small drones for research purposes, and such systems will go into mass production as the technology is made available.

24. USAF (n 15) 44.
4.7 Airpower roles in general

The drones of the future will be able to operate in areas that an adversary is fully engaged in defending. Drones will be able to fly many times the speed of sound, and many drones will likely be developed with stealth attributes. The general trend in their development aims at future autonomous drones being able to execute all of today’s air power roles. The most common type of military operations that today’s drones are engaged in are ISR missions. This core airpower mission is today being carried out by anything from small, handheld aircraft, to large, multi-million dollar systems such as the Global Hawk. Although it is likely that there will be a continued market for small and relatively elementary systems, we will also see a significant increase in drone surveillance capabilities. Already there are systems in operation that have stealth attributes and thus are difficult – impossible for some – to detect through the use of radars. Survivability is only increasing through better sensors and self-protection systems, and the capacity of sensors is increasing at a high rate.

We already see systems being deployed with what is termed persistent presence, such as DARPA’s Integrated Sensor Is Structure autonomous airship, which will be available for sensor data delivery 24 hours a day for 10 years. Another system being fielded is the Autonomous Real-Time Ground Ubiquitous Surveillance (ARGUS), which is capable of following and tracking single human beings in an area of 40 square kilometres from a position at 20,000 feet. It was the stealthy RQ-170 that penetrated Pakistani sovereign airspace and provided real-time full motion video to the White House as the operation to capture/kill Osama bin Laden was executed in April and May 2011. Decision makers throughout the chain-of-command, from the tactical team leader on the ground, to the general command, to the politicians deciding on going to war, all have a more or less insatiable demand for information. The further development of surveillance drones will only continue.

Probably the most significant factor under discussion with respect to drone warfare is the air-to-ground role of some of today’s drones. While the controversial targeted killings are not discussed in this article, the air-to-ground role in a military armed conflict will not disappear from the portfolio of modern military drones anytime soon. The benefits of being able to attack adversary forces with little to no risk to one’s own troops are simply too significant to disregard. An example is the Israeli Harpy system of so-called fire-and-forget drones, which are capable of flying above an operations area over a long period of time, and then reacting to and attacking emerging military targets based on pre-programmed radar signatures. Additionally, Lockheed Martin is in the process of developing the successor of

25. For a more elaborate discussion on drones and the traditional airpower roles, see Birkeland and Dyndal (n 1).
the Cold War high-speed surveillance aircraft SR-71, the SR-72. This will likely be capable of flying at hypersonic speeds, will be stealthy, and capable of both executing surveillance missions as well as ground attack missions.\(^{30}\)

A third, classic airpower role is the air-to-air mission. While we have not seen air-to-air drones fielded as of today, we should expect to see very capable drones that can neutralise hostile aircraft very efficiently in the years and decades to come. Some even talk about the F-35 being the last manned aircraft that the West will procure.\(^{31}\) The technological leap that we will see in these types of missions is the capability for situational awareness and sensor fusion that will be inherent in autonomous drones. Sensor fusion technology, where all sensor inputs to the aircraft are merged into one seamless picture for a superior understanding of the operational environment the pilot is flying in, is already present in the F-22 and F-35 fighter aircraft. This is just one example of early steps in developing the all-round airpower role capable autonomous drones of the future.

The combination of risk aversion and increasingly complex operating environments is driving requirements for drones that can execute risky missions in dangerous places, and this includes to the highest degree being capable of executing air-to-ground missions. Increasingly complex environments call for increasingly complex platforms that can tackle those environments, leading to the military requirement for autonomous drones for the most dangerous and complex mission sets during future operations.

5. CONCLUSION: DOES AUTONOMY FUNDAMENTALLY CHANGE ANYTHING?

Most of the weapons systems we see employed today are automatic and automated, and none are truly autonomous. They are evolutionary products of a long line of technological development within the respective field of warfare. However, if not revolutionary, the technological development facilitating the operational concepts discussed in this article is immense. The utilisation of remotely controlled unmanned aircraft today is not revolutionary technology in itself, but it does seem to lower the threshold somewhat for applying military power as a political tool. And, as the concepts discussed above show us, drone technology will likely also change the way we fight wars in the near future.

This ‘robotisation of conventional warfare’ can change the ways we fight wars to such a degree that over time we might consider it revolutionary. Higher levels of automatics have led to a trend where military drones are to a large extent being described as autonomous, and operations where the drones are increasingly able to execute actions without human input. There are many factors that have led to and are further contributing towards demands for increasingly autonomous weapons systems. The overall lowered willingness

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to accept risk to our own troops is one factor, and the allure of technology that facilitates aircraft being flown for 30 hours or more at a time while being controlled from the other side of the world is another. The military demand for autonomous weapons is very real, and very specific, and is based on actual challenges that the military faces in operations today.

The concepts described in this article are meant to meet increasingly complex problem sets in the operational planning and execution realm. There is not, however, a push to release military commanders from decision making and from being in or on the decision loop for applying lethal power. It is crucial to have a broad debate among policy makers, technology developers, scholars and civil society in order to decide how the weapons of the future will be programmed and the place and scope that human control should play therein. Technology that has been invented remains there to be used until it becomes obsolete. We can try to regulate the use of sophisticated military technology, but efforts to develop new weapons that provide clear advantages will most likely continue unabated. Autonomous drones will be an integrated part of military operations in the near future, and by then we must have calibrated our ethical compass, and have developed a legal and political framework for the use of autonomous drones in war. War is not the appropriate place for silent afterthought.
So Man Created Robot in His Own Image: The Anthropomorphism of Autonomous Weapon Systems and the Law of Armed Conflict

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ABSTRACT

Autonomous weapon systems have been widely debated throughout recent years. This article deals with autonomous weapon systems and the Law of Armed Conflict. Autonomous weapon systems are neither defined by international law, nor subject to specific regulation. The use of autonomous weapon systems must be in accordance with existing rules governing the conduct of hostilities. Among these rules are the principles of distinction and proportionality and the duty to take feasible precautions in attack. The assessment under these rules is subject to the discretion of the reasonable military commander. Somewhere in the decision cycle, the law requires a human assessment, which in turn can be labelled reasonable. The pending issue appears to be where in the decision cycle a human touch must be performed.

In this article, I argue that autonomous weapon systems remain weapons and that they do not become humans, although we use human-like characteristics to describe them. Fur-
thermore, I argue that because we call these weapon systems autonomous, we attribute them with human-like behaviour that they are not likely to possess in the near future, and subsequently that this attribution of human-like behaviour is not beneficial for our relationship to the machines or to the assessment of legality.

Keywords
Autonomous weapon systems, Law of Armed Conflict, anthropomorphism, reasonableness, military advantage and precautions in attack.

1. INTRODUCTION: ANTHROPOMORPHISMS, AUTONOMY AND THE LAW
This article is about the use of autonomous weapon systems (AWS) and the law of armed conflict. While ‘autonomy’ and ‘robotics’ have become ubiquitous terms, their exact definitions remain unclear. The core of the idea of an autonomous weapon system is, however, possible to define as a weapon that operates on its own in a qualified way. This implies both that the system is technologically advanced enough to sense its surroundings and act accordingly, and that it is actually left alone. How much one emphasises the one requirement or the other varies, and I shall return to the issue of definitions, but first let me provide an introduction to the title – and the topic – of this article.

The title of this article is an allusion to Genesis 1:27: ‘So God created man in His own image; in the image of God He created him; male and female He created them.’ Both the title of this paper and the quoted passage from the Bible are anthropomorphisms, namely the attribution of human features to non-human entities, whether these are God or a Robot. It is seemingly difficult for human beings to understand the world around them without attributing some human features to what they see. My computer lives its own life, my car is a hard-working old creature, my horse is cocky – but also kind –, my cat is offended and the wind is angry. If we allow the benefit of the doubt for the question whether my cat really is offended and whether my horse actually is both kind and cocky, we may state with certainty that my car is nothing but a car, it is not really hard-working, it is simply an old Land Cruiser that happens to be almost impossible to kill.

With attributes mentioned so far it is fairly easy to tell which ones are simply descriptive attributions and which ones are true characteristics – but what about autonomy? Can weapons truly be autonomous? In this paper, I argue that weapons are not, and in the foreseeable future will not be autonomous in the human way of understanding autonomy. I furthermore argue that advanced weapon systems remain exactly that, weapons under the law of armed conflict. They do not, I argue, become human-like entities with their own will. The machine does not become a commander. Furthermore, the machine as such is not obliged to follow the law, but the human being using the machine is. Advanced machines

do, however, have an enormous capacity to process data. This ability must be used under the control of human beings, yet the degree of control in time and space is not a set menu. How this control can be exercised over a system that processes information – far beyond the ability of a human brain – is a core challenge.

In this article, the question of how AWS can be used in accordance with rules is examined from the perspective of the legal framework governing conduct of hostilities, the ‘Law of Armed Conflict’ (LOAC), and not from other perspectives, such as the International Human Rights Law governing (inter alia) the right to privacy. Autonomous weapons, as any weapon, are governed by LOAC and its sub-branches governing means and methods of warfare as well as the law of weaponry – the latter containing more or less specific rules concerning disarmament. Autonomous weapons have not become subject to any specific prohibitions, either concerning their production, stockpiling or transfer, or their use. An initiative has been taken, however, by Human Rights Watch (HRW) in order to ban ‘killer robots’ and the UN has hosted a number of Expert Meetings on Lethal Autonomous Weapon Systems (LAWS) within the framework of the Convention on Certain Conventional Weapons (CCW). In the following I shall first address the different approaches to the definition of AWS, then, in sections 3 and 4 I shall address more closely the legal framework governing AWS and discuss what the law requires from the commander using such systems. Finally, I present my conclusions in section 5.

3. LOAC applies in armed conflicts, either international or non-international. International armed conflicts are governed, partly, by the four Geneva Conventions (GCs) as well as their first Additional Protocol. See Geneva Convention for the amelioration of the condition of the wounded and sick in armed forces in the field (GC I) (adopted 12 August 1949, entered into force 21 October 1950) 970 UNTS 75, Geneva Convention for the amelioration of the condition of the wounded, sick and shipwrecked members of the armed forces at sea (GC II), (adopted 12 August 1949, entered into force 21 October 1950) 971 UNTS 75, Geneva Convention relative to the treatment of prisoners of war (GC III) (adopted 12 August 1949, entered into force 21 October 1950) 972 UNTS 75, Geneva Convention relative to the protection of civilian persons in time of war (GC IV) (adopted 12 August 1949, entered into force 21 October 1950) 973 UNTS 75 and Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I, hereinafter AP I) (adopted 8 June 1977, entered into force 7 December 1978) 17512 UNTS 1125. See Common Article 2 to the four GCs and Article 1 of AP I. Non-international armed conflicts are governed, partly, by Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the protection of victims of non-international armed conflicts (Protocol II, hereinafter AP II) (adopted 8 June 1977, entered into force 7 December 1978) 17513 UNTS 1125, see Article 1(1). See also Common Article 3 to the four GCs.


2. THE WORLD AS IT IS AND THE WORLD ACCORDING TO THE LAW: WHAT IS THE DEFINITION OF A ‘FULLY AUTONOMOUS WEAPON SYSTEM’?

2.1 Unpredictable but not self-aware systems

Definitions are crucial for legal regulation. It is impossible to ban or restrain an unknown entity. Furthermore, how a leading State or the organised international community choose to define autonomous weapon systems will determine whether these weapon systems are seen as existing systems or solely as weapons of the future. Yet, a commonly agreed definition appears to be truly difficult to achieve.

In the past, treaty prohibitions governing the means of warfare have emerged after the international community witnessed a specific use, such as the use of gas during the First World War and the vast civilian damage caused by cluster munitions and anti-personnel mines. Some prohibitions have been introduced due to the potential devastating use of particular weapons (for example, explosive projectiles under a certain weight and blinding laser weapons), either with regard to the indiscriminate effect on civilians or the potential suffering inflicted on combatants. AWS have not (yet) proved devastating in use and opinions differ as to whether they are even in use. Partly because of this, the definitional challenge becomes even more strenuous.

Above, in the introduction, I have already presented a preliminary definition of an autonomous weapon as one that operates on its own in a qualified way, which implies both that the system is technologically advanced enough to sense its surroundings and act accordingly, and that it is actually left alone.

How one defines a ‘fully autonomous weapon system’ beyond this preliminary approach depends on whom you ask. There are at least three approaches to autonomy. According to the first, the concept is used in a rather wide sense, referring to the absence in intensity of human control in time and space – namely, that the system is left alone alone. This category encapsulates existing automatic weapons systems, from the simplest forms of pre-programmed mines with the use of trip-wires or signatures, to the most advanced automatic

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9. Horowitz (n 6) 90.
air-defence systems. Some also divide this broad category into two, arguing that the way a weapon is used – that it is actually left alone – is a separate category and that the true wide approach embraces systems that are able to select and engage targets without human intervention. In this article I view these as one broad category. If one uses a broad definition, this entails that the same weapon system may be both autonomous and automatic (or semi-autonomous). In cases where the system is operating under a certain degree of human control, it will be automatic, and where it is operating under less (or hardly any) human-imposed limitations in time and space, it will not. As opposed to others, I do not link the definition of autonomy to whether the system, when used in an autonomous mode, is used in accordance with LOAC. Very often, the degree of human control will determine whether the system is used lawfully. This does not, however, necessarily influence the definitional question. Having said this, some do link the definition to the fact whether the system can be used in accordance with the law – this the third category, dealt with below.

A second (more narrow) category refers to the inherent technical features of the weapon system – and reserving the term autonomy for systems that are technically advanced enough to understand a mission, that is to search for, identify and attack targets without any human operator intervening – or simply that they are able (through technology) to change their behaviour according to changes in circumstances, i.e. that they are adaptive. In the latter cases, some refer explicitly to artificial intelligence, others not. The core of the first part of the second category, however, is that none of the existing systems are (usually considered to be) capable of understanding the commander’s intent, and thus capable of being fully autonomous. A system capable of knowing its commander’s intent would know its commander very well and, more often than not, act according to his intentions. This approach leaves us with the impression that the term ‘autonomy’ is reserved for machines that operate in a way beyond human understanding. When finally understood, they are called ‘automatic’. If understood in this way, the group of autonomous systems will change in accordance with technological development.

10. An example of this is the US definition, ‘weapons that, once activated can select and engage targets without further intervention by a human operator. This includes human supervised weapon systems that are designed to allow humans to override operation of the weapon systems’: see United States Department of Defense (US DoD), ‘Directive Number 3000.09 Autonomy in Weapons Systems’ (21 November 2012). In the same direction, see the working definition chosen by Norway: ‘weapons that would search for, identify and attack targets, including human beings, using lethal force without any human operator intervening’. The latter definition was presented at the CCW conference (2016), pointing out that it is a working definition, not a proper legal definition. Document on file with author.

11. Horowitz (n 6) 92.

12. For such an approach, see the third category accounted for by Horowitz, ibid, 93.

13. This is the approach taken in British doctrine: ‘Autonomous systems will in effect be self-aware… as such they must be capable of achieving the same level of understanding as a human… as long as it can be shown that the systems logically follows a set of rules or instructions and are not capable of human level of situation understanding, they should only be considered automated. See Ministry of Defence (MoD), ‘Joint Doctrine Note 2/11: The UK Approach to Unmanned Aircraft Systems’ (30 March 2011).


15. Horowitz (n 6) 89 (referring to a ‘narrow construction’ where AWS are distinct from the weapons today, excluding rare exceptions).
A third category links the definition to the ability of the system to abide by international law. The following ‘working definition’ was proposed by Switzerland during the April 2016 Expert meeting on CCW: ‘weapons systems that are capable of carrying out tasks governed by IHL in partial or full replacement of a human in the use of force, notably in the targeting cycle’. Some commentators have also presented a ‘functional approach’ to AWS, leaving aside the challenge of definitions and focusing on the different challenges AWS represent for the law when looking at the different elements of the system: its munitions and platforms. This approach resembles the approach that would, in any case, necessarily have to be taken while applying the law as it is to new technology.

While the first definition suffers from challenges of being over-inclusive, the latter (third) definition suffers from being circular. The second definition understood in the UK view may be under-inclusive when referring to a ‘human level’ of understanding a mission, appearing to reserve the term ‘autonomy’ in practice for human-like robots only. In this paper, I understand autonomy according to the second view above (but not identical to the UK view), as a system’s technical ability to adapt to changes in circumstances and, due to this, its ability to search for, identify and attack targets without human intervention. This means that I exclude from the category of autonomous weapons, for example, loitering missiles which are pre-programmed to search for certain targets according to a pre-defined algorithm, and to attack these without human intervention. These weapons are, when operating without errors, predictable. Autonomous systems are, by their very nature, unpredictable. The scope of unpredictability is, however, limited because AWS do not possess self-awareness. Even though the scope of unpredictability is limited, the deeply rooted scepticism towards autonomous weapon systems appears to lie precisely in the fear of the unpredictable features of these systems. I argue here that the anthropomorphism of autonomy contributes to the fear of the systems and to our expectations as to their behaviour. Hence, because we think their behaviour is autonomous in the human meaning of the word, we fear the machines and expect similar behaviour from them as from a human being. I shall pursue the core of anthropomorphism in the following.

2.2 Autonomy and machines: putting a dress on a cow?

‘I am not a gun’ says the cartoon robot the ‘Iron Giant’, in the movie by Brad Wird from 1999, when the Giant discovers that the boy is his friend. The Iron Giant is in possession of one of the most human-specific characteristics: the ability of perception and self-awareness. That is, the ability to model a picture of the real-life world based on its own senses and, thereafter, to place itself within that picture. The ability to perceive and be self-aware is

17. Horowitz (n 6) 95-97.
among the core abilities expected from military commanders: to be able to adjust the use of force to circumstances ruling at the time. Autonomy is thus an intrinsically human term.20 An autonomous person has the freedom and ability to govern itself and to act according to its perceptions of the world around. Using the term with machines entails a humanisation of the machine – an autonomous machine constitutes an anthropomorphism.21 By necessity, this task becomes partly strained, which in turn may contribute to the difficulties of agreeing upon a definition. Furthermore, the anthropomorphism may create an illusion that an ‘autonomous’ machine will behave just as a human being going rogue, and that the machine may decide its own enemies and create its own goals and values.22 I do not, however, believe that a machine going rogue in the same manner as a human being is the real issue of concern. This is why the heading of this sub-section asks whether we are ‘putting a dress on a cow’ when using the language of autonomy on machines. Instead of ‘dressing up the cow’ and expecting human-like behaviour, the focus could more fruitfully be on those characteristics of the weapon system suited to describe the system as ‘autonomous’ and, subsequently to deal with these characteristics according to the law.23

The linguistic aspects of autonomy also invite us to address a deeper issue already launched at the outset of this article – do we deal with machines or men before the law? Are weapons (and systems) becoming humans – or are they simply a means of warfare? Are the weapons becoming their own users?24 As already noted in the introduction, I argue that machines remain a means of warfare, regardless of whether they resemble humans in certain respects.25 A number of other aspects of whether machines, in one way or another, become their own users and thus remove human presence are, in my view, primarily but not exclusively of ethical concern. The question ‘who are they?’ when speaking of autonomous weapon systems also relates to issues of accountability – namely, the question of where to place responsibility. Beyond what is discussed in sections 3 and 4 below, I do not address issues of accountability in this article. I do, however, address those legal assessments that presumably require a human touch. Let us, therefore, turn to the main question: what are the legal requirements that autonomous weapon systems can or cannot comply with?

22. Toscano (n 20) 197.
24. The question is, among others, raised by Jo Sannem and Eirik Skøyeneie, ‘Jussens treghet og teknologiens femmilssteg’ in Tor Arne Berntsen, Gjert Lage Dyndal and Sigrid Redse Johansen (eds), Når Dronene Våkner (Cap-pelen Damm Akademiske 2016) 109-129.
25. In the same direction, see US Working Paper (n 23) paragraphs 13 and 25.
3. THE LAW GOVERNING AUTONOMOUS WEAPONS: LEGAL ASSESSMENT AS A HUMAN VENTURE

The point of departure concerning AWS is introduced above, that AWS are not subject to specific regulation – or ban. Today AWS are subject to general rules governing the means and methods of warfare (formerly referred to as the Hague Convention); that is to say, they must not be of a ‘nature to cause superfluous injury or unnecessary suffering’ to combatants, they must not be inherently indiscriminate and they must otherwise be used in accordance with the principles of distinction and proportionality, as well as the duty to take feasible precautions in attack.

Autonomous weapon systems are seldom claimed to be mala in se, such as, for example, chemical and biological weapons. Their potential for being uncontrollable is what causes concern. Limitations upon autonomous weapons ought to be achieved through the enforcement of the prohibition of means and methods of a ‘nature to cause superfluous injury or unnecessary suffering’, the prohibition of indiscriminate attacks and the duty to take feasible precautions in attack. Admittedly, some arguments may be offered with regard to the prohibition of means and methods of a nature to cause unnecessary suffering, such as the ability to recognise a surrendering enemy. It is, however, first and foremost with regard to the prohibition of indiscriminate attacks and the precautionary duties that legal challenges have been stacking up. I therefore devote the remaining parts of this article to the latter rules.

Although there is no requirement in the law that attacks must be conducted by humans (they may for example be conducted by animals such as dogs or dolphins), the application of law is not a mechanical process that can be performed by machines in its entirety. Legal norms within this field of law are highly discretionary, using words such as ‘excessiveness’ and ‘advantage’; they call upon an assessment by military commanders.

26. St. Petersburg Declaration (n 8). The rule is repeated in the Hague Regulations (n 8), where the English translation of Article 23(e) reads that it is forbidden: ‘To employ arms, projectiles, or material calculated to cause unnecessary suffering.’ The debate (relating to the French and English texts) concerning the differences between ‘superfluous injury’ and ‘unnecessary suffering’ and between ‘calculated to cause’ and ‘of a nature to cause’ is now obsolete, subsequent to the adoption of the provision in AP I (n 3) Article 35(2), where it is stated that: ‘It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.’

27. Codified in AP I (n 3) Articles 51(4), 48, 50 and 52(2), as well as Articles 51(5)(b) and 57.


and situational awareness, and a flexibility to apply the law in accordance with rapid changes in circumstances – the ‘fog of war’. To fulfil the duty to assess, there must be a human being somewhere ‘in the loop’ when attack decisions are made using autonomous weapon systems. The pertinent question is – where in the loop? This question relates to the intensity of weapons control in time and space. The question can also be reformulated to illustrate the relationship between man and machine: where and to what degree does ‘man’ have to interfere with ‘machine’ in attack decisions? Highly discretionary legal concepts such as ‘excessiveness’ and ‘advantage’ appear human in character. Usually, the question of whether an attack was launched in order to achieve a ‘military advantage’ must be determined according to a threshold of ‘reasonableness’. Simply put, a military advantage entrusted a certain weight is a military advantage if a reasonable commander under similar circumstances would consider it to be so. In turn, the notion of reasonableness has a specifically ‘perception-based’ feature. An attack decision must always be reasonable under the concrete circumstances. This latter point arguably represents an inherent challenge for machines with little or no ability to perceive. The next section turns towards ‘reasonableness’.

4. MAN-MADE ‘REASONABleness’

4.1 Artificial intelligence: the rise or fall of the reasonable commander?

As introduced above, military commanders must assess the existence and weight of the ‘military advantage’ of an attack, as well as whether the attack must be expected to cause ‘excessive’ collateral damage compared to the concrete and direct military advantage anticipated. I shall mainly use the terms ‘advantage’ and ‘excessiveness’ in the following analysis.

32. See Johansen, ibid section 4.6 and Andrew D McClintock, ‘The Law of War: Coalition Attacks on Iraqi Chemical and Biological Weapons Storage and Production Facilities’ (1993) 7 Emory International Law Review 633, 644-645, where McClintock argues that the acquittal of Rendulic in the Hostage Case, ‘reflects the deference given to decisions made while the commander is enshrouded in the ‘fog of war’.’


34. See Thomas Slensvik and Sigrid Redse Johansen, ‘Missilangrep og folkeretten – ute av syne ute av sinn?’ in Tor Arne Berntsen, Gjert Lage Dyndal and Sigrid Redse Johansen (eds), Når Dronene Våkner (Cappelen Damm Akademiske 2016) 219-244.


36. See US DoD, ibid 199 and AP I (n 3) Article 52(2) referring to the ‘circumstances ruling at the time’.
Both terms are not only highly discretionary, as pointed out above, but also relative: ‘advantage of what?’; ‘to achieve what?’; ‘excessive compared to what?’ and so on. Furthermore, a military advantage is a highly subjective concept: advantage for whom? Consequently, those military commanders assessing the anticipated military advantage must know the aim of the military operation they are taking part in, and they ought to know the relative strength of their opposing forces. By way of illustration, let us assume that the operational objective of a phase of an operation is to establish air superiority in the area of operations. The military advantage relates to this objective. In order to create air superiority it may prove necessary to attack enemy air defence systems, command and control systems, as well as airfields. The relative importance of these targets is subject to the assessment of the reasonable commander. On the other hand, the assessment of the probability of tactical success in attacking each one of these targets by the use of a specific kind of ammunition, may be better performed by machines. Just as a machine can calculate the next move in the game of chess, predictions of enemy behaviour in the air (‘dogfights’) may be better performed by machines. The first example (the relative importance of the targets) belongs to reasoning, the latter example is a question of artificial intelligence. Weapons may be smart and even intelligent, but they do not yet possess reason in the ‘human’ definition of the concept.

At a certain stage, the law of armed conflict becomes a question of whether we can accept that human reason shall yield to intelligent weapons. Or rather, smart weapons, as they obviously lack the social/human dimension of intelligence. Does international law accept that the reasonable commander is being replaced by artificial intelligence?

We may therefore ask, as in the heading of this subsection, what does the technological development represent – a rise or a fall of the reasonable commander? Does he or she have to be even more reasonable than before to administer the advanced level of technology, or will he or she simply be out-conquered by algorithms? In the following I shall argue that commanders i) will have an even more onerous burden of reasonableness than before and ii) cannot be replaced in their performance of assessment by machines. Eventually, this is also why machines ought not to be compared to humans in this regard.

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37. For a more in depth introduction to these questions, see Johansen (n 31) section 13.1.
38. See ibid section 13.3 as well as the US DoD (n 35) 244 and Michael Schmitt, ‘Asymmetrical Warfare and International Humanitarian Law’ (2008) 62(1) Air Force Law Review 1, 28: ‘Ultimately, no objective means of valuing either incidental injury/collateral damage or military advantage exists. Instead, it is the subjective perspective of the party carrying out the proportionality assessment that matters.’
39. This position is based on the fact that the advantage relates to the ‘attack as a whole’, as specified by a number of ratifying states with regard to the scope of AP I (n 3) Articles 51 and 57. See UK Declaration of 28 January 1998. Similar declarations are posted by Australia on 24 June 1991, Canada on 20 November 1990, Belgium on 20 May 1986, Germany on 14 February 1991, Italy on 27 February 1986, The Netherlands on 26 June 1987, New Zealand on 8 February 1988 and Spain on 21 April 1989. The notion of the ‘attack as a whole’ is also reflected in UN General Assembly, Rome Statute of the International Criminal Court (last amended 2010) 17 July 1998, Article 8(2)(b)(iv).
4.2 The expansive duty to take feasible precautions in attack: a matter of the commander’s choice

The reason for my position, as stated above, lies at least in part in the expansive duty to take feasible precautions in attack, to spare the civilian population, civilians and civilian objects. First, I will briefly address the ‘commander’, and then move on to the precautionary duties. The heading of this sub-section refers to the ‘commander’s’ choice, but who is he or she? Upon whom does the duty lie? The wording of treaty law refers to ‘those who plan or decide upon an attack’, which in principle addresses all levels in the military chain of command. Some assessments, though, are in certain cases presumed to be carried out on a relatively high level of command, such as the assessment of the military advantage anticipated from an attack as a whole. As the example above shows, the attack as a whole may encompass the coordinated effort to achieve air superiority. In these cases, the military advantage is presumed to be assessed on the operational level of command and reassessed on tactical levels of command if circumstances change.

What about the precautionary duties of the commander? Commanders involved in both planning and/or conduct of an attack shall take all feasible precautions to:

- verify that the target is a military objective – that is, that by its nature, location, purpose or use, it makes an effective contribution to military action and that its destruction, capture or neutralization will offer a definite military advantage;
- refrain from and eventually cancel or suspend an attack if it becomes apparent that the attack may be expected to cause excessive collateral damage compared to the concrete and direct military advantage anticipated (the proportionality rule).

40. This duty is laid down in AP I (n 3) Article 57 and its core represents customary international law. With regard to the latter, see for example US DoD (n 35) paragraph 5.11 for an illustration of what applies as a minimum for States not parties to the AP I.


42. See Johansen (n 31) with regard to the notion of the attack as a whole in general. With regard to the specific level of command under concrete circumstances, see Michael Bothe, Karl Josef Partsch and Waldemar A Solf, New Rules for Victims of Armed Conflicts: Commentary on the Two 1977 Protocols Additional to the Geneva Conventions of 1949, (2nd ed., Martinus Nijhoff Publishers 2013) 409 where it is argued that: ‘In a coordinated military operation, the relative importance of the military objective under attack in relation to the concrete and direct military advantage anticipated is not a matter which can be determined by individual tank leaders, the commanders of lower echelon combat units or individual attacking bomber aircraft. If assigned a fire or bombing mission they must assume that an appropriate assessment has been made by those who assigned the mission. Thus, in this situation, the decision to cancel will have to be made at the level where the decision to initiate the attack was made.’


44. This summary is based on, but not quoted, from the AP I (n 3) Article 57(2)(a)(i) and (iii).
I shall address each of these two interrelated duties in some more detail. The duty to ‘verify’ that the target is a military objective invites the obvious questions: what does it mean to ‘verify’, which measures are ‘feasible’ in order to achieve verification, and how much of the verification process can be left to a machine – to an autonomous weapon? In simple terms, ‘verification’ means ‘to prove’ that the target is a lawful target, but the rule must not be confused with a duty to be certain. Nor is it a general requirement of ‘eyes on target’, as some doubt will always exist. Using the qualifying term ‘feasible’, the precautionary rule addresses the measures required in order to be as certain as possible under the circumstances. Obviously, one cannot verify having found a military objective unless one knows what the objective looks like. Verification therefore presumes recognition of some sort.

The duty to suspend or cancel attacks is closely linked to the duty to verify that the target is a military objective – with the additional requirement of observing the proportionality rule, namely that an attack shall be cancelled or suspended if it becomes apparent that the target is not a military objective, or that it may be expected to cause excessive collateral damage. The law, therefore, requires some sort of estimate of collateral damage. The duty encompasses an assessment of what collateral damage is reasonably foreseeable. This is a duty that obviously requires situational awareness through human perception. Furthermore, if one attack goes wrong, corrections may be expected according to the assessment of the damage (the so-called battle damage assessment – BDA).

The process of recognition can be feasibly done in accordance with the law by an automated or an autonomous weapon, if the parameters to match are inputted into the weapon in advance – to hit an object with a known signature. Problematic situations may arise if the parameters are very few, given that errors in recognition may occur, or that the weapon operates on its own over a considerable time, or travels over long distances, or a combination of these. These challenges are familiar to all highly automated weapons, such as with the use of unmanned aerial vehicles (UAVs or ‘drones’), combat systems on frigates (such as AEGIS, used by the Norwegian Armed Forces), as well as sea mines. Autonomous weapons, understood in the narrow sense as referred to above, pose additional challenges. If the autonomous weapon system has learned to recognise objects that have not previously been programmed into it, from its own observations – i.e. it is trying to achieve a level of perception – it may attack objects which have not been chosen by humans, but which ‘fit’ what the weapon system has learned about other objects. For example, the system knows that tanks have tank turrets and tracks, and the autonomous system is able to use this infor-

45. For example, see Michael Schmitt (ed), Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations (2nd ed., Cambridge University Press 2017) 475, commentary 12 to rule 113, commenting on the proportionality rule, emphasising that ‘Expectation and anticipation do not require absolute certainty of occurrence.’

46. In the same direction, see Boothby (n 30) 121.

47. For a more thorough account of the same position, see Johansen (n 31) paragraph 14.3.1.


49. See Slensvik and Johansen (n 34) 227.

50. ibid.
mation even if observing the vehicle from another angle than in the picture loaded into it. The autonomous system can add and process data beyond what is predicted by the human operating it. Such a system may prove demanding to operate by military commanders, not knowing exactly what information (data) the system will choose to collect and rely upon. Having said this, the use of autonomous processes in weapon systems may not necessarily produce more targeting errors during attacks. On the contrary, high-level technology may provide commanders with more comprehensive and up to date information about the target and the target area, creating a higher level of situational awareness. Furthermore, a number of errors are also likely to happen with humans in or on the loop, controlling the information loaded into the weapon and deciding for the system what the threshold is for verifying that an object is a military objective (a lawful target). The pending issue appears, rather, to be which errors are expected vs. which errors are accepted. An error in verification due to incorrect data may be acceptable as accidental – provided that the error appeared reasonable according to the circumstances. For example, civilian use of – or presence within – a compound expected to be a military training camp, and only this, may not have been reasonable to expect.51 If, on the other hand, the error of attacking an object that proved to be civilian was done by an autonomous system, was that error reasonable?

Two points shall be made in this regard: first, that the legal environment does not appear to be equally forgiving for mistakes made by machines as by humans, simply because it is counter-intuitive to label machines as reasonable. On the contrary, they are, by nature, unpredictable and the potential for systemic errors appears less consistent with the law than tragic accidents. Second, the human will never be completely ‘out of the loop’. This formula rests on a relative premise, namely that the human is far away (in time or space) from the attack decision. Nevertheless, recalling that the weapons system is a means of warfare and not an actor in warfare, a human being will always be accountable. After all, it will be a human decision to use the system against the category of target, within the area of operations, with ammunition, and so on. No matter how much autonomy a weapons system may eventually possess, the ultimate control of the weapon will expectedly rest with the reasonable commander. He or she will have to rise to the expectations of advanced weaponry, in order to comply with LOAC. He or she will have to know when to reassess the legality of the attack and thus to adequately interact and, when necessary, intervene on the autonomous system in time or space. As expectations of accuracy and precision increase, a parallel expectation of situational awareness arguably arises. For example, the law may arguably require a high degree of communication between the missile launch area and the forward air controller in the target area. It should be pointed out, however, that a high degree of communication does not necessarily mean very intense or extensive communication; it may imply sharing time sensitive information at the right time – for example, on changes in the circumstances in the target area.

51. An example where the views on the matter differ is the US bombing of the Al-Firdus bunker/shelter during the Gulf War in 1991. For the different views, see US DoD, Conduct of The Persian Gulf War: Final report to Congress (US DoD 1992) 617 (where it is argued that the attack was lawful and necessary) and Human Rights Watch, Needless Deaths in the Gulf War: Civilian Casualties During the Air Campaign and Violations of the Laws of War (Human Rights Watch 1991) 137 (where the legality was questioned on the basis of what information could reasonably be expected to be possessed).
5. CONCLUSIONS

In this article I have put forward two inter-related main arguments: first, that machines – due to their technological construction – cannot be characterised as autonomous in the human meaning of the word; and second, that the point of departure still remains – namely that relevant targeting assessments required by the law of armed conflict must be taken by human beings. The law does not state, however, how these assessments are to be carried out in practice. Furthermore, and on a more abstract level, the application of law to the employment of so-called autonomous weapon systems is made difficult because we label them autonomous. The attribution of human features to the machine (anthropomorphism) creates an expectation that the machine can perform human-like assessments. This expectation ought to be rebutted. We should not truly attribute these human features to the machine.

The general rules on precautions in attack do not seem to allow the reasonable commander to be replaced by automation or autonomy – human presence is required. The crucial issue appears to be where in the ‘loop’ the presence is required, and with what intensity. In short, high-tech weaponry requires highly skilled management. The diversity of autonomy in weapon systems and accompanying information gathering systems does not give room for a statement for or against the compliance with the law of armed conflict. Autonomy in weapon systems must be carefully used in order to comply with the law. Errors made by machines are arguably less tolerable if representing potential systemic errors than errors made by presumably reasonable commanders. Military commanders are therefore, arguably, expected to overrule autonomous systems anywhere precautionary duties so demand. This point does not, however, give reason for stating that autonomous systems as such are unable to be used in accordance with the law of armed conflict.

The attribution to them of human features does not turn autonomous weapon systems – the machines – into humans. On the contrary, the demands upon the operators appear to increase in equal step as the technological development moves forward. It is likely that there will be strict demands upon the human-machine interface in order to make advanced future technology fit within the law. So, Man created Robot in his own image, and they both have to work out their friendship – not only to look themselves in the mirror. In the end, it appears to be of paramount importance that the machines are not only properly controlled by humans, but also properly tested in all their autonomous functions and in how these interact with the human in the loop – in other words, meaningful human control.
Autonomous Weapons Systems and the Rights of Victims: Compensation Claims under Norwegian Law for Violations Committed through the Use of Autonomous Weapons

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ABSTRACT

Ensuring accountability for violations of international law is arguably one of the most important challenges posed by autonomous weapons systems (AWS). This article examines ways in which violations committed through the use of AWS could challenge the rights of victims to reparation for harm suffered. It finds that their use would pose problems in securing the rights of victims under domestic Norwegian law outside the scope of human rights law, where the standard of negligence for State liability apply. The article argues that the existing legal framework could be interpreted in a way as to secure strict liability for reparation in cases of violations of international humanitarian law. Furthermore, the use of AWS would introduce new challenges in proving the facts of the violation. It is argued that the duty to investigate alleged violations of human rights law provide a workable general framework to address these concerns.

Keywords

Human rights, humanitarian law, autonomous weapons, State responsibility, reparation

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1. INTRODUCTION

The prospects of a future where autonomous weapons systems (AWS) play a role on the battlefield have spawned much debate in recent years. In the aftermath of Human Rights Watch’s report on the subject in 2013,2 the State Parties to the United Nations (UN) Convention on Certain Conventional Weapons3 decided to examine the issue in a series of yearly expert meetings, with engagement from State and non-State actors. Industrialised states, including Norway, have expressed their concern about weapons with increasing levels of autonomy, but remain cautious with taking a position on the way forward.4 This cautiousness by Norway, a small yet affluent NATO member with borders to Russia, does not come as a surprise as it is by exploiting military technological advancements that developed countries ensure an asymmetry of military power.5 This strategic position is reflected in reports of the Norwegian Defence Research Establishment – chief adviser on defence-related science and technology to the Ministry of Defence and the Norwegian Armed Forces’ military organisation – advising a continued Norwegian commitment to remotely controlled, automated and autonomous technologies.6

The question that this article seeks to answer is the following: How would the use of autonomous weapons systems influence victims’ right to reparation under domestic Norwegian law for breaches of international human rights law (IHRL) and/or humanitarian law (IHL) during international military operations? Since the Second World War, the vast majority of operations by Norwegian armed forces have taken place outside Norwegian territory.7 Because of this historical reality, this article limits its scope to military operations outside the territory of Norway. The nature of military operations has varied from observer missions, to peacekeeping missions and law enforcement activities, to instances where Norway is party to the armed conflict. Although this admittedly covers a broad array of contexts, the present author does not consider it necessary to specify the mandate of

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the activities of the armed forces further. Instead, for the purposes of answering the above stated question, the article presupposes that (1) Norwegian armed forces have deployed autonomous weapons systems during a military operation (2) these weapons systems have been used in the process of selecting and/or attacking a target (3) the resulting use of force amounts to an arbitrary deprivation of life of civilians and/or a violation of humanitarian law entailing the death of civilians. Lastly, this paper’s main focus is on State responsibility. The liability of developers is therefore not specifically dealt with.

Debates on the challenges posed by the introduction of AWS into the battlefield have devoted considerable space to concerns about the consequences for international legal accountability mechanisms. Existing literature has examined the topic of civil liability often as an alternative to individual criminal liability, and not as a means of implementing the right of victims to reparation for harm suffered. In many cases, the discussion is opened and closed with a recap of US tort law. This article seeks to disconnect the subject from notions of sub-optimal forms of criminal liability and instead to situate it as a right to substantive remedies for victims under international IHRL and IHL. This is in line with the general view that obligations of States to bring perpetrators of serious international crimes to justice and to provide compensation to victims are complementary and cannot be substituted for one another.

The article argues that the use of AWS will introduce new legal challenges for the fulfilment of the rights of victims to receive compensation in accordance with international humanitarian law, specifically concerning the grounds for holding the State liable and for ascertaining the fact of the breach. By taking the Norwegian legal system as a case study, the article hopes also to contribute in clarifying questions concerning the civil liability of the State for violations committed during international military operations, a topic which has not been extensively examined in Norwegian legal literature.

Section 2 of this article is devoted to understanding the concept of ‘autonomous weapons system’. In section 3, the article gives a summary of some of the main concerns relating to the effects of AWS to accountability mechanisms. Section 4 examines how domestic Norwegian tort law can respond to protect the rights of victims facing the use of AWS in international military operations. In section 5, some related questions concerning the burden and standards of proof and of causality are examined. Conclusions are included in Section 6.


9. As Human Rights Watch and International Human Rights Clinic, ibid 27, curiously put it: ‘If victims could not effectively make use of U.S. civil accountability mechanisms, it is unlikely that they would be more successful in other jurisdictions’.

At the outset, it should be noted that there are no constraints in Norwegian law specifically barring victims from seeking compensation before Norwegian courts for violations committed by Norwegian armed forces in military operations abroad. Any claim for compensation under Norwegian law must satisfy three basic requirements: There must be a damage to a protected interest, a ground for holding the perpetrator liable (culpa or strict liability), and a causal relationship between the former two conditions that is not too remote.\(^{11}\)

2. AUTONOMOUS WEAPONS SYSTEMS

While there is no commonly agreed legal definition of what an autonomous weapons system is,\(^{12}\) there is no shortage of attempts to provide a workable definition. In a crude conception, they are often distinguished from remotely controlled and automatic (semi-autonomous) weapons technologies based on the degree of human intervention that is required for their use. Remotely operated systems are operated by a human operator, a typical example being the use of unmanned remotely controlled aircraft (e.g. drones). Automated (or semi-autonomous) systems may operate without a human, yet remain within the sphere of human control as they act according to pre-programmed specifications. These systems necessitate a human ‘in the loop’ of decision-making.\(^{13}\) More elaborate conceptions favour models based on ‘levels’ or ‘scales’ of autonomy. These models permit distinguishing the degree of autonomous capabilities of a system or of parts of its functions. Fully autonomous systems are often conceived to be able to observe, orient, decide and act without human intervention, rendering the human unnecessary for task completion.\(^{14}\) In Human Rights Watch’s distinction, the human is ‘out of the loop’ of decision-making.\(^{15}\) Some have argued that variations of retaining the ‘human on the loop’,\(^{16}\) with oversight or in real-time, may be at risk of providing little safeguard against abuse because of the speed with which the systems will operate, or that it will be unwanted because of the risk of enemy interception of communications between the human and the overseer.\(^{17}\)


\(^{13}\) Docherty (n 2) 2.


\(^{15}\) Docherty (n 2) 2.

\(^{16}\) ibid.

The autonomous components of a system may be limited to parts of the functions of the platform. Not all autonomous functions are relevant in examining problematic legal aspects of the systems. This is reflected in the much-cited US Department of Defence (DoD) Directive 3000.09, according to which an autonomous weapon is:

A weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override operation of the weapon system, but can select and engage targets without further human input after activation.

Under the directive, a system that has an autonomous function, but where the function concerns other aspects of the system than targeting and engaging, will not be an autonomous weapon. This is in line with the understanding adopted by the ICRC. The UK definition, in contrast, adopts a more general approach. Paraphrased, it focuses on the capability of the system to understand intent and direction, perceive its environment and act in order to achieve a desired state without human oversight or control. The UK approach is broader than the US definition, and encompasses functions that would not necessarily be problematic from the perspective of the legal rights of victims. In the following, the autonomous functions of selecting and engaging targets will therefore be the main focus.

3. ACCOUNTABILITY CONCERNS

The problem of accountability for breaches of international law has been at the heart of the debate on autonomous weapons systems, some considering it ‘one of the most important challenges’. A major reason for this is the potential that AWS will substitute one of the basic roles of humans in warfare: deciding on the selection and engagement of military targets. The consequence, argued by Human Rights Watch, could be that there would be no way of ascribing individual responsibility outside a weakened command responsibility. Others argue that the removal of control of humans ‘does not mean that no human is responsible for the actions of the autonomous weapon system’. Facing the uncertainty of applicability of the law to operators and commanders, some have directed their attention...

20. ICRC (n 18) 71.
23. Human Rights Watch and International Human Rights Clinic (n 8) 25. For a similar view, see ibid 1405-1409.
to the role of the developer based on the notion that with increased levels of autonomy, the control over the weapon is *de facto* exercised by the developer. In his analysis, Hin-Yan Liu groups this strand of concerns and coins them as conceptual, because they are based on the premise that responsibility is inherently attached to the functions and responsibilities that individuals have in virtue of their roles (as for example operator, commander or developer). In this sense, there may thus be an accountability gap because the AWS will take over a role previously held by individuals. Closing the gap may then entail an over-extension of existing role responsibilities.

Another strand of concerns relates to the specific characteristics of the technology. This includes the potential difficulty of establishing the facts of violations *ex post*, the difficulty in foreseeing how the AWS will behave in real-life situations, and an increased complexity in establishing responsibility based on the multitude of actors involved and the development of the weapons system. Again, borrowing from Hin-Yan Liu, these concerns are circumstantial in that they depend on ‘practical technological capabilities and how these are deployed […]’ If, however, technological advances enable accurate predictions of AWS behaviour, then the objections to ascribing responsibility for these consequences to the programmer and commander will lose force.

### 4. CULPA OR STRICT LIABILITY FOR THE STATE?

#### 4.1 THE NORWEGIAN LEGAL SYSTEM

The Norwegian legal system is of a civil law tradition with a dualist approach to international law. Human rights treaties are to a large extent incorporated through the Human Rights Act of 1999, which includes a ‘conflict of norms’ rule in section 3 by which human rights are given priority except in the case of conflict with norms of constitutional rank. In a 2014 amendment, the Constitution incorporated a separate chapter on human rights (chapter E), which encompasses a general obligation for the State to respect and secure human rights (section 92) and several reiterations of international legal obligations, including the right to life in current section 93. For those provisions that overlap with their international treaty counterparts, the question in practice will be whether the constitutional protection goes beyond the minimum level of protection afforded by human rights treaty standards. A consequence of the dualistic approach is that non-incorporated international obligations have no direct effect in domestic Norwegian law. Their relation—
ship with the domestic legal system is instead determined by the interpretative principle of presumption of harmony with international law, whereby relevant domestic rules are to be interpreted so that they conform to international law. Although consequential, the principle is limited to apply in cases where there is no conflict of norms (in the strict sense) between domestic and international law.\footnote{Rt. 2000 p. 1811, 1831-1832.}

Compared to human rights law, the incorporation of humanitarian law is far more limited: breaches by the armed forces of rules in the Geneva Conventions of 1949 and the two additional protocols of 1977, which are aimed at protecting people or property, are punishable under the military criminal code.\footnote{Militær straffelov adopted 22 May 1902 no. 13, section 108.} Thus, as far as the rights of victims are protected by international law vis-à-vis the State under IHL and IHRL, they will potentially be regulated domestically by two different sets of rules. Victims’ claims for compensation under domestic law can therefore be broken down into the two following scenarios: breaches of international obligations where the right to compensation is incorporated into domestic law, and breaches of international obligations where the right to compensation is not incorporated into domestic law.

**4.2 INCORPORATED RIGHTS – STRICT STATE LIABILITY**

A right to reparation is supported by clear and longstanding practice under human rights instruments as an element of the duty to respect and secure human rights. A general requirement to compensate victims for harm suffered flows, *inter alia*, from the International Covenant on Civil and Political Rights (ICCPR),\footnote{United Nations Human Rights Committee, ‘General comment no. 31 [80], The Nature of the General Legal Obligation Imposed on States Parties to the Covenant’, CCPR/C/21/Rev.1/Add. 13 (Hereafter: HRC) § 16.} and the European Convention of Human Rights (ECHR). Under the ECHR, the European Court of Human Rights (ECtHR) has long held that ‘where a right with as fundamental an importance as the right to life or the prohibition against torture, inhuman and degrading treatment is at stake, Article 13 requires … the payment of compensation where appropriate’.\footnote{Z and Others v the United Kingdom [GC], Application no 29392/95, § 109, ECHR 2001-V. See also Aksoy v Turkey, Application no 21987/93, § 98, ECHR 1996-VI.} These treaties establish a form of strict liability for the State to provide compensation following a violation, in the sense that the duty to compensate is not conditioned on negligence on the part of the State.

Under Norwegian law, the ‘conflict of norms’ rule in the Human Rights Act section 3 gives primacy to the human rights obligation to compensate the loss of the victim in cases where there is no ground in domestic law to provide compensation. This is reflected in a Supreme Court case of 2013 that concerned compensation based on the State’s failure to take measures to prevent the harassment of a woman by her former partner. The District Court, while finding a violation of ECHR Arts. 3 and 8, had rejected the compensation claim based on the assessment that the authorities had implemented every measure that reasonably could be expected. The Supreme Court however, dispensed with any evaluation on the traditional conditions for liability. Instead, the Court held the State liable to...
pay compensation based on the finding that there had been a breach of the convention. Following this case, Norwegian law is interpreted to include a form of strict liability for violations of the incorporated human rights instruments that impose a duty to provide substantive remedies in the form of compensation.

A question will then be to what extent human rights treaty standards apply to the conduct of Norwegian forces during international military operations abroad. In answering, one may distinguish between the following two scenarios: first, situations where the international human rights instruments apply extraterritorially, and second, situations outside the scope of international human rights treaty instruments. This section will sketch out the first, while the second situation is covered in section 4.3.

The scope of application of human rights instruments is limited by the notion of State jurisdiction. The practice of human rights institutions over time has resulted in an expansive approach, giving these instruments extraterritorial effect. As expressed by the ECtHR, the treaties ‘cannot be interpreted so as to allow a State party to perpetrate violations of the Convention on the territory of another State, which it could not perpetrate on its own territory’. Extraterritoriality has been conceptualised based on spatial and personal notions of jurisdiction. Under the spatial notion, jurisdiction may extend beyond the territory of the State to situations where the State exercises effective control over an area. The personal model is conceived to require State agent authority or control over an individual. Recent practice by the ECtHR suggests a relaxation of criteria for characterising a situation within the scope of the personal model. The most notable example to date is the Jaloud case, where the Court held that a car passing through a checkpoint under the command of a Netherlands Royal Army officer was sufficient to establish the authority and control of the Netherlands in the case. Beyond these two approaches, a third model of extraterritoriality has been put forward by Marko Milanovic based on a distinction between the negative obligation to ‘respect’ and positive obligations to ‘secure’ human rights. In short, he advocates for the obligations of the State to respect and secure human rights to be dependent on the ability of the State to comply with the human rights standards. Consequently, while the negative duty to respect human rights will apply in most circumstances outside the

37. See e.g. ECHR Article 1 and ICCPR Article 1(1). As a main rule this implies a territorial limitation, see Legal Consequences of the Construction of a Wall (Advisory Opinion) [2004] ICJ Rep 136, § 109, Al-Skeini and Others v the United Kingdom [GC], Application no 55721/07, § 130, ECHR 2011.
41. HRC (n 34) § 10; Al-Skeini and Others v the United Kingdom (n 37) §§ 138-140 and 142; Legal Consequences of the Construction of a Wall (Advisory Opinion) (n 37) § 112.
42. Jaloud v the Netherlands [GC], Application no 47708/08, § 152, ECHR 2014.
State’s territory, the positive duty to secure human rights will be more restricted insofar as it presupposes a higher level of control over the foreign territory. By contrast, international humanitarian law applies without geographical limitations in armed conflict situations. When both regimes apply in the given circumstances, humanitarian law is lex specialis. This, however, does not imply the complete suspension of international human rights law. The regimes are regarded as complementary and humanitarian law must therefore be interpreted in light of relevant human rights obligations. The relationship between the two regimes is of importance to the rights of victims in two respects. First, in that IHRL must be interpreted narrowly insofar as humanitarian law permits the interference. The threshold for what constitutes a breach of IHRL is determined by reference to IHL. This can be inferred from ECHR Article 15, under which derogations from Article 2 are permitted insofar as they are legitimate under IHL. This is also the backdrop for the position of the African Commission on Human and Peoples’ Rights: ‘Any violation of international humanitarian law resulting in death, including war crimes, will be an arbitrary deprivation of life.’ Second, lex specialis as a conflict of norms principle does not exclude the application of human rights norms in the absence of conflict between norms of IHL and IHRL. As there is no conflicting rule under IHL excluding the application of the right of substantive remedies for victims, these rules apply also for human rights violations in the context of armed conflicts.

In sum, strict liability under domestic law applies for human rights violations committed by the State through the deployment of AWS abroad, potentially also within a number of armed conflict situations provided that the State can be held to exercise jurisdiction in the particular case.

44. See Common Article 2 to the Geneva Conventions of 12 August 1949, Protocol I Additional to the Geneva Conventions of 12 August 1949, 8 June 1977, Article 1 (3) and Protocol II Additional to the Geneva Conventions of 12 August 1949, 8 June 1977, Article 1. On the threshold for armed conflicts to exist, see in particular Prosecutor v Tadić (Decision on the defence motion for interlocutory appeal on jurisdiction) ICTY-94-1-A (2 October 1995) § 70.
45. Legal Consequences of the Construction of a Wall (Advisory Opinion) (n 37) § 106-107.
48. ACHPR, General Comment 3 (n 46) § 32. This has been implicitly confirmed by the ICI, see ibid § 25.
4.3 NON-INCORPORATED RIGHTS – LIABILITY FOR VIOLATIONS OF HUMANITARIAN LAW

4.3.1 INTRODUCTION

Notwithstanding the expansive development of the scope of human rights treaties, there remain situations where they arguably will not apply. The question then is whether there is an obligation under international law to provide reparations to victims. If so, the next question is how this right is dealt with under domestic Norwegian law.49

4.3.2 INDIVIDUAL REPARATIONS UNDER HUMANITARIAN LAW

Under the international law on State responsibility, States have an obligation to make reparations in the case of internationally wrongful acts.50 This can take the form of restitution, compensation or satisfaction.51 The same obligation applies under IHL, under treaty and customary international law.52 Only States have traditionally been held to be entitled to reparation in case violations of international law.53 Whether this entitlement under IHL encompasses individuals as well as the injured State has been argued to be controversial.54

As early as 1987 the commentary to Article 91 to Protocol I Additional to the Geneva Conventions foreshadowed that the obligation enshrined could be owed to individuals, identifying an ‘emerging tendency to recognise the exercise of rights by individuals’.55 In 1988 work began on the Basic Principles and Guidelines on the Right to a Remedy and Reparation for Victims of Gross Violations of International Human Rights Law and Serious Violations of International Humanitarian Law.56 The resolution on the Basic Principles was passed without a vote by the UN General Assembly in 2005, and purports to be descriptive of existing international legal obligations.57 The Basic Principles lists the same rights of victims irrespective of the regime applicable, reflecting a harmonisation of the law of reparations under both IHRL and IHL. An individual right to reparations has also been

49. Under domestic law, the findings would arguably be the same in respect of customary human rights law.
51. International Law Commission, ibid, Articles 35-37.
53. The customary international legal rule on diplomatic protection is an expression of this principle, see for example Case Concerning the Mavrommatis Palestine Concessions (Greece v UK) PCIJ Rep Series A No 2, 12.
57. ibid, preamble.
confirmed by the International Court of Justice (ICJ). In his dissenting opinion in the Jurisdictional Immunities case, Judge Cançado Trindade, after giving a detailed examination of the question, concluded that ‘recent developments go beyond the strict and traditional inter-State dimension, in establishing the individuals’ right to reparation as victims of grave violations of human rights and of international humanitarian law’, suggesting a convergence in both regimes regarding the question also of compensation. This was not directly disputed by the majority, although it voiced concerns about the implementation of the norm. In sum, there is a strong claim that under international humanitarian law victims of violations have an individual right to reparation, encompassing the right to compensation. Notwithstanding the multiple different possibilities on how to implement such a right, it can ultimately entail a duty to make such remedies available in the national legal order.

Under the general law on State responsibility, compensation covers ‘any damage, whether material or moral, caused by the internationally wrongful act of a State’. The final determination must be based on weighing and balancing procedure: ‘Compensation should be provided … as appropriate and proportional to the gravity of the violation and the circumstances of each case, resulting from … serious violations of international humanitarian law.’ As mentioned in section 4.2 above, the right to compensation is not preconditioned on any notion on fault in the commission of the violation by the State.

4.3.3 COMPENSATION CLAIMS UNDER DOMESTIC LAW FOR VIOLATIONS OF INTERNATIONAL HUMANITARIAN LAW

In 1946, the Norwegian Supreme Court decided on whether the State was liable for damage caused by Norwegian forces during the Second World War. A factory bridge was sabotaged by Norwegian forces during an operation to halt advancing German troops, causing damage to the factory owner. The Supreme Court concluded that the acts were legal as a measure to defend the sovereignty of the nation and that the State therefore was not under a duty to compensate the loss of the citizen. From this and other similar cases post-Second World War, it has been held that the State will not be liable for acts that comply with IHL, but that it may be liable for acts that violate IHL.

60. ibid (Judgment) §§ 98-104.
62. ILA (n 58) Article 13.
63. International Law Commission (n 50) Article 31(2).
64. UNGA, Basic Principles (n 56) no 20. See also ACHPR, General Comment 3 (n 46) § 19.
A question, then, is whether a breach of IHL is also sufficient for the State to be liable for reparations under domestic Norwegian law. As of yet, there is no authoritative answer in case law. Based on an analogy to the status of human rights violations prior to the entering into force of the Human Rights Act, one should assume that the regular conditions in Norwegian tort law apply, interpreted in light of the presumption of harmony detailed above in section 4.1. This would mean that, in a situation of lack of alternative grounds for liability, the State would be liable to pay compensation in the case of *culpa* in the commission of violations by its armed forces.

Responsibility may first be based on the negligent acts of the State itself. This so-called organ liability requires negligence in the top management of the organisation. This is satisfied in case of violations attributable to the Minister of Defence, but possibly also when it is attributable only to the leadership of the armed forces.

Second, responsibility could be based on the vicarious liability of the State for negligent acts of its armed forces as employees of the State. Even though no person individually has acted with negligence, the State will also be liable if they cumulatively caused the damage in question. This alternative may combine the effect of acts or omissions by the leadership (organ liability) and its employees. Although there is no need to specifically identify who made what contribution, it must be established that they have contributed in some meaningful sense. The standard of negligence depends on the particularities of the case and varies according to existing responsibilities and the activity carried out, in conjunction with the risk of damage involved. Furthermore, the employee and/or employer must have been able to take reasonable and practical steps to prevent the damage from occurring. In some cases, considerable difficulties in preventing the damage could be exonerating.

However, based on the activity, which is connected with the use of lethal force in armed conflict, existing responsibilities of personnel to comply with IHL and the inherent risk in the use of complex new weapons technologies, the standard for what is expected in preventing violations will be high.

Third, even if no person or group of personnel can be pointed out as having acted with negligence, there is a customary ground for strict liability if the arrangement surrounding the deployment of the weapons system as a whole was reckless. This ground can be conceptualised as an extension of organ liability or vicarious liability of the State.
as employer. A condition is that there was an unavoidable risk that could and should have been removed,\(^7\) and that the State is the closest to bear responsibility for the fact that it was not.

As regards the first of these grounds, a central question is whether the leadership had reasons to intervene to prevent the violation from occurring. This will depend on the particular circumstances. Organ liability must therefore be understood in the context of the rigorous procedures for approval of the weapons system prior to deployment,\(^8\) and a basic principle of labour sharing: that the leadership must be able to rely on the expert opinions of subordinates, particularly so when dealing with technical questions regarding weapons systems. For this reason, the mere fact that there are external contradicting views concerning the risks posed by AWS would not necessarily be sufficient to engage responsibility. Prior to deployment, organ liability could more easily be conceived if the risks were known but remained unaddressed, or if the leadership remained passive after express concerns were voiced by experts after deployment of the system. Organ liability would clearly also play a role in the unlikely case that a leadership decision is taken in direct contravention of expert advice.

Like organ liability, vicarious liability is inherently tied to the notion of role-responsibility. Although this conception is somewhat diluted when assessing cumulative and anonymous negligence, the assessment will continue to operate within the general framework of responsibilities within the armed forces. Clearly, liability could arise following a failure by the armed forces to comply with their duties. The role of commanders here is of particular importance, given the flexible framework regulating their conduct.\(^9\) Because of their role, responsibility could also arise if the commander inadequately framed or laid out the duties or responsibilities of persons interacting with the AWS. It could also arise in case of failure to minimise risks of violations that should have been minimised, or in the case of failure to comply with a general duty of diligence in handling the system and in the training of operators.

The third ground may be considered an exception to the notion of role-responsibility. However, its relevance in the context of the use of new weapons systems is less clear; it has been particularly useful in situations where it has been apparent that there was an avoidable risk that should have been eliminated.\(^\) The use of AWS by contrast, may involve highly complex risk evaluations.

Although these three grounds cumulatively encompass a vast number of situations, some seem to fall outside their scope. One type of case is related to the increased impor-

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77. Nygård (n 11) 277.
78. The Norwegian State has incorporated Protocol I Additional to the Geneva Conventions Article 36 domestically through the adoption of Direktiv om folkerettslig vurdering av våpen, krigføringsmetoder og krigføringsmidler by the Norwegian Ministry of Defence (18 June 2003).
79. Protocol I Additional to the Geneva Conventions of 12 August 1949, Articles 86 and 87.
80. In the present author’s opinion, this was arguably the case in Rt. 1970 p. 1192 (Epileptiker), where a radiator in the prison cell of an epileptic inmate entailed the risk of the inmate suffering burns during an epileptic seizure, Rt. 1948 p. 1111 (Trikkedom), where a tramway driving with open doors entailed the risk of passengers falling out and injuring themselves, and Rt. 2000 p. 388, where the lack of reinforced windows in a closed psychiatric unit at a hospital entailed the risk of patients breaking the glass and injuring themselves.
tance of the role of the developer. It is not clear whether the State could be held liable when the violation is caused by a system error, the origin of which goes back to the developer, if the error would not be identified by justifiable maintenance routines or tests. Whether this gap can be effectively closed through developer liability will be highly dependent on the circumstances. Second, because self-learning systems by their very design imply leaving a certain discretion in selecting and engaging targets to the system itself, the actions taken by the system will be removed from the direct control of personnel. It is not clear whether this situation would fit the grounds mentioned as long as the removal of control in and of itself was not negligent or reckless. This must presumably be determined by a comprehensive assessment of general policy, the Rules of Engagement for the specific operation, and the information available to operators and commanders. A peculiar parallel could be drawn to the landmark decision in Rt. 1959 p.849 (Læregrutt). The case concerned the question of whether the employer, a car repair shop, could be held responsible for the tragic death and injury of individuals resulting from an underage trainee’s joyride with one of the cars delivered for repair. The Supreme Court answered the question in the negative, based on the fact that the damage was not produced as a result of the regular carrying out of duties by the trainee, and that the employer was not negligent in his control with and prevention of such acts. The case of AWS is similar and entirely different, as the decisions by the system at the outset will fall outside the scope of the vicarious liability doctrine.

This gap emerges because liability is based on the link to the performance of roles (role responsibility). The standard of care is shaped by the nature of the functions of each official and the expectations that reasonably can be held based on this function. Exceptions to notions of role-responsibility are in principle construed narrowly in a way that does not adequately compensate for this limitation. Faced with potential gaps like these, domestic courts may prefer to interpret the aforementioned grounds of liability broadly, bordering strict liability. In cases concerning violations of IHL, this solution could also be supported by the principle of presumption of harmony with international law and the State obligation to compensate the harm caused to the victims. At the same time, one could ask how far courts would be willing to go in making value judgments inherently connected to notions of *culpa* concerning the defensibility of using certain technologies in warfare, without it being seen as an undue interference by the judiciary in the expert security/defence area. In addition, the result would have a certain resemblance to the customary domestic doctrine of strict liability for risky activity. This doctrine is a product of the industrialisation and the concurrent development of new technologies and patterns of risky commercial activities. Certainly, a number of arguments favour the application of the doctrine in

81. Although the Product Liability Act no. 104/1988 (produktansvarsloven) holds the product developer strictly liable for damage caused by products, this does not necessarily apply to foreign developers, see the Product Liability Act section 1-4 and the Convention on the Law Applicable to Products Liability (2 October 1973) Articles 4-7 and 10. For domestic developers, a pertinent question would be whether the self-learning functions of the system and the role of the State in determining the specifications of the System would prove sufficient as exceptions under the Product Liability Act section 2-2 (b) and (c).

82. Nygård (n 11) 245-246.

83. In Norwegian called ‘risikoansvar’ or ‘ulovfestet objektivt ansvar’.

84. Nygård (n 11) 253.
the context of AWS: it is a new weapons technology that creates a certain risk of unlawful acts that may result in damage to individuals. As previously mentioned, however, outside context of technical failures, the notion of risk itself as a condition of civil liability is ill suited in armed conflict situations.85

A solution could be found in the doctrine of strict State liability for unlawful acts.86 In short, the State will be strictly liable for damage that an illegal act has produced. The extent to which the State can be held liable on this ground remains highly controversial.87 The application of the doctrine in the context of violations of IHL outside the scope of incorporated IHRL treaties raises two additional challenges.

The first relates to the scope of the doctrine as to the relevant ‘acts’. Traditionally, the doctrine has been applied to administrative decisions typically falling under the scope of the Public Administration Act.88 Some maintain that the doctrine only applies in these situations, whilst others argue that there is no reason not to include unlawful conduct.89 To date, it remains highly unclear to what extent it can be translated to other areas of the exercise of public power. Thus, the status of actual conduct of public officials is not clear in instances where the conduct does not result in an administrative decision. The strongest argument for equating the two stemming from case law is in Rt. 1987 p. 1495 (Reitgjerdet II), where the Supreme Court held the State strictly liable for having implemented an unlawful decision to retain an individual in a psychiatric institution.90 However, problems arise where there is less of a link between decision and implementation, and where there arguably is no conduct by State agents that can be considered unlawful, as is the case when the violation is produced by AWS.

The second challenge relates to the notion of ‘unlawfulness’. The doctrine has had some success particularly in cases concerning interferences with the integrity of individuals.91 Formally however, the notion of unlawfulness refers to the domestic legal realm, either by itself or interpreted in light of relevant international obligations.92 This could pose problems because of the apparent lack of domestic laws on the basis of which domestic courts can interpret relevant IHL norms. One option would be to generalise based on the fact that breaches of IHL will generally be covered by the civil and military criminal codes.93 This criminalisation expresses the legislator’s condemnation of the acts in question and could provide strong support in favour of considering the acts unlawful under domestic Norwegian law.

85. Hagstrøm (n 66) 231.
86. In Norwegian called ‘rettsstridslæren’.
89. For the latter position, see Hans Petter Graver, Forvaltningsrett (4th ed., Universitetsforlaget 2014) 547.
90. See Rt. 1987 p. 1495 (Reitgjerdet II), 1507.
91. ibid and Rt. 2005 p. 416 (Advokatbevilling).
92. Graver (n 89) 548.
Another possibility would be to look to the Norwegian Constitution, either as a separate ground for liability or as a source for considering the act unlawful under domestic Norwegian law. As previously mentioned, the Norwegian Constitution was amended in 2014 incorporating a new chapter on human rights. Section 92 now places an obligation on the State to respect and secure the human rights enshrined in the constitution and in international treaties to which Norway is bound, reaffirming that the constitutional guarantees are not necessarily identical to their treaty-based counterparts. The right to life in section 93 is inspired by the ECHR Article 2 and the ICCPR Article 6. Although it was not intended that the constitutionalisation of human rights would change the substantive level of human rights protection, there is little reason to adhere strictly to jurisdictional limitations in the constitution’s treaty-based counterparts solely because international treaty instruments do not extend to the situation. This is also supported by the fundamental importance attached particularly to the right to life. Thus, an arguable claim could be made that domestic Norwegian authorities are under a duty not to cause arbitrary deprivations of life irrespective of whether particular human rights treaties apply. Any such deprivation of life would thus be sufficient to hold the State strictly liable for damages.

In sum, although existing law would render the State liable for violations committed by AWS, some gaps are likely to remain. It is possible to extend the existing normative framework to close the gaps. However, precisely because this could necessitate an extension of the existing framework, these findings rest at the border between de lege lata and de lege ferenda.

5. ASCERTAINING THE FACTS OF THE CASE

5.1 INTRODUCTION

In addition to limitations in the application of traditional grounds of liability, several other challenges may arise, generally falling under Hin-Y an Liu’s category of circumstantial challenges in the sense that they would depend on the particularities of the specific case; see section 3 above.

On a practical level, the fundamental issue in civil tort cases concerns the question of establishing proof that the conditions for the claim are met. As a main rule, the onus is on the person claiming compensation. When operating within the scope of human rights treaty standards, however, Norwegian courts must apply the rules concerning the burden of proof under human rights law, derived from the fact that the claim for compensation is an extension of the right to remedy. Under human rights law, the burden of proof may vary depending on the specific circumstances, because not all cases ‘lend themselves to a strict application of the principle … that the burden of proof lies on the person making the allegation in question’. This is usually the case where the victim is in the custody of

95. Hassan v the United Kingdom (n 46) § 49.
the State, where the information is in the exclusive knowledge of the authorities. It is less clear how the division of the burden is in relation to allegations of arbitrary deprivations of life outside custody cases in the context of armed conflict. A similar uncertainty concerns the rules concerning burden of proof at the domestic level outside the context of human rights treaties. The difficulty of proving the case will also be influenced by whether liability is based on fault or whether strict liability applies. Such difficulty is highlighted by the difference between, for example, proving the causal relation between the act attributable to the State, and the violation of the rights of the victims; or between the negligent act/omission of the individual, and the decision by the weapons system to produce the damage to the individual.

How difficult this will be in practice for the victim must be understood in the context of the general framework regulating the establishment of the facts of the violation. The general duty to investigate potential violations of IHL and IHRL has been held to be the sine qua non for the fulfilment of the rights of victims, including the right to substantive remedies.

5.2 AUTONOMOUS WEAPONS AND THE DUTY TO INVESTIGATE

The duty to investigate follows from the general duty to ‘respect, ensure respect for and implement international human rights law and international humanitarian law’. It is a duty of means and not one of result. Under IHL, it has acquired the status of customary law. A distinction must be made between the general duty to investigate all possible breaches of IHL and IHRL, and the duty to conduct effective investigations. Under IHL, a duty to conduct effective investigations arises in cases of ‘gross violations of … humanitarian law constituting crimes under international law’. Regarding the threshold of application under the ECHR, the ECtHR has stated that ‘there should be some form of effective official investigation when individuals have been killed as a result of the use

96. ibid.
97. International Commission of Jurists (n 10) 57.
99. See Jaloud v the Netherlands (n 42) § 166.
100. See e.g. ICRC, ‘Customary IHL – Rule 158. Prosecution of War Crimes’ (ICRC) https://www.icrc.org/customary-ihl/eng/docs/v1_rul_rule158 accessed 23 October 2017, UNGA, Basic Principles (n 54) no. 3 (b) in conjunction with no. 1 and Turkel Commission (n 46) 93.
101. Turkel Commission (n 46) 102, 103 and 112.
102. UNGA, Basic Principles (n 56) no. 4; Turkel Commission (n 46) 82; and ICRC (n 100).
of force’.103 That this threshold applies in the context of law enforcement is uncontroversial.104 The duty applies extraterritorially in situations of armed conflict: ‘[T]he obligation under Article 2 to safeguard life entails that, even in difficult security conditions, all reasonable steps must be taken to ensure that an effective, independent investigation is conducted into alleged breaches of the right to life’.105

The duty of effectiveness implies that the investigation must be able to lead to a ‘determination of whether the force used was or was not justified in the circumstances and to the identification and punishment of those responsible’.106 It is inherent in the investigation on whether or not the use of force was ‘justified’ that the duty also involves a determination of the question of State responsibility for the violation.107 Effective investigations entail a duty of effectiveness, thoroughness, impartiality, and transparency.108 States have a certain margin of appreciation in their implementation of the obligation,109 but must ‘act of their own motion once the matter has come to their attention’.110

This raises the question of whether the duty to investigate could entail a limitation on the use of AWS if it would render it virtually impossible to achieve the purposes of investigations in cases where violations might have occurred. Framed in another way, the question is whether the State has a duty to ensure that it would be possible to ascertain whether a violation has occurred and to identify and persecute perpetrators of the violation.

The need to be able to trace and monitor the acts of AWS has been raised by several authors, as discussed above in section 3. Indeed, traceability is crucial in order to distinguish the illegitimate from the legitimate uses of lethal force. This entails, first, a possibility to ascertain the activities of the system ex post facto, in order to determine what happened. Second, understanding the ‘reasoning’ behind decisions taken by the system, particularly because rules of IHL, such as the duty of proportionality and the duty to take precautionary measures,111 presuppose complex and context-sensitive evaluations. In cases where the use of lethal force was illegitimate, the system must be able to disclose information that could be relevant for the purpose of establishing individual responsibility. This could entail distinguishing actions that are the result of system errors from actions that are the result of the normal operation of the system. This could in turn help identify violations that are the result of hacking, malfunction, inadequate maintenance, and so on. In other instances, distinguishing decisions that are the direct consequence of developer programming or

103. Al-Skeini v the United Kingdom (n 37) § 163.
104. Turkel Commission (n 46) 103.
105. Al-Skeini v the United Kingdom (n 37) § 164. This will nevertheless influence the determination of how substantial the obligations are, see Jaloud v the Netherlands (n 42) § 226.
106. Al-Skeini v the United Kingdom (n 37) § 166.
107. ibid § 163.
108. UNGA, Basic Principles (n 56) no. 3 (b); UNESC (n 98) no. 19; Al-Skeini v the United Kingdom (n 37) § 167; and Turkel Commission (n 46) 137-138.
109. See e.g. UNGA, Basic Principles (n 56) no. 4. Under the ECHR there is a duty to undertake ‘some form of official investigation’, see Al-Skeini v the United Kingdom (n 37) § 163.
110. Al-Skeini v the United Kingdom (n 37) § 166 and Aksoy v Turkey (n 35) §§ 98-99.
specifications of the particular operation (based on Rules of Engagement) could direct further investigations into developer or commander/operator responsibility. In addition, self-learning function of systems with high levels of autonomy could necessitate the identification of system behaviour that have developed as a consequence of training, testing or previous deployment.

It is likely that the positive obligations of the State to investigate violations would entail obligations such as these as the contrary solution would risk rendering the substantive rights 'ineffective in practice and it would be possible in some cases for agents of the State to abuse the rights … with virtual impunity'. The procedural obligations of States under Arts. 2 to 4 of the ECHR entail, on an abstract level, arranging conditions ex ante that permit the retrieval of necessary information to conduct effective investigations ex post following allegations or suspicion of violations. In the case of AWS, this could be translated to ensuring that the system permits the retrieval of necessary information to fulfil the purpose of the investigation of alleged violations. The role of the State in the development process of weapons systems favours this conception, as it maintains control over the end result of a weapons system through the development process, in the product specifications and requirements, testing procedures, and so on.

6. CONCLUSIONS

This article has attempted to identify and examine in what way the accountability concerns identified in section 3 apply also in the context of compensation claims under domestic Norwegian law. The use of AWS has the potential to influence the fulfilment of rights of victims of violations of human rights and humanitarian law. Although compensation cases before Norwegian courts for violations committed during military operations remain rare, understanding the potential legal issues that arise in this context is of paramount importance for discussions about a possible future development of AWS. In a wider perspective, the topic addressed by this article illustrates that the use of AWS can have a series of discrete effects influencing the implementation of international law in domestic legal systems that may not be readily apparent. This illustrates the importance of international legal standards concerning the protection of victims for the debate on the future of AWS.

In the Norwegian legal system, monism in regard to human rights guarantees secures conformity with international standards, and the expansive extraterritorial approach of human rights instruments ostensibly grants strong protection in domestic law for violations committed during international military operations. However, the conceptual challenges outlined could prove a thorny issue outside the scope of application of human rights treaties. Here, AWS may potentially prevent the right of victims to compensation claims

112. Al Nashiri v Poland, Application no 28761/11, § 485, ECHR 2014.
113. This finds support in that the procedural limb of Articles 2-4 go further than the duty to investigate in the strict sense, encompassing also the obligation to put an effective judicial system in place; see Jean-François Akandji-Kombe, ‘Positive obligations under the European Convention on Human Rights: A guide to the implementation of the European Convention on Human Rights’ (Human rights handbooks No 7, Council of Europe 2007) 32.
at the domestic level. In addressing accountability gaps in domestic law, developments in IHL concerning the right to compensation should be reflected also at the domestic level. This article has attempted to explore avenues in which such a right can be implemented, either by drawing on existing grounds for strict liability under domestic Norwegian tort law, or by interpreting the Norwegian constitution on the right to life in a way that closes the potential accountability gap. The circumstantial challenges outlined may also prove difficult to overcome, posing particular challenges for victims seeking to litigate their claims. Here, the article proposed to draw on the positive obligations of States to investigate alleged violations in order to address key concerns for establishing the fact of the violation.