

RESEARCH BRIEF

SENDING UP A FLARE: AUTONOMOUS WEAPONS SYSTEMS PROLIFERATION RISKS TO HUMAN RIGHTS AND INTERNATIONAL SECURITY

EXECUTIVE SUMMARY

There is growing evidence that AWS technology is advancing rapidly and is likely to proliferate. Many factors will determine which kinds of AWS proliferate, to whom they proliferate, and the pace and scope of proliferation. One factor is the technical nature of the robotic systems in question. Some elements of the physical hardware enabling certain kinds of AWS have already proliferated, and many extant weapons systems could be retrofitted with autonomy. Proliferation of autonomy is facilitated through a combination of powerful processing chips, sensors, and digital software. While the ease of acquisition of sensors and processors may be affected with sanctions, some elements of software underpinning autonomy are already freely available. While a sophisticated, legally compliant AWS may remain difficult (or impossible) to create for some time to come, a simple, 'low-end' AWS capable of autonomously navigating, acquiring and killing a target is an increasingly practical possibility today.¹ This may result in a toxic mélange: as AWS become increasingly sought, many of the systems that are simple and affordable to produce may be the least likely of complying with international law.

There are a range of potential uses of AWS by state and non-state actors, including warfighting, policing and extrajudicial killing. Use of AWS in warfighting poses well-studied human rights and humanitarian law challenges, as well as challenges to international stability and security. Through the Group of Governmental Experts on Lethal Autonomous Weapons Systems (GGE on LAWS) process, the international community has focused on the use of AWS in armed conflict. This process has identified serious concerns as to whether AWS can comply with international law. The ability of AWS to reliably distinguish targets, take precaution in their attack, and engage targets proportionally remains a technological challenge even for the most advanced militaries. The speed of AI decision-making may preclude the ability of humans to control conflict escalation. Reduction of potential soldier casualties on the part of AWS users, perceived distancing from the conflict, and increased dehumanisation of the enemy, may encourage an increased willingness to resort to force.^{2,3} There is also concern that human control over such systems will be increasingly illusionary due to factors such as the cognitive limitations of humans, and the potential influence of automation bias⁴ on human decision-making.

The use of AWS in policing was explored by a former Special Rapporteur on extrajudicial, summary and arbitrary executions who identified that such use could lead to violations of the 'rights to bodily integrity and human dignity.'⁵

Use of AWS for extrajudicial killing may pose severe risks to a wide range of human rights, particularly those of vulnerable populations. There may be overlapping drivers of use and potential targets of extrajudicial killing between state and non-state actors. The human rights implications are manifold, including violations of the rights to life, dignity, freedom of opinion and expression, freedom of religion, freedom of peaceful assembly and association, protection from discrimination, etc. Some AWS targeting techniques, such as biometric or pattern-of-life tracing, raise concerns regarding risks to the rights to dignity, privacy, and protection from discrimination. Errors in targeting caused by dataset bias may lead to erroneous and discriminatory killing. Challenges posed to attribution by AWS may undermine accountability: a core principle underlying international law.

Overcoming these risks to IHRL and IHL will require a multi-state effort. However, while the threat of AWS proliferation was raised early in the GGE on LAWS process and the topic continues to be raised periodically therein, concerns about proliferation have been raised almost exclusively in the context of AWS proliferation to terrorist groups. Other uses of AWS by both state and non-state actors in, and against, civil society have been largely absent from international dialogue. In 2023, however, a series of events and initiatives signalled a growing awareness of AWS proliferation risks. These included the Regional Conference on the Social and Humanitarian Impact of Autonomous Weapons (which included proliferation in its agenda),⁶ the Secretary-General's New Agenda for Peace (which noted concerns around new technologies' proliferation),⁷ a call for action by the signatories to the CARICOM Declaration on AWS,⁸ and a 'Joint call by

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the United Nations Secretary-General and the President of the International Committee of the Red Cross for States to establish new prohibitions and restrictions on Autonomous Weapon Systems' ('Joint call').⁹ The international community must seize the window of opportunity created by this awareness and take proactive and concrete action to evaluate and mitigate threats to human rights posed by AWS proliferation.

This paper¹⁰ highlights risks from the proliferation of AWS to state and non-state actors. It aims to prompt international action on an emerging and underexplored threat: the use of AWS systems, by both state and non-state actors, against high-risk human targets in civil society.

Recommendations include:

- To evaluate the feasibility of, and technical information needed for, detecting, monitoring, and attributing AWS use by state and non-state actors, and implement a monitoring program if feasible;
- To convene an interdisciplinary expert working group to identify best practices to reduce the threat to vulnerable groups from AWS;
- To prohibit the development of AWS with technology, including facial recognition, that facilitates targeted killing;
- To call upon states to pledge to refrain from the domestic use of AWS

1. PROLIFERATION

‘Those who support the development of autonomous weapons often make the error of believing that it will provide their State with an asymmetric advantage and no one else will have the technology to keep up. However, history has shown us that new weapons technology proliferates rapidly. The automation of warfare is no exception.’¹¹

That AWS will proliferate appears to be a broadly, if not ubiquitously, held belief among states and experts.¹² In 2019, the GGE included proliferation as a challenge which states should consider in its *11 Guiding Principles*.¹³ Two main forms of proliferation are likely to take place, both of which apply to state and non-state actors. The first is the proliferation of ‘ready-made’ AWS, i.e. professionally manufactured weapons systems which are either purchased from arms manufacturers via legal trade, or are diverted from military stockpiles and sold on the black market.¹⁴ A second form of proliferation is the indigenous development of AWS, either by states, non-state actors or individuals.¹⁵

These forms of proliferation may differ in key respects. Ready-made AWS are likely to be developed for state use — principally for armed conflict, but also potentially for policing. As states have agreed by consensus that IHL applies to AWS (though not on *how* IHL applies), ready-made AWS *should* possess the technical capability to perform distinction, proportionality and precaution calculations. Many states and non-government organizations have challenged the notion that AWS can perform such calculations along technical, ethical, and legal lines.^{17,18,19} Actual compliance with IHL may vary, based on a state’s technical capabilities, ethical beliefs and legal interpretations. However, as many states have stronger incentives to abide by international norms than non-state actors,²⁰ they may acquire AWS with superior technical capability to perform such calculations than

‘Autonomous weapon systems [AWS] select and apply force to targets without human intervention. After initial activation or launch by a person, an autonomous weapon system self-initiates or triggers a strike in response to information from the environment received through sensors and on the basis of a generalized ‘target profile’. This means that the user does not choose, or even know, the specific target(s) and the precise timing and/or location of the resulting application(s) of force.’¹⁶

AWS which many non-state actors may build or purchase.

For purposes of discussion, AWS can be broadly classified into ‘high-end’ and ‘low-end’ systems (with the caveat that, as technology advances, certain high-end capabilities may become sufficiently widespread to be utilised by low-end weapons). High-end systems, such as autonomous fighter jets or autonomous naval vessels, are likely to remain technologically complex and expensive (though less so than manned systems).²¹ They may demand advanced technologies, such as complex sensor systems, radiation-absorbing materials, high performance jet turbines, etc.²² These are high technological barriers that even industrialised militaries continue to struggle with.²³ Low-end systems, by contrast, are technologically simpler and less expensive.^{24,25} Such systems may rely on dual-use civilian technologies,²⁶ including autonomous multicopters or small fixed-wing drones.

The process of AWS proliferation may be highly dependent on the technical nature of the robotic systems in question. Some elements of the physical hardware enabling low-end AWS have already proliferated.²⁷ Many extant weapons systems, including low-end robotic systems capable of carrying munitions, could be retrofitted with autonomy.²⁸ As noted in the 2016 Report of the Informal Meeting of Experts on LAWS, ‘...due to the inherent dual-use character of many robotic technologies, many systems originally intended for civilian purposes could easily be modified to serve military functions. This would not only increase the risk of proliferation, but also create accountability problems.’²⁹

High-end systems may pose less of a proliferation risk. In addition to technological constraints, many of the physical components of high-end unmanned systems — particularly aerospace AWS — are regulated by sanctions regimes. These include both multilateral^{30,31} and national or regional export control regimes.^{32,33} Such regimes regulate domain-specific technologies, which may be difficult for less-advanced states or non-state actors to reproduce. Therefore, some elements of high-end AWS are already regulated by non-proliferation mechanisms.

The proliferation of autonomy is a separate issue. Autonomy is facilitated through a combination of powerful processing chips, sensors and digital software.³⁴ Because countries may struggle to find domestic alternatives to

imported processors,³⁵ sanctions may be one measure to impede AWS production. For example, many nations have applied sanctions to restrict Russia's ability to access microelectronics, including high-performance processing chips,^{36,37} although the efficacy of these measures is unclear.³⁸ It is also unclear whether similar sanctions regimes could be applied effectively to sensor systems. Large numbers of low-quality sensors can have their data outputs combined to produce high-quality sensor data.³⁹ Military research into such sensor fusion has been occurring for some time.⁴⁰ Thus, sensor quality may be less important than their ability to be networked and combined by a machine learning system.

Finally, it may also be difficult to effectively sanction the software needed for autonomous weapons.⁴¹ Many elements of the software enabling autonomy in AWS are already available. Examples include software that can identify a human,⁴² autonomously fly a quadcopter (including around obstacles)⁴³ and enable unmanned aerial vehicles (UAVs) to form primitive swarms.⁴⁴ Likewise, there are a multitude of open-source solutions for facial recognition.⁴⁵ Other elements of the software needed to enable autonomous AWS, however, remain difficult to produce from a technological standpoint. For example, accurately detecting human sentiment in a combat situation, such as attempts to surrender, remains a challenge even for the most advanced militaries,⁴⁶ as is distinguishing a walking cane from a gun.⁴⁷ Optical image recognition systems utilising machine learning remain brittle,⁴⁸ imposing challenges for even the basic mobility of autonomous ground vehicles.⁴⁹ Thus, the ability of AWS to reliably *distinguish* targets, to take *precaution* in their attack and to engage targets *proportionally* remains technologically challenging.

In summary, while a sophisticated AWS which respects IHL and international human rights law (IHRL) remains difficult or impossible to build, a simple AWS capable of autonomously navigating, acquiring and killing a target is a reasonably practical possibility.⁵⁰ As one scholar described the situation, it would be 'hard but doable,' and require 'not much money.'⁵¹

A further important point is that while most militaries would likely prefer to develop and produce customised AWS solutions, or acquire them legitimately (or covertly) from another military, others will not be able to do this:

either due to cost or lack of technological expertise. These countries may be forced to resort to open-source software: and the exercise of this option may increase if AWS become viewed as indispensable to warfighting.^{52,53,54,55} These factors may form a toxic *mélange*: AWS may become increasingly perceived as militarily necessary, while AWS that are most accessible may be the least likely to be capable of complying with international law.

2. POTENTIAL USES OF AUTONOMOUS WEAPONS SYSTEMS

This section presents a broad overview of potential uses of AWS by state actors and violent non-state actors (VNSA).⁵⁶ It aims to expand the current AWS dialogue to consider the human rights impacts of AWS uses by both states and VNSA outside of warfighting, and prompt action to mitigate impacts. While proliferation to these classes of actors may result in different impacts, there is some overlap. In terms of the use cases for AWS, the difference between a criminal state⁵⁷ and a criminal organisation may be small. This is especially the case where putative non-state actors may, for example, be acting on behalf of, or in collusion with, a state.^{58,59,60,61} Proliferation of AWS to states with poor human rights records may be particularly concerning.⁶²

2.1 PROLIFERATION IN ARMED CONFLICT

*'Kill the machines and they will be replaced. Kill citizens or the citizens of allies of the technological power and the opponent might relent...'*⁶³

The most evident use case for AWS proliferation among state actors is armed conflict. In 2021, the UN Security Council Panel of Experts on Libya reported the first alleged use of an AWS to kill humans. The panel described the Government of National Accord Affiliated Forces' use of a Turkish Kargu-2 autonomous weapon with 'fire, forget and find' capability to kill insurgents.⁶⁴ Since then, it has been reported that Russia^{65,66} and Ukraine⁶⁷ have likely used autonomous weapons on the battlefield. This use will likely grow. As of late 2023, other states believed to be developing AWS included China,⁶⁸ Israel,⁶⁹ South Korea,⁷⁰ and the United States. For example, in September 2023, the United States announced that it intended to 'field attritable, autonomous systems at a scale of multiple thousands [and]

in multiple domains within the next 18-to-24 months' under its *Replicator Initiative*.^{71,72}

AWS proliferation among states may threaten international stability and security.⁷³ Two broad *jus ad bellum*-related arguments are at the heart of these concerns. First, the speed at which AWS operate could escalate (or create) conflict, and may preclude the ability of a human to countermand attacks/responses in a timely manner.^{74,75,76,77} As Laird sets out: '...leaders could lose the ability to manage the crisis and with it the ability to control escalation. With tactical and operational action taking place at speeds driven by machines, the time for exchanging signals and communications and for assessing diplomatic options and offramps will be significantly foreclosed.'⁷⁸ This may decrease strategic stability.⁷⁹

Second, the combination of reduced potential soldier casualties, plausible deniability,⁸⁰ and conceptual distancing from a conflict and resulting dehumanisation of the enemy could lead to an increased willingness to use AWS.^{81,82,83} In 2014, Austria argued that '[p]utting soldiers' lives at stake makes States think twice whether to engage in armed conflict' but the option to use AWS 'remove[s] such restraint from the use of military force.'⁸⁴

Broader concerns relate to how AWS may alter the nature of warfare. Due to a perception that AWS may provide 'key military advantages',⁸⁵ may have a 'revolutionary impact on warfare',⁸⁶ and may thus be important for ensuring state security, states may engage in arms races due to fears of being left behind in AWS development.^{87,88} As Pakistan summarised in 2016, 'Faced with the prospect of being overwhelmed by LAWS, states possessing WMD capabilities would be reluctant to give them up, while others would feel encouraged to acquire them...Since the developing countries are not going to carry the burden of non-proliferation, an unchecked autonomous weapons' arms race could ensue.'⁸⁹ Other states have expressed similar views.^{90,91}

However, while there is broad agreement that AWS are likely to change the nature of warfare, there is not agreement about the effects that proliferation of AWS into armed conflicts will have. For example, Goldfarb and Lindsay challenge the argument that AWS will afford 'significant military advantages that will shift the balance of power toward early adopters,' stating that

this outcome is 'plausible, but...based on problematic assumptions about AI substitutability.'⁹² Wars may become more protracted and be 'decided by the slow erosion of resolve and institutional capacity [rather] than set-piece battles between robotic forces.'⁹³ Wyatt suggests that '[i]t appears likely that only large, wealthy states will have the infrastructure resources to initially acquire and effectively deploy full LAWS,' but states that, over time, developing states may be able to compete with advanced nations by acquiring or developing autonomous weapons systems.⁹⁴ Gartzke identifies a range of detrimental effects which may result from AWS adoption for warfighting, including increased targeting of civilian populations, increased willingness to engage in war, continual low-level conflicts, the potential '[revitalisation] of occupation,' and the potential use of AWS for domestic repression.⁹⁵ As one expert interviewee put it, this might resemble a 'metastasization of conflict.'⁹⁶

2.2 POLICING

The use of AWS technologies by state security forces raises serious human rights concerns,⁹⁷ with some non-governmental organisations calling for a prohibition on their use in this domain.^{98,99,100} In terms of proliferation pathways, it is important to note the 'shared space' that the military and police sectors occupy in many countries. For example, military forces may be utilised in civilian law enforcement roles,^{101,102,103} either as a matter of course or temporarily in times of emergency.^{104,105} Weapons developed for or by the military also proliferate into civilian police forces as 'hand-me-downs'.¹⁰⁶ There is evidence suggesting a progressive normalisation of the use of unmanned systems in policing.¹⁰⁷ For example, the US state of North Dakota legalised the use in policing of less-than-lethal armed drones in 2015,¹⁰⁸ while in 2022 the city of San Francisco initially approved,¹⁰⁹ but later rejected,¹¹⁰ the use of unmanned robots in killing criminal suspects.

2.3 EXTRAJUDICIAL USE OF AWS

A key challenge of AWS is the difficulty of attributing their use to a specific actor. Where non-state actors are operating on behalf of a state, such attribution becomes even more difficult.¹¹¹ As Hadfield and Leveringhaus describe, 'At a practical level, LAWS [are] likely to be stealthier, faster and harder to track, rendering it difficult to attribute a particular decision to a specific state.'¹¹² This may make

them attractive in a number of scenarios, including extrajudicial killing or maiming. The likelihood of AWS being used for extrajudicial killings may depend on a range of factors including what targets a group seeks to kill; the cost of killing via present methods; the risk (or lack thereof) of attribution under current methods; the importance of humans being a core component of the killing to intragroup dynamics; the potential to single out one's own group by being the only regional group using AWS, and thus fall under increased attention from governmental law enforcement — and many more factors which are impossible to unpack within the scope of this research. AWS might be regarded as particularly attractive in situations where attribution is not desired, such as in a transnational assassination,^{113,114,115} in regions with rule of law, or if there is risk of political condemnation¹¹⁶ sanctions,^{117,118} or other retorsion mechanisms. Below, and with the caveat that more research and analysis is required on this topic, some general insight into how AWS might be used to target individuals and groups is provided.

Targeted killings

The use of AWS for targeted killings requires that the AWS is able to search for and recognize an individual human target or set of targets. An obvious technology enabling this is facial recognition: such systems are being developed for special operations for 'identification and intelligence-gathering.'¹¹⁹ Open-source facial recognition systems¹²⁰ and datasets for testing drone-based facial recognition¹²¹ are readily available online. Facial recognition systems are one of the AI tools that are already being used by 'some governments ... to surveil their own citizens, harass journalists, human rights defenders, and political dissidents.'¹²² In the US, expansion of the use of facial recognition software by 'hundreds of local, state and federal agencies, including law enforcement' has prompted the introduction, but not yet passage, of federal legislation to prevent governmental use of 'facial recognition and other biometric technologies'.¹²³ Other mechanisms for identifying and targeting individuals, such as via their personal cell phones,¹²⁴ may also be sufficient to enable low-cost and reasonable-precision AWS. Potential civil society targets of AWS may be predicted by examining current targets¹²⁵ of extrajudicial killings,¹²⁶ such as human rights defenders,¹²⁷ journalists,^{128,129} LGBTQI+,¹³⁰ environmental activists,¹³¹ political dissidents^{132,133,134} and activists,¹³⁵ elected officials,^{136,137} and judicial and legal

officials.¹³⁸

Class-based killings

AWS could also be developed and used to identify and attack groups of individuals based on shared characteristics. Key technologies enabling this kind of attack include the ability to coordinate many drones to conduct attacks at scale — swarm attacks — and the use of physical characteristics to discriminate and target classes of individuals.¹³⁹ Given the present state of these technologies, one concern is the use of drones to conduct ethnic killing or genocide.¹⁴⁰ Asaro states that 'Despots and tyrants might turn such weapons against their own people or apply them to genocidal ends, or terrorists might use them to attack civilians.'¹⁴¹ Kallenborn describes that '[p]articularly nefarious states may be drawn to drone swarms and AFADS [armed fully autonomous drone swarms] as genocidal weapons.'¹⁴² Use of AWS to conduct some forms of genocide — e.g., those based upon visible morphological differences, such as skin colour — may be possible given existing data sets. Other forms of targeting — such as those based on particular clothes, spoken language or religious icons — may be more difficult,¹⁴³ and require data sets not yet in existence. Class-based killings might also be perpetrated using geographic delimitations. The risk of terrorist attacks on crowds in defined geographic areas, such as stadiums, has been explored in counterterrorism literature.¹⁴⁴ Not only have terrorist groups attempted such attacks, but '...these scenarios are highly achievable with COTS sUAS...'¹⁴⁵ The ability to 'box' an AWS to a certain operating area is one suggestion for addressing IHL challenges associated with state-produced military AWS.¹⁴⁶ However, the same ability to constrain an AWS to a geographic operating region which would be desirable for militaries would facilitate both indiscriminate terror killings, and discriminant killings of specific groups, *if the target groups are geographically delimited from non-target groups.*

3. HUMAN RIGHTS IMPACTS OF AWS PROLIFERATION

'[AWS] tend to be portrayed as 'weapons of war', but [IHL]... would never be the sole, and in many instances, it would not be the primary legal frame of reference to assess the legality of their use. Consideration of [IHL] requirements and constraints on the use of AWS must be a part of the debate on AWS...'¹⁴⁷

There is ample evidence indicating that any AWS regulatory framework needs to be well-grounded in human rights. Special Rapporteurs on extrajudicial, summary or arbitrary executions¹⁴⁸ identified multiple challenges that the use of AWS pose to human rights, prompting international discussion on AWS. Such challenges were also discussed in early informal expert meetings of the CCW¹⁴⁹ and were evaluated in contemporaneous scholarly literature.^{150,151} The risks of AWS to three human rights issues have been relatively well examined: the right to life, human dignity, and accountability. While it is beyond the scope or purpose of this paper to delve deeply into the risks AWS pose to human rights, these are discussed briefly to support the point that human rights considerations, human rights experts, and UN human rights instruments need to be a strong and integral part of international action on AWS, and that international action to mitigate risks to human rights from AWS is overdue.

3.1 THE RIGHT TO LIFE

The right to life¹⁵² is the ‘supreme right from which no derogation is permitted, even in situations of armed conflict and other public emergencies that threaten the life of the nation.’¹⁵³ Thus, AWS may infringe on the human right to life in both periods of armed conflict and peace.¹⁵⁴ There is ‘authoritative and overwhelming’¹⁵⁵ ‘international legal consensus’¹⁵⁶ that human rights law continues to apply during times of armed conflict.^{157,158}

Heyns argued that AWS could present novel challenges to the right to life.¹⁵⁹ He summarized that: ‘...the right to life has two components: (1) *preventing* the arbitrary loss of life and (2) *accountability* where that occurs. If the state or its agents cause an arbitrary loss of life (including by failing to exercise due diligence to prevent it) it commits a violation of the right to life; the lack of accountability where there is reason to believe that a death was unlawful, is in itself also a violation of the right to life.’¹⁶⁰ During periods of armed conflict, ‘deaths resulting from lawful ‘acts of war’ are not ‘arbitrary’ deprivation of life.’¹⁶¹ Conversely, if AWS are unable to satisfy the requirements of IHL to render their killings ‘lawful acts of war,’ these killings would be arbitrary. As AWS are not humans, they may be unable to perform the requisite legal tests required under IHL and IHRL.^{162,163}

Heyns also explored the human rights challenges

associated with the use of AWS in policing. He concluded that AWS might: cause arbitrary loss of life due to technical limitations in distinguishing between individuals and selecting appropriate force; fail to proactively prevent violations of the right to life; and pose strong challenges for human accountability.¹⁶⁴ Use of AWS to kill extrajudicially, whether it be by states or by VNSAs, is an obvious violation of the right to life.¹⁶⁵ Use of AWS in this context may worsen existing threats to the right to life by empowering such killing. If AWS are used to conduct extrajudicial killings, it may exceed the abilities of many states to protect members of the public from such killings, or hold perpetrators accountable.

3.2 HUMAN DIGNITY

Dignity ‘is a constitutive part’ of rights recognized in the International Covenant on Civil and Political Rights, influences the interpretation of other rights, and ‘is also recognized in several treaties as a separate right.’¹⁶⁶ The Preamble of the UDHR¹⁶⁷ recognizes the ‘inherent dignity’ of ‘all members of the human family’ as part of the foundation upon which ‘freedom, justice and peace in the world’ rest and Article 1 affirms that all humans are equal in dignity. IHRL and IHL both aim to protect human dignity.¹⁶⁸ The potential risks to human dignity occurring with the use of AWS that target people is a long-standing concern.^{169,170, 171} At its core sits the argument that the killing of humans, whether in peace or in war, should never be in the control of an autonomous robot¹⁷² that lacks ‘morality or mortality,’¹⁷³ and ‘deliberate human choice.’¹⁷⁴ Humans should not be treated as objects chosen by a machine for attack based on an algorithm.^{175,176} In the words of Heyns: ‘having a machine deciding whether you live or die is the ultimate indignity.’¹⁷⁷

3.3 ACCOUNTABILITY

Accountability underpins international law: ‘The international human rights and humanitarian law frameworks are predicated on the fundamental premise that they bind States and individuals, and seek to hold them to account.’¹⁷⁸ Accountability serves two key functions: it deters future violations of international law, and ‘serves as retribution,’ giving victims closure.¹⁷⁹ Ensuring legal accountability has been a persistent concern since the international community first began discussing the challenges posed by AWS.^{180,181}

Accountability has been discussed substantially in the GGE on LAWS, with the GGE on LAWS concluding that '[a]ccountability for developing, deploying and using any emerging weapons system in the framework of the CCW must be ensured in accordance with applicable international law.'¹⁸² However, this discussion has occurred in the context of IHL, and has sought (and, to date, failed) to resolve key issues, such as: *in wartime*, how to ensure that humans are held legally accountable for actions of state-controlled military AWS,¹⁸³ and how to define what renders human control of AWS 'meaningful'¹⁸⁴ — an issue which underpins AWS compliance with IHRL.¹⁸⁵

Legal accountability is only possible if the actions of an AWS can be attributed *in practice*. AWS are inherently difficult to attribute: they afford the user increased temporal and spatial separation from the attack, making attribution technically complex. Some countries may be unable to attribute attacks conducted with AWS and hold their human users accountable, as they may lack the technical or investigative resources to do so. This may challenge the ability of states to fulfil their duties¹⁸⁶ to investigate violations of international law and hold violators to account.

3.4 OTHER RIGHTS THREATENED BY AWS USE

Where AWS are used to conduct extrajudicial killings of individuals or groups, additional human rights may be violated. For example, political killings '[suppress] a range of human rights,'¹⁸⁷ including 'freedoms of expression, movement, association, and participation in public affairs.'¹⁸⁸ Brehm concluded that AWS targeting techniques such as biometric or pattern-of-life targeting '...[threaten] human dignity, the right to privacy, the right not to be discriminated against and not to be subjected to cruel, inhuman or degrading treatment and the right to an effective remedy.'¹⁸⁹ Errors in AWS targeting caused by dataset bias may lead to erroneous targeting of disabled individuals,¹⁹⁰ causing ensuing violations of the right to freedom from discrimination¹⁹¹ and the right to equality before the law.¹⁹² Use of AWS to commit gender-based violence^{193,194} may violate both the right to freedom from discrimination¹⁹⁵ and specialised instruments, such as the Convention on the Elimination of All Forms of Discrimination against Women.¹⁹⁶

4. RECOMMENDED ACTIONS

There is growing evidence that AWS technology is advancing rapidly, being deployed and is likely to proliferate. While concerns about proliferation have been raised periodically, the recent call for states to recognize the 'perils of proliferation' of AWS in the CARICOM Declaration on Autonomous Weapons Systems signals a heightened level of international awareness of the issue.¹⁹⁷ This awareness, coupled with recent action at the UN Human Rights Council¹⁹⁸ and the 'Joint call',¹⁹⁹ presents a window of opportunity for international action to address specific AWS proliferation issues. To this end, the following recommendations are presented:

A. EVALUATE THE FEASIBILITY OF A MECHANISM TO TRACK AWS USE BY STATE AND NON-STATE ACTORS

The pace of AWS technological development, coupled with the potential for its use against civil society, highlights the pressing need for systems to detect, report and evaluate their use. To evaluate what a monitoring mechanism (or amendment to an existing mechanism) might look like, additional research is needed. One priority area of investigation relates to the feasibility of, and technical information needed for, identifying the use of AWS. Specific questions might include:

- Can uses of AWS be distinguished from physically similar but non-autonomous weapons systems and, if so, how? What specific kinds of information are required to attribute a killing to an AWS?
- Can uses of AWS be attributed to a specific actor? If so, what kinds of information might be required to conclusively attribute a killing by an AWS to a specific actor? What kinds of technical characteristics would facilitate such attribution?
- What kinds of protocols should medico-legal or technical personnel implement when investigating a killing suspected to involve AWS?
- Is a standalone protocol for assessing suspected AWS use necessary or desirable? Are there existing protocols — such as the Minnesota Protocol — that could be updated or amended to include the relevant information?

If research indicates that it is technically feasible to detect the use of AWS, a monitoring program to track and evaluate AWS use should be implemented.

B. TAKE ACTION ON PRACTICAL THREAT REDUCTION

While a ban on AWS that target individuals or that target groups based on shared characteristics would arguably constitute a stronger form of protection, it is likely that AWS have and will continue to proliferate. The international community should take steps to understand and reduce the vulnerability of high-risk targets and populations. An interdisciplinary expert working group should be convened to identify best practices that can be implemented to reduce target vulnerability. This working group should also develop and implement protocols to monitor and inform high risk targets of AWS use in their region.²⁰⁰

C. BAN AUTONOMOUS WEAPONS SYSTEMS THAT INCLUDE FACIAL RECOGNITION

Facial recognition technologies are core enablers of AWS use for targeted killings and attacks. While facial recognition technology is readily available, a ban on the development, sale or deployment of AWS with facial recognition capabilities would be an important step in establishing an international norm prohibiting such weapons, and ameliorate the risk that military AWS with such capacities are diverted or replicated. Such a ban should be included in the legally binding instrument on AWS called for in Secretary-General's A New Agenda for Peace.²⁰¹

D. CALL UPON STATES TO PLEDGE TO REFRAIN FROM DOMESTIC USE OF AWS

The domestic use of AWS by states poses serious risks to human rights. Additionally, the domestic use of AWS by states would pose particular challenges to attribution — and thus accountability — for any killings involving AWS, challenging the abilities of states and international actors to investigate such killings. A decreased ability to attribute extrajudicial killings and hold guilty parties responsible threatens the rule of law at both the national and international level. Human rights instruments (including the Human Rights Council, the Special Rapporteur on extrajudicial, summary or arbitrary executions, and the

Special Rapporteur on counter-terrorism and human rights), as well as non-governmental human rights organisations, should call upon states to commit to a voluntary pledge to refrain from the domestic use of AWS, including by both military and non-military state actors.

END NOTES

1 Audrey Kurth Cronin, *Power to the People: How Open Technological Innovation Is Arming Tomorrow's Terrorists* (Oxford, New York: Oxford University Press, 2019), 238.

2 Peter Asaro, "On Banning Autonomous Weapon Systems: Human Rights, Automation, and the Dehumanization of Lethal Decision-Making," *International Review of the Red Cross* 94, no. 886 (June 2012): 687-709, <https://doi.org/10.1017/S1816383112000768>.

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