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Ethical discourses on autonomous weapon systems – opportunities of Austria's conservative position on autonomous weapon systems in international settings

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1. Introduction

Autonomous weapon systems (AWS), once restricted to science fiction's representation of a distant dystopian future, are becoming an increasingly decisive element in modern-day warfare. With the fast-paced development of novel AWS and their ever-increasing role on the battlefield, debates with policymakers and scholars surrounding their use and legal and ethical implications have surged since the early 2000s.[1] While some countries, such as the US, the UK, Russia and China actively endorse the development and use of AWS, Austria takes a more cautious approach. At the United Nations Convention on Certain Conventional Weapons (CCW) in 2018, Austria joined the set of nations, calling for a ban on fully autonomous weapon systems.[2] This represents a consequential shift, as Austria was the first Western democratic nation to do so. While Austria opposes AWS due to "moral, ethical, legal and humanitarian concerns",[3] opportunities for Austria to take on leadership roles in negotiating and debating frameworks for AWS have not yet been cohesively analysed. This paper will address this gap in research by first examining international perspectives and the current understanding of AWS,

[1] Arkin, Ronald: *Governing Lethal Behavior in Autonomous Robots*. Chapman and Hall/CRC/. 2009; Sharkey, Noel: Grounds for Discrimination: Autonomous Robot Weapons. In: *RUSI Defence Systems* 11.2/ 2008, pp. 86-89; Sharkey, Noel: The evitability of autonomous robot warfare. In: *International Review of the Red Cross* 94.886/ 2012a, pp. 787-799; Sparrow, Robert: Robots and Respect: Assessing the Case Against Autonomous Weapon Systems. In: *Ethics & International Affairs*, Volume 30/1/ 2016, pp. 93-116.

[2] Pax: Positions on Lethal Autonomous Weapon Systems. 2018. https://paxforpeace.nl/wp-content/uploads/sites/2/2020/11/pax-rapport-crunch-time.pdf.

[3] Bundesministerium für Europa Integration und Äußeres (BMEIA): Autonomous Weapons Systems. 2024a. https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems.

followed by ethical views on AWS and possibilities for Austria to foster international discussions on AWS.

1.1 Defining autonomous weapon systems

Before assessing ethical questions on AWS, it is important to understand how AWS are defined and understood internationally. Definitions shape the ethical and legal status and thus determine their development and deployment.[4] Although the CCW has hosted annual meetings on AWS since 2013 and established a Group of Governmental Experts (GGE) in 2016, little progress has been made in finding uniform definitions of AWS. As Williams and Scharre[5] outline, "multiple definitions and understandings currently exist about autonomous systems". Inconsistencies in international definitions of AWS may complicate discussions on their ethical and legal implications and can create loopholes for the development and deployment of AWS.

This is exemplified in the United Kingdom's (UK) approach to AWS, suggesting that it "does not possess fully autonomous weapon systems and has no intention of developing or acquiring them."[6] While this statement may appear as a clear policy guideline, there is an important caveat in relation to the UK definition of AWS. The UK government defines AWS as systems that "must be capable of achieving the same level of situational understanding as a human."[7] In essence, the term "autonomous weapon system" is uti-

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[4] Roff, Heather M.: An ontology of autonomy for autonomous weapons systems. In: Finkelstein, Claire, MacIntosh, Duncan and Ohlin, Jens David (Eds) *The Ethics of Autonomous Weapons*. Oxford: Oxford University Press/ 2017. Wood, Nathan Gabriel: Autonomous weapon systems and responsibility gaps: a taxonomy. In: *Ethics and Information Technology* 25.1/ 2023, pp. 1-14.

[5] Williams, Andrew P./Scharre, Paul D.: Defining Autonomy in Systems: Challenges and Solutions. 2015. p. 27.

[6] Ministry of Defence (MOD): Ambitious, safe, responsible: our approach to the delivery of AI-enabled capability in Defence. 2022. https://www.gov.uk/government/publications/ambitious-safe-responsible-our-approach-to-the-delivery-of-ai-enabled-capability-in-defence/ambitious-safe-responsible-our-approach-to-the-delivery-of-ai-enabled-capability-in-defence.

[7] Ministry of Defence (MOD): The UK Approach to Unmanned Aircraft Systems (Joint Doctrine Note 2/11), MoD Development, Concepts and Doctrine Centre, paragraph 508. 2017. www.gov.uk/government/uploads/system/uploads/attachment_data/file/33711/20110505JDN_211_UAS_v2U.pdf.

lised in a way that is more analogous to what "general AI"[8] would constitute, shifting the debate on autonomous weapons to a far-off future. Weapon systems that may search, select and engage targets independently and without human supervision – which is how other countries define AWS – would not fall into the UK's classification. This example highlights the detrimental effects the myriads of meanings associated with AWS can have, complicating attempts to foster uniform agreements on conditions of their development and deployment.

An additional issue surrounding definitions is the lack of clarity in descriptions of key characteristics in AWS. A comparative review of international AWS definitions outlines strong international similarities in relation to an absence of complexity in international definitions.[9] Nations commonly utilise general definitions of AWS, merely characterising these systems by their ability to select, engage and fire without the intervention of a human operator. This is exemplified in two of the most influential definitions of AWS. Definitions formulated by the US Department of Defense[10] (USDoD) and the International Committee of the Red Cross (ICRC)[11] emerged from debates and policies surrounding AWS and are often mirrored in those of other countries and organisations. However, both define AWS in undifferentiated ways, simply being a "weapon system that, once activated, can select and engage targets without further intervention by an operator"[12] and a "weapon

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8 Fox, John: Towards a Canonical Theory of General Intelligence. In: Journal of Artificial General Intelligence 11.2/2020, pp. 35-40.

9 Wood, Nathan Gabriel: Autonomous weapon systems and responsibility gaps: a taxonomy. In: Ethics and Information Technology 25.1/2023, pp. 1-14.

10 US Department of Defense (USDoD): Autonomy in Weapon Systems. 2012. https://ogc.osd.mil/Portals/99/autonomy_in_weapon_systems_dodd_3000_09.pdf; US Department of Defense (USDoD): Autonomy in Weapon Systems. 2023. https://media.defense.gov/2023/Jan/25/2003149928/-1/-1/0/DOD-DIRECTIVE-3000.09-AUTONOMY-IN-WEAPON-SYSTEMS.PDF.

11 International Committee of the Red Cross (ICRC): ICRC Position on Autonomous Weapon Systems. 2014. https://www.icrc.org/en/document/statement-icrc-lethal-autonomous-weapons-systems.

12 US Department of Defense (USDoD): Autonomy in Weapon Systems. 2012. https://ogc.osd.mil/Portals/99/autonomy_in_weapon_systems_dodd_3000_09.pdf; US Department of Defense (USDoD): Autonomy in Weapon Systems. 2023. https://media.defense.gov/2023/Jan/25/2003149928/-1/-1/0/DOD-DIRECTIVE-3000.09-AUTONOMY-IN-WEAPON-SYSTEMS.PDF.

system that has autonomy in the critical functions of selecting and attacking targets".[13] While the ICRC has recently updated its definition to specify target selection through "information from the environment received through sensors" (ICRC, 2021) and human involvement by "initial activation or launch by a person",[14] these definitions provide only rudimentary information on AWS. This is problematic as general definitions can be interpreted in ways that either legitimise and legalise the development and deployment of fully autonomous systems or prohibit any autonomy in weapon systems.

1.2 Practical examples of issues surrounding general definitions

Problematic implications of general definitions become apparent when unpicking terminology surrounding target selection. If "select" is understood as to "sense" or "detect", then most contemporary weapons would fall into the category of AWS, as considerable attempts by international military have been made to develop precision-guided munition (PGM).[15] In fact, the development of PGM can be traced back to WW2, where different disciplines intended to find ways to improve accuracy. While some ideas, such as Skinner's pigeon-guided missiles,[16] were less successful, Germany introduced the G7e/T4 Falke torpedo in 1943, which used an acoustic homing seeker to account for aiming errors. The G7e/T4 Falke was only used by three submarines and then replaced by the faster G7es/T5 Zaunkönig; however, it marked the advent of a new type of munition.[17] Although PGM can "sense" or "detect" targets by using some kind of signal, it cannot be classified as

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[13] International Committee of the Red Cross (ICRC): ICRC Position on Autonomous Weapon Systems. 2014. https://www.icrc.org/en/document/statement-icrc-lethal-autonomous-weapons-systems.

[14] International Committee of the Red Cross (ICRC): ICRC Position on Autonomous Weapon Systems. 2021. https://www.icrc.org/en/document/icrc-position-autonomous-weapon-systems.

[15] Roff, Heather M.: An ontology of autonomy for autonomous weapons systems. In: Finkelstein, Claire/MacIntosh, Duncan/Ohlin, Jens David (Eds) The Ethics of Autonomous Weapons. Oxford: Oxford University Press/ 2017; Zehfuss, Maja: Targeting: Precision and the production of ethics. In: *European Journal of International Relations* 17.3/ 2011, pp. 543-566.

[16] Włodarczyk, Justyna: Beyond Bizarre: Nature, Culture and the Spectacular Failure of BF Skinner's Pigeon-Guided Missiles. In: *Polish Journal for American Studies* 14/ 2020, p.7-140.

[17] Watts, Sean: Autonomous weapons: regulation tolerant or regulation resistant? In: Temp. Int'l & Comp. LJ 30/ 2016, pp. 177-187.

AWS as it lacks autonomy.[18] This example outlines how the interpretation of "select" can break down the distinction between "automatic" and "autonomous", suggesting that autonomy is merely a better version of well-designed and highly capable automation.[19]

Additional complexity surrounding "autonomy" is highlighted by the different tasks that can require limited or no human supervision. "Autonomy" resides in a multidimensional continuum, whereby different tasks can be interrelated and independent.[20] AWS may autonomously select a target, calculate the trajectory of a missile and make locational adjustments to engage the target. Autonomy is therefore a task-based collection of capacities and capabilities, whereby planning autonomy (constructing a plan to realise orders) and learning autonomy (learning from previous "experiences" to adapt to novel environments)[21] can be further differentiated. Which types of autonomous tasks can be classified as legal is down to interpretation in general definitions.

Further, general definitions insufficiently characterise the precise level of human control or oversight when considering AWS. For example, Austria takes the "clear position that significant human control over autonomous weapon systems is necessary",[22] leaving the question of what may constitute "signif-

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18 Gillespie, Anthony/West, Robin: Requirements for Autonomous Unmanned Air Systems Set by Legal Issues. In: THE INTERNATIONAL C2 JOURNAL. 4(2), 2010.

19 USAF 2016; Roff, Heather M./Danks, David: Trust but Verify: The Difficulty of Trusting Autonomous Weapons Systems. Journal of Military Ethics, 17(1), pp. 2-20. 2018. https://doi.org/10.1080/15027570.2018.1481907; Moray, Neville/Inagaki, Toshiyuki/Itoh, Makoto: Adaptive automation, trust, and self-confidence in fault management of time-critical tasks. *Journal of Experimental Psychology: Applied, 6*(1), 2002. pp. 44-58. https://doi.org/10.1037/1076-898X.6.1.44.

20 Roff, Heather M.: An ontology of autonomy for autonomous weapons systems. In: Finkelstein, Claire/MacIntosh, Duncan/Ohlin, Jens David (Eds) The Ethics of Autonomous Weapons. Oxford: Oxford University Press/ 2017; Wood, Nathan Gabriel: Autonomous weapon systems and responsibility gaps: a taxonomy. In: Ethics and Information Technology 25.1/ 2023. pp.1-14.

21 Wood 2023.

22 Bundesministerium für Europa Integration und Äußeres (BMEIA): Autonomous Weapons Systems. 2024a. https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems.

icant human control" unanswered.[23] Human operators can be in the loop, on the loop and out of the loop.[24] Human-in-the-loop refers to AWS that require human operators to make or confirm decisions. While AWS may provide recommendations or assistance, the human operator must decide which action to take. These systems are often seen as the most ethical systems as they ensure human accountability. Human-on-the-loop systems allow the human operator to monitor actions of AWS and can intervene, if necessary. Human-on-the-loop systems represent a balance between autonomy and oversight. Lastly, human-out-of-the-loop are AWS that operate without real-time human supervision or intervention. These types of AWS are the most controversially discussed systems, as algorithms calculate target engagement.[25] However, even fully autonomous "killer robot" systems can be classified as semi-autonomous systems by integrating a human-in-the-loop mode. For example, while the US definition on AWS prohibits fully autonomous human-out-of-the-loop systems for lethal engagement, these systems have been developed and deployed, just in semi-autonomous, human-in-the-loop mode. In addition, non-lethal intercept missions (e.g. anti-ballistic missiles) are commonly utilised in fully autonomous modes. This is evidenced by systems like the ship-based Phalanx Close-In Weapon System (CIWS), the ground-based air missile defence system Patriot and the experimental unmanned combat aerial vehicle (UCAS) X47B that can be used in fully and semi-autonomous mode. This evidences how ambiguity surrounding the classification of fully autonomous human-out-of-the-loop and semi-autonomous human-in-the-loop AWS can have substantial implications on their legal status.

In conclusion, general definitions of AWS are problematic as different aspects and abilities of sophisticated, complex systems, such as AWS, can be

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[23] Galliott, Jai/ Wyatt, Austin: A consideration of how emerging military leaders perceive themes in the autonomous weapon system discourse. In: Defence Studies 22.2/ 2022. pp. 253-276.

[24] Schaub Jr, Gary/ Kristoffersen, Jens Wenzel: In, On, or Out of the Loop? 2017. https://cms.polsci.ku.dk/publikationer/in-on-or-out-of-the-loop/In_On_or_Out_of_the_Loop.pdf.

[25] Schwarz, Elke: Autonomous Weapons Systems, Artificial Intelligence, and the Problem of Meaningful Human Control. In: Philosophical Journal of Conflict and Violence Vol.1/ 2021, pp 53-72; Amoroso, Daniele/Tamburrini, Guglielmo: The Ethical and Legal Case Against Autonomy in Weapons Systems. In: Global Jurist 18, no. 1/ 2018, 20170012.

interpreted in various ways. The absence of an internationally binding unitary framework that specifies key characteristics of AWS may lead to the asymmetric development and deployment of AWS, affecting global stability and security. Thus, international discussions surrounding the ethical use of AWS would first attempt to unravel and untangle understanding and definitions of AWS.

1. Ethical perspectives on AWS

Ethical questions and implications surrounding the deployment of AWS are guided by normative ethics. Normative ethics determine what is morally right or wrong, good or bad and what moral duties individuals should follow. This allows general principles to be formed that guide moral decision-making processes.[26] Arguments surrounding AWS mainly fall into two strands of normative ethics: Consequentialism and deontology. Consequentialism judges the morality of an action based on its outcome or consequence, whereas deontology emphasises the importance of following moral rules regardless of outcome.

2.1 Consequentialist perspectives on AWS

Consequentialist perspectives on AWS follow the reasoning that AWS could be evaluated positively, if maximising overall happiness and minimising suffering. Amorso and Tamburrini[27] contrast between narrow and broad consequentialist views, with the former being exclusively concerned with culmination outcomes and the latter with the wider consequential evaluation.[28] As Tamburrini[29] highlights, AWS has potential in narrow consequentialist views, as more accurate targeting and a reduction in human frontline exposure may

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[26] Kagan, Shelly: *Normative Ethics*. London: Routledge, 2018.

[27] Amoroso, Daniele/ Tamburrini, Guglielmo: The Ethical and Legal Case Against Autonomy in Weapons Systems. In: Global Jurist 18, no. 1/ 2018. 20170012.

[28] Sen, Amartya: Consequential Evaluation and Practical Reason. In: The Journal of Philosophy 97.9/ 2000, pp. 477-502.

[29] Tamburrini, Guglielmo: On banning autonomous weapons systems: from deontological to wide consequentialist reasons. In: Bhuta, Nehal/Beck, Susanne /Liu, Hin-Yan (Eds): Autonomous Weapons Systems: Law, Ethics, Policy. Cambridge: Cambridge University Press/ 2016. pp. 122-142.

reduce the number of casualties. This perspective can be evidenced by examining the advent of drone and robot mass-scale production during the US campaigns in Iraq and Afghanistan. While spending on drones hovered around $300 million per year in the 1990s, funding rose to $2 billion per year by 2005.[30] Reasons for this substantial increase relate back to urgent front-line demands during the messy counterinsurgency campaigns in Iraq and Afghanistan. Larger drones such as the MQ-1B Predator were able to quietly surveil terrorists and smaller drones like the RQ-11 Raven provided troops with over-the-hill reconnaissance on demand. Similarly, Afghan and Iraqi terrorists' large-scale use of improvised explosive devices (IEDs) created high demand for ground robots that could disable or destroy IEDs without putting human life at risk. While reconnaissance and bomb disposal may not directly equate to AWS, it demonstrates AI's potential to save lives and lower the human cost of war.

Besides removing human soldiers from potentially dangerous situations, computational processes may increase accuracy and precision in targeting and thus contribute to distinguishing between civilians and combatants. Civilians may be less likely to be harmed as algorithms can prohibit civilians from being targeted.[31] Many civilian casualties may be the result of human error.[32] Arkin[33] refers to the "plight of the non-combatant" by suggesting that civilian casualties are not merely caused by being caught up in crossfire but by human failings. Soldiers may make lethal decisions when they are exhausted, angry, afraid or vengeful. In principle, an "ethical governor" could be programmed and integrated into AWS, making sure that the AWS complies with the laws of war.[34] Given the obligation to protect civilians from

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30 Office of the Secretary of Defense: Unmanned Aircraft Systems Roadmap 2005-2030 (2005). https://irp.fas.org/program/collect/uav_roadmap2005.pdf.

31 Arkin, Ronald C./Ulam, Patrick/Duncan, Brittany: An Ethical Governor for Constraining Lethal Action in an Autonomous System. Technical Report GIT-GVU-09-02 / 2009. https://digitalcommons.unl.edu/csetechreports/163/.

32 Arkin, Ronald: The Case for Ethical Autonomy in Unmanned Systems. In: Journal of Military Ethics 9, no. 4/ 2010. pp. 332-341.

33 Arkin, Ronald: Lethal Autonomous Systems and the Plight of the Non-Combatant. In: AISB Quarterly 137, 2013. pp. 1-9.

34 Arkin, Ronald C./Ulam, Patrick/Duncan, Brittany: An Ethical Governor for Constraining Lethal Action in an Autonomous System. Technical Report GIT-GVU-09-02 / 2009. https://digitalcommons.unl.edu/csetechreports/163.

combat, introducing AWS to the battlefield may be desirable or perhaps even a moral requirement if these systems were to reduce harm and eliminate human error.[35]

However, to date there is limited evidence of whether AWS may be more reliable than humans in lethal decision-making. Morally questionable incidents with AWS involvement have not been frequently documented, though this may be due to their limited use on battlefields, or classification and secrecy surrounding AWS incidents. Most popular examples of AWS incidents include fratricides committed with the Patriot missile system during the Iraq war in 2003. The first incident happened on 23 March 2003. The Patriot missile system mistakenly identified a British Royal Air Force Tornado GR4 fighter jet near the Kuwait-Iraqi border as an enemy missile. This likely happened due to the inactive "identification friend or foe" (IFF) signal and the descending trajectory profile of the aircraft. The Patriot's operators did not know about any incoming friendly aircraft and were unable to connect to other radars on the network due to outdated equipment. Deprived of the ability to examine the input of other radars, the orders to engage were given, killing the crew of the Tornado GR4.[36] The second incident occurred only a few weeks later, on 2 April 2003. A US Navy F/A 18C Hornet was mistakenly targeted and destroyed by a Patriot missile system near Karbala, Iraq. Unlike the first incident, the Patriot missile system picked up a "ghost track", identifying a ballistic missile where there was none. This "ghost track" was presumably caused by a non-standard configuration in which radars overlapped and caused interference. After the Patriot's PAC-3 missiles were launched and unable to identify a target, the missiles activated their seekers

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[35] Sparrow, Robert: Robots and Respect: Assessing the Case Against Autonomous Weapon Systems. In: Ethics & International Affairs, Volume 30/1/ 2016. pp. 93-116; Arkin, Ronald: Governing Lethal Behavior in Autonomous Robots. Chapman and Hall/CRC, 2009.

[36] Hawley, John K.: Patriot Wars: Automation and the Patriot Air and Missile Defense System. In: Center for a New American Security. 2017. https://s3.amazonaws.com/files.cnas.org/documents/CNAS-Report-EthicalAutonomy5-PatriotWars-FINAL.pdf; Hawley, John K./Mares, Anna L./Marcon, Jessica L.: On fratricide and the operational reliability of target identification decision aids in combat identification. In: Herz, Robert (Ed.) Human Factors Issues in Combat Identification. Florida: CRC Press, 2017, pp. 299-312.

and locked on to the nearby Hornet fighter jet, killing the pilot.[37] Both fratricides were primarily caused by limitations of the Patriot's autonomous target identification capabilities.[38] While the system was designed to rapidly detect and engage incoming threats, the complexity of high-intensity conflicts highlighted issues in algorithms that differentiate between aircrafts, anti-radiation missiles and ballistic missiles.

While these arguments may not necessarily lead to the conclusion that humans make better decisions than machines, they do weaken the assumption that the use of AWS will necessarily reduce suffering and harm. In fact, to date there is too little evidence on the performance of AWS in saturation scenarios and contested environments to allow for sound judgement on the benefits of AWS (except for some systems like the Aegis Combat System that has been used and continually upgraded since 1983). It is likely that AWS will need to be combat-tested, weaknesses identified and improved.

Additionally, the argument of reducing human warfighters' suffering due to limited frontline exposure can be scrutinised when drawing on historical evidence. The first automatic gun, the Gatling gun, was not invented to accelerate the process of killing, but to save lives by reducing the number of soldiers exposed to the battlefield. The inventor, Richard Gatling, expected that if "a gun – which could by its rapidity of fire, enable one man to do as much battle duty as a hundred, that it would, to a large extent supersede the necessity of large armies, and consequentially, exposure to battle and disease

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37 Hawley, John K.: Looking Back at 20 Years of MANPRINT on Patriot: Observations and Lessons. Army Research Laboratory, 2007. https://apps.dtic.mil/sti/pdfs/ADA472740.pdf, Hawley, John K.: Patriot Wars: Automation and the Patriot Air and Missile Defense System. In: Center for a New American Security, 2017. https://s3.amazonaws.com/files.cnas.org/documents/CNAS-Report-EthicalAutonomy5-PatriotWars-FINAL.pdf; Hew et al. 2010; Hawley, John K./Mares, Anna L./Marcon, Jessica L.: On fratricide and the operational reliability of target identification decision aids in combat identification. In Herz, Robert (Ed.) Human Factors Issues in Combat Identification. Florida: CRC Press/ 2017, pp. 299-312.

38 Hew, Patrick/Lewis, Edward/Radunz, Penelope/Rendell, Sean: Situation awareness for supervisory control: Two fratricide cases revisited. 2010. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=959defb585ed0110be1386259caef17ef53a9c53; Hawley, John K./Mares, Anna L./Marcon, Jessica L.: On fratricide and the operational reliability of target identification decision aids in combat identification. In: Herz, Robert (Ed.) Human Factors Issues in Combat Identification. Florida: CRC Press, 2017, pp. 299-312.

[would] be greatly diminished".[39] Shortly after, the first machine gun, the Maxim gun, was introduced in 1883. From a narrow consequentialist perspective, the use of a superior weapon system in order to reduce casualties may constitute an ethical imperative. However, while the machine gun allowed the British Army to reinforce their colonial requests with reduced casualties on the British side in the late 1800s, the successors of the Maxim gun contributed to mass killings on unprecedented scales during WW1.[40] This example highlights how technological advancement in weapon systems may not have linear outcomes and accentuates the multi-factorial complexity in analysing their potential impact. Wide consequentialist perspectives allow multi-factorial complexity to be taken into account.

Broad consequentialist views extend the scope of consequentialist reasoning by considering a broader array of factors and outcomes. Discussions surrounding the ethical implications of AWS may need to take into account long-term effects on peace stability and incentives to start wars.[41] A reduction in an immediate "body-bag count" may lower the threshold for conflict engagement as a major disincentive for war is removed.[42] This may lead to increased overall long-term suffering as it implies more frequent or prolonged warfare. Additionally, global stability may be threatened as, besides lowering the threshold for war engagement, the deployment of AWS may cause an arms race as nations may feel compelled to develop more sophisticated AWS.[43]

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[39] Gatling 1877, as cited in Keller, Julia: Mr. Gatling's Terrible Marvel: The Gun that Changed Everything and the Misunderstood Genius who Invented it. London: Penguin, 2008, p. 27.

[40] Keller, Julia: Mr. Gatling's Terrible Marvel: The Gun that Changed Everything and the Misunderstood Genius who Invented it. London: Penguin, 2008.

[41] Tamburrini, Guglielmo: On banning autonomous weapons systems: from deontological to wide consequentialist reasons. In: Bhuta, Nehal/Beck, Susanne/Liu, Hin-Yan (Eds): Autonomous Weapons Systems: Law, Ethics, Policy. Cambridge: Cambridge University Press, 2016. pp. 122-142.

[42] Sharkey, Noel: Grounds for Discrimination: Autonomous Robot Weapons. In: RUSI Defence Systems 11.2, 2008, pp. 86-89.

[43] Sharkey, Noel: The evitability of autonomous robot warfare. In: International Review of the Red Cross 94.886/2012a, pp. 787-799; Tamburrini, Guglielmo: On banning autonomous weapons systems: from deontological to wide consequentialist reasons. In: Bhuta, Nehal/Beck, Susanne/Liu, Hin-Yan (Eds): Autonomous Weapons Systems: Law, Ethics, Policy. Cambridge: Cambridge University Press, 2016. pp. 122-142.

Arms races and their deleterious effect on global stability have numerous references to history. For example, during the pre-WW1 naval arms race (1900–1914) Germany and the UK competed in developing "Dreadnought" battleships, which were the most advanced battleships at that time. The race was driven by Germany's attempt to challenge British naval supremacy and contributed to the rising tensions in Europe, culminating in WW1.[44] During the Cold War Era (1945–1991), the US and the Soviet Union developed weapon capabilities to destroy each other multiple times ("Mutual Assured Destruction", MAD), which paradoxically acted as a deterrent against direct conflict.[45] Unless culminating in war, arms races normally conclude with nations signing treaties to limit developing, stockpiling or deploying specific weapons (e.g. Intermediate-Range Nuclear Forces Treaty, Conventional Armed Forces in Europe Treaty, Anti-Ballistic Missile Treaty, Chemical Weapons Convention). However, treaties on AWS are still in their very early stages and, with evolving international tensions, it is uncertain how attempts to regulate AWS will develop in the future. At the moment, official statements suggest that the aim of AWS development is to remove the human soldier from frontlines, to reduce casualties and increase combat effectiveness.[46] With the US aiming for a long-term transformation of their military

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[44] Berghahn, Volker: Naval Armaments and Social Crisis: Germany Before 1914. In: Best, Geoffrey and Andrew Wheatcroft (Eds). War, Economy and the Military Mind. Routledge: London, 2020, pp. 61-88; Maurer, John H.: Arms Control and the Anglo-German Naval Race before World War I: Lessons for Today? In: Political Science Quarterly 112.2, 1997, pp. 285-306.

[45] Muedini, Fait: In the United States and the Soviet Union, the Theory of Mutually Assured Destruction Altered International Relations. In: Santos, Rita (Ed): Arms Sales, Treaties, and Violations, 2018, pp. 118-129; Van Munster, Rens/Sylvest, Casper: On history and authority: the Cold War nuclear arms race and its importance for critical security theory. In: Critical Studies on Security 10.3, 2022, pp.157-171.

[46] Greenwalt, William C.: DOD's Replicator Program: Challenges and Opportunities. 2023. https://policycommons.net/artifacts/5668878/dods-replicator-program/6434352/; Pfaff, C. Anthony et al.: Trusting AI: Integrating Artificial Intelligence into the Army's Professional Expert Knowledge. Carlisle: USAWC Press/ 2023; Bachmann, Sascha-Dominik Dov/Grant, Richard V.: The Need for An Australian Regulatory Code for the Use of Artificial Intelligence (AI) in Military Application. In: American University National Security Law Brief 13.2, 2023, pp. 1-34.

through AWS and Russia and China targeting the major automation of their militaries by 2028-2030, it is unclear whether or not an arms race may have already begun.[47]

Contrary to the argument that the development and deployment of AWS may cause an arms race,[48] broad historical patterns in warfare indicate that innovations often challenge nations to provide asymmetric responses. This means that the response to the development of an adversary's advantage (e.g. weapons with superior firepower) may involve the development of a different system (e.g. superior surveillance systems) or new strategies (e.g. hit-and-run attacks). For example, when the Japanese encountered superior US skills in naval surface gunfire in WW2, they changed their strategy to attack at night, resulting in devastating nighttime naval surface action at the Battle of Guadalcanal.[49] This example highlights the dynamic in innovation and counter-innovation during warfare. As such, the development and deployment of AWS by one nation does not necessarily lead to increased international development and deployment of AWS.

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47 Sharma, Sanur: Unmanned Ground Vehicles: Global Developments and Future Battlefield. Manohar Parrikar Institute for Defence Studies and Analyses Issue Brief, 2022. https://www.idsa.in/system/files/issuebrief/ib-unmanned-ground-vehicles-ssharma-220422.pdf; Greenwalt, William C.: DOD's Replicator Program: Challenges and Opportunities. 2023. https://policycommons.net/artifacts/5668878/dods-replicator-program/6434352/; Kania, Elsa: "AI weapons" in China's military innovation. 2020. https://www.brookings.edu/wp-content/uploads/2020/04/FP_20200427_ai_weapons_kania_v2.pdf; Warren, Aiden/ Hillas, Alek: Xi Jinping Thought: Lethal Autonomous Weapons Systems and Military Modernization with Chinese Characteristics. In: The Journal of International Relations, Peace Studies, and Development 7.1, 2022, pp. 6-32.

48 Sharkey, Noel: The evitability of autonomous robot warfare. In: International Review of the Red Cross 94.886/2012a, pp.787-799; Tamburrini, Guglielmo: On banning autonomous weapons systems: from deontological to wide consequentialist reasons. In: Bhuta, Nehal/Beck, Susanne/Liu, Hin-Yan (Eds): Autonomous Weapons Systems: Law, Ethics, Policy. Cambridge: Cambridge University Press, 2016, pp. 122-142.

49 Mahnken, Thomas: Asymmetric Warfare at Sea: The Naval Battles off Guadalcanal, 1942–1943. In: Naval War College Review 64.1, 2011, pp. 95-121.

Besides issues surrounding the potential of an international AWS arms race, scholars are concerned about the effect of AWS on international stability.[50] International stability refers to a stable equilibrium. If disturbed by an outside force, it returns to its original state. An unstable equilibrium, in comparison, is a state in which a small disturbance causes the system to rapidly transition to an alternate state.[51] Introducing AWS may be problematic as they may possibly lead to unintended escalations. During "crisis stability", in particular, characterised by international, multilateral or bilateral tensions, one incident may cause escalation. Due to the pace of AWS decision-making, unsupervised AWS may respond to misidentified targets and thus provoke retaliatory strikes. In the absence of human intuition and reason, this may have grave consequences. For example, on 26 September 1983, the Soviet Union's satellite early warning system Oko misinterpreted a rare alignment of sunlight on high-altitude clouds and the satellite's Molniya orbits as a US nuclear attack. A fully autonomous system would have initiated a retaliatory attack and, in doing so, started WW3. It was only through human intuition that an all-out nuclear war could be prevented.[52] With the speed of AWS outpacing human decision-making, situations could occur where military actions lack sufficient oversight. This increases the likelihood of unintended consequences, making it more difficult to clearly signal national intentions. In a tense situation, this could lead to pre-emptive strikes or escalatory measures based on incorrect assumptions and data interpretation. As Sharkey[53] high-

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50 Horowitz, Michael C.: When speed kills: Lethal autonomous weapon systems, deterrence and stability. In Sechser, Todd et al. (Eds.) Emerging Technologies and International Stability. London: Routledge, 2021, pp. 144-168; Leys, Nathan: Autonomous Weapon Systems, International Crises, and Anticipatory Self-Defense. In Yale J. Int'l L. 45, 2020, pp. 377-411; Horowitz, Michael C./Scharre, Paul: AI and International Stability, 2021. https://s3.us-east-1.amazonaws.com/files.cnas.org/documents/AI-and-International-Stability-Risks-and-Confidence-Building-Measures.pdf; Horowitz, Michael C./Scharre, Paul/Velez-Green, Alexander: A Stable Nuclear Future? The Impact of Autonomous Systems and Artificial Intelligence, 2019. https://arxiv.org/pdf/1912.05291.

51 cf. Schelling, Thomas C.: Surprise Attack and Disarmament. In: Bulletin of the Atomic Scientists 15.10, 1959, pp. 413-418.

52 Petrov, Avvakum: The Life Written by Himself. Columbia: Columbia University Press, 2021.

53 Sharkey, Amanda: Autonomous weapons systems, killer robots and human dignity. In: Ethics and Information Technology 21.2, 2019, pp. 75-87; Sharkey, Noel: The evitability of autonomous robot warfare. In: International Review of the Red Cross 94.886/2012a, pp. 787-799.

lights, there remains a certain unpredictability of AWS based on the interaction of different computational algorithms. The deployment of multiple AWS would require testing these systems during war and correcting possible errors, which, to date, has not been done.

Critiques of consequentialist views on AWS argue that consequentialist arguments, particularly wide consequentialist perspectives, are often abstract and imprecise, based on "what-if" scenarios. The use of AWS does introduce high levels of uncertainty and complexity. Predicting consequences based on "what-if" scenarios, including unintended consequences, make precise ethical assessments on AWS challenging. Consequentialist views also do not provide coherent guidance on AWS, as it is not clear how to weigh different consequences. For example, how could a potential reduction in human soldier casualties be balanced against a possible increased risk to global security and stability? These dilemmas can lead to abstract and sometimes vague conclusions based on consequentialist perspectives, which scholars have been grappling with since the early 2000s.[54] An additional layer of complexity surrounding ethical recommendations on AWS is added when integrating deontological perspectives.

2.2 Deontological perspectives on AWS

Deontological views on AWS focus on the inherent morality of actions themselves, rather than the outcomes or consequences. Right and wrong are therefore determined by the rules governing the actions, not by the consequence of the action. One influential deontological argument surrounding

[54] cf. Sparrow, Robert: Robots and Respect: Assessing the Case Against Autonomous Weapon Systems. In: Ethics & International Affairs, Volume 30/1/ 2016, pp. 93-116f; Sparrow, Robert: Killer robots. Journal of applied philosophy, 2007, 24(1), pp. 62-77; Lin, Patrick/Abney, Keith/Bekey, George A.: Robot Ethics: The Ethical and Social Implications of Robotics. Cambridge (MA): MIT Press/ 2014; Sharkey, Noel: The evitability of autonomous robot warfare. In: International Review of the Red Cross 94.886/2012a, pp. 787-799; Lucas Jr, George R.: Automated Warfare. In: Stan. L. & Pol'y Rev. 25, 2014, pp. 317-341.

the prohibition of AWS is based on the concept of human dignity.[55] The utilisation of lethal autonomous weapon systems (LAWS) may be unethical as these systems violate the right to dignity of those targeted.[56] This argument is based on the Kantian account of dignity[57] and on the African Charter on Human and Peoples' Rights which emphasise the interrelated nature of the right to life and the right to dignity.[58] Even if the demands of the international humanitarian law (IHL) could be adhered to by AWS, AWS are incapable of valuing the significance of human life. This may violate the ethical principle of respecting human beings as ends in themselves and dehumanise human actors as just another target to be destroyed.[59] Also, the principles of distinction, proportionality and military necessity require human, not autonomous, judgement as human judgement reflects interpretation and rationalisation processes that are unique to human reasoning.[60]

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55 Heyns, Christoph: Autonomous weapons in armed conflict and the right to a dignified life: an African perspective. South African Journal on Human Rights, 33(1)/2017, pp.46-71; Asaro, Peter: On banning autonomous lethal systems: human rights, automation, and the dehumanization of lethal decision-making, special issue on new technologies and warfare. In: International Review of the Red Cross, 94(886)/2012, pp. 687-709; Docherty, Bonnie: Shaking the Foundations: The Human Rights Implications of Killer Robots. 2014. https://www.hrw.org/report/2014/05/12/shaking-foundations/human-rights-implications-killer-robots; Ulgen, Ozlem: Kantian Ethics in the Age of Artificial Intelligence and Robotics. In: *QIL* 43, 2017, pp.59-83.

56 Heyns, Christoph: Autonomous weapons in armed conflict and the right to a dignified life: an African perspective. South African Journal on Human Rights, 33(1), 2017, pp. 46-71.

57 Heyns, Christoph: Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, A/HRC/23/47. 2013. https://www.refworld.org/reference/themreport/unhrc/2015/en/105196; Heyns, Christoph: Autonomous weapons systems: living a dignified life and dying a dignified death. In Bhuta, Nehal et al. (Eds.), Autonomous Weapons Systems: Law, Ethics, Policy/Cambridge: Cambridge University Press, 2016, pp. 3-20.

58 Heyns, Christoph: Autonomous weapons in armed conflict and the right to a dignified life: an African perspective. South African Journal on Human Rights, 33(1)/2017, pp. 46-71.

59 Ulgen, Ozlem: Human Dignity in an Age of Autonomous Weapons: Are We in Danger of Losing an 'Elementary Consideration of Humanity'? In: Baltic Yearbook of International Law Online 17.1/2020, pp. 167-196.

60 Asaro, Peter: On banning autonomous lethal systems: human rights, automation, and the dehumanization of lethal decision-making, special issue on new technologies and warfare. In: International Review of the Red Cross, 94(886)/2012, pp. 687-709.

However, dignity in death on the battlefield may only be relevant in theoretical debates excluding realistic perspectives of warfare. References to history highlight that there are neither legal, ethical nor historical traditions of combatants allowing their enemies to die a dignified death in war.[61] War without reflection may be mechanical slaughter, as suggested by Heyns.[62] However, the question arises as to whether war with reflection can be seen as fundamentally different. Would the most ethical way to fight and die be in hand-to-hand combat? As such, deontologist perspectives on human dignity in dying remain a matter of debate.

A further deontological perspective that opposes the use of AWS relates to accountability and responsibility. Deontological views emphasise the importance of moral responsibility in lethal decision-making. When AWS make lethal decisions, it raises concern about who is morally accountable for that decision. Deontologists therefore argue that humans should not delegate the responsibility of killing to machines as this diffuses accountability and undermines the moral fabric of decision-making in warfare. This is summarised in the "accountability gap",[63] examining issues surrounding shared responsibility. If an incident results in a war crime, neither manufacturer nor personnel could be held accountable. As long as an AWS is not legally considered a "person", the result would be a gap in accountability. However, the accountability gap is only a concern if the AWS has fired in an unpredictable fashion. If the AWS has simply carried out instructions, then accountability would lie with the operator who has provided these instructions. In decisions surrounding accountability, human intent therefore plays an important role.

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61 Scharre, Paul: Army of None: Autonomous Weapons and the Future of War. New York: Norton & Company, 2018.

62 United Nations: UN human rights expert calls for a moratorium on lethal autonomous robots. Of human rights and robots. 2013. https://www.ohchr.org/en/press-releases/2013/05/un-human-rights-expert-calls-moratorium-lethal-autonomous-robots.

63 Chengeta, Thompson: Accountability gap, autonomous weapon systems and modes of responsibility in international law. In: Denv. J. Int'l L. & Pol'y, 45/2016, pp. 1-50; Drake, Emily: Evaluating autonomous weapons systems: A dichotomic lens of military value and accountability. In: Colum. Hum. Rts. L. Rev., 53/2021, pp. 297-344; Oimann, Ann-Katrien: The Responsibility Gap and LAWS: a Critical Mapping of the Debate. In: Philosophy & Technology 36.1/2023, pp. 1-22.

Scholars argue that keeping the human in the loop may reduce issues surrounding the accountability gap.[64]

However, if operators feel less responsible for lethal action, then this may result in increased killings. Humans are generally reluctant to kill.[65] The army historian Samuel Marshall, for example, found that during WW2 less than 20% of the interviewed US soldiers stated that they shot directly at the enemy.[66] Most soldiers were "posturing", pretending to fight but aiming above the enemy's head or were not firing at all. However, the innate resistance to kill can be overcome by increasing psychological and physical distance and diffusing responsibility.[67] Delegating the decision to kill to AWS may make it easier for the operator to come to terms with the decision to kill, as the operator may offload the moral responsibility for killing. This is problematic, as Grossmann[68] found that soldiers were more willing to kill if the responsibility was diffused. For example, firing rates of US machine gun crews were nearly 100% during WW2, as each member of the crew could justify their actions without taking individual responsibility for killing. The person feeding ammunition did not feel responsible for killing, as they only fed the ammunition, neither did the spotter feel responsible, as they merely pointed out where to shoot, nor the gunner, as they were just following directions provided by the spotter. In essence, this indicates how sharing individual responsibility in the process of killing may normalise lethal actions.[69] AWS

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64 Wood, Nathan Gabriel: Autonomous weapon systems and responsibility gaps: a taxonomy. In: Ethics and Information Technology, 25.1/2023, pp. 1-14; Oimann, Ann-Katrien: The Responsibility Gap and LAWS: a Critical Mapping of the Debate. In: Philosophy & Technology, 36.1/2023, pp. 1-22; Drake, Emily: Evaluating autonomous weapons systems: A dichotomic lens of military value and accountability. In: Colum. Hum. Rts. L. Rev., 53/2021, pp. 297-344.

65 Grossman, Dave: On Killing: The Psychological Cost of Learning to Kill in War and Society. In: Tweedy, Rod (Ed.) The Political Self. Routledge: London, 2018, pp. 141-155.

66 Marshall, Samuel/Lyman, Atwood: Men Against Fire: The Problem of Battle Command. University of Oklahoma Press, 2000.

67 MacNair, Rachel M.: The Psychology of Peace: An Introduction. Bloomsbury Publishing USA, 2011; Grossman, Dave: On Killing: The Psychological Cost of Learning to Kill in War and Society. In: Tweedy, Rod (Ed.) The Political Self. Routledge: London, 2018, pp. 141-155.

68 Grossman, Dave: On Killing: The Psychological Cost of Learning to Kill in War and Society. In: Tweedy, Rod (Ed.) The Political Self. Routledge: London, 2018, pp. 141-155.

69 Ibid.

could act as a "moral buffer", reducing individuals' perceptions of moral responsibility for their actions.

This may be the case, in particular, as humans tend to anthropomorphise machines. Humans implicitly oversee the individual system processes of sophisticated systems but identify a "behaviour" of the overall unspecified systems and think of it as the systems' intentions or personality. Suchman[70] specifies this as human "inclination to ascribe actions to the entity rather than its parts", thereby anthropomorphising the machine and ascribing personality to its decision-making capabilities. Sophisticated systems, such as AWS, may be perceived to have independent intentionality that determine decisions. This fallacy would have significant consequences, affecting human ethical thinking and causing human moral agency to atrophy. Deontological perspectives would suggest that lethal action should always remain a troubling and morally challenging act, not a technological option or a choice of technologically asserted recommendations. As Norbert Wiener, the founder of cybernetics as an interdisciplinary science, suggests: "to throw the problem of his responsibility on the machine, whether it can learn or not, is to cast his responsibility to the winds, and to find it coming back seated on the whirlwind."[71]

In conclusion, diffused responsibility in operating with AWS may pose a relevant challenge that needs to be addressed in international discussions surrounding the development and deployment of AWS. Together with issues surrounding the use of autonomous systems in lethal decision-making processes, deontological perspectives on AWS are less ambiguous than consequentialist perspectives and would advise against the use of AWS.

3. The Austrian position on AWS

International debates on AWS were formally introduced under the United Nations Convention on Certain Conventional Weapons (CCW) in 2013. Here, member states started assessing the implications of AWS on international security. However, even before debates on AWS gained traction in

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[70] Suchman, Lucy: Human-Machine Reconfigurations: Plans and Situated Actions. Cambridge: Cambridge University Press, 2007, p. 47.

[71] Wiener, Norbert: The Human Use of Human Beings: Cybernetics and Society. Boston: Da Capo Press, 1988, p. 185.

international settings, Austria raised concerns regarding the ethical and legal implications of AWS.[72] While Austria has maintained a critical perspective during the UN CCW meetings, its views became more conservative with the increased use and development of AWS. During the inaugural meeting in 2014, the Austrian delegates emphasised the need for careful consideration of the ethical, legal and humanitarian implications of AWS. An important aspect of the argument was the concern surrounding questions of accountability, focussing on human-in-the-loop approaches in maintaining human decision-making processes over lethal force (UN, 2014). While these arguments were reiterated during the 2015 and 2016 CCW meetings, the Austrian delegates stressed the need for a pre-emptive ban on fully autonomous weapon systems at the 2017 CCW meeting. Main concerns related to the further development and deployment of LAWS and AWS and implications surrounding arms races and indiscriminate killing in the near future.[73]

As progress towards legally binding agreements had been slow, Austria became increasingly frustrated by the lack of consensus and reluctance to com-

[72] For example, Meurers, Christian: Der Informationskrieg im 21. Jahrhundert und seine Auswirkungen auf die Militärdoktrinen der USA, 2010. https://www.bmlv.gv.at/pdf_pool/publikationen/diplomarbeit_informationskrieg_publikation_lvak_20100902.pdf; Bundesministerium für Europa: EU-Arbeitsprogramm 2015. 2015. https://www.parlament.gv.at/dokument/XXV/III/148/imfname_383089.pdf.

[73] United Nations: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (2015a). https://digitallibrary.un.org/record/3856238/files/CCW_MSP_2015_9-EN.pdf; United Nations: Meeting of High Contracting Parties 2015. Austria. 2015b. https://docslibrary.unoda.org/Convention_on_Certain_Conventional_Weapons_-_Meeting_of_High_Contracting_Parties_(2015)/austria.pdf; United Nations: Fifth Review Conference of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. 2016. https://documents.un.org/access.nsf/get?OpenAgent&DS=CCW/CONF.V/2&Lang=E; UN: Convention on Certain Conventional Weapons, 2017. https://meetings.unoda.org/meeting/29460/document.

mit to binding regulations.[74] This disappointment contributed to Austria's decision to take more decisive action, including to support a joint declaration calling for the prohibition of LAWS. The declaration was part of broader efforts within the CCW framework to establish clear international norms applicable to the development and use of fully autonomous weapons.[75] Since then, Austria has started supporting various organisations, such as the campaign "Stop Killer Robots",[76] as well as non-governmental organisations, like Human Rights Watch[77] and drafting statements and resolutions on the implications of AWS.[78]

Since then, international positions in relation to AWS at CCW meetings have become more polarised, particularly with the increasing global tensions in recent years. Nation states can now be split into three main fractions: those advocating for a ban on LAWS and legally binding restrictions on AWS (whereby Austria is among the most vocal states to raise concerns); those with more moderate views on LAWS and AWS, generally supportive of regulations but preferring political declarations and the strengthening of Article 36 weapon reviews (e.g. Germany, Switzerland); and those sceptical of novel regulations, expressing their favour for developing and deploying more au-

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74 United Nations: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (2015a). https://digitallibrary.un.org/record/3856238/files/CCW_MSP_2015_9-EN.pdf; United Nations: Meeting of High Contracting Parties 2015. Austria. 2015b. https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_-_Meeting_of_High_Contracting_Parties_(2015)/austria.pdf; Bode and Huelss, 2022.

75 Pax: Positions on Lethal Autonomous Weapon Systems, 2018. https://paxforpeace.nl/wp-content/uploads/sites/2/2020/11/pax-rapport-crunch-time.pdf.

76 Stop Killer Robots (SKR): Members, 2024. https://www.stopkillerrobots.org/a-global-push/member-organisations/.

77 Human Rights Watch (HRW): An Agenda for Action. Alternative Processes for Negotiating a Killer Robots Treaty. 2022. https://www.hrw.org/report/2022/11/10/agenda-action/alternative-processes-negotiating-killer-robots-treaty.

78 United Nations Human Rights Council (UNHRC): Joint Statement on Lethal Autonomous Weapon Systems. 2022. https://estatements.unmeetings.org/estatements/11.0010/20221021/A1jJ8bNfWGlL/KLw9WYcSnnAm_en.pdf; Moyes 2022; BMEIA, 2024a.

tonomous weapon systems (e.g. US, UK, Russia).[79] This tripartite division raises relevant questions surrounding expectations on bans and regulations on AWS. While Austria advocates for strong international regulations on AWS, supporting a ban on LAWS,[80] it is questionable to what extent these views may also be realistic. The following will first assess perspectives on the feasibility of bans and regulations on AWS before discussing opportunities that Austria's conservative position may hold.

3.1 (Un)realistic perspectives? The feasibility of banning or restricting AWS and LAWS

Recent conferences and meetings on AWS and LAWS suggest that there is international consensus on AWS and LAWS posing challenges to international humanitarian law and ethical norms. Attempts to formulate legal frameworks or adapt existing policy guidelines to regulate AWS and LAWS effectively are supported internationally.[81] How these frameworks and guidelines may regulate AWS and LAWS is, however, internationally disputed.

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[79] cf. Bode, Ingvild/Huelss, Hendrik: Autonomous Weapons Systems and International Norms. McGill-Queen's University Press - MQUP: Montreal Quebec, 2022.

[80] Bundesministerium für Europa Integration und Äußeres (BMEIA): Autonomous Weapons Systems. 2024a. https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems.

[81] Bundesministerium für Europa Integration und Äußeres (BMEIA): Autonomous Weapons Systems, 2024a. https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems; Bode, Ingvild/Huelss, Hendrik: Autonomous Weapons Systems and International Norms. McGill-Queen's University Press - MQUP: Montreal Quebec, 2022; CCW: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, 2022. https://unoda-documents-library.s3.amazonaws.com/Convention_on_Certain_Conventional_Weapons_-_Meeting_of_High_Contracting_Parties_(2022)/CCW_MSP_2022_6_Advance_version.pdf; CCW: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, 2024. https://meetings.unoda.org/ccw-mhcp/convention-on-certain-conventional-weapons-meeting-of-high-contracting-parties-2024.

One argument that advocates for a ban on AWS utilises the Martens Clause[82] as a theoretical backdrop. The Martens Clause addresses the protection of individuals in armed conflict, even in situations not covered by specific laws, by invoking the principle of humanity and public conscience. The original formulation states:

> "Until a more complete code of the laws of war is issued, the High Contracting Parties think it right to declare that in cases not included in the Regulations adopted by them, populations and belligerents remain under the protection and empire of the principles of international law, as they result from the usages established between civilized nations, from the laws of humanity and the requirements of the public conscience."[83]

When applying this principle to AWS, it means that AWS may violate the public conscience. However, "there is no accepted interpretation of the Martens Clause."[84] The reference to "public conscience" may imply that public attitudes may justify the use of AWS. However, recent research on US public attitudes towards AWS indicates that under specific circumstances, the majority of the surveyed participants would endorse the use of AWS, particularly to protect US Armed Forces personnel.[85] Some scholars argue that public conscience cannot be equated with public opinion, as conscience has an explicitly moral inflection that opinion lacks.[86] Public conscience would rather include exploring public discussion, academic scholarship, artistic and cultural expressions, individual reflection, collective action and additional means by which society deliberates its collective moral conscience.[87] This would disqualify any metric for understanding public conscience and therefore question the feasibility of the Martens Clause as a practical tool to justify the implementation of restrictions and bans.

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82 The Hague Convention II. Laws and Customs of War, 1899. https://ihl-databases.icrc.org/en/ihl-treaties/hague-conv-ii-1899.

83 Ibid.

84 Ticehurst, Rupert: The Martens Clause and the Laws of Armed Conflict. In: International Review of the Red Cross (1961-1997) 37.317/1997, pp. 125-134.

85 Horowitz, Michael C.: The ethics & morality of robotic warfare: Assessing the debate over autonomous weapons. Daedalus, 2016, 145(4), pp. 25-36.

86 Asaro, Peter: Jus nascendi, robotic weapons and the Martens Clause. In: Carlo Ryan (Ed): Robot Law. Edward Elgar Publishing, 2016, pp. 367-386.

87 Ibid.

In addition, ethical and unethical behaviour are fluctuating concepts that can change over time, particularly during war. This can be exemplified by the unrestricted submarine warfare during WW2. Despite a total of 48 states, including the US and Germany, banning unrestricted submarine warfare prior to WW2, these restrictions were rapidly abandoned during WW2. Germany declared unrestricted submarine warfare with War Order 154 in 1939.[88] Similarly, the US gave the order to execute unrestricted air and submarine warfare against Japan after the devastating attack of Pearl Harbor on 7 December 1941.[89] More recent examples of changing ethical standards during war include the use of cluster munition by the Russian and Ukrainian forces. While Russia and Ukraine are not parties of the Convention on Cluster Munitions that bans this type of munition, the use of cluster munition still needs to adhere to the Geneva Convention. As such, cluster munition is subjected to distinction, proportionality and necessity. However, an indiscriminate use of cluster munition has been documented on several occasions, suggesting that adherence to ethical frameworks may change with the requirements of war.[90] This could lead to the conclusion that nation states may only be violently opposed to AWS and LAWS until these technologies become the decisive factor in winning or losing a war.

This is also reflected in the international development of fully autonomous systems with semi-autonomous modes. For example, the Israeli loitering munition Harpy can operate autonomously, seeking out and destroying radar emitters independently. However, it can also operate in a semi-autonomous mode where a human operator provides target confirmation before the strike. Similarly, the UK Taranis is an experimental unmanned combat aerial vehicle (UCAV) that is designed to carry out deep penetration strikes in enemy territory. In fully autonomous mode, Taranis can fly into a target area, identify a threat and engage the enemy without human supervision, whereas

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88 Sondhaus, Lawrence: German Submarine Warfare in World War I: The Onset of Total War at Sea. Lanham: Rowman & Littlefield, 2017.

89 Holwitt, Joel Ira: Execute Against Japan: The U.S. Decision to Conduct Unrestricted Marine Warfare, Vol. 121, Texas: A&M University Press, 2009.

90 cf. on changing academic views on cluster munition: Saint, James: The case for cluster munitions: Amend or withdraw from the convention on cluster munitions. In: Australian Army Journal 19.1/2023, pp. 100-116; Poposka, Vesna/Abdulmecit, Nuredin: Legality of the use of cluster bombs in international law: a short overview. In: Journal of Liberty and International Affairs 10.1/2024, pp. 252-269.

in semi-autonomous mode a human operator makes the engagement decision. The US has recently developed the X-47B, a UCAV that can complete missions fully autonomously or semi-autonomously. These systems highlight the contemporary trend in AWS development, adapting to a potential future use of fully autonomous weapon systems. Recent advancements in swarm-based weapons further evidences the shift towards fully autonomous systems with the US Pentagon's Replicator program on AI-based weapon swarms developing cooperative AI units that can overwhelm or outmanoeuvre more traditional and expensive military assets.[91] With global tensions rising, nations appear to be waiting for an international incident to change their policy guidelines on AWS in order to legalise lethal fully autonomous weapon systems.

This is relevant, particularly in relation to the drawbacks of semi-autonomous systems, which can be exemplified by Russia's unsuccessful use of the Uran-9 unmanned ground vehicle (UGV) in the Ukraine. The Uran-9 is a remotely controlled robotic combat vehicle designed for reconnaissance and fire support. It is equipped with a variety of weapons, including a 30 mm cannon, anti-tank missiles and a machine gun. Despite its advanced design and equipment, the Uran-9 has encountered significant operational problems, providing only limited use for frontline deployment. Besides technical flaws, the Uran-9 has been found to be susceptible to communication disruption. In electromagnetically contested environments, the Uran-9 has experienced frequent losses in connection between the vehicle and its operator. With limited autonomous capabilities, this is a critical flaw as the Uran-9 relies on a remote operator for control and decision-making. By employing various electromagnetic countermeasures, the Ukrainian forces have exploited the UGV's vulnerability and, to date, have been successful in rendering it ineffective on the battlefield. This highlights one advantage of fully autonomous systems and a major incentive for their development. Electromagnetically contested environments may require the use of fully autonomous systems as this would enable an attack to continue without human

[91] Greenwalt, William C.: DOD's Replicator Program: Challenges and Opportunities, 2023. https://policycommons.net/artifacts/5668878/dods-replicator-program/6434352/; Simmons-Edler, Riley et al.: AI-Powered Autonomous Weapons Risk Geopolitical Instability and Threaten AI Research, 2024. https://arxiv.org/pdf/2405.01859.

intervention. In conclusion, the current development of AWS and LAWS in international contexts appears to endorse the opposite of a ban.

Furthermore, even if a legally binding ban on AWS or LAWS were to be implemented, it is questionable whether this ban would be successful. Legally binding treaties have been routinely violated (e.g. Nuclear Non-Proliferation Treaty, Anti-Ballistic Missile Treaty, Intermediate-Range Nuclear Forces Treaty). Research explains the success and failure of treaties on weapon systems by drawing on three key factors: the perceived horribleness of a weapon, its perceived military utility, the number of actors to cooperate for a successful ban.[92] If a specific weapon is perceived to be of little use but very horrific, then a ban is likely to succeed. However, if a weapon is viewed to provide a decisive advantage on the battlefield, the endorsement of a ban is unrealistic. An example can therefore be provided when contrasting chemical and nuclear weapons. Nuclear weapons are more harmful and indiscriminate than chemical weapons but can provide a decisive advantage in war (e.g. unconditional Japanese surrender after the Hiroshima and Nagasaki bombing). This may explain why the Non-Proliferation Treaty's goal of nuclear disarmament has not been met. In comparison, chemical weapons may have some advantages on the battlefield but are not decisive in winning a war. In this sense, many weapons that are perceived to provide few advantages have been banned. Additionally, the number of countries needed to endorse a ban is important. If weapons are difficult to develop and produce, and, therefore, are possessed by few countries, then a ban is likely to be implemented.

The problem with AWS is that these systems may score low on perceived horribleness, high on perceived military utility and require a high number of international actors to enforce a ban. None of the three key factors required for a successful ban are therefore apparent. AWS can be decisive in winning or losing a war due to the speed in processing information and acting on behalf of it that far outpaces human capabilities. AWS may not be perceived

[92] Crootof, Rebecca: The Killer Robots are Here: Legal and Policy Implications. In Cardozo L. Rev. 36, 2014, pp. 1837-1915; Watts, Sean: Autonomous weapons: regulation tolerant or regulation resistant? In: Temp. Int'l & Comp. LJ 30/2016, pp.177-187; Scharre, Paul/ Lamberth, Megan: Artificial Intelligence and Arms Control, 2022. https://arxiv.org/pdf /2211.00065; Scharre, P.: Army of None: Autonomous Weapons and the Future of War. New York: Norton & Company, 2018.

as more horrible than other weapons as it utilises similar kinds of ammunition as non-autonomous weapons and possibly even reduces the risk of collateral damage with improved precision targeting. AWS are also readily available internationally and can even be developed by non-state actors, often in the context of dual-use technology, where civilian innovations can be adapted for military purposes (e.g. commercial drone technology, civilian software development, development of artificial intelligence and robotics in the civilian sector, open-source platforms that provide software).[93] The wide availability of AWS suggests that most nations may possess some form of AWS, although differences in definitions and secrecy surrounding their development make it difficult to provide precise numbers. Enforcing a successful ban on AWS may therefore be challenging, particularly in a state of global tension.

In conclusion, enforcing a total ban on AWS or LAWS may be unrealistic from current perspectives. While prior bans on landmines and cluster munitions indicated that deep-pocketed Western nations are required to act as champions for these issues, Austria's support for a ban may have limited effect in shifting global attitudes. It may be more feasible to engage in discussions surrounding the implementation of global restrictions on the military use of autonomous systems as these have been supported by the majority of states. In its position as a neutral democratic nation, Austria may have opportunities here to facilitate international regulations on AWS and LAWS.

3.2 Strategic opportunities for Austria in finding international solutions for AWS

Austria has unique opportunities to take up leadership in debates surrounding AWS as it does not view AWS through the lens of its own security interests. As a permanently neutral country, Austria maintains its neutral position in all ongoing and future conflicts and avoids military alliances. Belligerents may not invade neutral territory under the Hague Convention (V) Article 1.[94]

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[93] World Economic Forum: Why we need to regulate non-state use of arms, 2022. https://www.weforum.org/agenda/2022/05/regulate-non-state-use-arms/.

[94] The Hague Convention (V) respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land. 1907. https://www.refworld.org/legal/agreements/hague/1907/en/18888.

Although an invasion of Austria by foreign forces may still be possible (e.g. Denmark, Belgium, the Netherlands, Luxemburg during WW2) particularly in relation to contemporary global tensions and the geographic location of Austria, an attack on Austria would be classified as a war crime and therefore be rather unlikely. Austria, as a neutral state, may have little incentive or own agenda in the development and deployment of AWS and so can communicate its aims for ethical standards more credibly and transparently. Here, fostering diplomatic solutions for AWS by bridging divides between states may be a particularly relevant role.

Austria has already proven itself as a diplomatic hub in multiple conflicts. For example, as part of the broader international effort to end the Bosnian war (1992-1995), Vienna was a key location where preliminary discussions took place. While the final peace agreement was signed in Dayton (USA), the negotiations in Vienna set the stage for the final treaty. Vienna was also the main venue for the negotiations that led to the Joint Comprehensive Plan of Action (JCPOA), commonly known as the Iran Nuclear Deal. These negotiations involved Iran and the P5+1 nations (US, UK, France, Russia, China and Germany), aiming to prevent Iran from developing nuclear weapons in exchange for lifting economic sanctions. If current global tensions result in war, Austria could utilise its experience and neutral state to advocate for international restraint in the deployment of AWS. While negotiating regulations on AWS may be more difficult during wartime, Austria's diplomatic relations may help to establish rules of engagement for AWS. The importance of Vienna as a hub for peace initiatives is further highlighted by it hosting various international organisations, including the International Atomic Energy Agency (IAEA) and the Organization for Security and Cooperation in Europe.[95] These organisations have been instrumental in diplomatic negotiations and peacekeeping efforts.

Austria has also already hosted themed conferences on AWS in recent years, such as the two-day Conference to Maintain Human Control in Autonomous

[95] Bundesministerium für Europa Integration und Äußeres (BMEIA): Non-Governmental Organizations and Quasi-International Organizations (2024b). https://www.bmeia.gv.at/en/european-foreign-policy/international-organisations-in-austria/ngos-and-quasi-international-organizations.

Weapon Systems in 2021.[96] More recently, the "Humanity at the Crossroads: Autonomous Weapons Systems and the Challenge of Regulation" conference took place in Vienna in April 2024.[97] This conference aimed to highlight the potential risks associated with AWS and LAWS and to promote global dialogue on the need for a regulatory framework to address these challenges. It played a crucial role in bringing together a diverse group of experts, including diplomats, academics, military personnel and representatives from civil society to discuss complex issues surrounding AWS and LAWS and the need for effective regulation. While the outcomes were generally well perceived by international actors, criticism from certain segments of the international disarmament and NGO community can be inferred from reports following the event. This criticism mostly addressed challenges in achieving consensus during the conference and lacking concrete outcomes,[98] which would imply a lack of success. Essentially, divergent national interests in AWS may require more continuous debates, highlighting the need for an ongoing hub on AWS and an opportunity for Austria to take on leading roles in concretising international ethical and legal guidelines towards AWS.

As an impartial, neutral venue for international discussion and regulation, Austria could advocate for the establishment of a dedicated United Nations forum or working group on definitions and legal implications of AWS under the framework of the CCW. While typical working groups within the CCW focus on specific types of weapons, a working group on definitions and legal implications may serve as a more permanent platform for dialogue, research and negotiation of perspectives on AWS. This may foster nuanced and ongoing debates on unifying definitions and legal implications thereof and allow cutting-edge research to be shared. With more regular meetings, the working group may contribute to the preparation of CCW meetings and may

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[96] LAWS Vienna 2021: Safeguarding Human Control over Autonomous Weapons Systems (n.d.). https://eventmaker.at/bmeia/laws_conference_2021.

[97] Bundesministerium für Europa Integration und Äußeres (BMEIA): Autonomous Weapons Systems, 2024a. https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems.

[98] Klare, Michael: Strong Support at Conference for 'Killer Robot' Regulation, 2024. https://www.armscontrol.org/act/2024-06/news/strong-support-conference-killer-robot-regulation; Aftab, Hira: Vienna Conference: Humanity at the Crossroads – Autonomous Weapons Systems and the Challenge of Regulation, 2024. https://article36.org/updates/vienna-conference-humanity-at-the-crossroads-autonomous-weapons-systems-and-the-challenge-of-regulation/.

lead to more concrete outcomes of these meetings by fostering more homogenous perspectives on definitions and their ethical and legal implications.

In conjunction with establishing continuous global debates and discussions on AWS, Austria could launch a centre for research on the ethical and legal implications of AWS. Utilising its position as neither a major military power nor robotics developer, Austria could represent a neutral location for unbiased research on AWS. Different academic fields could produce high-quality impartial international research on the effects and implications of AWS which could be utilised to inform global policy debates and evidence-based recommendations on AWS. The effectiveness of research centres has been evidenced by the Marx Planck Institute for Comparative Public Law and International Law (MPIL), the Stockholm International Peace Research Institute (SIPRI), the International Institute for Environment and Development (IIED) and the Basel Institute on Governance (BIG), for example. All these centres have produced evidence that guided global governance by influencing international policies and legally binding frameworks. While the establishment of a research centre dedicated to the ethical and legal implications of AWS may require significant funding, it would substantiate Austria's leadership role in shaping strict international guidelines on AWS. In addition, a research centre may help to foster regular multi-stakeholder dialogue, bringing together governments, academics, tech companies and civil societies to discuss the development and use of AWS. By facilitating this dialogue, Austria could encourage responsible innovation and ensure that the perspectives of those developing technologies are considered in regulatory discussions. Additionally, global civil knowledge on the ethical and legal implications of AWS could be improved by investing in producing impartial evidence. This is demonstrated by the MPIL, SIPTI, IIED and BIG, which have all utilised public engagement strategies to increase public knowledge of various global issues. Similar strategies could be employed to improve global public awareness of AWS. By providing fact-based and impartial information, civil society may pressure governments internationally to act and implement regulations on AWS.

Austria may also want to focus on its diplomatic relations to build coalitions with nations that support restrictions and bans on autonomous weapon systems, particularly among non-aligned and smaller states that may feel vulnerable to the proliferation of AWS and LAWS. While Austria has already joined

the "Stop Killer Robots" campaign, which aims to ban LAWS, it could engage with the Non-Aligned Movement to help build a broader coalition of states, predominantly in the global south, or build a coalition of middle powers – countries that may not be global superpowers but have significant diplomatic influence (e.g. New Zealand, Canada, Japan). Within the European Union (EU), Austria could form a coalition of EU Member States that put pressure on the EU to take on a leading role in international negotiations surrounding AWS. These coalitions could act as a counterbalance to the resistance towards imposing strict regulations on AWS from major military powers. The relevance of small-country coalitions and coalitions of like-minded states has been well documented throughout history. For example, the Visegrád Group (Visegrád Four/ V4) is a political alliance of Poland, Hungary, Czechia and Slovakia that, while formed in 1991 to aid the transition from communism, now collaborates on areas of common interest. The V4 has successfully opposed several policies proposed by the EU, particularly in relation to EU migration quotas, rule of law mechanisms and climate policies. By establishing coalitions, Austria could steer international discussions and focus on establishing a treaty for legally binding definitions and regulations for AWS.

In conclusion, while Austria has been proactive in the discourse surrounding the regulation of AWS by engaging and hosting meetings, there is further potential in relation to taking on leadership roles. Austria can strengthen alliances and endorse new alliances in order to influence international policy. By continuing to engage in advocacy and collaboration, Austria can harness its position to lead the way in shaping a responsible and sustainable approach to the future use of AWS.

4. Discussion

AWS pose significant ethical and legal challenges. These challenges are mirrored in the global inconsistency in what is to be considered as appropriate in the development and deployment of AWS. To date, there are various governmental definitions on what ought to be considered as AWS, highlighting the complexity of these systems. Issues surrounding AWS are highlighted in consequentialist and deontological strands of normative ethics. From a deontological perspective, the focus on the morality of actions themselves is used as arguments against the deployment and development of AWS. The use of AWS in life-and-death decisions undermines the moral responsibility

of humans in ensuring accountability and human oversight in protecting human life. In comparison, consequentialist perspectives focus on the outcome, weighing their potential benefit against their risks. Improved targeting may reduce human suffering and limit human casualties in warfare. However, there are also considerable negative outcomes relating to global stability and the risk of (accidental) conflict escalation.

In conclusion, ethical debates on AWS highlight a fundamental tension between duty and outcome. A balanced ethical debate would require the consideration of both points, highlighting the need for robust regulatory frameworks that ensure accountability while also addressing the potential benefits of AWS. A responsible approach to AWS would require the integration of deontological ethics with consequentialist assessments to navigate the complexities of modern warfare while upholding humanitarian values.

Austria's conservative perspective on AWS is marked by the utilisation of deontological arguments as a theoretical backdrop. Being deeply committed to ethical responsibility and legal compliance, the Austrian approach towards AWS emphasises human oversight in the use of weapon systems. In this sense, Austria assures adherence to international law by aligning its military technology to fundamental human rights. Despite its conservative approach, Austria proactively partook in international dialogue and cooperation to establish regulations governing AWS. While these discussions have not yet produced any concrete outcomes, they are an initial step towards drafting internationally unified understandings of AWS. This is essential as unified definitions of AWS can provide an underlying framework for ethical standards in AWS deployment and development.

While Austria has already played an important role in being an impartial venue fostering international encounters to exchange ideas, to share information and co-ordinate efforts in regulating AWS, more can be done in developing diplomatic leadership. Austria may engage in further diplomatic relations and may attempt to build coalitions with like-minded non-aligned states or middle powers to exert pressure on major military powers. It may also invest in a research centre to provide impartial, fact-based evidence in developing sustainable regulatory frameworks for AWS and to develop global information campaigns on AWS in order to exert pressure on governments to adopt regulatory frameworks.

Importantly, it would be advisable that Austria expedites its endeavour to establish legally binding frameworks on AWS and starts to take on international diplomatic leadership roles in the process. With increasing global tensions, the prompt development of international policies on AWS would be advisable, as these policies can be established more easily during peacetime than in wartime. This would allow global standards to be shaped and responsible innovation to be led to prevent future atrocities committed by autonomous systems.

2. Key points and recommendations

- AWS and LAWS pose significant ethical and legal challenges that, to date, remain unresolved by the international community.
- Definitions of AWS vary internationally and provide space for interpretation and loopholes to further develop fully autonomous AWS and LAWS.
- Narrow consequentialist ethics highlight the potential of AWS in reducing human casualties and improving military effectiveness.
- Broad consequentialist ethics highlight concerns regarding the societal and global impact of AWS.
- Deontological ethics view the development of AWS as critical due to questions surrounding accountability, moral responsibility and human dignity in lethal decisions.
- Austria's views on AWS align with deontological and wide consequentialist perspectives, rooted in ethical, legal and humanitarian concerns.
- While Austria took on a conservative attitude towards AWS, it remains proactive and vocal in outlining concerns about AWS in international debates.
- Austria's neutrality and diplomatic experience provides unique opportunities to position itself as a diplomatic leader and further international discussions to potentially expedite unifying definitions and policy frameworks on AWS and LAWS.
- However, to do so, Austria may need to further invest in AWS knowledge generation and international coalitions.

References

Aftab, Hira: Vienna Conference: Humanity at the Crossroads – Autonomous Weapons Systems and the Challenge of Regulation. 2024. https://article36.org/updates/vienna-conference-humanity-at-the-crossroads-autonomous-weapons-systems-and-the-challenge-of-regulation/.

Amoroso, Daniele/Tamburrini, Guglielmo: The Ethical and Legal Case Against Autonomy in Weapons Systems. In: Global Jurist 18, no. 1. 2018. 20170012.

Amoroso, Daniele/Tamburrini, Guglielmo: Autonomous Weapons Systems and Meaningful Human Control: Ethical and Legal Issues. In: Current Robotics Reports 1/2020, p.187-194.

Arkin, Ronald C./Ulam, Patrick/Duncan, Brittany: An Ethical Governor for Constraining Lethal Action in an Autonomous System. Technical Report GIT-GVU-09-02/ 2009. https://digitalcommons.unl.edu/csetechreports/163/.

Arkin, Ronald: Governing Lethal Behavior in Autonomous Robots. Chapman and Hall/CRC. 2009.

Arkin, Ronald: Lethal Autonomous Systems and the Plight of the Non-Combatant. In: AISB Quarterly 137. 2013, p.1-9.

Arkin, Ronald: The Case for Ethical Autonomy in Unmanned Systems. In: Journal of Military Ethics 9, no. 4. 2010, p.332–341.

Asaro, Peter: Jus nascendi, robotic weapons and the Martens Clause. In: Carlo Ryan (Ed): Robot Law. Edward Elgar Publishing. 2016, p.367-386.

Asaro, Peter: On banning autonomous lethal systems: human rights, automation, and the dehumanization of lethal decision-making, special issue on new technologies and warfare. In: International Review of the Red Cross, 94(886). 2012, p.687–709.

Bachmann, Sascha-Dominik Dov/Grant, Richard V.: The Need for An Australian Regulatory Code for the Use of Artificial Intelligence (AI) in Military Application. In: American University National Security Law Brief 13.2. 2023, p.1-34.

Berghahn, Volker: Naval Armaments and Social Crisis: Germany Before 1914. In: Best, Geoffrey and Andrew Wheatcroft (Eds). War, Economy and the Military Mind. Routledge: London. 2020, p.61-88.

Bundesministerium für Europa Integration und Äußeres (BMEIA): 2024 Vienna Conference on Autonomous Weapons Systems (n.d.). https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems/2024-vienna-conference-on-autonomous-weapons-systems#:~:text=The%20Austrian%20Federal%20Ministry%20for,the%20Hofburg%20Palace%20in%20Vienna.

Bundesministerium für Europa Integration und Äußeres (BMEIA): Autonomous Weapons Systems. 2024a. https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/conventional-arms/autonomous-weapons-systems.

Bundesministerium für Europa Integration und Äußeres (BMEIA): Non-Governmental Organizations and Quasi-International Organizations (2024b). https://www.bmeia.gv.at/en/european-foreign-policy/international-organisations-in-austria/ngos-and-quasi-international-organizations.

Bode, Ingvild/Huelss, Hendrik: Autonomous Weapons Systems and International Norms. McGill-Queen's University Press - MQUP: Montreal Quebec. 2022.

Bundesministerium für Europa: EU-Arbeitsprogramm 2015 (2015). https://www.parlament.gv.at/dokument/XXV/III/148/imfname_383089.pdf.

Convention on Certain Conventional Weapons, CCW: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. 2022. https://unoda-documents-library.s3.amazonaws.com/Convention_on_Certain_Conventional_Weapons_-_Meeting_of_High_Contracting_Parties_(2022)/CCW_MSP_2022_6_Advance_version.pdf.

Convention on Certain Conventional Weapons, CCW: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. 2024. https://meetings.unoda.org/ccw-mhcp/convention-on-certain-conventional-weapons-meeting-of-high-contracting-parties-2024.

Chengeta, Thompson: Accountability gap, autonomous weapon systems and modes of responsibility in international law. In: Denv. J. Int'l L. & Pol'y 45. 2016, p.1-50.

Crootof, Rebecca: The Killer Robots are Here: Legal and Policy Implications. In Cardozo L. Rev. 36/ 2014. 1837-1915.

Docherty, Bonnie: Shaking the Foundations: The Human Rights Implications of Killer Robots. 2014. https://www.hrw.org/report/2014/05/12/shaking-foundations/human-rights-implications-killer-robots.

Drake, Emily: Evaluating autonomous weapons systems: A dichotomic lens of military value and accountability. In: Colum. Hum. Rts. L. Rev. 53. 2021, p.297-344.

Fox, John: Towards a Canonical Theory of General Intelligence. In: Journal of Artificial General Intelligence 11.2/2020, p.35-40.

Galliott, Jai/Wyatt, Austin: A consideration of how emerging military leaders perceive themes in the autonomous weapon system discourse. In: Defence Studies 22.2. 2022, p.253-276.

Greenwalt, William C.: DOD's Replicator Program: Challenges and Opportunities. 2023. https://policycommons.net/artifacts/5668878/dods-replicator-program/6434352/.

Grossman, Dave: On Killing: The Psychological Cost of Learning to Kill in War and Society. In: Tweedy, Rod (Ed.) The Political Self. Routledge: London. 2018, p.141-155.

Hawley, John K.: Looking Back at 20 Years of MANPRINT on Patriot: Observations and Lessons. Army Research Laboratory. 2007. https://apps.dtic.mil/sti/pdfs/ADA472740.pdf.

Hawley, John K./Mares, Anna L./Marcon, Jessica L.: On fratricide and the operational reliability of target identification decision aids in combat identification. In Herz, Robert (Ed.) Human Factors Issues in Combat Identification. Florida: CRC Press. 2017, p.299-312.

Hawley, John K.: Patriot Wars: Automation and the Patriot Air and Missile Defense System. In: Center for a New American Security. 2017. https://s3.amazonaws.com/files.cnas.org/documents/CNAS-Report-EthicalAutonomy5-PatriotWars-FINAL.pdf.

Hew, Patrick/Lewis, Edward/Radunz, Penelope/Rendell, Sean: Situation awareness for supervisory control: Two fratricide cases revisited. 2010. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=959defb585ed0110be1386259caef17ef53a9c53.

Heyns, Christoph: Autonomous weapons in armed conflict and the right to a dignified life: an African perspective. South African Journal on Human Rights, 33(1). 2017, p.46–71.

Heyns, Christoph: Autonomous weapons systems: living a dignified life and dying a dignified death. In Bhuta, Nehal et al. (Eds.), Autonomous Weapons Systems: Law, Ethics, Policy/Cambridge: Cambridge University Press. 2016, p.3–20.

Heyns, Christoph: Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions, A/HRC/23/47. 2013. https://www.refworld.org/reference/themreport/unhrc/2015/en/105196.

Holwitt, Joel Ira: Execute Against Japan: The U.S. Decision to Conduct Unrestricted Marine Warfare. Vol. 121. Texas: A&M University Press. 2009.

Horowitz, Michael C./Scharre, Paul: AI and International Stability. 2021. https://s3.us-east-1.amazonaws.com/files.cnas.org/documents/AI-and-International-Stability-Risks-and-Confidence-Building-Measures.pdf.

Horowitz, Michael C./Scharre, Paul/Velez-Green, Alexander: A Stable Nuclear Future? The Impact of Autonomous Systems and Artificial Intelligence. 2019. https://arxiv.org/pdf/1912.05291.

Horowitz, Michael C.: The ethics & morality of robotic warfare: Assessing the debate over autonomous weapons. Daedalus. 2016, p.145(4), 25-36.

Horowitz, Michael C.: When speed kills: Lethal autonomous weapon systems, deterrence and stability. In Sechser, Todd et al. (Eds.) Emerging Technologies and International Stability. London: Routledge. 2021, p.144-168.

Human Rights Watch (HRW): An Agenda for Action. Alternative Processes for Negotiating a Killer Robots Treaty. 2022. https://www.hrw.org/report/2022/11/10/agenda-action/alternative-processes-negotiating-killer-robots-treaty.

International Committee of the Red Cross (ICRC): ICRC Position on Autonomous Weapon Systems. 2014. https://www.icrc.org/en/document/statement-icrc-lethal-autonomous-weapons-systems.

International Committee of the Red Cross (ICRC): ICRC Position on Autonomous Weapon Systems. 2021. https://www.icrc.org/en/document/icrc-position-autonomous-weapon-systems.

Kagan, Shelly: Normative Ethics. London: Routledge. 2018.

Kania, Elsa: "AI weapons" in China's military innovation. 2020. https://www.brookings.edu/wp-content/uploads/2020/04/FP_20200427_ai_ weapons_kania_v2.pdf

Keller, Julia: Mr. Gatling's Terrible Marvel: The Gun that Changed Everything and the Misunderstood Genius who Invented it. London: Penguin. 2008.

Klare, Michael: Strong Support at Conference for 'Killer Robot' Regulation. 2024. https://www.armscontrol.org/act/2024-06/news/strong-support-conference-killer-robot-regulation.

LAWS Vienna 2021: Safeguarding Human Control over Autonomous Weapons Systems (n.d.). https://eventmaker.at/bmeia/laws_conference_2021.

Leys, Nathan: Autonomous Weapon Systems, International Crises, and Anticipatory Self-Defense. In Yale J. Int'l L. 45. 2020, p.377-411.

Lin, Patrick/Abney, Keith/Bekey, George A.: Robot Ethics: The Ethical and Social Implications of Robotics. Cambridge (MA): MIT Press. 2014.

Lucas Jr, George R.: Automated Warfare. In Stan. L. & Pol'y Rev. 25/2014, p.317-341.

MacNair, Rachel M.: The Psychology of Peace: An Introduction. Bloomsbury Publishing USA. 2011.

Mahnken, Thomas: Asymmetric Warfare at Sea: The Naval Battles off Guadalcanal, 1942–1943. In: Naval War College Review 64.1. 2011, p.95-121.

Marshall, Samuel Lyman Atwood: Men Against Fire: The Problem of Battle Command. University of Oklahoma Press. 2000.

Maurer, John H.: Arms Control and the Anglo-German Naval Race before World War I: Lessons for Today? In: Political Science Quarterly 112.2. 1997, p.285-306.

Meurers, Christian: Der Informationskrieg im 21. Jahrhundert und seine Auswirkungen auf die Militärdoktrinen der USA. 2010. https://www.bmlv.gv.at/pdf_pool/publikationen/diplomarbeit_informationskrieg_publikation_lvak_20100902.pdf.

Ministry of Defence (MOD): The UK Approach to Unmanned Aircraft Systems (Joint Doctrine Note 2/11), MoD Development, Concepts and Doctrine Centre, paragraph 508. 2017. www.gov.uk/government/uploads/system/uploads/attachment_data/file/33711/20110505JDN_211_UAS_v2U.pdf.

Ministry of Defence (MOD): Ambitious, safe, responsible: our approach to the delivery of AI-enabled capability in Defence. 2022. https://www.gov.uk/government/publications/ambitious-safe-responsible-our-approach-to-the-delivery-of-ai-enabled-capability-in-defence/ambitious-safe-responsible-our-approach-to-the-delivery-of-ai-enabled-capability-in-defence.

Moyes, Richard: Ground-breaking UN joint statement on autonomous weapons (2022). https://article36.org/updates/ground-breaking-un-joint-statement-on-autonomous-weapons/.

Moray, Neville/Inagaki, Toshiyuki/Itoh, Makoto: Adaptive automation, trust, and self-confidence in fault management of time-critical tasks. Journal of Experimental Psychology: Applied, 6(1), 44–58. 2002. https://doi.org/10.1037/1076-898X.6.1.44.

Muedini, Fait: In the United States and the Soviet Union, the Theory of Mutually Assured Destruction Altered International Relations. In Santos, Rita (Ed): Arms Sales, Treaties, and Violations. 2018, p.118-129.

Office of the Secretary of Defense: Unmanned Aircraft Systems Roadmap 2005-2030 (2005). https://irp.fas.org/program/collect/uav_roadmap2005.pdf.

Oimann, Ann-Katrien: The Responsibility Gap and LAWS: a Critical Mapping of the Debate. In: Philosophy & Technology 36.1. 2023, p.1-22.

Petrov, Avvakum: The Life Written by Himself. Columbia: Columbia University Press. 2021.

Pfaff, C. Anthony et al.: Trusting AI: Integrating Artificial Intelligence into the Army's Professional Expert Knowledge. Carlisle: USAWC Press. 2023.

Poposka, Vesna/Abdulmecit, Nuredin: Legality of the use of cluster bombs in international law: a short overview. In: Journal of Liberty and International Affairs 10.1. 2024, p.252-269.

Roff, Heather M.: An ontology of autonomy for autonomous weapons systems. In: Finkelstein, Claire/MacIntosh, Duncan/Ohlin, Jens David (Eds) The Ethics of Autonomous Weapons. Oxford: Oxford University Press. 2017.

Roff, H. M./Danks, D.: Trust but Verify: The Difficulty of Trusting Autonomous Weapons Systems. Journal of Military Ethics, 17(1), 2–20. 2018. https://doi.org/10.1080/15027570.2018.1481907.

Saint, James: The case for cluster munitions: Amend or withdraw from the convention on cluster munitions. In: Australian Army Journal 19.1. 2023, p.100-116.

Scharre, Paul: Army of None: Autonomous Weapons and the Future of War. New York: Norton & Company/2018.

Scharre, Paul/Lamberth, Megan: Artificial Intelligence and Arms Control. 2022. https://arxiv.org/pdf/2211.00065.

Schaub Jr, Gary/Kristoffersen, Jens Wenzel: In, On, or Out of the Loop? 2017. https://cms.polsci.ku.dk/publikationer/in-on-or-out-of-the-loop/In_On_or_Out_of_the_Loop.pdf.

Schelling, Thomas C.: Surprise Attack and Disarmament. In: Bulletin of the Atomic Scientists 15.10. 1959, p.413-418.

Schwarz, Elke: Autonomous Weapons Systems, Artificial Intelligence, and the Problem of Meaningful Human Control. In: Philosophical Journal of Conflict and Violence Vol V/1. 2021, p.53-72.

Sen, Amartya: Consequential Evaluation and Practical Reason. In: The Journal of Philosophy 97.9. 2000, p.477-502.

Sharkey, Amanda: Autonomous weapons systems, killer robots and human dignity. In: Ethics and Information Technology 21.2/2019, p.75-87.

Sharkey, Noel: Grounds for Discrimination: Autonomous Robot Weapons. In: RUSI Defence Systems 11.2. 2008, p.86-89.

Sharkey, Noel: Automating warfare: Lessons learned from the drones. In: JL Inf. & Sci. 21. 2011, p.140-157.

Sharkey, Noel: The evitability of autonomous robot warfare. In: International Review of the Red Cross 94.886/2012a, p.787-799.

Sharma, Sanur: Unmanned Ground Vehicles: Global Developments and Future Battlefield. Manohar Parrikar Institute for Defence Studies and Analyses Issue Brief. 2022. https://www.idsa.in/system/files/issuebrief/ib-unmanned-ground-vehicles-ssharma-220422.pdf.

Simmons-Edler, Riley et al.: AI-Powered Autonomous Weapons Risk Geopolitical Instability and Threaten AI Research, 2024. https://arxiv.org/pdf/2405.01859.

Stop Killer Robots (SKR): Members. 2024. https://www.stopkillerrobots.org/a-global-push/member-organisations/.

Sondhaus, Lawrence: German Submarine Warfare in World War I: The Onset of Total War at Sea. Lanham: Rowman & Littlefield. 2017.

Sparrow, Robert: Robots and Respect: Assessing the Case Against Autonomous Weapon Systems. In: Ethics & International Affairs, Volume 30/1. 2016, p.93-116.

Suchman, Lucy: Human-Machine Reconfigurations: Plans and Situated Actions. Cambridge: Cambridge University Press. 2007.

Tamburrini, Guglielmo: On banning autonomous weapons systems: from deontological to wide consequentialist reasons. In: Bhuta, Nehal, Susanne Beck and Hin-Yan Liu (Eds): Autonomous Weapons Systems: Law, Ethics, Policy. Cambridge: Cambridge University Press. 2016, p.122-142.

The Hague Convention II. Laws and Customs of War. 1899. https://ihl-databases.icrc.org/en/ihl-treaties/hague-conv-ii-1899.

The Hague Convention (V) respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land. 1907. https://www.refworld.org/legal/agreements/hague/1907/en/18888.

Ticehurst, Rupert: The Martens Clause and the Laws of Armed Conflict. In: International Review of the Red Cross (1961-1997) 37.317. 1997, p.125-134.

Ulgen, Ozlem: Human Dignity in an Age of Autonomous Weapons: Are We in Danger of Losing an 'Elementary Consideration of Humanity'? In: Baltic Yearbook of International Law Online 17.1. 2020, p.167-196.

Ulgen, Ozlem: Kantian Ethics in the Age of Artificial Intelligence and Robotics. In: QIL 43. 2017, p.59-83.

United Nations: Convention on Certain Conventional Weapons. 2017. https://meetings.unoda.org/meeting/29460/documents.

United Nations: Fifth Review Conference of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. 2016. https://documents.un.org/access.nsf/get?OpenAgent&DS=CCW/CONF.V/2&Lang=E.

United Nations: Meeting of High Contracting Parties 2015. Austria. 2015b. https://docs-library.unoda.org/Convention_on_Certain_Conventional_Weapons_-_Meeting_of_High_Contracting_Parties_(2015)/austria.pdf.

United Nations: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. 2014. https://documents.un.org/doc/undoc/gen/g14/048/96/pdf/g1404896.pdf.

United Nations: Meeting of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. 2015. https://digitallibrary.un.org/record/3856238/files/CCW_MSP_2015_9-EN.pdf.

United Nations: UN human rights expert calls for a moratorium on lethal autonomous robots. Of human rights and robots. 2013. https://www.ohchr.org/en/press-releases/2013/05/un-human-rights-expert-calls-moratorium-lethal-autonomous-robots.

United Nations Human Rights Council (UNHRC): Joint Statement on Lethal Autonomous Weapons Systems. 2022. https://estatements.unmeetings.org/estatements/11.0010/20221021/A1jJ8bNfWGlL/KLw9WYcSnnAm_en.pdf.

US Department of Defense (USDoD): Autonomy in Weapon Systems. 2012. https://ogc.osd.mil/Portals/99/autonomy_in_weapon_systems_dodd_3000_09.pdf.

US Department of Defense (USDoD): Autonomy in Weapon Systems. 2023. https://media.defense.gov/2023/Jan/25/2003149928/-1/-1/0/DOD-DIRECTIVE-3000.09-AUTONOMY-IN-WEAPON-SYSTEMS.PDF.

Van Munster, Rens/Sylvest, Casper: On history and authority: the Cold War nuclear arms race and its importance for critical security theory. In: Critical Studies on Security 10.3. 2022, p.157-171.

Warren, Aiden/Hillas, Alek: Xi Jinping Thought: Lethal Autonomous Weapons Systems and Military Modernization with Chinese Characteristics. In: The Journal of International Relations, Peace Studies, and Development 7.1. 2022, p.6-32.

Watts, Barry D: Six Decades of Guided Munitions and Battle Networks: Progress and Prospects. Center for Strategic and Budgetary Assessments. 2007. https://csbaonline.org/uploads/documents/2007.03.01-Six-Decades-Of-Guided-Weapons.pdf.

Watts, Sean: Autonomous weapons: regulation tolerant or regulation resistant? In: Temp. Int'l & Comp. LJ 30. 2016, p.177-187.

Wiener, Norbert: The Human Use of Human Beings: Cybernetics and Society. Boston: Da Capo Press. 1988.

Williams, Andrew P./Scharre, P. D.: Defining Autonomy in Systems: Challenges and Solutions. 2015. https://d1wqtxts1xzle7.cloudfront.net/79206991/1010077-libre.pdf.

Włodarczyk, Justyna: Beyond Bizarre: Nature, Culture and the Spectacular Failure of BF Skinner's Pigeon-Guided Missiles. In: Polish Journal for American Studies 14/2020, p.7-140.

Wood, Nathan Gabriel: Autonomous weapon systems and responsibility gaps: a taxonomy. In: Ethics and Information Technology 25.1. 2023, p.1-14.

World Economic Forum: Why we need to regulate non-state use of arms. 2022. https://www.weforum.org/agenda/2022/05/regulate-non-state-use-arms/.

Zehfuss, Maja: Targeting: Precision and the production of ethics. In: European Journal of International Relations 17.3. 2011, p.543-566.