LETHAL AUTONOMOUS WEAPON SYSTEMS – EMERGING AND POTENTIALLY DISRUPTIVE TECHNOLOGY –

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The renewal of the competition for the super power status has led to the revival of the emphasis on defense planning, by the great powers, on the capabilities intended for so-called high-end conventional, technological sophisticated warfare, which involves large-scale and high-intensity military actions. Weapons that can be linked to waging high-end warfare actually include the military uses of the lethal autonomous weapon systems (LAWS) and artificial intelligence (AI). The connection between robotics, and autonomous systems and AI has the potential to change the nature of warfare. Theoretically, a lethal weapon system should be considered autonomous if it is designed so that it can modify its integrated programming, does not take into account the objectives initially set and modifies its rules of engagement without human intervention. Human judgment will remain essential, but the line between what humans and machines do best will constantly be shifting in the coming years. The most critical dimension of autonomy is the task the machine is performing. There are significant expectations and challenges, opportunities, and risks associated with LAWS across the full range of military operations. LAWS will influence military operations in the future and will have at least an evolutionary – if not revolutionary – effect.

Keywords: lethal weapons; drone; artificial intelligence; human operator; automation;

PRELIMINARY CONSIDERATIONS

Events in recent years, particularly since 2014, have tested, if not undermined, the strategic assumptions underpinning NATO's posture. To Europe's east, Russia occupied Crimea and launched a separatist war in eastern Ukraine, is modernising its conventional and nonconventional forces, and launched an invasion of Ukraine on 24 February, a *"special military operation"* to protect the civilian population and to *"demilitarize"* and *"de-Nazify"* Ukraine. The United States and its allies and partners have taken steps to accelerate the delivery and maintain an effective assistance package in order to support Ukraine to deny Russia's offensive that is more limited in terms of territory, but not in terms of brutality and, finally, the achievement of conditions for Ukraine's offensive actions. Ukraine has repeatedly requested more advanced weapons, including LAWS, aircrafts and air defense systems to increase the range, distance, and lethality of its military actions. The LAWS proved to be among the most effective weapons in the fight, for both sides.

Russia also increased its military activities in Europe's north, particularly by adding nuclear-capable missiles to Kaliningrad (a Russian territory on the Baltic Sea that is not contiguous with Russia itself) and Belarus, enhancing its air patrolling activities close to other states' airspace, and increasing its naval presence in the Baltic Sea, the Arctic Ocean, and the North Sea. Taken together, these moves have heightened NATO concerns about Russian aggression and its implications for NATO territories, particularly Central and Eastern European NATO allies. To Europe's south, instability resulting in part from the *"Arab Spring"* led to collapse of states, civil war in some instances, and significant refugee flows into Europe. This has led to political tensions across the broader European Union, as well as to concerns about terrorists inserting within refugee flows.

The renewal of super power status competition with Russia, which was underscored by seizure and annexation of Crimea in March 2014 and subsequent actions in Ukraine, has led to a renewed focus in U.S. and NATO defense planning on strengthening military capabilities for countering potential Russian aggression in Europe.

The challenges generated by emerging and disruptive technologies in the weapon realm can be represented by five significant and potentially disruptive technological developments: hypersonic weapons, missile defense, artificial intelligence and automation, counter space capabilities and computer network operations (cyber).(Andrew Futter, p. 1). This article will highlight only details specific to lethal autonomous weapon systems and tries to assess the comparative influence of LAWS and AI particularly in three domains: command and control; delivery platforms and vehicles and conventional applications of autonomous systems with effects on international stability and security.

Weapon acquisition programs that can be linked to preparing for high-end warfare include (to mention only a few examples) those for procuring: advanced aircrafts and the next-generation long-range bombers, highly capable warships (attack submarines and destroyer), ballistic missile defense capabilities, longer-ranged land-attack and anti-ship weapons, new types of weapons such as lasers, railguns, and hypervelocity projectiles, new intelligence, surveillance, and reconnaissance capabilities, military space capabilities, electronic warfare capabilities, military cyber capabilities, hypersonic weapons, and the military uses of robotics and autonomous unmanned vehicles, quantum technology, and artificial intelligence.

The result of employment in combat and the accomplishment of aim and purpose by the semi-autonomous systems conclude that fully autonomous weapon systems will become more and more feasible for military leaders. The progress of LAWS is recognised as taking place or predicted to materialise between numerous probable equal or asymmetric opponents. (Congressional Research Service, 2016, summary).

The great powers' approach to LAWS is largely determined by the perceived threat from the opponents, combined with lessons learned from continuous conflicts in Syria and Ukraine about how the future battlefield will look like. Military strategists consider decisive, information dominance on the battlefield, in Ukraine and view LAWS-suited technology as the key to fulfilling that aim. The combination of the use of different types of LAWS, along with countermeasures against those systems, is going to be the area where the military will put a strong emphasis. In Ukraine, The Russian Federation has allegedly deployed an AI – enabled

Kalashnikov ZALA Aero Kub-BLA *"loitering"* munitions, while Ukraine has used Turkish-made Bayractar TB2 drones, which have some autonomous capabilities.

Autonomy/automation is the application of AI to particular tasks, some of which might involve robotics and therefore automated or autonomous weapon systems. There are different variants of autonomy in terms of function and sophistication. These distinctions exist along a continuum from discrete automated systems to more capable and goal-orientated autonomous systems. The age of autonomous weapons has arrived. Today on the globe, at least thirty nations have weapons that can search for and destroy enemy targets all on their own. From Israel's Harpy drone to the American submarine-hunting robot, Sea Hunter, the implications resulting from the granting of weapons the freedom to make life and death decisions and the legal and ethical issues around their use, all are consequences of next-generation warfare. As a result, NATO countries will promote innovation and increase their investments in emerging and disruptive technologies. (NATO, 2022, p. 6).

AI essentially allows robotic machines to operate without human intervention based on interaction with their environment, albeit to different extents. Like AI, automation has been used in aspects of nuclear early warning, targeting and delivery systems for many decades, although most involve a high degree of human control. In spite of the fact that autonomous weapons were initially considered a scientific experiment, the results of their employment in battle determine a reconsideration and a multilateral assessment of LAWS. In the last period of time, the democratic great powers have tried to find out solutions to neutralize nuclear deterrence and eliminate the risks of nuclear escalations. The solutions were represented, among others, by the development of AI and the use of LAWS. Anyway, both solutions are accompanied by risks.

Usually, the states accept to acquire lethal systems with large autonomy, even if these present relevant risks, to protect and secure the assets that have the mission to execute the second strike. Even so, conventional military applications of autonomous systems have the capacity to affect both, the nuclear forces' approach and the stability generated by the first strike, preventing triggering an unexpected war (Horowitz, Scharre, Velez-Green, 2019, p. 1).

CONCEPTUAL CLARIFICATIONS

So far, lethal autonomous weapon systems do not have a definition discussed or negotiated and then accepted by all parties in international organisations. In specialised literature, LAWS represent or describe a particular category of weapon systems that utilise sensor suites and computer algorithms in order to, without assistance, detect a target and employ an onboard weapon system to tackle and annihilate the target without manual operator control of the system.

In the UN Report of International Rescue Committee, Autonomous weapon systems were defined as weapons that can without assistance decide on and engage targets, i.e. with autonomy in the *"critical functions"* of acquiring, tracking, selecting, and attacking targets. (ICRC, 2014, p. 1).

Most definitions are mainly based on the mission of the human operator with respect to target determination and employment decisions, rather than on the degree of technological complexity of the weapon system. For simplicity, this article will use the term LAWS to describe any system that fits the definitions shown in *figure no. 1*.

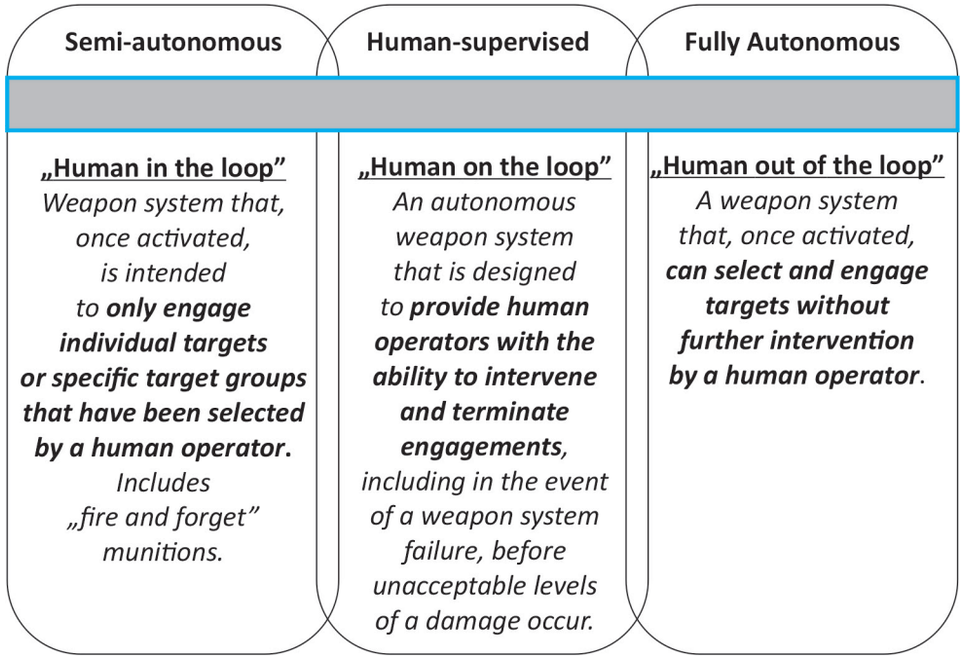

Figure no. 1: Spectrum of Autonomy in LAWS (Caton, 2015, p. 3)

Autonomy is a capability (or a set of capabilities) that enables a particular action of a system to be automatic or, within programmed boundaries, *"self-governing"*. This does not involve making independent decisions and uncontrolled actions. (Department of Defense, 2012, p. 1).

Autonomy signifies the capacity of a system to function and make suitable to changing circumstances with reduced or without human control. Despite the concentration in much of the literature on the apparatus using or applying mechanical power and having several parts, each with a definite function and together performing a particular task, autonomy is a much wider concept that includes layouts such as automated movement coordination and automated process of selecting, organizing, and looking after the content in a collection of systems. Autonomy also includes systems that can diagnose and repair faults in their own functioning, such as identifying and fixing security vulnerabilities. (National Science and Technology Council Committee on Technology, 2016, p.10). On the other side, automation occurs when a machine works alone and previously could be put into function by an operator. The expression has a connection to the same extent to the physical work and mental or cognitive work that might be substitute by AI.

States Parties to The Convention on prohibitions on the employ of Certain Conventional Weapons which may be deemed to be excessively injurious or to have indiscriminate effects (CCW) are talking about practical, juridical, military, moral principles, and other important topics or problems connected with emerging technologies, in spite of the fact that is obvious that there is no mutual agreement of LAWS. Some States have assimilated LAWS with remotely piloted airplane or military *"drones"*, a view that the United States disapproves, as remotely - piloted craft are, by definition, directly directed by operators just as manned aircraft are. The other States have concentrated on AI, robot armies, or whether *"meaningful human control"* – an undefined explicitly term – is exercised over life-and-death decisions.

A definition used by the U.S. Department of Defense, defines LAWS as *"a weapon system that, once activated, can select and engage targets without further intervention by a human operator. This includes human-supervised autonomous weapon systems that are designed to allow human operators to override*

the operation of the weapon system but can select and engage targets without further human input after activation". (Department of Defense, 2017, p. 14). It specifically excludes: cyberspace systems for cyberspace operations; unarmed, unmanned platforms; unguided munitions; munitions manually guided by the operator (e.g., laser- or wire-guided munitions); mines; or unexploded explosive ordnance. (Caton, 2022, p. 4). A vital theme is the requirement for LAWS to be projected in this way to give the permission commanders and operators to exercise suitable or proper in the circumstances levels of human judgment over the employ of force. (Department of Defense, 2017, pp. 4,5,14).

In order to comply with provisions of CCW, respectively, to not be excessively injurious or to have indiscriminate effects, the human-supervised autonomous weapons used for rocket defense of manned installations or platforms – but that do not target humans – and autonomous weapons that *"apply non-lethal, non-kinetic force, such as some forms of electronic attack, against materiel targets"* are exempted from this senior-level review. (Congressional Research Service, 2020, p. 16).

LAWS are a class of weapon systems capable of independently identifying a person, object, or place selected as the aim of an attack and employing an available or situated on a ship, aircraft, or other platform weapon system to engage and destroy the target without manual human control. LAWS require computer algorithms and sensor suites to classify an object as hostile, make an engagement decision, and guide a weapon to the target. This capability would enable the system to operate in environments where communications are difficult to operate or are denied and traditional conventional assets may not be able to operate. This definition's principal characteristic is the role of the human operator with regard to target selection and engagement decisions. This assumes that the system employs autonomy for fighting connected functions containing, but not restricted to the following operations: acquiring, tracking, and identifying possible targets; selecting prospective targets; prioritising selected targets; the choice, judgment, or control of when to fire; or giving closing direction on selected targets, on the condition that human control is maintained above the decision to select distinct targets and clearly defined or identified target categories for attacking.

There is a system of lock-on-after-launch homing munitions that relies on tactics, techniques, and procedures to increase the expectation that the solely targets within the searcher's acquisition list when the searcher initiates are those particular targets or clearly defined target groups that have been determined by a human operator. Previous to be deployed the LAWS is examined to shall make certain that: the system project integrates the required capabilities to authorize commanders and operators to employ suitable degrees of human judgment in the employment of force; the system is projected to fulfil engagements in a period of time in accordance with commander and operator goals and, if unable to do so, to bring to an end actions or search supplementary human operator inputs prior carrying on the combat and the system project; contains safeties, anti-tamper devices, and information assurance; tackles and reduces the possibility or outcomes of failures that could cause not planned combats or to loss of control of the system. (Department of Defense, 2017, p. 7).

Regarding the role of the human operator, the policy and responsibilities for the development and use of autonomous weapon systems require that all systems, including LAWS, are projected to permit leaders and persons who operate equipment to exert, suitable or proper in the circumstances, degrees of human judgment regarding the employment of force. In addition, human judgment concerning the employment of lethality does not demand manual operator conduct of the weapon system, how is it frequently understood, but rather comprehensive human participation in decisions with reference to how, when, where, and why the LAWS will be employed.

Some states' policy (i.e. UK) is based on a distinction between automated weapon systems and *"fully autonomous weapon systems"*. For them, an automated or automatic system is *"…programmed to logically follow a pre-defined set of rules with predictable outcomes"* whereas an autonomous system is *"…capable of understanding higher level intent and direction"*. An autonomous weapon system would be capable of understanding and perceiving its environment, and deciding a course of action from a number of alternatives without depending on human oversight and control. The understanding is that the overall activity of such a system would be predictable but individual actions may not be. (ICRC, 2014, p. 10).

The factors in determining levels of autonomy in weapon systems include: the capability of the weapon system of carrying out a military mission or task; the robustness of the system against failures and enemy hacking; a design that ensures human judgment is retained for appropriate decisions; and the capability of the system to be used in compliance with international humanitarian law, as determined.

There are various ways to discuss autonomy in weapon systems. The definitions of the terms, and even the taxonomy of existing systems, are not always consistent among authors on the subject. In fact, *"what is autonomy?"* the synthesized view of the many definitions acknowledges a common sequence of *"autonomy"* in weapon systems based primarily on two factors: (1) *the target specificity* (the geographic, temporal, and descriptive guidance designating the target of lethal force) provided by human operators when the weapon system is set into motion, and (2) *the execution flexibility* (scope of potential self-initiated action) in service to assigned goals. (Congressional Research Service, 2016, p. 5).

Autonomy, outside of the technical literature, operates primarily as a general expression for a variety of concerns involving decision-making and predictability of increasingly computerised weapon systems. Definitions that are particular to non-technical literature generally define autonomy in terms of ethically relevant sub-processes of the system as a whole, such as targeting, goal seeking, and/or the initiation of lethality. Lethal autonomy is frequently defined in the literature solely by whether or not a human makes the targeting decision. (Ibid., p. 6). Instead of viewing autonomy as an inherent feature of an unmanned vehicle in isolation, the projection and operation of autonomous systems needs to be considered in terms of human-system collaboration. Due to software complexity, autonomous systems present a variety of challenges to commanders, operators and developers, both in how these systems interact in dynamic environments and in human-system collaboration.

Both the target specificity and execution flexibility of an autonomous system may vary by conflict, mission, or even individual objective. Therefore, a particular weapon system occupies a range rather than a point within the continuum of autonomy determined by its potential uses, and has a specific degree of autonomy only upon being set into motion with these parameters assigned. (Ibid., p. 5).

Taking into consideration that are misperceptions about autonomy over taking decisions, it is required to be clarified and understood, by the military leaders, that all LAWS are observed and directed in the execution of missions by human operators to some degree, and the software of autonomous systems includes or contains, the project point or level beyond which the actions and decisions delegated to the computer do not or may not extend or pass.

Artificial intelligence is a transformative technology. The great powers are developing AI applications for a range of military functions. The expression artificial intelligence was coined in 1955 by John McCarthy, a computer scientist, to describe the proposed objective for a debate on computers as a thinking mechanism. To this day, however, there is no generally accepted definition for AI in commercial, academic, or government communities. (The Institute for Foreign Policy Analysis, 2019, p. 4). The researchers in the field of advancement of AI broadly seek to understand the processes, significant as a cause or basis of thinking and intelligent comportment and their implementation in an apparatuses using or applying the mechanical power and having several parts, each with a definite function and together performing a particular task.

The US Secretary of Defense uses the following definition of AI, where considers AI as …*"any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to the action of new data sets".* (Congressional Research Service, 2020, p. 1). Any artificial systems that perform these tasks can be created to a specified degree in computer software, physical hardware, and additional circumstances that form the setting for being fully understood and assessed, so far not investigated. Such systems can fulfil tasks demanding human-like ability to see, hear, or become aware of something through the sensors, acquiring knowledge and understanding, acquisition of facts, information, and skills through experience, study, or by being taught, making plans, imparting or exchanging of information and or physical activities. The field of AI encompasses many methodologies and areas of emphasis, such as machine learning, deep learning, neural networks, robotics, computer vision (image processing), and natural language processing. The armies study the application of AI for many fields, including: intelligence collection and analysis, logistics, cyber

operations, information operations, command and control, and in carrying out a variety of semiautonomous and autonomous vehicles.

The domain of AI has noticed remarkable increase in last period of time. Many of these latest benefits have resulted from *"deep learning"*, a type of machine learning based on artificial neural networks in which multiple layers of processing are used to extract progressively higher level features from data. Anyway, previous *"first wave"* AI systems that use rule-based decision-making logic have been putted into service in automated and autonomous systems for decades, including in nuclear field. (Horowitz, Scharre, Velez-Green, 2019, p. 5).

AI constitutes also coding, computer systems and software capable of performing tasks that require intelligence if undertaken by humans. It is not one discrete system, but something that can be applied in many different ways depending on the particular task. It is useful to distinguish between narrow AI, which has specific goals and is limited by its programming and the problem to be solved, and general AI (not to be confused with artificial general intelligence – the notion of a super intelligence), which involves writing software that allows systems to *"learn"* by analysing data sets and then to make decisions. The majority of AI, and especially the systems currently used across the nuclear enterprise, are rules-based *"if-then"* types, principally because they are predictable However, the computing and information technology revolution has created the requisite processing power and expertise to allow for the possibility of wider applications. (Futter, 2021, p.7).

It can be said that we have entered a *"fourth industrial revolution"*, characterised by rapid and converging progress in the field of AI, robotics, the Internet of Things, quantum computing, nanotechnology, biotechnology, and 3D manufacture and other technologies. In particular, AI is a critical and rapidly ascension of technological development that presents major implications on national military and economic security. (The Institute for Foreign Policy Analysis, 2019, p. 3). In theory, fully autonomous, computer-controlled weapons do not exist yet, UN officials say. The debate is still in its early days, and the experts have at times grappled with basic definitions. The United States has argued that it is premature to establish a definition of such systems, much less regulate them.

EVOLUTION AND OPERATIONAL REQUIREMENTS ASPECTS

The use of LAWS in warfare is not quite a new concept. It could be argued that the development and implementation of such systems have evolved in the last century and have accelerated significantly after the September 11, 2001 attacks on the US LAWS is very extensive and is not limited to: autonomous weapon systems; robots; drones; unmanned systems; unmanned vehicles and unmanned platforms. The LAWS are extending the rapid and continuous integration of capabilities across multiple theatres of operations. (Jeffrey L. Caton, 2022, p. xi). An extensive diversity of matters is subject to dispute in the field of study literature regarding the consideration and evolution of lethal autonomous weapon systems. Although an exact taxonomy regarding the examination and progress of LAWS does not exist, the numerous topics under discussion can be beneficially separated into those concerning risks and potential benefits, juridical matters, and moral or ethical concerns.

The military leaders argued that likelihood conflicts within a sophisticated, highly contested, anti-access/area denial environment would be won by the side with an information advantage, enabling the ability to outpace, outthink, and outmanoeuvre adversaries across multiple domains. In order to maintain its information advantage and dominate this new battlefield, the armies are assumed to adopt a network-centric approach (connecting every sensor with every shooter) in an attempt to transfer data to weapons reaction speed to execute the joint of all domain operations in order to destroy an adversary by attacking them from all domains. Over the past several decades, the armies around the world have been successfully incorporating autonomous functions into their weapons. Currently, there are four Joint Capability Areas envisioned for unmanned systems to support: battlespace awareness, force application, protection, and logistics. While many of the basic requirements of locomotion, sensing, navigation, and connectivity were solved at the prototype level in the 1980s and 1990s, and further refined through combat experience in the 21st century, there still remain significant technological challenges for autonomous weapon systems development.

The main technological challenges are as follows: interoperability and modularity; communication systems, spectrum, and resilience; security: research and intelligence/technology protection; persistent resilience; autonomy and cognitive

behaviour, and weaponry. Tackling these technologies in a concerted fashion may yield dramatic improvements that facilitate mission performance, endurance, reliability, and synchronisation at reduced levels of human risk and logistics burden. (Caton, 2022, p. 16). The researchers recognised six decisive domains in which advances in autonomy would have significant benefit to the unmanned system that can be summarised thus: perception, planning, learning, human-robot interaction, natural language understanding, and multi-agent coordination.

The army science and technology community identified the need for enhanced capabilities in five areas: adaptive tactical reasoning; focused situational awareness; safe, secure, and adaptive movement; efficient proactive interaction with humans; and interaction with the physical world. (Caton, 2022, p. 19). The LAWS assures commanders access to information to afford a great numbers of courses of action to carry out simultaneous and sequential operations using the surprise and the rapid and continuous integration of capabilities across all domains (air, naval, terrestrial, spatial, cyber) to achieve physical and psychological advantages and influence and control over the operational environment. The armies' leaders contend that the use of LAWS will be crucial for operations in all fields across a range of conflicts, both because of their capability and performance advantages and because of their ability to take greater risks than manned systems. The increased speed and the effects of the war combined with an exponential increase in the available date make military leaders plead for efficient command and control systems that would optimise situational awareness, rapid decision-making and the ability to direct forces in various theatres (aerial, spatial, cyber, terrestrial, naval). The use of AI is growing across a wide range of sectors. Great powers among which the United States, the United Kingdom, France, Germany, China, and Russia are currently investigating systematically modern AI applications for the reason of preserving an asymmetric superiority over opponents. There are many primary forces that drive the efforts for developing LAWS, including changing the international security environment, especially the strategic shift to Asia-Pacific theatre and the resulting anti-access/area denial challenge, the affordable technical solutions, and the military effectiveness. Given these circumstances, the armies will develop and field affordable, flexible, interoperable, integrated, and technologically advanced unmanned capabilities.

Prior to being released to the field LAWS have to formally completed operational test and evaluation. This supposes three phases, respectively, the requirements and development phase, test and evaluation and the transition to operational deployment. (Department of Defense, 2012, p. 56). Finally, the LAWS as technology, have to be affordable, and realistic in order to field a network that can securely and reliably connect sensors to shooters and support command and control in a lethal, electronic warfare-rich environment.

AI has applications across a variety of sectors, including: Cybersecurity – autonomous detection and decision-making to improve reaction times to threats; Defense – autonomous and semi-autonomous weapons systems; Space exploration – spacecraft and rover autonomy. Before being deployed LAWS the armies have to solve the following aspects: the development of autonomy-related applications for use across the full range of military operations and the imperative technologies to the development of LAWS. AI is being incorporated into a number of other intelligence, surveillance, and reconnaissance applications, as well as in logistics, cyberspace operations, information operations, command and control, semiautonomous and autonomous vehicles, and lethal autonomous weapon systems. (Congressional Research Service, 2020, p. 10).

Autonomous weapon systems, (also referred to as human *"out-of-the-loop"*): *"a weapon system that, once activated, can select and engage targets without further intervention by a human operator"*. Examples include some *"loitering"* munitions that, once launched, search for and attack their intended targets (e.g. radar installations) over a specified area and without any further human intervention, or weapon systems that autonomously use electronic *"jamming"* to disrupt communications. (ICRC, 2014, p. 6). A weapon system with *"full autonomy"* in target selection and attack potentially offers increased capabilities in force protection, particularly in situations where time is limited, and it further removes the risks for the user of the weapon system and their soldiers. These systems may offer savings in personnel, associated costs, and potential utility for *"dull, dirty, dangerous, and deep"* missions. Fully autonomous weapon systems may not be useful in low intensity conflicts but they could find a role in high-intensity conflicts against military objects, and in very limited circumstances. These situations might include time-critical defensive situations, particularly those where the tempo of operations and time pressure for a response is high.

The issue here is not that the apparatus will make such miscalculations and operators will not. It is similar with the distinction between operator miscalculation and algorithmic error, like the difference between writing and tweeting. The dimension, domain, and speed of killer robot systems – governed by one targeting algorithm, deployed from one side to the other of a whole mainland – could cause misidentifications by operators similar to a recent US drone strike in Afghanistan seem like mere rounding errors by comparison. However, large scale proliferation is just as negative. The states could compete to develop progressively highly destructive or damaging varieties of autonomous weapons, including ones having the ability to assemble chemical, biological, radiological and nuclear arms. The ethics risks of increasing rapidly weapons lethality would be increased by escalating weapon employ. High-end autonomous weapons are likely to lead to more frequent wars because they will decrease two of the primary forces that have historically prevented and shortened wars: concern for civilians abroad and concern for one's own soldiers.

The weapons are likely to be endued with valuable moral regulators projected to reduce collateral damage, using what is called the *"myth of surgical strike"* to control ethical protests. Autonomous weapons will also minimise both the need for and risk to one's own soldiers, dramatically altering the cost-benefit analysis that states experience while triggering and carrying on wars. Asymmetric wars – that is, wars waged on the soil of nations that lack competing technology – are likely to become more common.

Targeted killings until very recently by drones had been limited to non-state actors. Until, for the first time in January 2020, a State armed drone targeted a high-level official of a foreign State and did so on the territory of a third state. It could have maintained that drone strikes were the preferred option for decision makers and military alike for their relative efficiency, effectiveness, adaptability, acceptability, deniability, and political gain but it could be noted that their benefits were as illusory as the *"myth of a surgical strike"*. Because of the current absence of effective oversight, it was practically impossible to know whether a person killed in a drone strike was, in fact, a lawful target, adding that harm to civilian populations, including deaths, injuries and trauma, was likely largely under-reported.

In fact, autonomy is already used for a wide variety of military tasks, including many related to the use of force. These include: identifying, tracking, prioritising and cueing targets; deciding the timing of when to fire a weapon; manoeuvring and homing in on targets; and detonation timing. According to research in the field, at least 30 countries have defensive systems with human-supervised autonomous modes that are used to defend military bases and vehicles from short-warning attacks, where the time of engagement would be too short for a human to respond and, in a few rare exceptions, autonomy is used for weapons to select and engage targets on their own. (Scharre, Horowitz, 2015, p. 11). The military services contend that enhancing old processes and capabilities is insufficient. Each service is advocating for this type of advanced technology to support operations in a highly contested fight, ensuring not just means of transport, but aircraft, munitions, satellites, ships, submarines, tanks, and people are at the right place at the right time prosecuting the right target with the right effects, in seconds. The LAWS combine the strike and intelligence, surveillance, and reconnaissance missions into a single platform by turning it into a new revolutionary capability. One of the main operational tasks is to support missions to defeat improvised explosive devices and eliminate high value targets. Enemy LAWS will complicate air, ground, and maritime operations by adding new low-altitude, ground, and amphibious threats to the force that must be countered. This concern will require the development of friendly countermeasures, including tactics, techniques, procedures, and training that enable the force to operate in the emerging environment.

Autonomous systems could be used to conduct remote sensing operations in areas that were previously hardly accessible for manned and remotely-controlled systems, such as in the deep sea. Autonomous unmanned systems such as aerial drones or unmanned underwater vehicles could also be seen by nuclear weapon states as an alternative to intercontinental ballistic missiles as well as manned bombers and submarines for nuclear weapon delivery. These would be recoverable (unlike missiles and torpedoes) and could be deployed in ultra-long loitering periods – days, months or, even years. (United Nations University, 2018, p.14). In the end, autonomous weapons will erode the base or foundation of humanity's final temporary solution against war crimes and atrocities: the international laws of war. These laws, systematised in treaties reaching as far back as the 1864

Geneva Convention, are the international thin blue line separating war with honour from massacre. To address the growing controversy regarding drone attacks, internationally recognised legal experts have made a detailed legal analysis that examined both the *"jus ad bellum"* (right to war) and *"jus in bello"* (waging a war, international humanitarian law) principles. In general, they concluded that there is little reason to treat drones as distinct from other weapons systems with regard to the legal consequences of their employment.

CONCLUSIONS

LAWS will likely continue to grow in both capabilities and numbers. This growth is an international phenomenon that includes military, government, and commercial applications in all domains – air, land, and sea. AI is a high-speed advance domain that constitutes a crucial influence in the time ahead on international security and stability for the reason that represents a great number of prospective benefits. The military utility of LAWS was demonstrated in combat operations. Fully autonomous is more than just mobility, it is about decision-making. AI and implicit LAWS have significant potential to upset the foundations of nuclear stability and undermine deterrence in the long term, especially in the increasingly multipolar strategic environment.

Given the range of AI applications across sectors, interagency coordination will likely be an important mechanism for ongoing efforts, including consideration of adaptive regulatory approaches to allow for rapid technology advancements. Advance in military armament recently is frequently assessed by a weapon's capability to keep the crew and staff outside of the battlefield and its capability for force-multiplication. These capabilities serve to decrease costs related to waging war.

Autonomous weapon systems in use today – *"autonomous"* or *"supervised autonomous"* according to the definitions provided – presents constraints in several respects: first, they are limited in the tasks they are used for (e.g. defensive roles against rocket attacks, or offensive roles against specific military installations such as radar); second, they are limited in the types of targets they attack (e.g. primarily vehicles or objects rather than personnel), and third, they are used in limited contexts (e.g. relatively simple and predictable environments such as at

sea or on land outside populated areas). The role of the weapon system – defensive or offensive – and the type of target – the military object (so-called *"anti-materiel"*) or combatant (i.e. anti-personnel) may also be key factors affecting their utility. The military services, too, are increasingly experimenting with autonomy and unmanned systems.

Nevertheless, it is still possible that *"fully autonomous weapon systems"*, operating without human supervision, may be of military decisive value in critical situations - such as responding to an overwhelming attack, or where a mission is critical but communications links are not available or *"jammed"* – provided that the user is confident that the weapon system would perform better than humans in the same situation. The LAWS – frequently associated with killer robots – was used to kill human beings for the first time in history in 2020 during the Libyan civil war, as claimed by United Nations Security Council report. The study of past similar events, legitimate thereby the outset of the last major weapons competition, one that has the capacity to become the last for humankind.

The emerging potential of AI, to the same extent, is also significant for nuclear weapons, strategies, and doctrines. AI could also be a stimulus for harmonizing the differences between these fields. This interpenetration of AI with nuclear field and doctrines requires greater critical study, research and examination not only by the military and researchers but also by international fora. The great powers have realized that the field of AI that just coming into existence and beginning to display signs of future potential could play a decisive role in the development, improvement, and multiplication of their striking and retaliatory capability, including the capability to respond to a nuclear attack, executed by surprise. The progresses belonging to the last period of time in AI, machine learning, and autonomous has the potential to erode, to a great extent, the base of nuclear strategy, this aspect has the possibility, to be favourable, advantageous, or not optimistic, desirable in the same extent. First of all, will be able to strengthen the stability and decreases the possibility of error of judgment and incidental exacerbation. Secondly, could stimulate the counterparts to reply with disruptive actions that could escalate the threat of a nuclear war.

Autonomous lethality ensures overwhelming developing relevance, during military operations and plays a key role in strategic deterrence. Growingly autonomous lethal weapons systems, which do not have, or do not need a crew

or staff and are authorised to apply the capacity to cause death or serious harm or damage in the absence of human action, will perform a decisive role in the probability of triggering wars. States who used drones on the grounds of self-defence, defined in a very elastic fashion against purported terrorists, risked creating a situation where there will be no *"red lines"* really. As more government and non-state actors acquire armed drones and use them for targeted killing, there is a clear danger that war will come to be seen as normal rather than the opposite of peace. The war is at the risk of being normalised as a necessary companion to peace, and not the opposite. In the absence of greater regulations of the weapons, and official forums to discuss the deployment of drones specifically, we can be witnesses to their growing use and this fact increase the danger of a global conflagration.

This diplomatic process and the potential verdict of international law could check or halt the development of AI-enabled weapons, especially ones where machines select and attack targets without human intervention.

BIBLIOGRAPHY:

1. Caton, J.L. (2015). *Autonomous Weapon Systems: A Brief Survey of Developmental, Operational, Legal, and Ethical Issues.* Strategic Studies Institute. US Army War College, https://e.pdfpremiumfree.com/downloads/autonomous-weapon-systems-a-brief-survey-of-developmental-operational-legal-and-ethical-issues/, retrieved on 15 September 2022.
2. Futter, A. (2021). EU Non-Proliferation and Disarmament Consortium. *Explaining the Nuclear Challenges Posed by Emerging and Disruptive Technology: A Primer for European Policymakers and Professionals*. Nr. 73, pp. 1, 7, https://www.nonproliferation.eu/wp-content/ uploads/2021/03/EUNPDC_no-73_FINAL-1.pdf, retrieved on 15 September 2022.
3. Horowitz, M.C., Scharre, P., and Velez-Green, A. (2019). *A Stable Nuclear Future? The Impact of Autonomous Systems and Artificial Intelligence*, pp. 1, 5, https:// arxiv.org/ftp/arxiv/papers/1912/1912.05291.pdf, retrieved on 15 September 2022.
4. Scharre, P., Horowitz, M.C. (2015). *An Introduction to Autonomy in Weapon Systems*, https://www.files.ethz.ch/isn/188865/Ethical%20Autonomy%20Working%20Paper_021015_v02.pdf, retrieved on 15 September 2022.
5. Congressional Research Service, *Artificial Intelligence and National Security*, 2020, pp. 1, 10, 16, https://sgp.fas.org/crs/natsec/R45178.pdf, retrieved on 15 September 2022.
6. Congressional Research Service, *Lethal Autonomous Weapon Systems: Issues for Congress*, 2016, pp. 1, 5-7, https://apps.dtic.mil/sti/pdfs/AD1170011.pdf, retrieved on 15 September 2022.

7. Department of Defense Defense Science Board, Task force report: *The Role of Autonomy in DoD Systems*, 2012, p. 1, 56, https://irp.fas.org/agency/dod/dsb/autonomy.pdf, retrieved on 15 September 2022.
8. Department of Defense, *Directive Number 3000.09,* 2012. Incorporating Change 1, 2017, pp. 4, 5, 7, 14, https://www.esd.whs.mil/portals/54/documents/dd/issuances/dodd/ 300009p.pdf, retrieved on 15 September 2022.
9. Executive Office of the President National Science and Technology Council Committee on Technology, *Preparing for the Future of Artificial Intelligence*, 2016, p. 10, https://obamawhitehouse.archives.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/preparing_for_the_future_of_ai.pdf, retrieved on 15 September 2022.
10. ICRC, Report of the ICRC Expert Meeting on *'Autonomous Weapon Systems: Technical, Military, Legal and Humanitarian Aspects*', 26-28 March 2014, Geneva, 9 May 2014, pp. 1, 6, 9, 10, https://www.icrc.org/en/doc/assets/files/2014/expert-meeting-autonomous-weapons-icrc-report-2014-05-09.pdf, retrieved on 15 September 2022.
11. *NATO 2022 Strategic Concept*, NATO Madrid Summit, 29 June 2022, p. 6, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf, retrieved on 15 September 2022.
12. The Institute for Foreign Policy Analysis, *National Security Update the Military Applications and Use of Artificial Intelligence*, 2019. Report, pp. 3, 4, https://policycommons.net/artifacts/1777473/national-security-update/2509119/, retrieved on 15 September 2022.
13. United Nations University, Centre for Policy Research, *AI & Global Governance: AI and Nuclear Weapons – Promise and Perils of AI for Nuclear Stability,* 2018, https://cpr.unu.edu/publications/articles/ai-global-governance-ai-and-nuclear-weapons-promise-and-perils-of-ai-for-nuclear-stability.html, retrieved on 15 September 2022.