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# ARTIFICIAL INTELLIGENCE AND WEAPONS OF MASS DESTRUCTION

***Abstract:*** *There is considerable evidence in the modern history of warfare that when tensions between states are high, decision makers are more likely to seek detours or shortcuts to war to avoid great losses and costs. Accidental wars and unintentional escalations are actually relatively rare, despite fears and some signals of rising tensions. It is this type of warfare that is a major source of concern for many states, especially when combined with high-risk weapons systems or systems with the potential for mass destruction. The purpose of the article is to determine the role of artificial intelligence in the policy of non-proliferation of weapons of mass destruction. Among the most dramatic risks of escalation through the use of artificial intelligence is nuclear conflict. This topic has received significant and increasing political attention and research in recent years, driven by two main factors. The first is the tremendous progress that has been made in the field of artificial intelligence, especially machine learning. Such advances may provide an opportunity to improve early warning and decision support systems, or may contribute to improved targeting data. A second related reason is that competitive pressures to implement artificial intelligence in a different area amid the discourse of the "global race" have the potential to accelerate the adoption of artificial intelligence in the nuclear architecture. With its implementation, new risks of accidents, unforeseen escalation and vulnerability may arise. Artificial intelligence also expands the range of attack options that an attacker can take advantage of, including using cyber-attacks and information operations. The objective of the article is to*

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*determine with the development of artificial intelligence, what role it will play in the non-proliferation of weapons of mass destruction or vice versa.*

***Keywords:*** *nuclear weapons, artificial intelligence, weapons of mass destruction, strategy, war, threat, automation, global race.*

## Introduction

Interest in automating nuclear deterrence has long been on the agenda of the United States and the Soviet Union, but technology limitations have also made it clear that decisions about nuclear strikes cannot be delegated to an automated system. In short, humans must remain in the loop to analyze information, verify technical functions, and make the decision to launch a nuclear weapon, because there is a risk that automated technologies will for some reason provide the wrong information to the center. The capabilities of artificial intelligence (AI) have rapidly advanced over the last ten years. Developments in machine learning (ML) techniques, which enable computer systems to "learn" from data to carry out activities that would otherwise need human intellect, have fueled this process[3]. State interest in using AI systems for military objectives has grown as a result of advancements in fields including computer vision, natural language processing, robotics, and autonomous systems. For decades, the military has used autonomous weapons such as mines, torpedoes, and heat-guided missiles that operate based on simple reactive feedback without human control. However, artificial intelligence (AI) has now entered the arena of weapons design[4].

Artificial intelligence (AI) is a catalyst for many trends that increase the salience of nuclear, biological or chemical weapons of mass destruction (WMD)[5]. The creation or production of WMD or precursor technologies can be aided and expedited by AI. Those without the knowledge to create hazardous compounds or fissile materials can develop WMD capabilities with AI's help. The proliferation of AI itself is a concern. Since it's an intangible technology, it spreads readily and is hard to stop with supply-side measures like export restrictions. There are worries about increased dangers of accidental or

[3] V. Chernavskikh, *Nuclear weapons and artificial intelligence: technological promises and practical realities*, 2024, <https://www.sipri.org/sites/default/files/2024-09/bp2409_ai-nuclear.pdf> (10.10.2024).

[4] C. Caruso, *The Risks of Artificial Intelligence in Weapons Design*, Harvard College 2024, <https://hms.harvard.edu/news/risks-artificial-intelligence-weapons-design> (11.10.2024).

[5] O. Meier, *The fast and the deadly: When Artificial Intelligence meets Weapons of Mass Destruction*, 2024, <https://europeanleadershipnetwork.org/commentary/the-fast-and-the-deadly-when-artificial-intelligence-meets-weapons-of-mass-destruction/> (14.10.2024).

deliberate use of nuclear weapons, decreased crises stability, and new arms races at the nexus of AI and nuclear weapons.

In general, the nuclear industry has historically been conservative and reluctant to integrate digital technologies for the obvious reasons of reducing the risk of new system vulnerabilities. However, while many legacy systems are considered analogous, there are clear signs from several nuclear powers, including the United States and the Russian Federation, that they are seeking to modernize their nuclear architecture.

Artificial Intelligence has the potential to enhance the intelligence and autonomy of any military system, be it cyber, conventional, or nuclear. However, a number of drawbacks in AI systems make their possible application challenging from a security, legal, and ethical standpoint[6]. Although the status of AI integration in nuclear command, control and communications (NC3) systems, for example, cannot be fully assessed because the information is not publicly disclosed, the growing literature on the possible uses of ML shows clear areas of opportunity.

The use of artificial intelligence in nuclear deterrence architecture may be particularly attractive for early warning systems. For example, computer vision algorithms can be used to detect unusual movements of troops or equipment. AI can be used to improve speed and accuracy by processing large amounts of data more efficiently and as a means of autonomously classifying enemy behavior with remote sensors. This will also allow for more accurate anomaly detection. Significant progress has been made in this field in recent years, and for example, a study published in 2022 demonstrated the effectiveness of using high-precision neural networks to improve target detection in radar signals.

While AI could theoretically make deterrence more effective, there remains a risk that the system may misperceive escalation, or perceived threat, because human actions are misperceived. The imperfect data used in complex systems means that decisions based on such data can increase the alarm status.

In the area of nuclear command and control, nuclear-weapon states are likely to be slow to adopt AI simply because the technology is so vulnerable and unpredictable. However, there are more reasons why ML (machine learning) could affect the delivery of nuclear weapons, including using autonomous systems such as unmanned aerial vehicles.

They provide more flexibility than nuclear ICBMs (Intercontinental ballistic missiles), better avoid obstacles and have the ability to cover larger areas. However, the use of unmanned systems to deliver nuclear weapons poses a

[6] V. Boulanin, *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk*, Vol. I Euro-Atlantic Perspectives, Stockholm International Peace Research Institute 2019, p. 4, <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.sipri.org/sites/default/files/2019-05/sipri1905-ai-strategic-stability-nuclear-risk.pdf> (16.10.2024).

threat to human control. There are different regional views on the feasibility and acceptability of their use, but the problem remains that states that feel relatively vulnerable in their nuclear arsenals may assess the risks and benefits differently.

The impact of artificial intelligence on nuclear risks is not only related to the use of AI technologies in nuclear architecture. Advances in artificial intelligence and its capabilities (such as remote sensing and autonomy) can improve the speed, accuracy, lethality, and survivability of conventional weapons. This opens up new avenues for escalation, both horizontal and vertical inadvertent escalation. Conventional forces can be used more effectively against enemy nuclear forces. Or some states may perceive advances in conventional weapons systems as a threat to their future second-strike capabilities. This could lead to a doctrinal shift that could legitimize the limited use of nuclear weapons by some states against what they perceive as more powerful conventional adversaries.

Even before the deployment of weapons in different areas of the country, AI can perceive a violation of strategic stability as the cause of a new threat. Government investments in AI can create a sense of vulnerability in the adversary, which can lead to further instability and destabilizing actions. At the same time, attackers may significantly underestimate the true extent of AI capabilities or their use, thereby creating additional pressure.

Proliferation Risks - AI can facilitate the proliferation of new weapons, for example by converging with other fields of science and technology, or by making existing weapons systems more lethal and autonomous. Therefore, the use of AI has become more attractive in order to spread new weapons and implement them in various fields. Ultimately, though, in an era of renewed great power tensions, the major military countries will be wary of regulating too soon, for fear of stifling innovation and constraining themselves unnecessarily[7].

## Convergence risks - biosecurity and chemical weapons

The convergence of artificial intelligence and biotechnology is producing novel threats which pose an existential risk both to specific demographic groups and the population at large[8]. The convergence of artificial intelligence, biology and chemistry has created opportunities for medical breakthroughs and

[7] S. Cleobury, *Artificial Intelligence and Arms Control – How and Where to Have the Discussion,* Geneva Centre for Security Policy 2023, <https://www.gcsp.ch/publications/artificial-intelligence-and-arms-control-how-and-where-have-discussion> (21.10.2024).

[8] R. Donaldson, *Sounding the alarm on AI-enhanced bioweapons*, European Leadership Network 2024, <https://europeanleadershipnetwork.org/commentary/sounding-the-alarm-on-ai-enhanced-bioweapons/> (23.10.2024).

drug discovery, but it also perfectly illustrates the risks of dual use. For example, a class of LLMs (Large language models) called chemical language models (CLMs) are used to discover new treatments and, among other things, to predict potential drug molecules that target specific disease-causing proteins. AI language models can be used to design new proteins. (e.g. ProtGPT2) and while potentially contributing to disease control solutions, such applications may create opportunities for misuse. In recent years, researchers and political communities have focused on the risks of misuse of artificial intelligence in biotechnology. One critical risk concerns the proliferation of biochemical weapons, although the risks are more varied and have several levels of complexity.

## Expanding the influence of artificial intelligence to achieve nuclear stability

The potential impact of AI technologies and systems on nuclear defense and stability extends beyond advances in cyber threats and the proposed use of AI-based systems for nuclear attack early warning systems. Unmanned ships with autonomous navigation capabilities equipped with artificial intelligence systems are expected to have a significant impact on nuclear deterrence based on SLBMs (Submarine-launched ballistic missiles). Autonomous unmanned ships are being developed as new elements of undersea warfare, similar types of unmanned ships are a new word in the art of warfare. Their main purpose is to detect submarines, including those out of port, and follow them for long periods of time, and if necessary, attack and destroy them.

In recent times, it is significant to generate synthetic data called deep fakes, which are often used to make imitation videos of political leaders. These increasingly realistic and seductive videos can create misconceptions about the personalities, behavior, political positions and actions of the political leaders depicted. Deeply faked videos of current and former nuclear power leaders such as Barack Obama, Donald Trump, Joe Biden and Vladimir Putin have been widely circulated, raising doubts about their consistency and rationality.

Technological progress has brought about the emergence of machines that have the capacity to take human lives without human control. These represent an unprecedented threat to humankind[9]. The race to militarize AI was initially driven by the emergence of autonomous weapon systems (AWS). These are weapon systems with artificial intelligence that select and direct force to attack targets without human intervention. Examples include mobile munitions and

[9] B. Dresp-Langley, *The weaponization of artificial intelligence: What the public needs to be aware of*, National Library of Medicine, <https://pmc.ncbi.nlm.nih.gov/articles/PMC10030838/> (25.10.2024).

autonomous drones. Mobile munitions are flown in a designated area to sink or destroy certain targets, after they are activated, further human intervention is impossible. But using AI for nuclear command, control, and communications might also lead to arms races or make it more likely that states will use nuclear weapons in an emergency, whether on purpose or by mistake. AI can play a role in this process without being directly related to nuclear launchers. For example, it might advise humans on escalation-related issues. By enabling quicker real-time analysis of systems and data and improving situational awareness, artificial intelligence (AI) holds promise for supporting decision-makers. However, this could shorten the time needed to make decisions and result in more tensions, misunderstandings, and miscommunications – including between states that possess nuclear weapons[10].

The Turkish STM Kargu-2 unmanned aerial vehicle was used in an autonomous attack mode against Haftar-linked forces during the second Libyan civil war. The variety of uses of existing autonomous weapons is constantly expanding.

AWS raises serious concerns regarding the protection of international human rights (IHL - International humanitarian law) in conventional conflicts. In addition, AWS has the potential to give users of conventional military technology a greater advantage in the conventional weapons space. In this regard, it has been argued that if the AMC upsets the conventional balance, and therefore a nuclear-armed adversary may be incentivized to threaten the use of nuclear weapons in order to avoid military defeat of its adversary.

In the Soviet Union, when they thought that their country was not as powerful as the United States of America, the system "Perimeter" was created - in the West it is called "Dead Hand". If for some reasons the highest authorities are removed from the pile, the emergency system of computers requires the response of the heads of state. If it doesn't get a response, sensors that detect radiation, shock waves and radio-electronic pulses will prompt the system to deploy special signal missiles that will launch from a height and from there transmit a signal to all surviving elements of Russia's nuclear triad. That is, even if the three heads of the country - the president, the chief of the general staff and the minister of defense - die, the system will still retaliate.

At the beginning of the 90s, they talked about shutting down this system. But recently, the commander of the Russian Strategic Missile Forces, General Karakaev, said that it is modernized and ready for combat. If a missile is detected from the US, there will be a retaliatory strike from Russian territory. These rockets may meet each other in mid-air, continue their flight and

[10] *Proceed with Caution: Artificial Intelligence in Weapon Systems, AI in Weapon Systems Committee*, Report of Session 2023-2024, Published by the Authority of the House of Lords, p. 51, <https://publications.parliament.uk/pa/ld5804/ldselect/ldaiwe/16/16.pdf> (26.10.2024).

eventually crash at their destination. It will be mutual destruction. The situation is the same in America, but the US is considering a preventive strike as well. The Russian military elite is talking about reflecting this in the Russian military doctrine[11].

In discussing these issues, it is important to focus on false alarm cases of missile attack - situations when the world was on the brink of global nuclear war. Today, apart from the Caribbean crisis, 4 such cases are known. Two of these are related to the Soviet missile attack warning system and two to the American early warning system[12].

## First case

The first time at 9:00 a.m. on November 9, 1979, on the computers of the North American Aerospace Defense Command (NORAD) (located in the Cheyenne Mountains Bunker), the Pentagon's National Command Center and the Reserve Command Center at Fort Richey saw a message that the Soviet the Union launched a massive nuclear strike to destroy the control system and US nuclear forces have collapsed. High-ranking military personnel were immediately announced from all three points and took part in the emergency meeting. An order was sent to the special equipment "Minuteman" to be ready for launch. Alerting the entire air defense system, at least ten aircraft immediately took to the skies, as well as the air defense of the president's plane, although without the president himself. After receiving the message about the attack, a few minutes after checking the data on the satellites located around the US territory, it turned out that there were no signs of an attack on any of them, so the alarm was canceled. Later it turned out that the reason for providing false information was a computer game that was mistakenly uploaded to the computer of a soldier on duty.

## Second case

On June 3, 1980, the US military again received a warning of a missile attack. At first the launchers were mobilized and the crew took their places in the bombers, but this time the computers did not give an accurate and clear picture of the attack as the first time. Instead, the screen showed constantly changing numbers of missiles launched. Also, these numbers did not always match at different control points. Many officers did not take this incident as

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[11] *What are the rules for launching nuclear weapons?*, Tbilisi 2022, p. 1, <https://www.radiotavisupleba.ge/a/31735977.html> (28.10.2024).

[12] *Four cases when the world was on the verge of nuclear war*, Tbilisi 2019, <https://geostate.ge> (05.11.2024).

seriously as the previous one, but a state of emergency was still declared to assess the likelihood of an attack being real. The information from the satellite and radar was checked again. And again, not a single system claimed the fact of a missile attack. It was later discovered that the reason for this was a malfunction of a single circuit in the computer, which reflected the random numbers of the missiles launched[13].

## The third case

September 26, 1983 might have been not only the most difficult date in world history, but also radically changed the future life of the world, if not for the sound judgment and courageous decision of a Soviet officer who saved the world from a nuclear disaster[14]. Lt. Col. Stanislav Petrov's decision to save humanity from nuclear war in 1983 is a lesson to humanity about the risks posed by technological advancement and the special efforts to make such advancements in the war arena[15]. In 1983, the Cold War between the United States and the Soviet Union reached its peak, less than a month after the tragedy when the Soviet Union shot down a South Korean passenger Boeing 747 near Sakhalin, which killed 269 innocent people, this is what Stanislav Petrov first thought that maybe this new to become a pretext for war. On September 26, 1983 (according to other data, in July), the satellite echelon of the Soviet system, put on combat duty, announced the American missile attack. The satellites, which were located in an elliptical orbit, observed the American missile bases from the angle that they were at the edge of the visible disk of the Earth. This made it possible to detect the rockets on the launch pad against the background of dark space, thus determining the fact of the launch of the rockets, by infrared radiation that works on the rocket engine. Such a configuration was chosen to reduce the glare of the satellite's sensors, which was reflected by the clouds or by the sun's rays on the snow. However, on this day, after noon, the satellite, the area of American missile bases, and the sun came into such an arrangement that the sun's rays reflected strongly from the clouds, which were located very high. The satellite reported the launch of several rockets from the American continent. However, radar observations did not confirm this, as the missiles were located too far away[16].

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[13] *Four cases when the world was on the verge of nuclear war*, Tbilisi 2019, p. 1, <https://geostate.ge> (08.11.2024).

[14] *Who is the man who saved the world from a nuclear disaster*, Tbilisi 2021, p. 1, <https://intermedia.ge> (10.11.2024).

[15] *Ibidem*.

[16] *Four cases when the world was on the verge of nuclear war*, Tbilisi 2019, p. 1, <https://geostate.ge> (12.11.2024).

Lieutenant Colonel Stanislav Petrov was on duty at the control panel at the time, after analyzing the information (the missile "launch" was made from only one point and consisted of several intercontinental ballistic missiles) and based on the reports of the "visuals" (officers who monitored the air and space on video control screens and no missile activity was detected), Lt. Col. Petrov decided that this was a false alarm received from the system. No, and upon receiving information about the threat, the leadership of the Soviet Union had to be informed about the alleged American missile attack - they were the General Secretary of the Communist Party of the Soviet Union (Yuri Andropov), the Minister of Defense (Dmitry Ustonov) and the Chief of the General Staff of the Armed Forces of the Missile Forces. (Yuri Votintsev). Stanislav Petrov's heroism can be appreciated by the fact that the Soviet military discipline provided for unspoken obedience to superiors and unconditional execution of orders, without any interpretation of his own.

This incident highlights the importance of human power alongside the work of artificial intelligence. The US National Security Commission on Artificial Intelligence (NSCAI) recommends that it not be entrusted with nuclear weapons and that humans take the reins, while there are additional risks posed by AI's inherent vulnerabilities and special needs for information processing.

## The fourth case

Early in the morning of February 25, 1995, a Norwegian scientist, with the help of the Americans, launched the most powerful weather missile ever from Anoia, off the coast of Norway. The purpose of the rocket was to study the North Sea, in the construction of which the first stage American tactical missile "Honest John" was used. It flew at an altitude of 580 kilometers. During observation, the flight trajectory of the missile was found to be suitable for the American missile «TRAIDENT» D-5, which was launched from the submarine. Such a missile could be used for a high nuclear explosion that would disable Russian warning radars. An explosion at such a height was seen as a massive nuclear attack by the Americans. The launch of the Norwegian missile threatened the world with a retaliatory nuclear strike from Russia against the USA. The next day, President Boris Yeltsin announced that he had activated his "nuclear suitcase" for the first time for emergency contact with the militants to discuss the situation. In addition, in the 1990s, the Russian space echelon operated at full capacity to provide quality detection of enemy missile launches. With all this, according to Viktor Barantz's memoirs, the launch of the Norwegian missile was "news" only for the Russian president, and the warning

in this regard came from Oslo to the General Staff 3 weeks earlier. This was also confirmed by the Chief of the General Staff, Mikhail Kolesnikov[17].

Accordingly, the threat of nuclear war can arise for various reasons. However, the most important thing is that the issue of nuclear security should not be entrusted to artificial intelligence and computer systems, because the human factor is very important in security policy, because it has the ability to make rational and correct judgments in crisis situations.

## Conclusion

The synthesis of AI and weapons of mass destruction presents humanity with both a set of opportunities and many threats. As artificial intelligence continues to develop every day, which also enhances the capabilities of weapons of mass destruction, this is a matter of concern. These systems also enable innovative solutions that are also helpful in detecting, preventing and mitigating these threats.

Ethical norms of artificial intelligence technologies in the direction of weapons of mass destruction require effective verification and strict control. International cooperation, transparent policies and strong regulatory frameworks are essential to ensure that artificial intelligence systems are used responsibly for good rather than threats.

The findings indicate that power grid analysis, picture analysis to detect concealed and protected places, and communications metadata analysis to identify key players and their involvement in proliferation networks are the most potential machine learning applications in Counter-WMD. Artificial intelligence in the far future might be able to predict nuclear decision points, monitor proliferator progress, and create new frameworks for arms reduction.

More coordination and collaboration between various businesses and nations to create shared protections for AI development is probably going to ease geopolitical tensions and deter relevant entities from promoting the military use of their AI technologies. Examining how old and new dangers merge will become essential to maintaining and enhancing national and international security as all of these technologies grow at an accelerated rate and nuclear tensions reach an almost unprecedented level. There are worries about increased dangers of accidental or deliberate use of nuclear weapons, decreased crises stability, and new arms races at the nexus of AI and nuclear weapons.

[17] *Who is the man who saved the world from a nuclear disaster*, Tbilisi 2021, p. 1, <https://intermedia.ge> (12.11.2024).

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