POTENTIAL IMPACT OF LETHAL AUTONOMOUS WEAPON SYSTEMS ON STRATEGIC STABILITY AND NUCLEAR DETERRENCE IN SOUTH ASIA

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Abstract

Several trends show that the efforts to alter South Asian strategic landscape have increased, which primarily includes unprecedented proliferation of technology to India. This has exacerbated Pakistan's security dilemma and is a matter of significant concern for South Asian security environment. Militaries worldwide are preparing for a new warfare trend in emerging technologies that include artificial intelligence and machine learning-based autonomous weapon systems, robotics, hypersonic weapons, and quantum technologies. These technologies are expected to change the character of war besides affecting geopolitical competitions and rivalries. It is pertinent to analyse the impact of these new technologies on regional rivalries to identify and implement effective solutions, thus mitigating potential risks and preventing the occurrence of a catastrophe. As several states are developing AI-based Lethal Autonomous Weapon Systems, capable of targeting without human supervision, possible exploitation of these technologies by nuclear-armed states may increase the risk of war leading to more aggressive nuclear postures. Such a risk would be higher in South Asia as the ballistic missile flight time would be less than ten minutes, and conventional military interactions of rival states could occur near a long border. The integration of autonomy into conventional weapons and nuclear systems has the potential to undermine strategic stability and will be a quick recipe for accidents and miscalculations. This study explores the region's threat perceptions and analyses the potential use of LAWS and how it can impact nuclear deterrence and strategic stability of South Asia. This study hypothesizes that LAWS will lower the nuclear threshold in the region and undermine deterrence stability.

Keywords: South Asia, Strategic Stability, Nuclear Deterrence, Artificial Intelligence, Machine Learning.

Introduction

While the beginning of the first nuclear age in July 1945, the complex global security structure encountered multi-faceted security threats. In the aftermath of the first nuclear attack by the US on Hiroshima and Nagasaki, the international community became cognizant of the long-lasting consequences of nuclear war for humans and the environment. Technological competition was simultaneously occurring between the major powers, leading to the advent of the Cold War.

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Several similarities can be observed when comparing the Cold War era with the present world order: It is multipolar once again where major powers are entangled in technological competition, Europe's security is dented, and decoupling is taking place. The advent of the Fourth Industrial Revolution (4IR) further added complexity. In contrast with previous technological revolutions, the latest technological innovations are increasing uncertainty.

In this era of the strategic arms race, the competition lies in different arenas of technology, including Artificial Intelligence (AI), automated decision making, big data analytics, quantum computing, human intelligence and hybrid intelligence, intelligent robotics, hypersonic, additive technology, and weapons that are based on novel physical principles, [1] including directed energy, genetic, radiological, electromagnetic, and geophysical weaponry. Nevertheless, Lethal Autonomous Weapon Systems (LAWS) is the most critical arena. The deployment of LAWS on the battlefield would exhibit a third revolution in warfare after the invention of chemical and nuclear weapons.[2] As there is no specific definition of LAWS, ambiguity surrounds it. Generally, LAWS are defined as weapons that, once activated, can select, and engage target(s) on their own without human interference. This system requires vital information such as visual mapping of the environment, the forward line of own troops, humanitarian and protected sites such as hospitals, adversary locations, operation guidelines, rule of engagement and the commander's intent, and dynamic de-confliction information, and last-minute changes in the protected entities and locations.[3] The fact that these weapons will allow attacks with the risk of limited human casualties on the attacking side will make states less hesitant about initiating war.

While artificial intelligence (AI) revolution is positively transforming various sectors of human life, it is altering geopolitical competition among states.[4] Disruptive technologies create conflict prevention and management challenges. With the onset of dual-use technologies, including Machine Learning (ML), AI, big data analytics, the probability of the deployment and use of LAWS in future wars has increased manifold.[5] There are wide-ranging concerns regarding the use of LAWS on the battlefield, including chances of miscalculation, malfunction, accidents and near misses, and their use by non-state actors. If nuclear-armed states are involved in such events, the risk of a nuclear war will increase. Moreover, once these weapons are added to the military arsenals of states, the prevention of their vertical and horizontal proliferation will be a huge challenge as these weapons will be cost-effective and can be produced in a short time on a larger scale than traditional weapons.[6]

If the development of these weapons is not halted, fighting wars through killer robots may become the new normal. This is so because powerful states including Russia[7] and the US[8] are rapidly progressing in this field, along with some others including the UK, China, India, Israel, and Turkey.[9] The use of AI and ML on the battlefield will affect Europe and South Asia the most. In Europe's case, the ongoing situation is the first large-scale military conflict to experience the massive use of

drones on both sides, changing perceptions of drone warfare. The rapid advances in drones speed up a long-anticipated technological trend which could soon bring the first fully autonomous weapon to the battlefield. Ukraine already possesses counter-drone weapons operated through AI and semi-autonomous attack drones while Russia has AI-controlled weaponry. If the war persists, it will increase the likelihood of AI drones being used to identify, select, and attack targets without human involvement.[10]

In South Asia, India is heavily investing in the applications of AI and ML for gaining military strength.[11] A significant digital transformation in India's military readiness is currently underway, leveraging new technologies such as AI, drone systems, and autonomous weapons to optimize its defense capabilities. For instance, to strengthen border security, India has implemented AI-driven solutions, installing 140 surveillance systems along the Pakistan and China borders. By integrating cameras, radar feeds, and sensors, these technologies enhance defense operations' accuracy, detect intrusions, and classify targets. The use of advanced surveillance reduces human monitoring, facilitating efficient intrusion detection, particularly in remote areas such as the Line of Actual Control (LAC).[12] Although India's pursuit of these weapon systems is in the developmental phase, the arrival of fully autonomous weapon systems in South Asia is inevitable. In 2013, Pakistan took a pioneering stance by being the first country to propose a pre-emptive ban on fully autonomous weapons, thereby significantly shaping and leading the international discourse surrounding LAWS. Since then, Pakistan has consistently underscored the urgent need to develop a legally binding instrument to address this issue. Pakistan's Mission in Geneva has dedicated extensive efforts towards promoting the prohibition of LAWS over several years. From 2014 onwards, international discussions on this matter have been ongoing. Pakistan emphasized on the necessity of maintaining human control over weapons, and encompassing qualities such as reliability, predictability, understanding, explain-ability, and traceability.

The situation will have a cascading effect on South Asia due to the region's complex security environment. India, being the revisionist power, has been striving to become a regional hegemon and has begun an ambitious strategic modernization program to pursue these ambitions. Such Indian designs threaten the delicate regional military balance. The Indian rapid military advancements and intentions to resume nuclear testing[13] have intensified regional security dilemma. In such a complicated security architecture, LAWS and AI-enabled weapon systems could lower the nuclear threshold and exacerbate tensions leaving lesser room for resolving conflicts such as the Kashmir issue, a bone of contention between India and Pakistan since 1947.

Definition of Lethal Autonomous Weapon System

A weapon's autonomy can be defined as its ability to independently perform an action or set of actions, by using computer programing and the interactions of actuators and sensors with its surroundings. Autonomy in weapon systems can be interpreted in different ways as it is a relative notion. There exist three prisms to

analyse the degree of autonomy in a system. The first is based on the extent of human intervention in the system's task execution. Second is the level of independence of the system in which it controls its behavior while dealing with uncertainties in an operating environment. Third is the quantity and variety of its automated functions.[14]

Major powers and other states have taken distinct positions on the development of LAWS based on their interests. In March 2023, the Convention on Certain Conventional Weapons (CCW) presented an updated document containing different variants of definitions by various states, at the request of the Group of Governmental Experts (GGE) Chair on emerging technologies in LAWS.

CCW is an international treaty aimed at regulating the use of specific conventional arms that are considered excessively destructive or having indiscriminate impacts. The treaty seeks to safeguard civilians and combatants, during armed conflicts, from the harmful effects of these weapons. Most of the international actors follow the US definition of LAWS. In this CCW convention, the US presented its revised definition of LAWS. As per the new definition, LAWS are advanced weapons encompassing independent functions. It also includes those weapon systems which once activated, can detect, choose, and engage targets with destructive force without further human involvement.[15]

The update by US governmental experts on LAWS is a positive sign, but it raises questions due to a lack of clear distinction of sophistication in the definition. For instance, whether this sophisticated weapon also includes nuclear weapons or only deals with conventional ones. Secondly, compared to the CCW 2022 version of the US definition, it excludes attacks on civilians, attacks to terrorize civilians, and cause incidental loss of civilian life.

Pakistan identifies the threats of LAWS according to its definition provided to CCW. According to its definition, LAWS are not limited to only one or two specific types of weapons. In fact, they belong to a category defined by their autonomous features, particularly in the domain of selecting and engaging targets. Furthermore, the complexities tied to these weapons systems arise from this autonomous capability, leading to varying degrees of unpredictability and far-reaching consequences.[16] This definition clarifies the concept of LAWS for not being an individual weapon. In addition, it is a capability that brings autonomy to select a specific target and engage itself to kill. Therefore, if nuclear weapons have this capability, their impact will be unpredictable and may have cascading effects. It may result in quick escalation and even a nuclear crisis.

In CCW meetings, Pakistan, Cuba, and Brazil have advocated for a LAWS ban. On the other hand, the US, Russia, and India have been advocating in favor of LAWS, based on the argument that these weapons would reduce civilian casualties and ensure human control.[17] India's reluctance can be noticed that neither it has provided any definition nor supported anyone in the CCW 2023 compilation of definitions. These states view the development and deployment of LAWS through the lens of their

national interests while ignoring its dire consequences for humanity. The damage once done by autonomous weapons will not be reversed – these weapons could go wrong or out of hand. Therefore, irrespective of their national interests, states must consider the impact on humanity before the deployment of these weapons.

Contemporary Use of LAWS in Military Operations

Autonomous weapon systems presently used in military operations include air defense systems deployed on combat ships or army installations to attack interceptors, missiles, or mortars; active defense armaments installed on tanks to strike inbound munitions; loitering arms with self-governing configurations operated by sensors and vehicles; and specific missiles and sensor-fused arms that are operated against combat ships and armored combat vehicles. As per proponents' views, LAWS have military advantages compared to directly operated and tenuously controlled weapon systems. These advantages include:

- **Increased Targeting Speed:** The rapid process of identifying, monitoring, and employing force on targets provides the army an edge in both offensive and defensive operations. However, this also carries the risk of losing control over the application of force and eventually provoking escalation.
- **Automated Access Denial:** Without soldiers or continual supervision, LAWS can deny opponents access to or movement across regions. Laying minefields has a similar function.
- **Continuing an Attack in the Event of Communication Disruption:** Armed drones that are operated by remote controls, (land, sea, and air) rely on communication links to initiate an attack, however, these lines can be jammed, cut off, or hacked. LAWS can function without Command and Control (C2). They can continue operations even after the destruction of communication links by sensing the environment and developing a course of action that does not depend on communication links.
- **Greater Number of Unmanned Armed Systems, Especially Swarms:** Operator participation is not involved in LAWS. Hence, it allows the deployment of additional autonomous armed systems while requiring fewer human resources compared to remote-controlled systems.[18]

Despite these advantages, many states and weapons companies are insisting on not eliminating human control. It demonstrates that awareness regarding the risks and consequences of these weapons is growing.[19]

Threat Perceptions in South Asia

The volatile security environment of South Asia is characterized by multiple factors that fuel region's threat perceptions. One of these factors is the enduring

rivalry between two nuclear-armed neighbours, India, and Pakistan, who share an extended border. Owing to geographical contiguity, Indian aggressive intentions threaten Pakistan's major cities and strategic assets, contributing to strategic instability. The impact of India's rapid military modernization and fastest-growing nuclear program[20] cannot be ignored.

India's 2021 military expenditure was ranked third highest in the world.[21] It also remained the world's largest importer of arms from 2018 to 2022.[22] In addition, 93 Indian military modernization projects worth USD 18.4 billion were reported to be underway in 2022.[23] These plans include both procurement deals and indigenization of a variety of armaments. It involves the induction of artillery guns, high-volume firepower, longer-range BrahMos supersonic cruise missiles, enhanced Pinaka rocket regiments, loitering munition systems, enhanced surveillance and weapon detecting capabilities, and runway-independent remotely piloted aircraft.

Additionally, India is pursuing disruptive technologies for military purposes while neglecting the associated nuclear risks. Indian Defence Minister, Rajnath Singh, announced the launch of 75 latest AI-based products during a defense exhibition on 11 July 2022. These multi-domain technologies include autonomous/unmanned robotic systems, AI platform automation, blockchain-based automation, Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), and LAWS.[24] Moreover, Indian defence spending has reportedly increased to USD 52.8 billion in the 2023 federal budget.[25]

Under the guise of a two-front threat, India is swiftly upgrading its conventional and nuclear arsenals. It has great power ambitions as reflected in its foreign policy goals. To become a "leading power," upward trajectory modernization plans are aimed at outcompeting China – despite the growing appetite in India for trade and sociocultural affinity with China – while threatening Pakistan's national security.[26] Another destabilizing factor is the presence of violent non-state actors which operate as Indian proxies in Pakistan and other regional states.

Since its creation in 1947, India has strongly relied on violent proxies. For instance, India's proxy group Shanti Bahini fought a guerrilla war in Bangladesh, another Indian proxy called Tamil Tigers operated in Sri Lanka, and Baloch proxies sponsored by India have been operating in the Baluchistan province of Pakistan.[27]

Another key challenge in the region is India's ambiguous nuclear doctrine and nuclear posture. The lack of clarity in the development of LAWS and the ineffectiveness of Confidence Building Measures (CBMs) with Pakistan is intensifying this strategic ambiguity.[28] AI-enabled autonomous systems could result in strategic misjudgments and machine errors, pushing two nuclear adversaries to the brink of a nuclear crisis.

A comprehensive analysis of the state of strategic stability in South Asia demonstrates that India has shifted to a preemptive counterforce doctrine.[29] India is

strengthening its conventional and strategic precision-strike weapons to strike deep into another state's territory for offensive preemptive counterforce.[30] Moreover, Indian military modernization, coupled with its strategic communication, complements overall trends. For instance, its development and deployment of integrated multilayered BMD systems, procurement of Russian-made S-400 Triumf air defence system, advanced air defence and Prithvi defence vehicle, and ASAT weapon technology[31] reveals that such capabilities will enable India to target another state's military satellites and long-range strategic missiles. This also includes the deployment of cruise missiles for the sea, land, and air operations, for instance, equipping Su-30 aircraft with Brahmos missiles and increasing the range of BrahMos and Nirbhay cruise missiles.[32] Such happenings create pressure for both China and Pakistan as India follows a trend of conducting misadventures and acts of provocation against both states. Examples include India's phantom surgical strikes in Pakistan in 2016[33] and 2019,[34] and provocation against China at Ladakh[35] and Arunachal Pradesh.[36]

This region is highly vulnerable in terms of geography as nuclear-armed foes happen to share borders. A ballistic missile, once launched, would take less than ten minutes to reach the target in the adversary's territory, besides the fact that conventional military interactions of regional rivals take place along an extended border. Therefore, the introduction of LAWS in this region would be catastrophic. Since the independent systems will enhance the pace and precision of a conventional war by keeping aside political options, nuclear anxiety among NWS in a crisis will increase. The likelihood of LAWS being a grave threat would multiply through its integration with the Weapons of Mass Destruction (WMDs).[37]

At this stage, there is a low probability of a war involving AI between South Asian nuclear-armed states because the development of AI operated weapons systems by India is in its preliminary phase. Besides, Pakistan's consistent efforts of preemptively banning its production and regulating these weapons have gained momentum. This campaign is supported by 90 states and the Secretary General of the UN.[38] Although awareness of the grave consequences of fully autonomous weapons is growing, several major countries are resisting the adoption of an internationally legally binding instrument on LAWS. Consequently, the development of these weapons is going on without any hindrance. Therefore, considering regional tensions such as the India-Pakistan Kashmir conflict, the India-China dispute in the Himalayas, India's quest for hegemony in the Afro-Asian Ocean Region (AAO), and India's growing space capabilities that pose a security dilemma for Pakistan, the possibility of an armed conflict cannot be ruled out. It would be irrational to make any ultimate judgments about the lasting impact of AI on strategic stability in the region. However, regardless of technological advances, human intervention in strategic decision-making and C2 systems must not be renounced.

Possible Impact of LAWS on South Asia

The basis of an offensive nuclear posture is a preemptive nuclear attack. The intention of such an attack is to end a conventional armed conflict or to prevent a possible nuclear strike by an enemy while carefully assessing the situation so as not to prompt severe nuclear retaliation.[39]

The use of AI to make weapon systems autonomous carries numerous risks. The most significant danger of nuclear escalation ascending from using AI emanates from its application in conventional military uses that could pressure NWS to adopt erratic launch postures. Integrating AI into weapon systems will enable them to make decisions faster than humans. Operating at a faster speed may be advantageous on the battlefield as states operating autonomous systems will outperform those operated by humans.[40] Nonetheless, a state's ability to succeed in a war at the speed of machine implies that the adversary could lose at the speed of machine.

Hence, the fear of being defeated at machine speed may compel a technologically disadvantaged state to adopt dangerous nuclear postures that are generally considered unstable. For example, due to the risk of AI and ML with autonomy in weapon systems, a state could pre-delegate the use of nuclear arms early in a crisis or launch on warning (LOW) posture to avoid decapitating. It is pertinent to mention that the source of instability in this case is not solely the system's autonomy; it is the increasing pace of the war, as discussed earlier. Further advancements such as hypersonic weapons[41] has the potential to create instability. Unstable postures could result in misjudgments, and miscalculations ultimately leading to accidents as states might put their nuclear weapons on a hair trigger due to the fear of decapitation. Against this backdrop, it is critical to analyse how AI and ML might affect South Asian strategic stability.

Horizontal and Vertical Proliferation

In 2019, the Indian military initiated acquiring and deploying modern arms equipped with disruptive technologies. Despite the international community's warnings and criticism, the Indian military has inducted autonomous weapons in its arsenals. India has developed the Combat Air Teaming System (CATS) in the aerospace domain. It is an advanced air warfare system with a human-crewed aircraft and stealth-enabled UW with a surveillance/weapons payload. It is deployed individually or in swarms, capable of interoperability and autonomous operations.[42] India has recently flight-tested Stealth Wing Flying Testbed (SWiFT), a fully autonomous technology demonstrator and precursor to future combat drones. It can conduct human-independent operations. India has deployed an AI-enabled armored multi-terrain Unmanned Ground Vehicle (UGV) in the land warfare domain. It has a mounted gun turret and carries Intelligence, Surveillance, and Reconnaissance (ISR) payload. It can function autonomously, making it ideal for low-intensity tactical operations.[43]

These are a few examples of India's vertical proliferation in disruptive technologies. In addition, the R&D organization of India, namely Defence Research and Development Organization (DRDO) has been actively engaged in research and development of the unmanned remotely operated tank "Mantra", gun-mounted remotely operated vehicles, direct energy weapons, swarm-based self-healing minefields, and canister nuclear weapons.[44]

India is setting a precedence for regional states, including those in Southeast Asia, to acquire these sophisticated technologies[45] by hook or by crook. In a technologically asymmetrical region, weaker states will strive to obtain LAWS as an achievable deterrent aimed at maintaining strategic stability and minimizing the probability of military escalation in a crisis.

Conflict Escalation and Risk of Nuclear Exchange

India has been using human shields in Indian Illegally Occupied Jammu and Kashmir (IIOJK),[46] which demonstrates the possibility of India using LAWS in the Kashmir conflict, the way Israel has been using robotic weapons against Palestinians in the West Bank.[47] If LAWS are operated in IIOJK, it could lead to increased violence, escalation, or a wider conflict. Considering the geographical contiguity of adversaries, any conflict could escalate rapidly as forces on either side can be easily deployed and mobilized. Minimal reaction times could lead to preemptive actions, resulting in the rapid escalation of a conflict.

Another destabilizing factor is the Indian Cold Start Doctrine (CSD)[48] that aims to launch a swift and decisive offensive against Pakistan in the event of a conflict. It involves rapid mobilization of Indian forces and a quick thrust into Pakistani territory aimed at capturing key strategic locations and cutting off Pakistan's supply lines. The doctrine's focus on rapid offensive action could lead to a massive escalation of any conflict between Pakistan and India, potentially resulting in a full-scale war. It would not only increase the likelihood of preemptive strikes but would also intensify nuclear exchange risk.

Several other features of the Indian nuclear posture threaten South Asia's strategic stability. These include the Indian development of tactical nuclear weapons, acquisition of Prahaar and Prithvi, ambiguity in its No First Use (NFU) policy, rapidly expanding nuclear arsenal, and acquisition of missile defense systems, such as the Russian S-400. These systems may embolden India to use nuclear weapons in a limited war scenario as it may feel that it can effectively defend itself against a retaliatory strike.

Given the conventional applications of AI could increase the probability of nuclear escalation, the peace and security of South Asia depends on the effectiveness of nuclear deterrence and a stable strategic and security environment. The CCW discussions primarily revolve around the function of robotic systems in conventional wars.[49] Nonetheless, the primary concern is the growing autonomy within nuclear

early warning and Command and Control (C2) systems. Although there is uncertainty about this, the increasing autonomy of these systems may heighten the potential for nuclear weapons to be used inadvertently whether due to machine error, system failure, or a false alarm during war and peace.

Arms Race and Balance of Power

Pursuing more accurate, innovative, and versatile weapons against the adversary could result in a destabilizing arms race. The NWS and Non-Nuclear Weapon States (NNWS) may possibly use ML and autonomy for many non-nuclear military purposes as well but with a strategic effect. Non-nuclear military technologies include various weapon systems developed by both NWS and NNWS, such as access to different warfare domains, high speed, precision, detection abilities, and military decision-making. Since advances in ML and autonomy will be a game-changer for NWS, the foundations of nuclear strategy would most likely remain the same. Its adoption will still impact strategic relations among states and the balance of power due to its potential to disrupt the conventional superiority of a hegemonic state.

The existing balance of power in South Asia is defined by two nuclear states – Pakistan and India – and asymmetries in their power structures will indeed affect this balance. The onset of LAWS will add to Pakistan's security dilemma. It will also challenge conventional modes of conflict. Smaller NNWS will be prompted to acquire these weapons as an achievable deterrent, but their acquisition of LAWS could alter regional balance and fuel arms race.

Adoption of Dangerous Postures

Technology plays a vital role in shaping a state's military postures. These technological advancements will enable India to adopt offensive nuclear launch postures like the Launch on Warning (LOW) strategy,[50] also termed as launch under attack and nuclear first-use. Pakistan does not give India's existing NFU policy credence due to India's irresponsible behaviour and nuclear signaling. The pursuit of disruptive technologies is emboldening India to adopt a counter-force posture against Pakistan, which can increase the likelihood of misadventures like the 2019 Balakot crisis.[51]

The US and the then USSR first adopted the LOW nuclear strategy during the Cold War, and it is still effective despite carrying the danger of false alarms. The strategy assures a decapitation strike and an accidental launch by the opponent. It allows a state to deter its adversary from attacking first. In case an attack is launched by one side, the other could launch a retaliatory nuclear weapons strike before being destroyed. As soon as the satellite and warning sensors intercept an incoming missile from the adversary's territory, the officials in the receiving state's chain of command would immediately plan and decide on a counterattack. Since there will be little time

to understand whether a genuine attack triggered the alarm or was a false alarm, this posture presents grave nuclear dangers.[52]

Threat of Non-State Actors

Present arms control regimes predominantly focus on the threats emanating from states and overlook the dangers posed by violent non-state actors.[53] It is mainly because violent non-state actors are not formally recognized in international relations and do not have the same level of political legitimacy as states. These actors often operate outside the norms of international law, making it difficult to regulate them and can pose a significant threat to international security. It is also difficult to verify their compliance with any agreements. Additionally, non-state actors' motivations are often linked with ideologies or criminal objectives, which make negotiations even more challenging. Hence, arms control regimes traditionally focus on regulating the acquisition, possession, and use of weapons by states only.

In this context, it can be argued that an AI arms race will not be limited to states like nuclear arms race; it will most likely involve non-state actors too. The efficiency, ease of diffusion of AI systems, cost-effectiveness, scalability, and fewer chances of human casualties would increase the likelihood of prompting malevolent actors to acquire such technologies.

Consider an Indian proxy operating in Pakistan, such as the Baluchistan Liberation Army (BLA),[54] getting hold of this technology and operating covertly within Pakistani territory will be an upset for the entire region – instability will hinder Pakistan's development while affecting regional connectivity and deterring all interested states from bringing in their investment.[55] One such opportunity is Chinese investment in China-Pakistan Economic Corridor (CPEC). The mega-modal project is set to usher in an unprecedented era of regional connectivity and development in Pakistan through the construction of roads, railways, and ports. Despite international pressure, this project's second and most crucial phase has commenced, which focuses on strengthening the agricultural sector and promoting industrial development in Pakistan. While this multi-dimensional project is creating various opportunities for Pakistan and linkages for China, at the same time, it has been subjected to security threats at the hands of non-state actors sponsored by India, and Indian propaganda campaigns to malign prospects for Pakistan's economic growth. India adopted symmetrical and asymmetrical strategies to sabotage CPEC.

In November 2020, Pakistan presented a dossier to the UN Secretary General Antonio Guterres on India's terror campaigns in Pakistan, urging the UN to play its role in persuading India to end its terror campaign against Pakistan.[56] Although Pakistan's political and military leadership has curbed Indian efforts to disrupt CPEC, Baluchistan's stability is tantamount to the successful execution of this project. In such a fragile security situation, violent non-state actors launching attacks with autonomous weapons will make it nearly impossible to halt or persuade them.

For two decades, countries like US and Israel have been prominent examples of state actors using drones in military operations. However, non-state actors have already started using drones, and more than 400 incidents have been reported where non-state actors launched attacks with UAVs. An attack on Russian base in Syria is a case in point. In January 2018, 13 Uncrewed Aerial Systems (UAS) attacked the Russian Khmeimem base and Tartus naval facility. The responsibility for the attack was claimed by the Alawites Movement, a religious and socio-political group located in Syria. Although the attack caused no casualties or injuries, but the technological capability of a non-state group alarmed the international community.[57]

Moreover, in 2017, the so-called Islamic State dropped an explosive in a residential area in Iraq by using a drone. In 2019, Iran employed drones to launch attacks on heavily fortified oil installations in Saudi Arabia, with Yemen's Houthis claiming responsibility for the assaults. These incidents highlight the asymmetrical advantages that can be gained by utilizing small, uncrewed vehicles. As demonstrated by these instances, the proliferation of drones without AI is already underway. Moreover, integrating AI into drone technology is poised to enhance the efficiency and lethality of these attacks. Incorporation of ML capabilities, and drone swarms can become more formidable by overpowering existing air defense systems. AI has the potential to aid drones in targeted killing, as it enables swift identification and precise execution of individuals or even members belonging to particular ethnic groups. The unprecedented distribution of technological means and skills will alter the nature of warfare[58] and enhance the destructive capacity of non-state actors. A new approach to arms control must be adopted, with mechanisms that tackle both the horizontal proliferation to smaller states and vertical proliferation to non-state actors regarding AI-enabled weapon systems.

Miscalculations and Misperceptions

As mentioned earlier, one of the risks arising from AI and ML is miscalculation and misperception.[59] It entails leveraging the information landscape in which military and political decisions regarding nuclear weapons are made. The fear of quickly losing a war will likely generate motivations for quick responses involving nuclear options, increasing prospects for miscalculation, and decreasing stability.

There is an increasing concern in Western policy makers' circles regarding attacks primarily targeting C4ISR systems.[60] These systems are used for conventional and nuclear weapons, including satellites, intelligence gathering, and logistics. Such attacks pose two risks. Firstly, since they are not considered nuclear systems, they receive less security scrutiny than nuclear systems.[61] Secondly, an adversary may consider that attacking these systems has less potential to initiate a nuclear escalation which could result in a misjudgment. The state launching the attack might be unaware about the system's possession of nuclear C4ISR capabilities (NC4ISR). Resultantly, the intention might be to carry out a conventional attack, but the targeted state could perceive it as an attack on its nuclear assets.

Many incidents from the Cold War era can serve as lessons. The most relevant case is Lieutenant Colonel Stanislav Petrov, who prevented a global catastrophe by averting a nuclear conflict. On 26 September 1983, when Petrov was serving at a Soviet early warning facility, the radar detected five US nuclear warheads heading towards Soviet territory. Instead of calling for massive Soviet retaliation, he declared it a false alarm originating from the automatic nuclear missile early-warning system. He made a deliberate decision to refrain from taking an action.[62] This highlights automated systems' unreliability and underscores human judgment's importance in crucial decision-making within susceptible C2 structures.

The development of LAWS should therefore be forestalled through strict guidelines regarding procurement policies under international law, particularly International Humanitarian Law (IHL). Another way to mitigate the existential threat of nuclear war involves the establishment and institutionalization of international norms and coordination frameworks that prohibit the targeting of NC4ISR systems, the prohibition of autonomy and ML weaponization, especially within the cyber domain, and the sharing of best practices and defenses among NWS.

Conclusion

New AI technologies will lead to unique challenges, including their proliferation by state and violent non-state actors involved in conflicts, increasing the existing complexities of strategic architecture across the globe as well as in various regions. Since artificial intelligence systems can complete tasks more efficiently and quickly and exploit vulnerabilities in other systems, this will make attacks more accurate, effective, and difficult to attribute.

Likewise, integrating artificial intelligence, autonomy, and machine learning will have an impact on nuclear command and control, heightening the risk of an inadvertent nuclear war. The targeting and tracking of an adversary's launchers may significantly upgrade the accuracy and speed of operations. Therefore, the integration of an uncontrolled autonomy into weapon systems[63] aimed at improving the performance of precision munitions, unmanned aerial vehicles, airborne warning and control systems, ballistic missile defense systems, nuclear-powered submarines, and anti-satellite weapons, along with risky nuclear postures like preemptive counterforce, will only exacerbate strategic instability and increase crisis risk.

Impact of lethal autonomous weapon systems on South Asia's nuclear deterrence depends on various interrelated factors. While artificial intelligence could enhance the accuracy and efficiency of nuclear weapon systems, improve early warning systems, and increase situational awareness, deploying killer robots can increase the risk of inadvertent escalation. It could, in turn, increase tensions between nuclear weapon states, pushing them to the brink of nuclear conflict. The potential risks of such deployments must therefore be considered.

States must consider the implications of machine learning urgently because the consequences of getting it wrong are severe. Instead of impractical options like banning or merely focusing on the responsible use of artificial intelligence and machine learning, a comprehensive legal treaty-based approach must be adopted to make the best use of these technologies. Lessons must be drawn from the past while looking into the potential risks of establishing a non-proliferation regime for lethal autonomous weapon systems.

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