INDIA'S ACQUISITION OF STRATEGIC NON-NUCLEAR WEAPONS IN THE THIRD NUCLEAR AGE: IMPLICATIONS AND WAY FORWARD FOR PAKISTAN

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Abstract

The advent of the Third Nuclear Age has transformed the global security environment, as this era is marked by the integration of emerging and disruptive technologies into the military and nuclear policies of major and regional powers. It weakens the traditional deterrence postures and adds to the complex global security environment. The challenges of these technologies are staggering in South Asia, where two nuclear-armed neighbours, India and Pakistan, are engaged in an enduring rivalry. Moreover, India's acquisition of strategic non-nuclear weapons (SNNWs) such as offensive cyber capabilities, anti-satellite capabilities (ASAT), and hypersonic missiles has blurred the lines between conventional and nuclear strikes. Since India has been heavily developing and deploying SNNWs, their implications for Pakistan's security and regional strategic stability are profound, as they shorten response time and raise the probability of miscalculations. In this context, the recent escalation-cum-retaliation mini-war has been briefly assessed in this study through the lens of SNNWs. Lastly, this paper attempts to analyse the types of SNNWs, India's advancements in this domain, and their impact on the existing deterrence framework in South Asia. This paper hypothesises that India's acquisition of SNNWs can have profound implications for Pakistan's security and would undermine strategic stability in South Asia. It also provides valuable policy inputs to Pakistani policymakers and stakeholders to sustain a credible deterrence posture amid India's technological developments.

Keywords: Strategic Non-Nuclear Weapons, India, Pakistan, South Asia, Nuclear Deterrence, Strategic Stability, Cyberspace, Anti-Satellite Capabilities (ASAT), Hypersonic Missiles.

Introduction

The world is undergoing a technological transformation in the contemporary third nuclear age. The intensification of great power competition and the increasing multipolar nature of the world order, driven by the proliferation of advanced

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technologies, pose new challenges to global stability. Within the changing global dynamics, the introduction of emerging technologies like hypersonic weapons,[1] artificial intelligence-led weapon systems,[2] cyber capabilities, and missile defence systems poses daunting risks to the security of the nuclear weapon states, thereby redrawing the lines of nuclear deterrence.

India is building SNNWs that will act as force multipliers and strengthen its nuclear and conventional capabilities. SNNWs will provide India with a greater edge in counterforce and first-strike scenarios. These developments have far-reaching consequences for regional security, especially for Pakistan. This is because India's acquisition of SNNWs will widen the conventional asymmetry and technological gap, which may disturb the already delicate deterrence stability between India and Pakistan.[3] Traditionally, Pakistan adheres to the Credible Minimum Deterrence (CMD) nuclear doctrine, which means having sufficient and balanced nuclear capabilities to deter aggression, without entering a costly and escalation-prone arms race.[4] Even Pakistan's Full Spectrum Deterrence (FSD) is operationalised through the notion of CMD[5] to prevent aggression at all levels of conflict - tactical, operational, and strategic.

The Cold War and the immediate post-Cold War period never faced the kind of challenges that states are facing today, which are disrupting established deterrence frameworks. For instance, in the past, arms races (e.g., MIRVs, missile defenses), nuclear command and control (NC2) issues, false alarms (e.g., the 1983 Soviet false launch warning), non-state actors, and nuclear terrorism (a post-9/11 concern) have all been traditional nuclear challenges.[6] However, the advent of the Third Nuclear Age presents additional challenges that further complicate deterrence frameworks, some of which are discussed in this research subsequently.

Additionally, this era is characterized by an increasingly frequent occurrence of cyber threats to the NC2 systems.[7] As modern NC2s are increasingly digitalized and interconnected, their digital nature renders them vulnerable to cyberattacks. Moreover, due to interconnectedness, a cyberattack on one point can disable or disrupt the entire chain of command, from creating false alarms to spoofing, among other effects. A cyberattack on NC2 systems would also impact situational awareness and nuclear decision-making, potentially increasing the likelihood of miscalculated or unauthorized launches between adversaries.[8]

Additionally, India's pursuit of hypersonic missiles[9] will further complicate Pakistan's security dilemma, as they can evade traditional missile defense systems due to their precision, high speeds, and maneuverability. Moreover, hypersonic weapons shorten response times; therefore, they can lead to preemptive nuclear strikes. Apart from high speed and precision, the dual nature of these weapons presents a profound challenge to crisis stability as they blur the lines between conventional and nuclear strikes.[10] During a crisis, adversaries can have trouble distinguishing whether the incoming attack is conventional or nuclear since dual-capable missiles can carry both types of payloads (conventional and nuclear), leading to a possibly miscalculated response and escalation of the crisis. India also integrates AI-led military systems, which significantly improve its precision strike capabilities and provide real-time data. It presents a dual challenge for Pakistan as it must simultaneously address India's technological advancements and adjust to an evolving strategic calculus.

Against this backdrop, this study aims to analyse defining aspects of the third nuclear age, India's developments in SNNWs, and their potential implications for Pakistan's deterrence posture and strategic stability in South Asia. This research is significant because it contributes to the understanding of how Pakistan can overcome the possibilities and challenges of the Third Nuclear Age, with an emphasis on SNNWs.

The Concept of Nuclear Ages

The concept of the nuclear age determines the development of nuclear history and classifies it into distinct periods. All nuclear ages are characterized by distinct technological dynamics and a specific geopolitical landscape, which define the role of nuclear weapons in international relations. Eminent scholars such as Professor Andrew Futter and Benjamin Zala have described the nature of the three nuclear ages[11] which provides an academic framework for scholars to examine the evolution of nuclear strategy and deterrence, reflecting shifts in global power structures, technological advancements, and evolving security priorities. The three nuclear ages, as outlined by Professor Futter and Zala, are: the First Nuclear Age (1945–1989), the Second Nuclear Age (1990s–early 2000s), and the Third Nuclear Age, which is the contemporary period.[12]

The First and Second Nuclear Ages

The Cold War (1945–1989) was essentially the First Nuclear Age, during which the United States and the Soviet Union were engaged in a bipolar rivalry. In this era, the concepts of Balance of Power (BoP) and Mutually Assured Destruction (MAD) influenced nuclear strategies of both major powers, where they kept large nuclear arsenals to deter one another and prevent confrontation. During the first nuclear age, several arms control initiatives were taken to reduce the chances of conflict escalating and maintain strategic stability. These initiatives included the Strategic Arms Limitation Talks (SALT)[13] and the Anti-Ballistic Missile (ABM) Treaty.[14]

Subsequently, the Second Nuclear Age began in the post-Cold War period (1990s to the first decade of the 2000s). The world underwent a notable transition during this period, as the bipolar world order gave way to the multipolar world order. Moreover, nuclear proliferation extended beyond the P5 countries, and new nuclear-armed states emerged, such as India, Pakistan, and Israel.[15] Since the nuclearization of South Asia, Indo-Pakistan regional rivalry has become prominent in international relations. Simultaneously, major powers focused much of their attention on countering nuclear proliferation and addressing threats posed by non-state actors. During this period, the dominant aspects were nonproliferation efforts, regional deterrence strategies, and the gradual modernization of nuclear arsenals, aimed at adapting to the emerging security landscape.[16]

The Third Nuclear Age

The three major dynamics define the Third Nuclear Age. First, technological advances are pushing forward the development of both nuclear weapon systems and non-nuclear weapon systems involving new missions, which pose unprecedented proliferation, stability, deterrence, and crisis management challenges. Second, geopolitical transformations of global BoP drive the international system towards multipolarity, shifting political alignments and triggering great power competition. Third, global nuclear governance is marked by a normative split between those who uphold the existing order and those who challenge it. This convergence of transformative changes distinguishes the current atomic age from the previous ones.[17]

The Third Nuclear Age marks a revolutionary period in global nuclear strategy, characterized by the integration of cutting-edge technologies, including hypersonic missiles, artificial intelligence, missile defense systems, and cyberspace, into military and nuclear strategies. Although not of nuclear character, these technologies create a strategic effect. For instance, as hypersonic missiles travel at a speed of 5 Mach, they shorten the reaction time and overcome conventional missile defense systems.

While AI enhances decision-making and precision strike capabilities, it increases the chances of unintended escalation due to the autonomous nature of the weapon systems. Similarly, cyber capabilities also bring vulnerabilities to the NC2 systems and can disrupt communication and decision-making during a crisis. As Professor Futter highlights, the same period is characterized by the concurrent and intertwined impact of such technologies on the nuclear strategy, which makes the strategic environment dynamic and uncertain.

Emerging technologies certainly do not exactly simulate the effect of nuclear weapons, yet they exert a significant impact by potentially interfering with nuclear missions. In this era, the focus of nuclear competition has shifted from concerns about the proliferation of nuclear weapons to perceived "rogue states" to the strategic rivalry between the three major powers, i.e., China, Russia, and the US. These states modernise their nuclear arsenals and incorporate advanced technologies within their military doctrines. Professor Futter defines this nuclear age as Anglo-centric, mainly because it is an expression of a story constructed by English-speaking powers and the Washington narrative of nuclear history.[18] An identifiable characteristic of this period is the concurrent impact of various technologies on nuclear deterrence, which have contributed to different degrees. Likewise, key powers and regional players, such as India, are shifting towards offensive doctrines and acquiring sophisticated systems, including hypersonic weapons and missile defense systems. The interaction of these technological advances highlights the complexity of the conditions for strategic stability in a multipolar nuclear world, where capabilities and doctrines change simultaneously.

Strategic Non-Nuclear Weapons

SNNWs are complex weapon systems, primarily conventional but sometimes involving cyber and space-based components, designed to achieve strategic goals by either causing a strategic effect or contributing to nuclear deterrence, all while remaining below the nuclear threshold.[19] Such weapons can affect nuclear deterrence and evade tactical and operational levels of war so that countries can directly target elements crucial for their enemy's power. SNNWs can be used in both counterforce and countervalue missions. In counterforce missions, states attack the military assets of their adversaries to eliminate their military-industrial formation, including military installations, nuclear sites, etc. In countervalue missions, the civilian population, socioeconomic hubs, and political centers are attacked, resulting in greater collateral damage than counterforce missions.

The most prominent aspect of SNNWs is precision, which enables possessing states to achieve their political, economic, and military objectives without engaging in direct combat.[20] Besides being precise, some of these weapons are also cost-effective, and their production time is less than that of nuclear weapons. Yet, they can strategically impact adversaries, making states more likely to invest in SNNWs. For example, cyberattacks on an adversary's critical infrastructure or NC2 systems can cause massive destruction, especially during active conflict, as they will create false alarms, spoofing, jamming, disruption of communication, and even unauthorised launches.

In the post-Cold War era, the world witnessed a technological transformation marked by the rapid development and integration of new technologies in the military domain. The integration of new technologies led to an increased interconnection of nuclear and non-nuclear military capabilities – a phenomenon referred to as nuclear entanglement. Since systems are interlinked and intentions are unclear, nuclear entanglement increases the risks of non-nuclear conflicts spiraling into nuclear wars. Moreover, the blurred lines between conventional and nuclear technologies can lead to ambiguous targets and complications in decision-making processes.

Additionally, the Conventional Prompt Global Strike (CPGS) concept was introduced in the early 2000s, incorporating new and sophisticated technologies known as SNNWs. These technologies include anti-satellite (ASAT) capabilities, cyber weapons, hypersonic cruise missiles, and boost-glide technologies. States can thus achieve their objectives through both kinetic and non-kinetic means by utilizing these technologies. Kinetic applications involve attacking and destroying physical infrastructure, whereas non-kinetic applications include disrupting command and control (C2) instruments via cyberattacks.[21] As SNNWs are dual-capable, which means these weapons can carry both nuclear and non-nuclear payloads, the integration of these systems into military armament complicates the regional security environment. In the third nuclear age, the emergence and application of SNNWs will bring strategic effects like nuclear weapons. It would change the paradigm of world security and redefine the classical deterrence architectures.

Types of Strategic Non-Nuclear Weapons

Hypersonic missiles, advanced cruise missiles, advanced conventional weapons, ASAT weapons, emerging technologies such as AI, cyberspace, direct energy weapons (DEWs), and BMDs may be included in SNNWs. The aim is to employ advanced strategic non-nuclear capabilities to enhance precision and provide alternatives to nuclear use, though their impact on nuclear risk reduction remains contested.[22]

- **Hypersonic Weapons**
  - Hypersonic weapons, including Hypersonic Glide Vehicles (HGVs) and Hypersonic Cruise Missiles (HCMs), are advanced weapons in modern military technology. These weapons can travel at speeds exceeding Mach 5 with high maneuverability, making them difficult to intercept.[23] Unlike traditional ballistic missiles, which follow predictable high-altitude trajectories, hypersonic missiles operate within the atmosphere at altitudes ranging from 18 to 60 miles (29 to 97 kilometers). They can alter their flight path in the terminal phase, thereby increasing the complexity of interception. The ranges of their systems are widely distributed, with some systems used for short-range precision strikes while others have intercontinental ranges exceeding 1,000 miles.[24] Short, preemptive strikes, sometimes with little or no warning, are expected from a direction the enemy controls against high-value targets, like command centers and military installations.[25] This capacity enables states to modify the circumstances of battle to their advantage, highlighting the role of a state in modern warfare.
  - The biggest challenge is detecting hypersonic missiles due to their high speed and maneuverability. During the boost phase, these missiles emit infrared signals, which satellite systems can detect. However, in later stages, their low-altitude flight patterns often evade detection by both space and ground radars. Decreased detectability, coupled with a high-speed compressive response for targeted states, thus upsetting the strategic balance. The first known example of the deployment of a hypersonic missile in an active conflict is Russia's deployment of Kh-47M2 Kinzhal hypersonic missiles against Ukraine in 2023.[26] It is an air-launched missile that travels at speeds beyond Mach 10.[27] Russia deployed them to attack a weapons depot in Western Ukraine to degrade Ukraine's military logistics.[28] This suggests that hypersonic missiles could be utilised operationally for tactical advantage, rather than solely for deterrence during live combat. Moreover, hypersonic missiles can be used against missile defenses, persuading the adversary to adopt rapid response doctrines and policies.

- **Advanced Cruise Missiles**
  - Another type of SNNWs is cruise missiles. Since these dual-capable missiles possess advanced guidance systems, improved propulsion, and warhead performance, they can provide a greater edge during a conflict. Additionally, these missiles have a more extended range. Depending on their specific systems and configurations, they can range from a few hundred to 2500 kilometers. Moreover, cruise missiles can fly at low altitudes, enabling them to evade radar detection. Their dual capability and precision enhance their strategic value, as they can be employed for counterforce and countervalue missions where precision is crucial.[29] There are two types of cruise missiles: Anti-Ship Cruise Missiles (ASCMs), which are utilized for targeting enemy maritime vessels, and Land-Attack Missiles, used for attacking terrestrial targets such as military installations and strategic assets.[30]
  - Major powers and regional states are actively developing cruise missiles. Since these weapons are dual-capable, the receiving state may struggle to determine whether the incoming attack is conventional or nuclear, thereby increasing the likelihood of a miscalculated response. These weapons require precision, making them suitable for launching limited military strikes, which in turn lowers the threshold for their use.
  - A notable example of an advanced cruise missile having a strategic impact is the United States' use of Tomahawk Land Attack Missiles (TLAMs) during the 2017 strike on Syria's Shayrat Airbase.[31] On April 7, 2017, the US launched 59 Tomahawk missiles from naval ships in the Mediterranean Sea in response to a chemical weapons attack allegedly carried out by the Syrian government. The missiles targeted critical infrastructure at the airbase with high precision, minimising collateral damage while achieving the intended objective.[32] This strike demonstrated the Tomahawk's capability to execute precision attacks on strategic targets, reinforcing its value as a versatile and effective tool for military operations.
- **Anti-Satellite (ASAT) Weapons**
  - The weaponization of space has become an integral part of the broader concept of Space-Based Nuclear Weapons (SBNWs), reflecting the shift in the dynamics of modern warfare. ASAT weapons provide one of the key components in SNNWs, which comprise the capability to interfere with an adversary's space-based assets, crippling and destroying assets such as communication, navigation, and surveillance satellites. Kinetic ASATs utilise direct-impact missiles to destroy satellites physically,

producing lethal debris that presents long-term threats to other assets in orbit and the sustainability of space activities. On the other hand, non-kinetic techniques, such as cyber-attacks, electromagnetic interference, or jamming, damage satellites without destroying them, thereby limiting the amount of debris while raising the challenge of attribution.[33] ASAT weapons also possess the characteristics of SNNWs, as these weapons would strike a specific adversary's critical space infrastructure to degrade operational capabilities and impair situational awareness.[34] These arms usually consist of a projectile shot through a missile to destroy satellites in Low Earth Orbit (LEO). Kinetic ASAT strikes often generate millions of microscopic debris fragments, posing a severe threat to orbiting satellites. This Millimeter-scale debris, accounting for over 100 million fragments, is particularly hazardous, as it can cause mission-ending damage to space assets.[35] Consequently, states and organisations are increasingly focused on mitigating this risk by preventing the creation of additional debris.

- There exists limited publicly available data regarding the use of ASAT weapons to destroy an adversary's ISR satellites during a conflict, specifically. However, several demonstrations and tests have shown they can disrupt ISR capabilities. For instance, during the Cold War, the Soviet Union's Istrebitel Sputnikov programme[36] demonstrated its ability to intercept and destroy enemy satellites, including ISR satellites necessary to monitor Soviet activities. Although not used in active combat, this programme demonstrated the potential of an ASAT system to neutralize reconnaissance satellites. Furthermore, India's 2019 ASAT test through Mission Shakti[37] has shown that it can neutralise satellites in the LEO, given its capability to counter adversary ISR satellites during high tensions. Hence, the acquisition of ASAT weapons by India can induce an arms race in space because of the offensive nature of these weapons.[38]

- **Cyber Weapons**

  - The non-kinetic aspects of SNNWs consist of cyber weapons that attack an adversary's digital infrastructure to disrupt, degrade, or turn off the adversary's NC2 systems and electronic networks. These cyber tools contribute to strategic goals without causing physical destruction or collateral damage. They can destroy an adversary's NC2 systems, disrupting their communications and coordination and thereby affecting their effectiveness. In high-stakes conflicts, this accuracy can be the difference, as eliminating key assets can turn the tide. For example, subjecting cyber tools to critical infrastructure, such as energy grids, financial systems, or military networks, can lead to widespread chaos and reduce an adversary's ability to respond effectively.[39]

  - The potential of cyber weapons to act as a force multiplier gives an edge to the attacking states, especially in preemptive situations. Ransomware or distributed denial-of-service (DDoS) attacks provide deterrence by slowing or negating an adversary's actions without requiring kinetic combat. Their hidden character allows them deniability, making it hard to attribute and respond internationally.[40] On the other hand, the deployment of cyber weapons brings massive complications. The vague lines between war activities and espionage create difficulties in applying international norms and regulations. Additionally, the complexity of attributing cyberattacks to the actors involved increases the likelihood of miscalculation and unintentional escalation. The interdependence of global systems exacerbates these risks, as unforeseen effects of cyberattacks may also impact other countries or civilian targets.[41]

- One of the best-known examples of how a cyber weapon has produced strategic results is the 2010 Stuxnet incident against Iran's nuclear programme.[42] Created by the US and Israel, the programme "Olympic Games" gave birth to Stuxnet, which affected Iran's uranium enrichment facility at Natanz.[43] The advanced worm exploited several zero-day vulnerabilities, penetrating Siemens PLC systems that regulate the centrifuges. Once the enemy penetrated it, the centrifuges went into a destructive spin while simultaneously sending standard operation signals to guard systems, thus concealing sabotage. The attack led to the destruction of almost 1000 centrifuges, giving a major setback to Iran's nuclear programme.[44] Hence, the Stuxnet incident confirmed that cyber weapons could interfere with critical infrastructure and attain objectives commonly attained through kinetic means. It introduced a new form of warfare, where non-kinetic methods of weakening the adversary's capabilities were emphasized. Simultaneously, it revealed critical infrastructure to be vulnerable to cyber threats, encouraging states to invest more in cyber protection measures. Stuxnet is the first-known case of a cyber weapon of unprecedented importance, sponsored by a state that reshaped the role of cyber tools in national security and altered global cybersecurity norms. This suggests that state-backed cyber operations could be employed to achieve political objectives, delay or disrupt the development of nuclear weapons, without necessitating direct military conflict.

- Furthermore, cyber weapons overlap with nuclear strategies, especially in terms of positive and negative control over nuclear weapon forces. Positive control ensures that if adversaries try to interfere with nuclear weapons, they will work as intended. Negative control, however, safeguards against accidental, unauthorised, or inadvertent use of nuclear weapons.

- To sustain credible nuclear deterrence, both types of controls are necessary.[45] This is because the lack of positive control undermines the credibility of a nuclear response, making states vulnerable to disarming first strikes. On the other hand, weak negative control increases the chances of accidental use of nuclear weapons as a result of miscalculations. In this context, the offensive cyber capabilities create vulnerabilities that challenge both positive and negative controls.

- **Directed Energy Weapons (DEWs)**
  - Directed Energy Weapons (DEWs) are a key component of SSNWs.[46] They utilize advanced technologies to deliver high-energy weapons, such as lasers, electromagnetic pulse (EMP) systems, or particle beams, against targets. These weapons are unlike traditional weapons because they can neutralise an adversary's systems without releasing physical projectiles. DEWs have effectively emerged as an essential tool in modern warfare due to their increased engagement rate, accuracy, and capability of reducing collateral damage.
  - Additionally, these weapons can also target systems such as drones, missiles, vehicles, and electronic infrastructure. For example, laser weapons utilize concentrated beams of light to target their targets at the speed of light. These work well for missile defence applications as they intercept threats before they reach their targets. Microwave weapons interfere with the enemy's computer systems by releasing high pulses of electromagnetism, making the adversary's C2 systems or other technologies dysfunctional. Particle beam weapons, relatively experimental, can damage targets at the molecular level and are thus highly destructive.[47]
  - The strategic value of DEWs as SNNWs is due to their capability to destroy threats swiftly, cost-effectively, and with high precision. DEWs are more suitable in situations where a quick response is needed, such as defense against incoming missiles or drone swarms. In addition, the ability to degrade electronic systems is consistent with the objectives of SNNWs, which include degrading an adversary's operational capabilities while minimizing the risks of escalation at a large scale.[48] However, the implementation of DEWs also introduces new challenges. Their inclusion in military strategies involves threats about misuse, particularly in space, or against civilian objects. The dual use of DEWs, which means they can be employed for both defensive and offensive purposes, poses challenges to the arms control framework, as their development is often justified under the pretext of defense.
  - The real-world example of the use of DEWs and their strategic impact is China's deployment of DEWs in Djibouti in 2018.[49] According to the US pilots operating out of Camp Lemonnier, they were attacked with high-powered laser beams that emanated from a nearby Chinese military base.

These lasers rendered pilots blind and confused during flight operations, creating safety hazards in the air, and necessitated a change in the course of their operational protocols.[50] The incident demonstrated that DEWs could change the direction of military operations without causing physical damage to the equipment. It also showed how DEWs could disrupt key missions, including logistics and reconnaissance, making them a highly effective tool in modern asymmetric warfare.

- **Ballistic Missile Defence (BMD) Systems**

    - BMDs are another type of SNNWs since they can neutralise incoming missiles and reduce mutual vulnerability. These systems identify, monitor, and destroy ballistic missiles at the boost, midcourse, or terminal phase, protecting critical infrastructure and both military and civilian populations. BMDs provide a defensive shield through which they can alter the strategic calculations of potential adversaries, thus reducing the effectiveness of their offensive capabilities.[51]

    - BMD systems are comprised of major components meant to work in coordination. The latest sensors and radars, such as the US AN/TPY-2, provide high-resolution tracking and identification, as well as real-time monitoring of incoming threats.[52] Interceptor missiles defeat these threats kinetically or with explosive force, while command and control systems manage the workflow, resulting in an integrated and efficient response. Some examples of advanced BMD systems are the Terminal High Altitude Area Defence (THAAD) of the US and Ground-Based Interceptors (GBIs), which have been deployed to neutralise the threats posed by missiles in strategic locations.[53]

    - The strategic function of BMD systems is to undermine the enemy's confidence in their offensive capabilities, making them reevaluate their current operating strategies and develop more advanced missile systems—hypersonic missiles or multiple reentry vehicles (MIRVs)—to penetrate BMDs by evading interception. On the one hand, BMD systems enhance defence, but on the other, they raise the risks of arms race. Striking a balance is necessary so that BMD strengthens the deterrence without escalating the crisis.[54]

- **Emerging and New Technologies**

    - The integration of emerging technologies, including AI-led weapon systems and space-based weapons, not only expands the scope of SNNWs but also enhances their role in contemporary warfare. AI-based technologies are crucial for improving the functionality of SNNWs. AI enables autonomous decision-making, allowing systems to operate with less human intervention. This autonomy makes these systems increasingly efficient and responsive compared to human-controlled systems.[55] For instance, AI-driven algorithms can process vast amounts of data in real-time, delivering more accurate targeting capabilities to a system while reducing the risk of collateral damage. AI-led technologies are particularly suitable in high-stakes scenarios where decisions must be made quickly.

- Additionally, AI supports real-time adaptability, as it constantly monitors operational environments and modifies strategies in response to changing situations. AI has made cyberattacks more precise and sophisticated by improving penetration testing and automating malware delivery. At the same time, they are more likely to result in misattribution or miscalculation.

- Space-based weapons[56] further expand the SNNW scope by taking strategic competition into the extraterrestrial domain. These systems, placed in orbit, can attack terrestrial or orbital targets with high precision. Space-based weaponry is an example of the growing militarization of space, indicating its relevance in modern war dynamics. They emphasise securing the "high ground" as space dominance increases surveillance, communication, and targeting capabilities. However, using space-based weapons also introduces significant challenges, including the tendency to produce space debris and destabilise the global security infrastructure.

India Using SNNWs as Force Multipliers

India's integration of SNNWs reflects the shift in its military strategy in the third nuclear age, which focuses on building effective conventional capabilities and enhancing atomic deterrence. It also demonstrates India's policy objective of increasing operational flexibility, diversifying military capabilities, and achieving counterforce capabilities by developing advanced technologies, such as hypersonic missiles, cyber weapons, and missile defense systems.

India launched the Integrated Guided Missile Development Program (IGMDP) in 1983 and completed it in 2008.[57] IGMDP reflects India's desire to achieve precision-strike capabilities. This initiative laid the foundation for India's development of advanced missile systems capable of delivering precise and effective strikes. India's Land Warfare Doctrine also emphasises swift, accurate, and punitive responses, highlighting the strategic utility of precision-strike options in its conflict management framework.

Although India's 2003 nuclear doctrine[58] does not explicitly explain the incorporation of SNNWs, it does state that "*India will not be the first to initiate a nuclear strike but will respond with punitive retaliation should deterrence fail*."[59] This reflects a doctrinal space for the use of other SNNWs, including cyber capabilities, ASAT weapons, and conventional prompt strikes vis-à-vis Pakistan. India is also developing the Agni-P missile, which signals a shift towards integrated conventional precision-strike options and counterforce strategy.[60] This missile system combines conventional and nuclear capabilities, reflecting India's focus on further blurring the lines between conventional and nuclear systems and their use. This will enhance the chances of miscalculations and inadvertent use of nuclear weapons in crises.

Under its Hypersonic Technology Demonstrator Vehicle (HSTDV) programme, India has advanced its hypersonic capabilities, testing the HSTDV project in 2020 and a long-range hypersonic missile in 2024, achieving speeds above Mach 5.[61] In November 2024, India conducted another test of a long-range (>1500 km) hypersonic missile (reaching speeds above Mach 5), which enhanced its strategic strike capabilities with both rapid and precision targeting capabilities.[62] These weapons also provide offensive strike advantages.[63]

Besides hypersonic weapons, India has advanced its ability to strike targets with precision through systems such as the BrahMos cruise missile, which utilizes advanced guidance technology to achieve high-precision strikes with a Circular Error Probable (CEP) of less than one meter. Brahmos relies on better guidance systems during the midcourse and terminal phases, resulting in high accuracy. A turbojet engine, an efficient propulsion system, powers it. Due to their higher range, payload capacity, and enhanced speed, these missiles can evade interception and penetrate deep into enemy territory. These are the latest developments in India's efforts to modernize its military capabilities, with a focus on precision and offensive flexibility.

Furthermore, India has been heavily investing in its ISR capabilities to strengthen existing targeting systems and integrate advanced targeting capabilities within its strategic framework. This integration is exemplified by the "Astra" air-to-air missile and the "Brahmos" supersonic cruise missile. Both systems feature advanced targeting capabilities. Moreover, Brahmos is integrated with India's ISR capabilities through the RISAT (radar imaging satellite) series and other ISR platforms. By doing so, Brahmos can function as part of a "robust kill chain" and facilitate intelligence gathering through ISR capabilities, processing data through sophisticated C2 systems, and executing precision strikes on selected targets.

Besides BrahMos, India has developed the Smart Anti-Airfield Weapon (SAAW), equipped with precision-guided munitions and high-penetration warheads, to strike at hardened targets using conventional precision strikes. Such developments reflect India's objective of employing advanced technologies to enhance precision and speed and achieve counterforce capabilities. The advances mentioned demonstrate that India is developing advanced technologies to support its strategic offensive capabilities, enabling it to deliver specific and compelling strikes without causing collateral damage.

India's expanding missile inventory and pursuit of a BMD system reflect its evolving strategic posture. Its acquisition of the Russian S-400 Triumf air defense system[64] marks a critical step in its BMD capabilities, enabling it to intercept various aerial threats, including ballistic and cruise missiles, at multiple altitudes and ranges.[65] While India's indigenous BMD programme remains in its developmental stages, its further deployment could enable the interception of Pakistan's ballistic missiles in their terminal phases, as well as cruise missiles.[66] However, deploying such a system might create a false sense of invulnerability within India, potentially increasing the likelihood of considering a disarming first strike against Pakistan.[67]

In 2019, as mentioned above, India also tested its ASAT capabilities by successfully destroying a satellite in the LEO using a ballistic missile defence interceptor.[68] This capability enables India to potentially neutralize Pakistan's satellite capabilities, which play a critical role in navigation, communication, and intelligence-gathering functions. Through such ASAT capabilities, India could impair Pakistan's strategic and military capabilities within a nuclear threshold. A muted response from the US to India's ASAT advancements gives India the confidence to further enhance its ASAT capabilities. India can also use these ASAT capabilities[69] for preemptive measures and compellence tools vis-à-vis Pakistan without crossing into overt escalation. Hypothetically, ASAT weapons can effectively degrade a rival's ISR abilities, paralysing its reconnaissance and communication systems.

India is working on DEWs as a key part of its efforts to strengthen its defence and handle new security challenges. The Defence Research and Development Organisation (DRDO) is leading these efforts, with a primary focus on high-energy lasers and microwave systems. Significant projects include the Kali (Kilo Ampere Linear Injector) and various laser systems used against drones, missiles, and electronic devices. India's DEW initiatives aim to accurately address threats, minimize collateral damage, and carry out operations cost-effectively. The progress in these technologies complements India's plan to become self-sufficient in defence under the 'Make in India' programme. While these efforts are being developed, they demonstrate India's goal to strengthen its position in global defense and adapt to the new ways of warfare, in which DEWs are likely to play a significant role in both conventional and asymmetric conflicts.[70]

Additionally, India is strengthening its cyberattack capabilities as part of its overall effort to defend its interests in the digital realm, pursue cyber offensives, and ensure national security. [71]The National Technical Research Organisation (NTRO) and Defence Cyber Agency (DCA) are leading the development of new cyber tools for espionage, attacking networks to cause disruption, and conducting targeted attacks. India is enhancing its cyberattack capabilities by developing advanced malware, penetration techniques, and tools to disrupt and turn off adversary networks and sensitive infrastructure. It demonstrates that India wants to secure its cyber assets and establish cyber deterrence. While strengthening its cyberattack skills helps India, it could also increase the chances of cyber conflicts in the region and start a race for cybersecurity with neighbouring countries.

The events of the April–May 2025 88-hour near-war between India and Pakistan demonstrate how SNNWs are being used in the contemporary Third Nuclear Age. In May 2025, India launched a multi-domain precision strike military operation, “Operation Sindoor”, against Pakistan.[72] Under the operation, India extensively employed SNNWs to achieve counterforce targeting by conducting operations involving precision strikes on Pakistan’s key military assets. It significantly shaped the course of the conflict and altered the character of warfare. The operation highlighted the use of SNNWs, including SCALP air-launched cruise missiles from Rafale jets, supersonic BrahMos cruise missiles, and Israeli-origin Harop drones.[73] Although Pakistan responded to India’s provocative actions in a befitting manner, the employment of SNNWs indicates India’s conventional doctrinal evolution, which aims at conducting decapitation strikes on military assets without crossing the nuclear threshold. India relied on the accuracy and stand-off range of its SNNWs to hit sensitive military sites that are critical for Pakistan. This was the first instance where India launched swarms of its indigenous as well as imported drones against Pakistan, to achieve both kinetic (attack missions) and non-kinetic (surveillance) objectives without risking its manned assets. Furthermore, India attempted to conduct massive cyberattacks against Pakistan’s military communications and logistics to impair Pakistan’s situational awareness and affect battlefield response.

In response to India's Operation Sindoor, Pakistan launched Operation Bunyanum Marsoos to counter via its Quid-Pro-Quo-Plus (QPQ+) conventional strategy.[74] During this operation, Pakistan carried out responsive counterforce attacks through the use of Fateh-1 guided artillery rockets for precision strikes, swarming or loitering drones as tactical non-nuclear weapons, electronic warfare, and cyberattacks.[75] Although cyber and conventional attacks by India provided limited damage to Pakistan because of its exceptional defensive cyber/electronic warfare safety and security capabilities and exceptional air defences, such actions reflect India’s desire to achieve a strategic effect without using nuclear weapons during a crisis. The employment of SNNWs also indicates New Delhi’s aim of attaining escalation dominance while avoiding a nuclear response from Islamabad.

Additionally, the deployment of dual-capable missiles like Shaurya and Brahmos to launch conventional precision strikes could have led to a miscalculated response by Pakistan, had it responded hastily. Pakistan’s calculated response successfully averted the possibility of miscalculations during this crisis; further escalation cannot be ruled out in future crises, considering the compressed response times. Apart from miscalculations, the use of dual-capable missiles adds psychological pressure on the adversary due to the blurred lines between conventional and nuclear strikes, thereby it could lead to preemptive nuclear strikes to avoid decapitation in future crises.[76]

New Delhi is constantly upgrading its SNNW capabilities, not just tactical tools designed to redefine the deterrence balance. It was evident from the 2025 India-Pakistan near-war that New Delhi is working towards limited war tactics, utilizing its technological edge, which could impact the stability of deterrence between the two countries. This India-Pakistan near-war also immediately climbed the middle rungs of Kahn's escalation ladder. For instance, the starting Kahn's 'Sub-crisis maneuvering' quickly climbed just below 'Large Conventional War without the use of Weapons of Mass Destruction (WMDs)' in a matter of a few days.[77] It suggests that Kahn's traditional escalation ladder needs to be updated to accommodate new challenges, as discussed in this research, especially in South Asia.

Besides changing the nature of conflict in South Asia, India's reliance on SNNWs increases the risk of miscalculations, accidental escalation, and a new arms race in the domain of SNNWs. Even so, using SNNWs during the crisis demonstrated that India intended to cause limited damage, create space for limited wars without crossing the nuclear threshold, and attempt to redefine the norms of strategic engagement in South Asia.

Implications for Pakistan

India's acquisition of SNNWs, including its precision strike capabilities, missile systems, ASAT weapons, BMDs, ISR capabilities, and cyber weapons, has grave implications for Pakistan. The introduction of these advanced weapons and technologies continues to obscure the lines between conventional and nuclear capabilities, creating an environment where the deployment of these weapons under the nuclear umbrella is a conceivable political and military option. This phenomenon is especially alarming in the South Asian context, which is traditionally considered a nuclear flashpoint where even a limited conflict holds the potential to escalate into full-scale war.

Secondly, deploying SNNWs alters Kahn's escalation ladder[78] by increasing the likelihood of a conflict escalating directly to the strategic level, bypassing or skipping the operational and tactical levels in the initial stages. This significantly heightens the probability of nuclear weapon use. Thirdly, many SNNWs are forward-deployed, leading to the delegation of their use to local commanders. This decentralisation of command increases the risk of 'tactical escalation,' where a battlefield commander could independently decide to deploy SNNWs, thereby escalating a conflict. The 2023 BrahMos missile crisis exemplifies this risk, as the launch of a BrahMos missile into Pakistani territory by a commander could have escalated into a larger conflict if not for Pakistan's restrained response.[79]

Fourthly, India's use of SNNWs for escalation dominance will compel Pakistan to adopt countermeasures. Suppose an Indian SNNW attack has strategic effects through targeting a critical infrastructure. In that case, Pakistan may either respond through a QPQ+ conventional policy or even go for nuclear use if its nuclear threshold is crossed at all levels of conflict within FSD.[80] Such capabilities, when used offensively and preemptively by India, act as destabilizers for the already fragile deterrence stability between India and Pakistan. Fifth, integrating SNNWs into India's strategic arsenal can exacerbate the instability of the arms race. Thereby, Pakistan may be compelled to develop similar capabilities. Arms race instability will also fuel crisis instability, where such rapid escalation (as discussed above) can lead to a full-scale conflict.

Sixthly, the high operational pace of SNNWs, combined with their reliance on ISR capabilities, increases the likelihood of miscalculations, particularly during high-stakes situations. Such situations escalate the possibility of unwanted escalation. Seventh, the growing interconnectivity and digitalization of nuclear forces have created new avenues of vulnerability, especially in cyber operations, due to the incorporation of new technologies. Early warning systems and nuclear command, control, and communication (NC3) structures are increasingly adopting machine learning and automation, and are consequently becoming more vulnerable to cyberattacks.[81] Cyber-attacks against the NC3 systems between India and Pakistan present a major threat and may take such a turn that would resemble the Arkhipov incident during the Cuban Missile Crisis.[82] Such operations may exploit weaknesses in NC3 frameworks, disrupt communication channels, distort data, or generate false alarms, thereby contributing to miscalculations or unauthorized actions.

India's use of hypersonic weapons means that for Pakistan, profound challenges are presented in the already precarious regional deterrence dynamics. Hypersonic weapons, which move at high speeds and can evade current missile defense systems, can only be effectively operated with rapid, accurate strikes. The close geographic proximity to Pakistan of India and these weapons' extreme speed and maneuverability drastically shrinks Pakistan's already short time frame for decision-making and reaction in the event of a crisis. This will make it difficult for Pakistan to understand the threat, confirm its intent, and respond accordingly. The missile flight time from India to Pakistan is already a few minutes. Hypersonic weapons render this reaction time approach zero, thereby undermining the strategic stability of the region, as they increase the possibility of miscalculation and accidental escalation during periods of high tension. In such situations, there can be pressure to move quickly, which may result in a rapid or disproportionate response, and the possibility of conflict escalating increases. What is more, adding hypersonic capabilities to India's armory makes things even more difficult for Pakistan to adopt traditional deterrence strategies, as these weapons attacks can neutralise vital military assets or command structures ahead of an effective counter-response.

Way Forward for Pakistan

In the aftermath of India's SNNWs ' advancements, Pakistan needs to draw a multi-layered strategy to counter the attempted escalating dominance of India. The plan should be designed to sustain credible deterrence at all levels of conflict, including conventional, subconventional, and strategic levels of conflict. However, Pakistan needs to leverage its diplomatic, military, and technological tools to achieve this and focus on crisis management preparedness. In the military domain, Pakistan has made significant achievements by developing platforms such as the ZDK-03 Karakoram Eagle, an Airborne Early Warning Control System (AEWACS) Aircraft, and the Falcon DA-20 Electronic Warfare (EW) aircraft, which provide enhanced surveillance and marking capabilities requisite for improving situational awareness. They can also be used for electronic warfare. Apart from this, Pakistan has an indigenously designed Burraq Unmanned Combat Aerial Vehicle (UCAV).[83] This system is intended for real-time intelligence collection, enabling precision strikes and conventional operations with increased efficiency. Additionally, Pakistan's Ra'ad-II, ALCM, with a range of 600 km, can perform precision strikes. Likewise, the Babur cruise missiles are of two types: sea-based and land-attack, such as the Babur-3 and Babur-1 B, respectively. These accomplishments are commendable, yet more needs to be done by Pakistan to neutralise the impending risks emerging from India's integration of SNNWs.

To fill this gap, Pakistan needs to focus on increasing the qualitative development of its conventional capabilities. This entails making ISR systems more complex for improved threat detection and real-time awareness of the battlefield, developing electronic warfare capabilities to counter enemy systems, and continuing to invest in the next generation of missile technologies to maintain credibility in its deterrence. At the same time, efforts in diplomacy must be intensified to advocate for arms control measures on both regional and international levels. TCBMs with India, although not an easy proposition, are as important as ever to lessen the risks of unintended escalation. India, however, does not want to engage in a dialogue with Pakistan. Additionally, Pakistan should consider collaborating with regional partners to acquire or co-develop state-of-the-art technologies to close gaps in capabilities and maintain a credible deterrence posture. Pakistan can establish an Inter-Services Cyber Command in cyberspace to address future cyber threats, given India's growing cyber capabilities.[84] Such a command would enable coordinated and unified responses to potential cyberattacks while enhancing situational awareness and the overall resilience of Pakistan's cyber infrastructure.

Pakistan has actively engaged with international forums to emphasise the necessity of arms control. At the regional level, Pakistan has repeatedly proposed a Strategic Restraint Regime (SRR) to India, aiming to promote stability and mitigate the risks of conflict. Unfortunately, India has not reciprocated on these proposals. In the contemporary third nuclear age, India must recognize that the dangers posed by SNNWS can be mitigated through the establishment and implementation of transparency and confidence-building measures (TCBMs). Discussion on TCBMs is beyond the scope of this study; therefore, it does not propose any TCBMs.

Furthermore, in the absence of TCBMs, it is essential for Pakistan to clearly outline its red lines regarding India's use of SNNWs in future crises. This means Pakistan may update its FSD strategy to explicitly state that the high-precision conventional strikes on critical infrastructure and drone attacks targeting its strategic depth will be considered as an act of war. Since SNNWs introduce ambiguity as they can be deployed through dual-capable platforms, it is necessary to address this by issuing credible declaratory policies. For instance, Pakistan can signal that attacking strategic assets like C2 centers, nuclear infrastructure, military bases, etc., with SNNWs could result in a broader retaliation. The 2025 crisis short of war demonstrated India's interest in counterforce capabilities[85] within the SNNWs. Thus, Pakistan should focus on strengthening survivability measures for its second-strike forces. This involves utilizing multiple delivery methods (land, sea, and air), mobile missile units, and potentially investing in the development of hypersonic or evasive maneuvering systems. Furthermore, Pakistan must strengthen its redundant and hardened command and control (C2) systems to avoid being paralyzed by a first strike. On the diplomatic front, Pakistan has already been highlighting India's irresponsible behaviour, but it also needs to expose how India's use of SNNWs is eroding strategic stability in South Asia. With that background, Pakistan can persuade the international community to convince New Delhi to establish new norms involving long-range conventional weapons, precision strike capabilities, and the use of drones in cross-border operations. Besides these norms, Islamabad can propose a regional SNNW Code of Conduct to New Delhi for the responsible use of SNNWs.

Conclusion

The beginning of the third nuclear age brought about new challenges to the regional and global security architecture, as the proliferation of SNNWs defines this era. These weapons are non-nuclear, yet they can cause a strategic impact without causing physical destruction on a massive scale. Due to this, states are actively pursuing the development of SNNWs. In South Asia, India's rapid growth of these weapons risks destabilising strategic stability as they can gravely threaten Pakistan's security. While some types of SNNWs have been operationalised, a few are still in the development phase. Once fully operationalised, they may provide India with a greater edge and shift the regional BoP. To sustain a credible deterrence posture amid India's technological advancements, Pakistan must develop a multi-layered strategy to counter India's escalating dominance. This strategy should utilize all available state tools, including political, military, and diplomatic measures, while also establishing unilateral risk reduction strategies to enhance its defensive capabilities. By doing so, Pakistan can adapt to the changing regional environment and reduce the risks posed by the Third Nuclear Age.

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