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THE YEAR OF INDIA'S MISSILE TESTING

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In 2025, India tested its missile capabilities, which included both conventional and nuclear options. These missile tests were marked by success, highlighting India's significant progress on its path toward achieving both conventional military strength and nuclear preparedness. For a nation developing nuclear weapons primarily as a means of deterrence, this belief system must be supported by credible conventional weapons capabilities. This combination reinforces the strategic principle that nuclear weapons should serve to deter conflict rather than be employed in warfare. To effectively maintain this deterrent posture, these weapons must always be kept in a state of operational readiness. Achieving and sustaining the operational readiness of any weapon system necessitates regular and rigorous testing protocols, ensuring that they are reliable and effective when required. Such a comprehensive approach not only bolsters national security but also contributes to regional stability by signalling a commitment to responsible defence policies.

While China and Pakistan continue to be significant factors influencing India's missile development and the qualitative enhancements of its existing missile systems, the landscape of India's security environment has become increasingly complex this year. The United States military presence in Bangladesh has added another layer of strategic concern, as has Saudi Arabia's recent signing of the Strategic Mutual Defence Agreement (SDMA) with Pakistan. These developments underscore the challenges that India faces in both security and foreign policy arenas, making them more intricate than ever before.

In addition to these evolving dynamics, India's relations with Turkey have also soured, leading to heightened tensions. New Delhi has actively shown its support for Greece in its ongoing territorial dispute with Turkey over the Aegean Sea islands, further complicating the regional diplomatic climate. These multifaceted issues demand careful navigation in India's foreign policy, requiring a balance between strengthening defence capabilities and fostering diplomatic relationships to maintain stability in the region. It becomes interesting to understand India's missile testing this year, which has happened amid foreign policy challenges as well as a major war-like crisis: Operation Sindoor, which had witnessed the credibility of India's missile systems.

In December 2025, India announced a Notice to Airmen (NOTAM) outlining an extensive no-fly and no-ship exclusion zone that extended up to 3,550 kilometres. This ambitious plan aimed to enhance national security in the region but was subsequently annulled due to pressing concerns over the presence of Chinese "research" vessels operating in these waters. The cancellation of this NOTAM represented one of the largest safety corridors ever declared in relation to a missile test conducted by India, reflecting the complexities of regional security dynamics. Additionally, India made significant advancements in its defence capabilities this year by successfully testing its hypersonic technologies. In particular, the Hypersonic Cruise

Missile (HCM), designated as the Long-Range Hypersonic Cruise Missile (LR-HCM), showcased the country's commitment to pushing the boundaries of missile technology and maintaining a strategic edge in the defence landscape. These developments highlight India's proactive approach in safeguarding its interests while navigating the challenges posed by emerging geopolitical realities.

Amid these developments, it becomes imperative to understand India's missile tests and their broader implications. The security imperatives of the region heavily influence technological advancements in missile systems, compelling the Indian subcontinent to regularly conduct missile tests. This is not merely an act of demonstration; it serves a vital purpose in validating India's technological progress. By carrying out these tests, India aims to ensure that it possesses assured operationally ready capabilities, which are crucial for maintaining a credible deterrent posture. These capabilities enable India to inflict significant counter-force damage when necessary, safeguarding its national security interests in a region characterised by complex geopolitical dynamics. Additionally, such actions contribute to strategic stability, signalling India's commitment to maintaining sovereignty while navigating an environment marked by tensions and potential conflicts. Understanding this context is essential for grasping the significance of India's missile tests within the framework of regional security and defence.

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EVOLVING STRATEGIC CALCULUS BEHIND MISSILE TESTING IN 2025

India conducted missile testing, which included tests in February, May, June, July, August, September, and November in the year 2025. These missile tests have been conducted to check the operational readiness of India's conventional capabilities as well as to strengthen deterrence. These tests were also necessary as India is in the process of developing its Integrated Rocket Force (IRF), a strategic initiative that aims to enhance the country's missile capabilities. This development is crucial as it will allow missile forces equipped with conventional capabilities to significantly bolster India's ability to execute conventional counter-strikes effectively. It is important to understand the definition of conventional counter-strike within the specific context of India, as it may encompass a range of military operations. By 2025, it became apparent that this definition diverged from the established policies surrounding nuclear counter-strikes, highlighting a strategic pivot in India's defence posture.

India’s approach to conventional counter-strike is now evolving to include options that extend into the realm of asymmetric warfare tactics. This shift indicates a broader strategy that not only encompasses direct military confrontations but also addresses irregular threats posed by non-state actors and terrorist groups. The incorporation of missile forces into counter-terrorism operations signifies a proactive stance, aiming to deter and respond to threats with precision and efficiency. By enhancing its capabilities in this manner, India positions itself to respond to a variety of threats while maintaining a robust defence framework that aligns with contemporary security challenges. This is a stark difference from its counter-terrorism operations in the past, which restricted its operations within its borders and with small arms capability, and even if it extended to cross-border operations as seen during Surgical Strike (2016), there was no use of heavy weaponry even then. In 2019, following the Pulwama attack, India conducted airstrikes in Balakot to destroy terrorist hideouts. Nevertheless, the limitation of Balakot airstrikes of not engaging in stand-off capabilities made India seek missile systems, for even air power for stand-off capabilities to keep both aircraft and pilots safe.

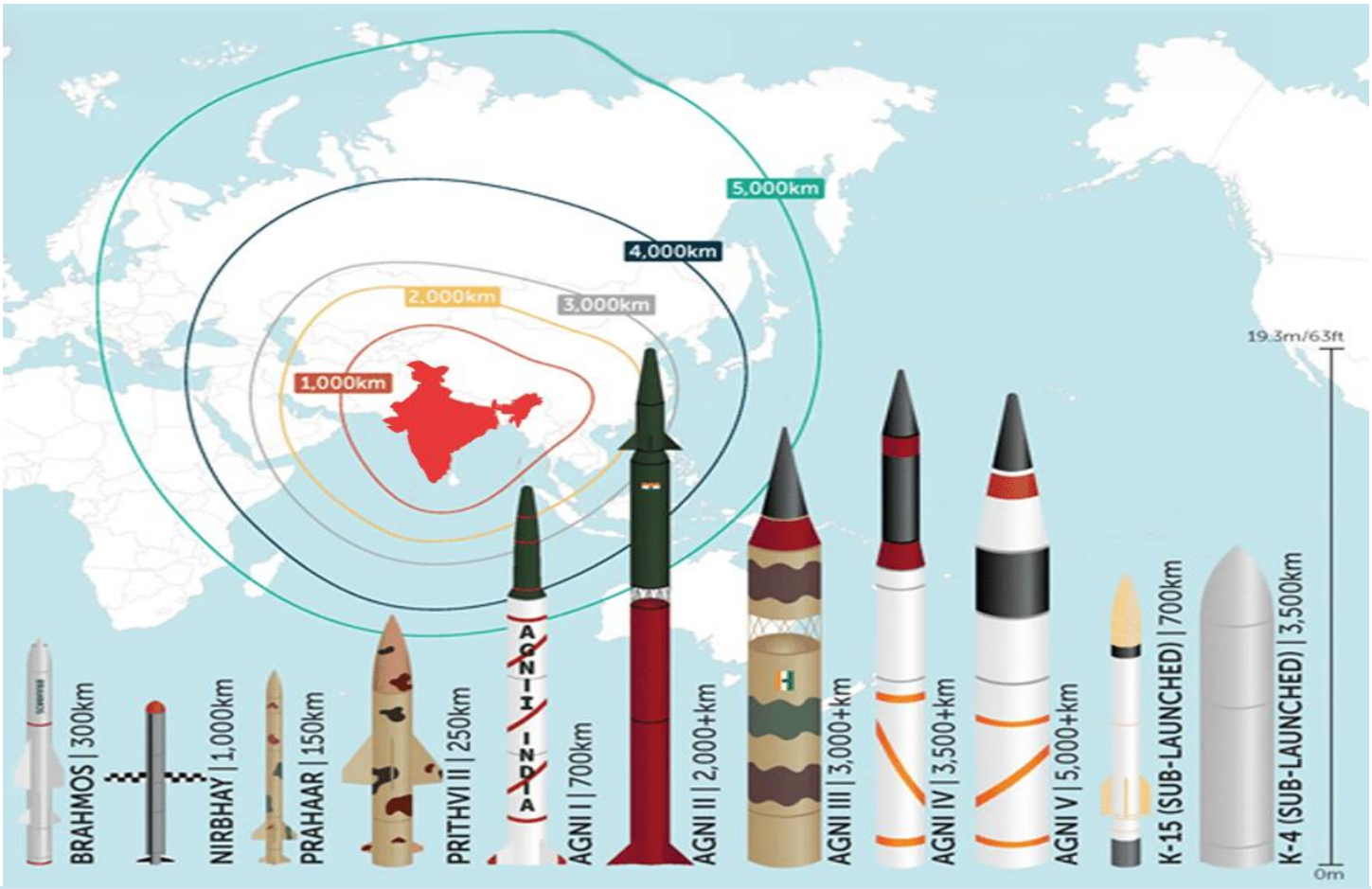
In addition, Pakistan's engagement in cross-border terrorism functions as a strategic foreign policy tool known as 'proxy wars,' which is conducted under the protective shadow of its nuclear arsenal. These proxy wars predominantly take place within Indian territory, prompting a robust response from India's counter-terrorism forces. Among these forces, the Rashtriya Rifles (RR) play a crucial role, alongside elite units such as the National Security Guard (NSG) and the Para Special Forces. Additionally, various infantry units are actively deployed along the Line of Control (LoC) to engage in counter-terrorism operations.

In these operations, there is a conscious decision to avoid the use of heavy weaponry, which helps to mitigate civilian casualties and maintain a level of operational control. This restraint ensures that counter-terrorism efforts

remain focused on specific targets rather than broad-based military engagements. Consequently, such operations are confined to a tactical scope within the borders, resulting in careful planning and execution to achieve their objectives while minimising wider conflict. This approach reflects a complex interplay of military strategy and geopolitical considerations in the ongoing security dynamics between India and Pakistan.

However, despite India's minimal intention and willingness to launch any military attacks against its adversaries, the reality of proxy wars currently compelling the nation necessitates that New Delhi identify terrorist launch pads as legitimate ***counter-force counter-terrorism targets***. This categorisation urges the use of long-range attacks utilising advanced long-range systems, unlike *counter-terrorism targets,* where only terrorist outfits are targeted, which are mostly located near to border areas. The author defines *counter-force counter-terrorism targets* as those locations and entities that facilitate terrorism, emphasising their importance in the strategic landscape. These targets should be regarded now as critical *counter-force targets* due to their direct connection with Pakistan's military, as they often serve as proxies and, in most cases, employ personnel from the Pakistani army and Inter-Services Intelligence (ISI) itself.

It is important to note that these counter-force counter-terrorism targets, which could include locations in adversaries' legally recognised territories or those in disputed areas, differ significantly from traditional counter-terrorism targets that focus solely on individual terrorists. Engaging these counter-force targets could provoke responses from adversaries, activating their conventional military capabilities, which carries the potential risk of escalating tensions into a small-scale conventional conflict, reminiscent of situations observed during Operation Sindoor. Moreover, such actions could expose India's own *counter-force* and *counter-value* assets to retaliatory threats.



In light of these complex dynamics, India has made it a priority to develop and enhance its defensive and offensive capabilities. This includes a robust focus on air and missile defence systems, as well as the advancement of offensive missile capabilities designed to deter aggression and respond effectively to any emergent threats. By strengthening these aspects of its military strategy, India aims to create a more resilient defence posture while navigating the intricate landscape of regional security. However, despite India's minimal intention and willingness to launch any military attacks against adversaries, proxy wars in the present are mandating New Delhi to treaty terrorist launch pads as ***counter-force counter terrorism targets*** and launch long-range attacks with long-range systems. The author defines ***counter-force counter terrorism*** targets as those targets that facilitate terrorism and hinders regional and global peace.

Thus, these imperatives strongly compel India to conduct extensive tests of its stand-off capabilities, which include a range of missile systems designed

to operate effectively at different ranges. These systems not only possess the capability to deliver conventional warheads but also include missiles that can be equipped with nuclear warheads, ensuring a robust deterrent strategy. Furthermore, these stand-off capabilities are significantly enhanced by continuous technological advancements. These innovations enable the missile systems to effectively evade advanced enemy air and missile defence systems, thus creating a potential for lethal outcomes in any conflict scenario. This strategic approach not only fortifies India's defence posture but also emphasises the importance of maintaining a credible deterrent in an increasingly complex geopolitical environment.

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REASONS FOR TESTS

Deterrence, whether achieved through conventional means or enhanced by Weapons of Mass Destruction (WMD), is an essential qualitative aspect for any state. The effectiveness of this deterrence is dependent not only on the state's own advancements in technology but also on the defensive measures employed by its adversaries to counter these innovations. As a result, deterrence should not be viewed as a static phenomenon. A technology that once provided a robust deterrent against adversaries may lose its effectiveness over time, especially as those adversaries develop increasingly sophisticated weapon systems. Therefore, it is important for a state to continually strengthen its deterrence capabilities by actively engaging in the process of technological development and innovation.

In India, for example, missile systems undergo rigorous testing. Continuous testing is vital to ensure that all technological parameters of the missile systems can operate effectively at any time of the day or in the midst of crises. Such readiness is crucial for maintaining a reliable deterrent posture, allowing the state to respond promptly and effectively to any threats that may arise. The commitment to constant advancement and preparedness not only enhances national security but also serves as a reassurance to allies and a warning to potential adversaries. By investing in research and development, states can better navigate the complex landscape of modern warfare and deterrence strategies. India's missile systems undergo tests diurnally. This is to ensure that all technological parameters of the missile systems can function at any time of the day in times of crisis.

The failure of any technological parameter during the test leads to the technological amendments needed to ensure that the missile system is capable of operational roles at any given time of the day. Instrumentation engineering proves vital during evaluation and testing to record the parameters. Technologies like strain gauges and advanced telemetry prove vital during missile tests. Today, such frequent testing of missile systems is even more crucial owing to the fact that no weapon system functions independently, but they function under a networked centric environment with external technologies like guidance and jamming systems equipped with them and need integration during times of operations.

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Again, weather changes could affect missile performance. This year, India has been grappling with the La Niña effect, and there is little doubt that such climatic changes could affect missile performance. Thus, amid unnatural weather changes, missile systems would need to be tested to ensure their efficacy.

In August 2025 Agni-V test with multiple independently targetable re-entry vehicles (MIRVs) was conducted to check the technological parameters of the missile system, as its MIRV capabilities had undergone technological advancements. The Agni-V with MIRVs has replaced hydraulic actuators used for increasing the accuracy of missiles, and uses mechanical actuators[1] to avoid leakage and, on many occasions, compromise on accuracy. The accuracy of the MIRVs is also reliant on the Post Boost Vehicle (PBV) or "bus", which is deployed to manoeuvre in space to accurately be able to release each warhead.

The PBV faces technological challenges when it has to release both decoys and main warheads to designated targets, burdening accuracy. Thus, to check whether such technological parameters are functioning, a missile needs to undergo tests. In addition, multi-stage missile systems require frequent testing to check their parameters. The Agni-V missile now uses light composite materials like carbon composites and fibre-reinforced composite materials and carbon fibre-reinforced polymer by replacing the heavy maraging steel on its second and third stage to reduce the weight of the missile and increase its range.

The year also ended with New Delhi confirming the efficacy of its sea-based nuclear deterrence, which forms the backbone of its counter-strike and second strike capabilities, strengthening its no-first-use nuclear doctrine. A Submarine Launched Ballistic Missile (SLBM) known as the Kalam 4 (K-4) was tested in December 2025, demonstrating India's ability to fire targets

[1] "Integration of MIRV Technology," *The Prayas e Pathshala,* March 20, 2024, <Integration of MIRV Technology>

from sea-based platforms up to a range of 3500 km.[2] This missile was cold-launched using pressurised gas, and the missile was ejected from the submarine before engine ignition to ensure that the submarine is safe.[3]

Hot-launched missiles would result in damage to the submarine due to extreme heat. Canister-launched missiles improve he survivability of mobile missile systems.[4] For a submarine-launched missile system, the survivability factor is not only about its launch platform being protected against adversary attacks, but also the missile needs to be protected against the harsh underwater environment, for which canister-launched missiles are a solution. India's land-based mobile missile systems, including MIRV-capable Agni-V, are also capable of canister launch.

Post the Pahalgam terrorist attack in 2025, in May 2025, India conducted tests of its missile systems amid its strategic signalling of closing the Baglihar Dam and Salal Dam.[5] These dams always held strategic significance for India, and closing these dams became one of its counter-terrorism tactics. However, the closing of common assets that are of strategic significance for both countries needs a credible conventional deterrence that could support such bold acts, as such moves are bound to invite adversaries' offensive actions. India's missile systems highlighted its ability to provide a credible deterrence amid the closure of the two strategically significant dams.

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[2] "K-4 SLBM Test from INS Arighaat," *Sanskriti IAS,*< K-4 SLBM Test from INS Arighaat - Sanskriti IAS>

[3] "K-4 SLBM Test from INS Arighaat," *Sanskriti IAS,*< K-4 SLBM Test from INS Arighaat - Sanskriti IAS>

[4] Debalina Ghoshal, "Credible Threat," *Force,* 2019.

[5] "J-K: Parts of Chenab river dry up as India closes Baglihar, Salal dams amid cross-border tensions," *The Economic Times,* May 6, 2025, <J-K: Parts of Chenab river dry up as India closes Baglihar, Salal dams amid cross-border tensions - The Economic Times>

Missile testing is often viewed as triggering an arms race. However, nuclear-armed states with nuclear strategies that depend on qualitative improvements rather than quantitative increases rely on the credibility of weapon systems. Such credibility prevents the state from entering into a quantitative increase in nuclear weapons. Thus, the state can maintain a *'credible minimum deterrence'* rather than moving towards a *'minimum credible deterrence'* or towards a *'limited deterrence.'*

As of now, India still maintains a nuclear posture of *'credible minimum deterrence',* for which missile testing of its nuclear-capable missiles would ensure that New Delhi possesses enough nuclear weapons needed for deterrence and does not need to be involved in a horizontal arms race. The author defines '***horizontal arms race***' as an arms race in which states participate in a quantitative increase in their arms build-up.

Frequent missile testing enables India to become part of ***'vertical arms race'*** which is an arms race almost impossible for any state to avoid in present times owing to the fact that states want to showcase at the global platform their technological know-how prowess. The author defines vertical arms race as an arms race in which states develop technologically advanced capabilities and equip their missile systems with the same. For example, states have entered into a vertical arms race of hypersonic systems, which include both hypersonic cruise missiles as well as Hypersonic Glide Vehicles (HGV). India is also successfully following the vertical arms race by focusing on MIRVs, Manoeuvring Re-entry Vehicles (MaRVs) and hypersonic systems.

*Despite the **drone culture**, **missile systems** that are technologically **advanced** and have **strategic value** continue to form the backbone for not only **deterrence** but also **diplomacy***

For instance, India is reported to have cleared the initial developmental hurdles and joined the hypersonic club by successfully testing an Extended Trajectory Long Duration Hypersonic Cruise Missile (HCM) in July 2025. The missile has been developed under Project Vishnu.[6] Under Project Dhvani, which involves developing hypersonic glide vehicles, successful trials of the Hypersonic Technology Demonstrator Vehicle (HSTDV) enabled India to achieve success in scramjet technology.[7] Now, the Defence Research and Development Organisation (DRDO) would require Cabinet Committee on Security (CCS) approval for *"resource infusion and accelerated prototyping."*[8]

Missiles are also tested for signalling to adversaries and to the international community regarding a state's own policies. For instance, amid the international debate of including ballistic missiles in Iran's nuclear talks and United Nations Security Council (UNSC) Resolution 2231 that banned Iran

[6] "India testing a missile that flies at eight times the speed of sound, hits targets 1,500 km away," *The Economic Times,* July 17, 2025, <India testing a missile that flies at eight times the speed of sound, hits targets 1,500 km away - The Economic Times>
[7] "India's Dhvani Hypersonic Missile," *GK Today,* October 6, 2025, <India's Dhvani Hypersonic Missile – GKToday>
[8] "Project Vishnu, "India's Hypersonic Leap Hinges on CCS Nod as DRDO Tackles Fiery Frontiers," *Indian Defence Research Wing,* November 6, 2025, <Project Vishnu: India's Hypersonic Leap Hinges on CCS Nod as DRDO Tackles Fiery Frontiers - Indian Defence Research Wing>

from developing ballistic missiles, Iran test-fired a nuclear-capable long-range cruise missile called Soumar in 2015. [9] This test highlighted not only Iran's technological and deterrent prowess, but also signalled to the international community that debating Iran's ballistic missile capabilities is a futile concern, as such warheads could be delivered by cruise missiles too. Right after Russian President Vladimir Putin offered to voluntarily extend the New START Treaty post February 2026 for another year, Russia test-fired a new nuclear-capable cruise missile called Burevestnik with a range of 14000 km in October 2025.[10] The missile falls under the New START category of weapon systems, and clearly, the testing of the missile post this offer signalled Russia demonstrating its New START category weapon systems and offering an extension as a goodwill gesture and not because of structural weaknesses in its nuclear deterrent capabilities.

Such tests were mechanisms through which Tehran wanted the world to believe that they were ready for nuclear talks to address the concerns of global order, but were not ready to discuss subjects that concern their national security. India is also testing its missile systems as a signal to its adversaries that New Delhi will not bend against threats and would address its concerns in a way that would best serve its security needs. At the same time, its missile tests were also signalling to the international order that its non-alignment policy would continue irrespective of the pressures imposed upon it.

States also use missile testing to express angst and discontent, as seen in the Korean Peninsula. The Agni-Prime missile test that could hit targets 2000 km away in September 2025, not only demonstrated India's technological leap this year, but also was tested to express its angst against US tariff impositions. The United States has a military base in Diego Garcia (which is within India's Agni long-range series range), and there is also an increased

[9] "Iran Displays New Missile; Nuclear Warhead Questions Still Unanswered," *Iran Watch,* March 10, 2015, <Iran Displays New Missile; Nuclear Warhead Questions Still Unanswered | Iran Watch>
[10] Christian Edwards and Nina Subkhanberdina, "Putin hails developers of nuclear-powered Burevsetnik missile, in latest signal to the west," *CNN,* November 5, 2025, <Putin hails developers of nuclear-powered Burevestnik missile, in latest signal to the West | CNN>

US military presence in Bangladesh, especially in the region of Chittagong, which is strategically located close to the India-Myanmar border.[11]

Despite the drone culture, missile systems that are technologically advanced and have strategic value continue to form the backbone for not only deterrence but also diplomacy. It provides the state with leverage to strengthen its global presence on global platforms. In 2025, India took a bold step to de-dollarize in Brazil, Russia, India, China, and South Africa (BRICS) to reduce the dominance of US dollars, and BRICS countries could trade in Indian rupees to strengthen the domestic exchange rate.[12] Right after this, India test-fired its long-range Agni-V missiles with intercontinental range striking capabilities. India has probably learnt from the US-Iraq misadventure of 2003 that hard power is necessary to back any economic or other forms of non-traditional bold moves. The US attacked Iraq not just to mitigate the threat from weapons of mass destruction (WMD) but also to strengthen the position of the dollar because in 2000, the then Iraqi leader, Saddam Hussein, decided to dump dollars for Euros. From 2001 to 2003, until the US invasion, Iraq's oil exports under the United Nations oil-for-food programme were paid in euros, and according to reports, the Iraqi account held at BNP Paribas earned a higher rate of interest in euros than it earned in dollars.[13]

Today, India's missile development program is not just confined to providing deterrent capability to its forces, but also forms a part of its export products, further strengthening India's missile diplomacy. India's BrahMos missile systems have been delivered to the Philippines in 2024,[14] and many other Southeast Asian countries have expressed interest in the missile system. This move to deliver BrahMos missiles to Southeast Asia has

[11] Dipanjan Roy Chaudhury, "US moves in Bangladesh set off alarm in neighbours India, Myanmar," *The Economic Times,* September 16, 2025, <US moves in Bangladesh set off alarm in neighbours India, Myanmar - The Economic Times>
[12] Lisa Monica and Putri Sekararum, "India challenge dollar, invites BRICS countries to pay in rupees," *IDN Financials,* August 6, 2025, <India challenges dollar, invites BRICS countries to pay in rupees | IDNFinancials>
[13] Faisal Islam, "Iraq nets handsome profit by dumping dollar for euro," *The Guardian,* February 16, 2003, <Iraq nets handsome profit by dumping dollar for euro | Business | The Guardian>
[14] "India delivers first batch of BrahMos missiles to Philippines," *BrahMos Aerospace,* April 19, 2024, <India delivers first batch of BRAHMOS missiles to Philippines>

provided an impetus to India's missile industry. India also has a deal to provide BrahMos missiles to Armenia[15] as a strategic move to counter Azerbaijan, which has been supportive of Pakistan.

CONCLUSION

Missile tests play a crucial role in evaluating the parameters that establish a nation's deterrence capabilities. States will only declare a missile system ready for induction or deployment once these critical parameters are confidently met, aligning with their strategic objectives both during times of peace and conflict. In the context of India's military strategy, missiles form the fundamental basis of both its conventional and nuclear deterrence frameworks. With the evolution of operational strategies, as seen in

[15] "India-Armenia Mega $4B Arms Deal: BrahMos, Akash Missiles Set To Stun Pakistan," *Zee News,* November 10, 2025, <India-Armenia Mega $4B Arms Deal: BrahMos, Akash Missiles Set To Stun Pakistan | World News | Zee News>

initiatives like Operation Sindoor, missiles have transitioned from merely serving as deterrent tools to being actively utilised as combat weapons.

This shift reflects a broader transformation in India's approach to warfare, highlighting the need for continuous testing of missile capabilities. Such testing is essential not only for verifying operational effectiveness but also for ensuring that India's missile systems can fulfil a variety of intended roles. These roles include not only deterrence and technological advancement but also the projection of national prestige and the facilitation of diplomatic relationships. In this rapidly changing environment, maintaining a robust missile testing program will be vital for India to adapt to emerging challenges and maintain its strategic edge in the region. Thus, amid these changes in India’s war-fighting strategies, India would consistently need to test its missile capabilities to ensure they are capable of achieving the roles that the Indian subcontinent wants them to perform: deterrence, technological prowess and prestige, combat, and diplomacy.