CRISIS, HYPERSONICS, AND HYPER-OODA WARFARE

Escalation Without Guardrails: The Pakistan-India Crisis 2025 and the Strategic Pitfalls

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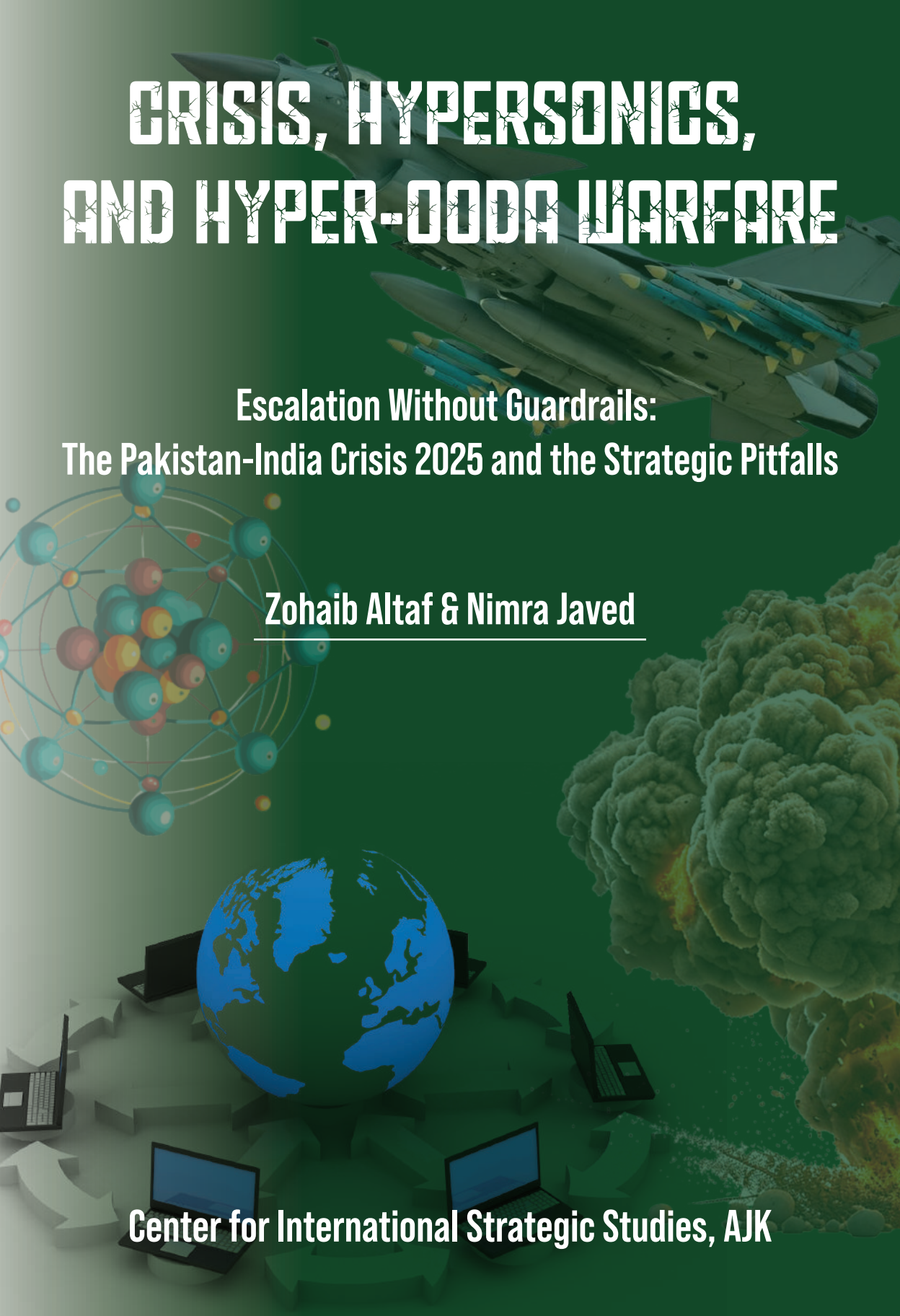

Center for International Strategic Studies, AJK

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Foreword

This report, Crisis, Hypersonics, and Hyper-OODA Warfare Escalation Without Guardrails: The Pakistan-India Crisis 2025 and the Strategic Pitfalls, examines one of the most consequential India–Pakistan crises in recent decades. The events that followed the 22 April 2025 attack in Pahalgam, Indian Illegally Occupied Jammu and Kashmir (IIOJK), demonstrate how rapidly political decisions, military signaling, and high-tempo operations can compress escalation timelines in a nuclearized environment.

The study documents the crisis trajectory from the immediate aftermath of the attack through the onset of Operation Sindoor on 7 May and the ceasefire announced on 10 May 2025. It analyzes the conduct of hostilities across air, missile, drone, electronic warfare, and cyber-related dimensions, while also assessing the wider strategic significance of the confrontation. A central focus is the post-crisis phase, where India's accelerated modernization drive, spanning hypersonic weapons, space-based ISR, AI-enabled command-and-control, drone swarms, and increasingly counter-force-oriented concepts, signals important shifts in the region's deterrence and crisis-stability environment.

This report is intended to support policymakers, strategic planners, diplomats, and researchers by providing an integrated account of crisis dynamics and their implications for future conflict management. It frames the April–May 2025 episode not as an isolated event, but as a case that reveals structural pressures shaping deterrence in South Asia, including doctrinal evolution, technological change, and the growing role of multi-domain operations. The recommendations offered are forward-looking and are designed to strengthen crisis resilience and deterrence stability by prioritizing survivability, redundancy, and credible response options, alongside improved mechanisms for communication and de-escalation. The report draws on publicly available information, official statements, and open-source reporting, supplemented by analytical assessment of operational and doctrinal trends. While it advances clear judgments regarding escalation risks and stability challenges, it does so with the objective of informing sober policy choices rather than amplifying political narratives. In a

region where misperception and speed can be as dangerous as firepower, the need for rigorous assessment and disciplined crisis-management thinking remains acute.

We hope this report contributes to more informed debate on deterrence, escalation control, and the institutional measures required to prevent future crises from crossing irreversible thresholds.

Dr Asma Shakir Khawaja

Acronyms and Abbreviations

AI	Artificial Intelligence
AJK	Azad Jammu and Kashmir
ARF	Army Rocket Force
ASWSWC	Anti-Submarine Warfare Shallow Watercraft
BVR	Beyond Visual Range
C2	Command and Control
CEP	Circular Error Probable
CJCSC	Chairman Joint Chiefs of Staff Committee
DCyA	Defence Cyber Agency
DGIS	Directorate General of Information Systems
DRDO	Defence Research and Development Organisation
ER	Extended Range
EW	Electronic Warfare
GHQ	General Headquarters
GPS	Global Positioning System
IAF	Indian Air Force
IIOJK	Indian Illegally Occupied Jammu and Kashmir
INS	Indian Naval Ship
ISR	Intelligence, Surveillance, Reconnaissance
ISPR	Inter Services Public Relations
IWT	Indus Waters Treaty
LLMs	Large Language Models
LoC	Line of Control
ML	Machine Learning
MIRV	Multiple Independently Targetable Reentry Vehicle
NASM-SR	Naval Anti-Ship Missile (Short Range)
NDMA	National Disaster Management Authority
NFU	No First Use
	Observe, Orient, Decide, Act
OSINT	Open-Source Intelligence
PAF	Pakistan Air Force
SAR	Synthetic Aperture Radar
SEAD	Suppression of Enemy Air Defenses
SLBM	Submarine-Launched Ballistic Missile
TEL	Transporter Erector Launcher
VLSRSAM	Vertically Launched Short-Range Surface-to-Air Missile

Executive Summary

- The April–May 2025 India–Pakistan crisis, triggered by the 22 April Pahalgam attack in Indian Illegally Occupied Jammu and Kashmir (IIOJK), escalated into one of the most dangerous confrontations in decades.
- India's unilateral actions and Operation Sindoor's missile and air strikes provoked a full-spectrum Pakistani response.
- The crisis saw the largest aerial dogfight since World War II, with over 125 aircraft engaged alongside drones, cruise missiles, and Electronic Warfare (EW).
- In its aftermath, India launched a rapid modernization drive across land, air, naval, space, and cyber domains.
- This push, combined with hardline rhetoric, signals a doctrinal shift toward escalation dominance and preemption.
- For Pakistan, India's expanding Intelligence, Surveillance, and Reconnaissance (ISR) network, hypersonic weapons, and AI-driven combat cloud compress decision-making and threaten deterrence stability.
- The study recommends strengthening Pakistan's deterrence, enhancing survivability, and expanding the Army Rocket Force (ARF) with satellites and integrated missile–drone packages to create a buffer zone inside India, while reinforcing crisis-management mechanisms and international engagement to prevent future confrontations.

Introduction

On 22 April 2025, the Pahalgam attack in IIOJK killed 26 civilians and triggered a cascade of political and military decisions that would ultimately lead India and Pakistan to the brink of full-scale war. India's suspension of the Indus Waters Treaty (IWT), severing of bilateral engagement, and intensified skirmishes along the Line of Control (LoC) signaled an uncompromising approach that culminated in the 7 May Operation Sindoor's missile and air strikes.

Pakistan's defensive and retaliatory response demonstrated the efficacy of its integrated, multi-domain operations, which successfully blunted Indian offensives and inflicted significant attrition on Indian strike packages. The aerial battles, involving over 125 aircraft, marked the largest dogfight since World War II and underscored how rapidly crises in South Asia can escalate into high-intensity conflict.

This report examines the crisis from its origins in the Pahalgam attack to the eventual ceasefire on 10 May 2025, analyzing both the conduct of hostilities and their strategic aftermath. It highlights India's accelerated post-crisis modernization, spanning hypersonic weapons, space-based ISR networks, drone swarms, AI-enabled Command and Control (C2), and counterforce-oriented doctrines. It assesses the implications of these trends for Pakistan's deterrence posture, regional crisis stability, and the future of escalation control in South Asia.

The report's final section offers forward-looking recommendations for Pakistan, emphasizing survivability, redundancy, precision-strike capabilities, and robust crisis-management mechanisms to counter India's evolving doctrines. It argues that without recalibrating its strategic posture, Pakistan risks facing increasingly compressed decision timelines and greater vulnerability to preemptive Indian action Pakistan risks facing increasingly compressed decision timelines and greater vulnerability to preemptive Indian action in future crisis.

Pahalgam Incident and the Escalation Before Indian Strikes (22 April–6 May 2025)

On 22 April 2025, the peaceful hill town of Pahalgam in IIOJK was struck by one of the deadliest attacks in the region over a decade.[1] Armed militants entered Baisaran Valley, a popular tourist

area, and opened fire indiscriminately on civilians, killing 26 people, most of them Hindu tourists, and injuring dozens more.[2] The brutality of the assault shocked the world. Pakistan, like many other countries, immediately codemned the attack.

Islamabad's Foreign Ministry issued a statement expressing condolences to the victims.[3] Pakistan also urged the need for a neutral, international investigation, insisting that hasty conclusions without evidence would only aggravate tensions in an already volatile region.[4]

The next day, 23 April, India began taking punitive steps even before its investigation into the incident was complete. New Delhi announced that it was placing the IWT in abeyance, a treaty that had survived even the 1965 and 1971 wars.[5] Alongside this, India halted the issuance of visas to Pakistanis, cut off trade links, and suspended other forms of bilateral engagement. These moves, taken so swiftly, were perceived by Islamabad as part of a political strategy rather than a considered response to the attack.[6] Pakistan condemned the measures and described them as irresponsible, emphasizing that such unilateral actions undermined regional stability.

On 24 April, Prime Minister Narendra Modi addressed the nation in a televised speech. He vowed that there would be "severe punishment" for those responsible for the Pahalgam killings and that "terror safe havens" would be "wiped out."[7] Although he did not name Pakistan directly, however, the implications were unmistakable.[8] The language used in the speech further raised concerns in Islamabad that India was preparing to escalate the situation. Later that day, skirmishes were reported along the LoC in multiple sectors.

As tensions mounted, Pakistan continued to call for an impartial international investigation into the Pahalgam attack. On 26 April, Islamabad's demand gained support from several countries, including Turkey, China, Malaysia, Switzerland, and Greece.[9] These governments echoed the view that accusations without evidence could worsen instability and pressed for restraint. India, however, categorically rejected the proposal for an international investigation.[10] New Delhi maintained that it had sufficient intellgence pointing to cross-border involvement, though it refrained from sharing specifics publicly.

On 27 April, *The New York Times* published a detailed report that further fueled concerns about the credibility of India's allegations.[11] Citing diplomatic sources,

the article stated that Indian officials were still in the process of investigating the attack and had only made vague references to "technical intelligence," such as facial recognition data, linking the attackers to Pakistan.[12] The report noted that no hard evidence had been shared with key foreign governments, even in private. One Western diplomat was quoted asking, "Do you want to go to war with a nuclear-armed neighbor based just on past patterns?"[13] The report underlined what Pakistan had been arguing that India's actions appeared to be driven more by political calculations and historical bias than by verified intelligence.

From 30 April onwards, there were increasing signs that India was preparing for military action. Pakistani intelligence began picking up credible information about unusual troop movements and the forward deployment of Indian artillery units along the LoC. Ceasefire violations during this period became more frequent and more intense, with several sectors witnessing exchanges of fire. Civilian populations living near the border were also affected, prompting Pakistan's disaster management authorities to issue evacuation advisories in some high-risk areas.

Pakistan's military leadership assessed that the situation was deteriorating rapidly. The General Headquarters (GHQ) in Rawalpindi placed forward-deployed units on high alert and strengthened defensive positions along the LoC.[14] The air force also began maintaining heightened readiness, with combat air patrols intensified in sensitive sectors. These steps were defensive in nature, aimed at deterring any Indian offensive moves. Diplomatically, Pakistan used every available channel to warn that any cross-border attack would have "serious consequences" and risked pushing the region into a wider conflict.[15]

Efforts by third countries to de-escalate the situation had little impact during this period. Messages relayed through Washington, Beijing, and Gulf capitals failed to calm tempers. Indian leaders continued making aggressive public statements, signaling that they were unwilling to step back.[16] The sense in Islamabad was that the decision for military action had already been made in New Delhi.

By the first week of May, Pakistan was bracing for the possibility of strikes. Border villages were partially evacuated, and military hospitals near the LoC were placed on standby. Pakistani officials briefed friendly capitals

about the likelihood of Indian escalation, emphasizing the danger of miscalculation between the two nuclear-armed states. The buildup of forces, coupled with Modi's rhetoric and the pace of Indian decision-making, left little doubt that a major confrontation was imminent.

Fig 1 demonstrates how quickly the situation escalated after the Pahalgam attack and shows the clear pattern of India's preparation for military action against Pakistan. Each step, from unilateral decisions like suspending the IWT to Modi's threats and intensified LoC skirmishes, indicates that

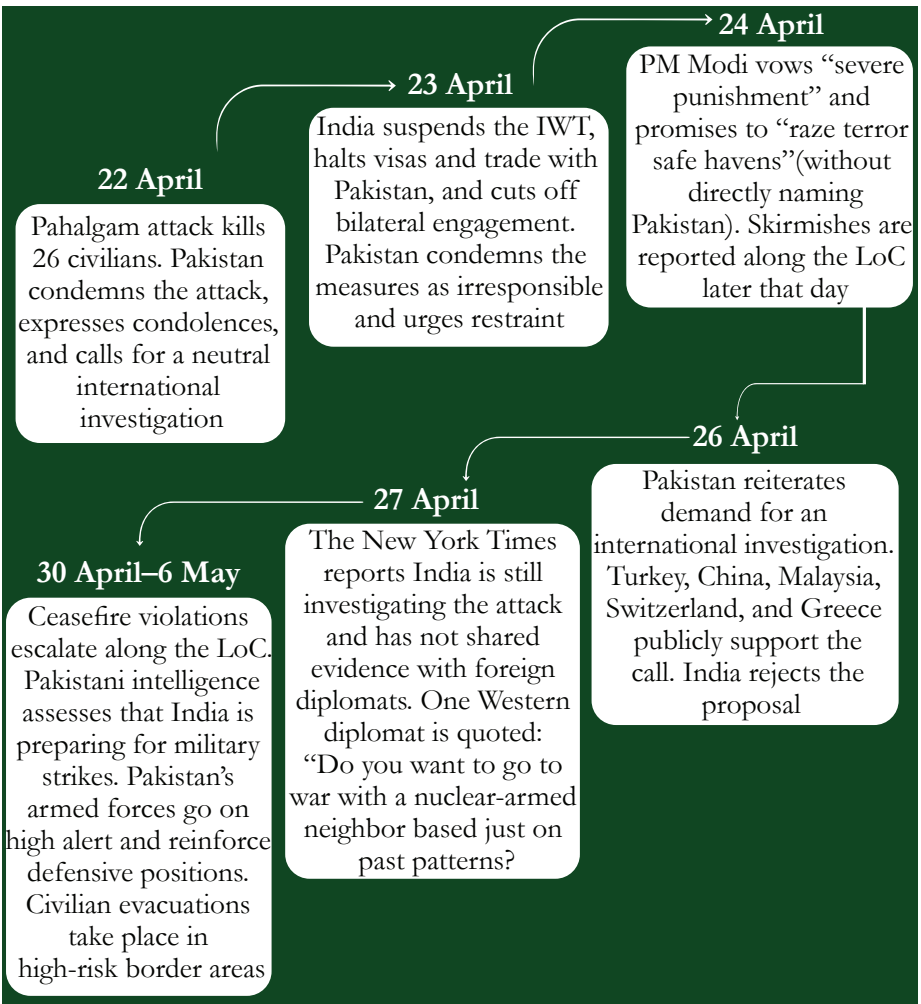

Fig 1, Timeline of Pahalgam Incident and Escalation before Indian Strikes.[17]

India was building the political and military groundwork for an eventual strike.

In the early hours of 7 May 2025, India launched a series of missile and air strikes inside Pakistan under what it termed "Operation Sindoor." Some 125 Indian and Pakistani fighter jets battled for over an hour in one of the biggest dogfights in recent history, according to a Pakistani security source quoted by CNN.[18] The strikes were presented by Indian officials as precision attacks on so-called militant hideouts; however, on the ground it became clear that the targets were largely civilian areas in Azad Jammu and Kashmir (AJK) and Pakistan.[19]

Residential neighborhoods, mosques, schools, and local businesses were destroyed in what Pakistan's Inter-Services Public Relations (ISPR) described as indiscriminate aggression.[20]

India employed advanced munitions, including SCALP (Storm Shadow) and HAMMER air-to-surface missiles fired from Rafale aircraft, as well as loitering munitions designed to saturate defenses.[21] By the end of the first wave of attacks, 40 civilians were confirmed dead, with dozens more injured in overall conflict with India.[22]

Pakistan's response was immediate and comprehensive. The Pakistan Air Force (PAF) scrambled J-10C and JF-17 Block III fighters, already on alert due to prior intelligence indications, to intercept Indian aircraft before they could re-enter Indian airspace. Supported by airborne early warning platforms such as the Erieye and ZDK-03, Pakistani fighters used real-time data fusion from radar and satellite networks to optimize their engagement profiles.[23] Armed with PL-series Beyond Visual Range (BVR) missiles, the PAF engaged Indian strike packages in Extended Range (ER) combat and successfully shot down six Indian aircraft, including Rafale and Su-30MKI fighters.[24]

This was not a simple air battle. Pakistan's integrated EW units were fully engaged, jamming Indian aircraft datalinks and communications to break strike coordination. Global Positioning System (GPS) spoofing was used against incoming loitering munitions, forcing several to crash harmlessly before reaching populated areas.[25] These electronic countermeasures degraded the accuracy of India's SCALP and HAMMER missiles, limiting the effectiveness of the strikes. The use of AI-enabled C2 systems gave Pakistani commanders the ability to prioritize threats and

direct air and ground forces with precision, a capability that allowed the country to absorb the initial attack without strategic dislocation.[26]

The confrontation escalated as India shifted its tactics after suffering unexpected losses. Indian forces began sending waves of drones deep into gaps in the country's air defense network.[27]

Many of these drones targeted civilian infrastructure and soft logistical nodes, while others attempted to scout Pakistani air bases. Pakistani air defenses, now fully mobilized, shot down most of the drones before they could cause major damage, but a handful penetrated to hit isolated civilian targets.[28]At the same time, India expanded its targeting to include Pakistan's military infrastructure.

BrahMos supersoniccruise missiles were launched against airbases, runways, aircraft shelters, and command centers in Punjab. While some runways were damaged and some facilities were hit, Pakistan's rapid runway repair units minimized operational disruptions, keeping the air force fully functional.[29]

Pakistan then moved decisively to neutralize India's offensive capability. Using a combination of Fatah I and Fatah II missile and air to surface supersonic missiles, precision stand-off weapons, and armed drones, Pakistani forces struck 26 military sites inside India.[30] The targets included forward operating bases, logistics depots, ammunition storage sites, and radar stations. One of the most significant blows was the destruction of an Indian S-400 air defense battery deployed to protect critical airspace along the western sector.[31]

Pakistan's planners employed a layered saturation tactic, using drones and decoy missiles to draw fire and expose the S-400 radar, before striking with precision-guided missiles to destroy the battery and its supporting systems. This strike removed a major barrier to Pakistani air operations and exposed vulnerabilities in India's much-publicized air defense umbrella.[32]

Throughout these exchanges, Pakistan maintained a focus on integrated, multi-domain operations. Air force fighters, EW Units, ground-based air defenses, cyber elements, and missile forces operated in a tightly coordinated manner. Data from radars, satellites, and electronic interceptors flowed into centralized command centers where AI-driven systems provided real-time threat analysis and optimized response plans. This level of interoperability ensured that

India's attacks could be absorbed, countered, and punished without unnecessary escalation.[33]

Pakistan's civil defense networks were equally active during the confrontation. High-risk border villages were evacuated, and the National Disaster Management Authority (NDMA) deployed emergency medical teams to affected areas in AJK and Punjab. Mobile field hospitals treated the wounded close to strike zones, while military and civilian hospitals nationwide were placed on red alert. These measures helped limit civilian casualties from India's initial missile and drone attacks.[34]

On **8 May,** Prime Minister Shehbaz Sharif addressed a joint session of Parliament to brief the nation on the situation. He condemned India's actions as an "unprovoked act of war", noting that the initial strikes deliberately targeted civilians and Pakistan's forces had responded decisively.[35] At the same time, the Ministry of Foreign Affairs briefed the diplomatic community in Islamabad, showing missile fragments and aircraft wreckage recovered from strike sites. The evidence included remnants of SCALP, HAMMER, and BrahMos missiles, as well as debris from the Indian aircraft shot down during the early air battles.[36]

Diplomatic efforts intensified over the next 48 hours as the United States, China, Gulf states, and European powers pushed both sides to de-escalate. The G7 foreign ministers issued a joint statement warning of catastrophic consequences if the crisis continued. Pakistan made it clear in its communications with international interlocutors that it would defend its sovereignty but had no interest in initiating uncontrolled escalation. These assurances, combined with India's recognition of the damage sustained, helped pave the way for a ceasefire announced on **10 May.**[37]

By the end of this confrontation, Pakistan had demonstrated its ability to defend itself and impose costs on India across multiple domains. The successful BVR engagements against Indian Rafales and Su-30MKIs, the destruction of the S-400 system, and the elimination of BrahMos missile launch sites sent a clear strategic message. Pakistan's civilian leadership and military command underscored that its deterrence remained credible and any attempt to exploit perceived vulnerabilities would be met with a coordinated, high-technology response.[38]

The crisis also exposed the human cost of escalation. Pakistan's emphasis on the deaths

Pakistan's ability to conduct integrated, multi-domain operations in defense and retaliation ensured that India's objectives remained unfulfilled and the balance of deterrence was preserved.

Crisis Management and the Role of External Actors

As the confrontation escalated between Pakistan and India, the international community's handling of crisis management became central to the eventual ceasefire. In the initial phase, the United States publicly distanced itself, describing the situation as "a matter for the two countries to resolve."[39] This cautious posture signaled to Islamabad that Washington was unwilling to engage directly at the outset—a sharp contrast to earlier India–Pakistan crises, where the US often intervened early to manage escaltion.

This approach shifted as the crisis deepened and the risk of a wider war became evident. According to Pakistani officials, the US ultimately played a critical role in achieving the ceasefire.[40] Senior American officials engaged both capitals through back-channel diplomacy, using established relationships to push for a halt to hostilities. Pakistan's military leadership, including the Chairman Joint Chiefs of Staff Committee (CJCSC), later acknowledged this role publicly, emphasizing that US intervention had created the necessary space for de-escalation.[41]

India, however, rejected the idea that US pressure shaped its decisions, insisting that its choice to stop operations was made independently. This denial became a political flashpoint in New Delhi. The opposition accused the government of "surrendering in front of the US" and highlighted public statements by the American President, who repeatedly claimed that it was US diplomacy that had led to the ceasefire.[42] These remarks undermined the Indian government's narrative and fueled domestic criticism of its crisis handling.

The India–Pakistan hotline also became the subject of political controversy. Indian leaders accused Pakistan of using the hotline specifically "to ask for the ceasefire," New Delhi exploited the mechanism to portray itself as a strong party. Pakistan rejected this characterization, arguing that the hotline had served its intended purpose: reducing miscalculation and limiting the scope of the fighting.

The CJCSC of Pakistan later highlighted that this conflict revealed serious gaps in crisis communication. They noted that there had been only one functional crisis management chanel—the hotline—between the two countries, and that no other direct mechanisms were available during the hostilities.[43] This lack of redundancy, they warned, heightened the risk that future crises could spiral out of control before international actors had time to intervene.

In their post-crisis assessment, Pakistan's military and civilian leadership also pointed out that this confrontation differed significantly from past episodes. Previous crises had often centered along the LoC, but this conflict's opening salvoes hit Pakistan's cities and urban centers, while the LoC remained relatively quiet by comparison.[44] This dynamic added new un-predictability, further complicating the management of escalation.

From Pakistan's perspective, the 2025 crisis highlights the need for more robust crisis management architecture. Early international involvement, rather than delayed engagement, is critical to avoid miscalculation, and existing channels such as the hotline should not be politicized. Strengthening these mechanisms, Pakistan argues, is essential for reducing the danger of future confrontations in a region where even limited clashes can rapidly escalate.

Future Conflict Scenarios and Associated Risks

On 28 July 2025, India's Defence Minister Rajnath Singh made a pointed statement reaffirming that "Operation Sindoor has not stopped".[45] He emphasized that the operation was far from concluded and suggested that future actions could follow at a time and place of India's choosing.[46] This was not an isolated statement but part of a series of threatening remarks by Indian leadership in the weeks following the ceasefire.

Prime Minister Narendra Modi and other senior officials repeatedly used language designed to signal that military action against Pakistan could resume at any moment. Modi, in a nationally televised address, declared that "Operation Sindoor has been suspended, not ended" and reinforced this message with the statement "Water and blood cannot flow together", an allusion to the suspension of the IWT and India's intent to leverage water access as political pressure.[47]

The Defence Minister himself

reinforced this tone on multiple occasions, famously describing the operation as "just a trailer" and warning that Pakistan would see "the full movie" if it did not change its behavior. Other leaders, including Home Minister Amit Shah and External Affairs Minister S. Jaishankar, similarly adopted a hard line, ruling out any dialogue except on terrorism and asserting that India's posture toward Pakistan was permanently altered.[48]

prototypes and imported MQ-9 Reaper drones, providing it with persistent ISR and precision strike capability.[49]

In the air domain, the Indian Air Force (IAF) had inducted 36 Rafale fighter jets, equipped with SCALP cruise missiles and HAMMER precision-guided munitions, and had also signed a major follow-up deal with France to procure 26 Rafale-M naval variants for carrier operations.

7-22 May 2025	**Narendra Modi**	**"Operation Sindoor has been suspended, not ended… Water and blood cannot flow together. Talks and terror cannot go together"**
22 May 2025	**Narendra Modi**	**"Pakistan will not get water from rivers over which India has rights." (linked to Indus Waters Treaty suspension)**
Mid-May 2025	**Rajnath Singh**	**"Operation Sindoor is not over yet; this was just a trailer. We will show the full movie when the time comes"**
Mid-May 2025	**Rajnath Singh**	**"Talks with Pakistan will only be on terrorism and PoK… Any attack on Indian soil will be treated as an act of war"**
Mid-May 2025	**Rajnath Singh**	**"Called Pakistan a 'factory of terrorism' and questioned its nuclear credibility"**

Fig 2, Key Threatening Statements Made by Indian Leaders after the May 2025 Crisis

India already possessed a broad set of advanced military capabilities before the May 2025 crisis. Its drone and unmanned systems arsenal included swarm drone

India was also working to integrate the BrahMos supersonic-cruise missile with its Su-30MKI fighters to enhance its standoff precision strike capability.[50]

In the missile domain, India's strategic arsenal included the Agni family of ballistic missiles, which had achieved a Circular Error Probable (CEP) of approximately 10 meters, placing them among the most precise ballistic systems in the world.[51]

This baseline was significantly expanded following the May 2025 crisis as India embarked on a rapid and multi-domain modernization drive with a clear emphasis on precision, speed, and autonomous capabilities.

In the land domain, India focused on improving its artillery, missile, and force integration systems. Indigenous development of Pralay quasi-ballistic missiles and Pinaka Mk-II guided rockets was accelerated, giving Indian forces the ability to conduct high-accuracy, short-notice strikes at ranges up to 500 kilometers.[52] Upgrades to the Agni missile family continued, improving accuracy beyond its already low CEP through enhanced inertial navigation and satellite-aided guidance.[53]

The Indian Army also rolled out Rudra integrated all-arms brigades and Bhairav light commando battalions, which brought infantry, armor, artillery, engineers, drones, and EW units into self-contained formations capable of rapid deployment on both the western and northern border.[54] These reforms were paired with large-scale procurement of new armored platforms and loitering munitions to improve India's offensive strike capabilities at the tactical and operational levels.[55]

In the air domain, India continued upgrading its Rafale fleet with enhanced data links and integrtion of newer SCALP and HAMMER precision weapons while finalizing the Rafale-M deal forcarrier-based operations. This was accompanied by ongoing production of the Tejas Mk-1A fighter aircraft and exploratory talks for a fifth-generation fighter acquisition, including potential F-35 and Su-57 procurement.[56]

The effort to integrate BrahMos cruise missiles with Su-30MKI fighter squadrons was pushed as a priority, creating a stronger standoff strike capability for the IAF. Precision airpower was further strengthened by the introduction of advanced air-to-air missiles like the Meteor and Astra Mk-II and improved stand-off weapons, including the Rudram-4 long-range stand-off missile currently in advanced trials.[57]

India also upgraded its S-400 air defense systems and introduced Akash Prime and Akash-NG systems with

improved improved multi-target engagment capabilities. These developments ensure India has the capability to launch accurate, deep-strike missions with minimal warning times, maintaining air dominance and strike precision.[58]

In the naval domain, the Navy inducted the Indian Naval Ship (INS) Arnala Anti-Submarine Warfare Shallow Watercraft (ASWSWC) and INS Tamal, the final stealth frigate of the Krivak-class, while laying keels for new guided-missile destroyers and next-frigates.[59]

A major submarine expansion drive was launched with the German-Indian joint program for six AIP-equipped conventional submarines, adding stealth and endurance to the fleet. The Navy also made significant advances in missile armament. BrahMos- ER cruise missiles were deployed aboard surface ships and coastal batteries, while development of the K-5 submarine-launched ballistic missile (SLBM), with a 5,000–6,000 kilometer range, was complete.[60] India's Defence Research and Development Organisation (DRDO) has developed K-6. It is designed to have a range of 6,000 to 8,000 kilometers. The K-6 is being developed for use with the planned S5-class submarines.[61]

This bolstered the Arihant-class SSBNs' sea-based nuclear deterrence capability. In parallel, work progressed on the K-6 SLBM, a Multiple Independently Targetable Reentry Vehicle (MIRV) equipped missile with an expected 8,000-kilometer range. Carrier aviation was reinforced by the Rafale-M deal, ensuring future Indian carrier groups could project power far beyond the sub-continent.[62] The Navy also tested the Naval Anti-Ship Missile (NASM-SR) and Vertically Launched Short-Range Surface-to-Air Missile (VLSRSAM), enhancing shipborne strike and air defense capabilities.[63]

India also accelerated the development of BrahMos-2, a hypersonic cruise missile with a projected range of 1,500 kilometers. This next-generation variant builds on the success of the BrahMos-ER and is designed to travel at hypersonic speeds, drastically reducing the adversary's reaction time and penetrating even the most advanced air defense systems.[64] BrahMos-2 is expected to have a variable trajectory and precision comparable to India's ballistic missiles, with a CEP under 10 meters. Integration plans for BrahMos-2 include Su-30MKI squadrons, ground launchers, and naval platforms, creating a tri-service hypersonic strike capability. This system represents a major

leap in India's ability to conduct precision strikes at ERs.[65]

In the space domain, India accelerated the deployment of the Defence Space Agency's military satellite network. A plan to field more than 50 dedicated military satellites by 2029 was announced, covering communications, reconnaissance, and early warning.[66] The indigenous NavIC satellite navigation system was upgraded for encrypted military use, improving missile accuracy and secure communications for joint operations. These space assets feed directly into India's new Akashteer combat cloud, which integrates terrestrial and orbital sensors for real-time targeting and tracking.[67]

This space-ground linkage gives Indian forces a significant edge in operational awareness. India's space capabilities are also expected to support cheap, mass-precision strike operations by providing highly accurate satellite guidance to large numbers of conventional and hypersonic weapons.[68]

As India deploys more Synthetic-Aperture Radar (SAR) and optical reconnaissance satellites, it will be able to achieve near-continuous surveillance of adversary territory, identifying targets and relaying coordinates to strike platforms in real-time. This enhances the effectiveness of India's missile arsenal, including BrahMos-2, Agni, Pralay, and Pinaka systems, enabling large-scale precision attacks without heavy reliance on expensive terminal seekers for each weapon.

India's drone ecosystem also saw dramatic growth. The Armed Forces expanded acquisition of imported MQ-9 Reaper drones while heavily investing in indigenous kamikaze and swarm drones.[69] Systems such as Nagastra-1 loitering munitions (AI-guided with 2-meter CEP), Kharga FPV kamikaze drones, and Rudrastra VTOL strike UAVs have been inducted or are in final trials.[70]

The Army and IAF have also deployed AI-enabled swarm drone technologies capable of overwhelming enemy air defenses and carrying out coordinated strikes.

Exercises like Divya Drishti in July 2025 demonstrated integrated drone swarms linked with real-time battlefield AI systems for reconnaissance, strike, and Suppression of Enemy Air Defenses (SEAD).[71] These swarm drones can work in conjunction with hypersonic weapons and precision-guided missiles to saturate adversary defenses.

EW and cyber capabilities were significantly reinforced. India's Defence Cyber Agency

(DCyA) has built advanced offensive and defensive tools, while Bharat NCX 2025 cyber exercises have trained units to manage state-level cyberattacks.[72] AI-integrated EW systems like Sambhav, Samyukta, and Himashakti were deployed at scale, capable of jamming communications, spoofing GPS, and degrading adversary radar networks.[73] These EW suites are linked with the Akashteer system, which functions as an AI-driven air defense and electromagnetic control grid.[74] India also expanded its cyber force, creating additional rapid-reaction teams capable of offensive cyber operations and infrastructure disruption during conflicts.[75]

After the crisis, India tested the ET-LDHCM hypersonic cruise missile in July 2025, capable of flying at Mach 8 over 1,500 kilometers with mid-course maneuvering.[76] Development also continued on Agni series missiles, with Agni-I and Prithvi-II tested back-to-back to validate readiness and accuracy.[77]

Work on Agni-V derivatives, including bunker-buster variants and hypersonic glide vehicles, was also advanced. Additional missile programs included enhancements to the BrahMos family, E variants, and development of the Pralay tactical ballistic missile.[78] These systems collectively improve India's ability to conduct precision conventional and nuclear strikes across multiple ranges and domains.

India's modernization effort demonstrates a determined move toward fully networked, AI-enabled, multi-domain forces capable of short-notice, precision-strike campaigns. Its focus spans every domain: land, air, naval, space, drones, EW, cyber operations, and hypersonic weapons, laying the foundation for rapid offensive operations and stronger deterrence postures in future conflicts.[79]

The integration of BrahMos-2 hypersonic missiles with precision satellite guidance and an expanding military space network will allow India to conduct mass precision strikes at a lower cost, reducing the reliance on expensive individual guidance packages and allowing simultaneous saturation attacks on multiple targets.[80] This strategy, supported by India's broader modernization in the air, naval, and land forces, makes its armed forces more capable of executing high-tempo operations across the subcontinent and beyond.[81] By utilizing its space assets for precision targeting and its indigenous defense industry for scalable production, India has set the stage for a military force

capable of delivering both conventional and strategic effects with unprecedented speed and accuracy.[82]

On 21 July 2025, the Indian Express reported that the Indian Army has drawn up an ambitious roadmap to integrate Artificial Intelligence (AI), Machine Learning (ML), and Big Data Analytics by 2026–27, a plan that has been accelerated after lessons from Operation Sindoor.[83]

The roadmap outlines a series of initiatives designed to expand the Army's operational and decision-making capacities. Here is the list of Initiatives planned:

1. Coordinated drone missions (or drone swarming) and real-time battlefield monitoring
2. Combat simulations for troop training, information warfare, and data-backed decision-making
3. AI tools that can process large volumes of information quickly
4. Text summarizers built on Large Language Models (LLMs) to scan and condense long reports
5. AI-powered chatbots
6. Voice-to-text systems
7. Facial recognition
8. Tools that can detect unusual patterns or threats
9. Analyze feeds from drones, satellites, aircraft and ground sensors, and fuse this data in real time to support faster, more informed decision-making
10. An AI task force under the Directorate General of Information Systems (DGIS), with representatives from other Army directorates
11. Decision support systems that can generate counter-intelligence, enhance surveillance, manage logistics and supply chains, analyses Open Source Intelligence (OSINT) and social media, map adversary capabilities, and run war gaming simulations
12. Better positioning and targeting of equipment, predictive maintenance, and AI-based navigation in environments where GPS access is denied
13. Embedding AI features in the General Staff Qualitative Requirements — the technical specifications for all new equipment being procured
14. Retrofitting select AI capabilities into legacy systems
15. An AI lab at DGIS to develop and test models, integrated with AI applications from the Navy and Air Force
16. Collaboration with industry and academia to advance research

Implications of India's Post-2025 Military Developments for Pakistan

India's post-2025 modernization drive has fundamentally shifted the strategic landscape in South Asia. This modernization effort is not incremental; it is part of a deliberate doctrinal transition towards multi-domain, precision-centric, and escalation-dominant warfare.[84]

The Indian Defence Attaché, Captain Shiv Kumar's statement in July 2025 that India would "no longer be restricted to limited attacks" and would "directly target Pakistan's military infrastructure" underscores this shift.[85] India is now preparing for deep, counterforce-oriented campaigns that aim to paralyze Pakistan's retaliatory options at the outset of hostilities. This approach marks a sharp departure from India's earlier posture of punitive limited strikes, reflecting a willingness to escalate forcefully in future conflicts.[86]

A critical component of this evolution is India's rapidly maturing counterforce capability. The integration of BrahMos supersonic missiles—and development of BrahMos-2 hypersonic missiles with a 1,500 km range—into Su-30MKI and Rafale fleets provides India with the ability to strike hardened Pakistani targets with minimal warning.[87] The ET-LDHCM hypersonic cruise missile program and improved Agni-series ballistic missiles, now capable of sub-10-meter CEP, further enhance India's confidence in its ability to neutralize Pakistan's strategic missile forces, C2 nodes, and other critical military infrastructure.[88]

This modernization effort is tightly linked with India's growing air-suppression and preemption doctrine. Systems such as the Akashteer combat cloud and AI-enabled EW suites (Sambhav, Samyukta, Himashakti) are designed to cripple adversary air defense networks by jamming radars, disrupting missile guidance, and severing communication links.

When paired with massed drone swarms and loitering munitions like Nagastra-1, these capabilities create the ability to degrade Pakistan's radar sites, forward-deployed airbases, and surface-to-air missile systems in the initial hours of conflict.

India's multi-layered missile defense systems, including the S-400 and upcoming Project Kusha ER air defense systems, reinforce this doctrine.[89] Indian planners may believe they can absorb a degraded Pakistani

retaliatory strike, emboldening them to initiate large-scale offensives during crises. This confidence is further amplified by India's expanding space-based ISR and navigation network.[90]

With over 50 planned military satellites, the Defence Space Agency will have near-real-time tracking capability, allowing India to continuously monitor Pakistani force movements and mobile missile deployments.[91] This undermines Pakistan's traditional reliance on mobility, dispersal, and redundancy for deterrent survivability.

Furthermore, there is an attempt going on by India to make the OODA LOOP faster. As India's Integrated Defence Staff Chief, Air Marshal Ashutosh Dixit said, "Future wars will be won by those who complete the OODA loop the fastest."[92] The Indian Army's AI Roadmap (2026-27) has multi steps that can make OODA LOOP Faster or what is described as super OODA LOOP.

AI Roadmap Step		Direct Impact on OODA Loop
Drone Swarming & Coordinated Missions		**Observe** – Provides swarm ISR in contested areas, enhancing situational awareness
Real-time Battlefield Monitoring		**Observe/Orient** – Streams fused battlefield data instantly, reducing delays
LLM-based Text Summarisers & AI Chatbots		**Orient/Decide** – Condenses intelligence reports and enables faster communication
Facial Recognition & Threat Pattern Detection		**Observe** – Rapidly identifies enemy assets, movements, and anomalies
Multi-source Data Fusion (drones, satellites, sensors)		**Observe/Orient** – Merges multiple data sourcesinto a coherent operational picture
AI-enabled Decision Support Systems		**Decide** – Generates actionable recommendations and counter-intelligence insights
Predictive Maintenance & Targeting		**Act** – Predicts equipment failures and ensures readiness for faster responses
AI-based Navigation in GPS-denied environments		**Act** – Maintains maneuvering capabilities in GPS-denied environments

Fig.3 Indian Army's AI Roadmap's (2026-2027) Direct Impact on OODA Loop

Dr. Michael Raska explains in his article, militaries are now moving toward what he calls the **"Super OODA Loop."**[93] In this new model, AI, ML, and real-time data fusion fundamentally transform each stage of the loop.

Observation is no longer limited to what a human can see or interpret, but instead relies on multi-domain sensors and predictive analytics. Orientation shifts from individual cognition to AI-driven sense-making, where algorithms filter vast volumes of intelligence to highlight patterns and anticipate threats. Decision-making becomes semi-autonomous, supported by AI systems that generate options, simulate outcomes, and recommend courses of action in milliseconds.

Finally, the act phase is executed through autonomous or coordinated platforms such as drone swarms or precision strike systems that feed instantly back into the next observation cycle. This transformation marks the shift from human-paced decision cycles to machine-speed continuous loops. The US Army has already demonstrated AI-enabled OODA loop capable of shrinking detection-to-engagement cycles to under 20 seconds.[94]

What India will achieve at this level? It is an open question as it faced challenges in the past in achieving what it aspires. If India is able to achieve what it is planning, it will likely create challenges for Pakistan. This has direct implications for Pakistan's Transporter-Erector-Launchers (TELs), which rely on constant mobility, firing from one location and then relocating, to ensuresurvivability.

In a fast-moving, AI-enabled battlespace, in theory, these mobile launchers become more exposed, though there are countermeasures that can be adopted; yet in the real operational environment, translating this vulnerability into effective preemption is far more difficult and remains highly challenging.

There are broader implications of the Indian developments as well. As Caitlin Talmadge, Lisa

Michelini, and Vipin Narang argue in International Security (2024), adversaries perceive nuclear No First Use (NFU) pledges as credible only under two conditions: when the political relationship between states is relatively benign, or when a state's military lacks the ability to engage in nuclear first use.

By contrast, India's expanding capabilities suggest precisely the opposite, reinforcing the perception that its NFU pledge is less a binding constraint and more a declaratory posture unlikely to reassure Pakistan.

For Pakistan, all of this feels deeply unsettling. Time and again, it has pointed out at the United Nations that India is pushing ahead with a massive conventional arms build-up and forging military partnerships on new technologies with multiple countries.[95] In such a situation, when India's NFU pledge doesn't look credible, the pressure on stability grows heavier.

Add to that New Delhi's refusal to way even long-standing agreements like the IWT in abeyance, and the picture becomes clearer. Instead of reducing dangers, India's push for faster OODA loops, hypersonic weapons, and precision strikes only makes South Asia more fragile and more prone to crisis.

India's advancements in cyber warfare and EW pose a severe risk to crisis stability. Akash-teer-linked EW capabilities can degrade Pakistan's communication and radar systems, creating fog-of-war conditions.

The 2025 crisis started in the air and showed how fast things can escalate. More than 125 aircraft were involved, and Pakistan shot down six Indian planes in the opening hours. That made it clear that airpower is now the frontline in any confrontation. India is still trying to build a bigger edge here. Rafales with long-range munitions, Su-30MKIs carrying BrahMos missiles, and even plans for stealth aircraft — though these projects face problems and delays — are all part of this push.

India is also looking to bring the naval domain into the conflict. During the fighting, some of its leaders even said that Karachi port could be attacked, which shows that the next clash might not remain limited to the skies. India is expanding its submarine fleet with AIP boats, MIRV SLBMs, and adding more aircraft carriers. All of this is meant to give India the ability to threaten Pakistan's coastline and sea routes.

Pakistan has not stood idle in this area. The PAF showed in 2025 that India cannot assume air

superiority, and aircraft like the JF-17 Thunder armed with CM-400 AKG anti-ship missiles give Pakistan the ability to target Indian carriers if they come close. Precision missiles and the new ARF add another layer, giving Pakistan options to hit Indian naval and air bases if needed. These steps do not erase India's advantage, but they do ensure that New Delhi cannot feel secure enough to dominate, either in the skies or at sea.

Recommendations for Pakistan

To mitigate the destabilizing effects of India's modernization and preserve credible deterrence, Pakistan must act across strategic, operational, and technological dimensions:

a. Expand the ARF with dedicated satellites and integrated strike packages of missiles, swarm drones, and loitering munitions to create a buffer zone inside India. To ensure New Delhi cannot place critical assets near Pakistan's border and giving Pakistan's air and missile defense systems, the time, they need to intercept incoming threats.

b. Pakistan should invest in EW, cyber deception, and AI-enabled countermeasures to disrupt India's OODA loop, since even corrupting one node in such a tightly linked system can slow down the entire cycle or force wrong decisions.

c. Pakistan must highlight the Indian private space companies' role in the acceleration of Indian missile development.

d. Expand the inventory of Ababeel MIRV-capable ballistic missiles to penetrate Indian missile defenses and complicate counterforce targeting.

e. Operationalize the Babur-3 sea- launched cruise missile on Agosta 90B submarines and future platforms to bolster the survivability of Pakistan's sea-based deterrent.

f. Integrate existing HQ-9P, LY-80, and FM-90 surface-to-air missile systems into a national C2 grid linked with airborne early warning platforms.

g. Prioritize the acquisition of HQ-19 long-range interceptors capable of countering hypersonic and ballistic missile threats.

h. Invest in counter-drone defense technologies, including laser-based directed-energy weapons, electronic jammers, and rapid-fire anti-aircraft systems to neutralize Indian drone swarms and loitering

munitions.

i. Expedite procurement of J-35 stealth fighters, capable of deep penetration and survivable strike missions against hardened Indian targets.

j. Acquire KJ-500 AEW&C aircraft to provide continuous airborne early warning and to direct integrated air defense responses.

k. Upgrade existing JF-17 Block III and J-10CE fleets with long-range PL-15 BVR missiles and advanced electronic countermeasure pods.

l. Expand space-based ISR in collaboration with China to ensure real-time tracking of Indian missile deployments and fighter movements.

m. Enhance and institutionalize crisis communication with India by establishing multi-layered hotlines and SOPs, while exploring neutral third-party oversight, such as UAE's past role in the LoC ceasefire or China's proposed guarantor role under SCO, to ensure channels remain insulated from political manipulation.

n. Create redundant, hardened communications channels for nuclear C2 using fiber-optic networks and low-earth orbit satellite links.

o. Establish offensive cyber units capable of disrupting India's Akashteer combat cloud, satellite links, and missile guidance systems at the outset of hostilities.

p. Clearly articulate that any Indian attack on Pakistan's military infrastructure, especially nuclear command nodes, will trigger disproportionate retaliation.

q. Conduct joint air-land-missile exercises under EW and cyber-denied conditions, simulating runway damage, TEL dispersal, and degraded C2, to show that Pakistan can absorb a first strike and still hit back in a coordinated way, something it has already demonstrated during the recent conflict with India.

r. Strengthen defense cooperation with China to co-develop missile defense, hypersonic countermeasures, and space-based ISR capabilities.

s. Expand partnerships with Turkey and other states on drone warfare, EW systems, and AI-enabled battle management.

t. Scale up indigenous production of drones, precision-guided munitions, and advanced missile systems to avoid external vulnerabilities.

u. Create a dedicated strategic technology cell to integrate AI, cyber, and space innovations

into Pakistan's defense planning.

By implementing these measures, Pakistan can preserve credible deterrence despite India's modernization and maintain escalation control during crisis. The focus must be on survivability, redundancy, and rapid response, ensuring India cannot believe it can disarm Pakistan in a first strike. By deploying mobile and containerized missile systems, hardening and dispersing C2 networks, expanding sea-based deterrents, and building rapid runway repair and redundancy drills, Pakistan can ensure survivability, redundancy, and swift response against any Indian first-strike attempt.

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