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Hypersonic Weapons and Escalation Control between India and Pakistan: Risks and Challenges for Deterrence

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Abstract

South Asia's deterrence environment is increasingly strained as India accelerates its development of hypersonic weapons, raising concerns about rapid, inadvertent, or misinterpreted escalation during crises with Pakistan. The paper analyses how hypersonic weapons alter escalation control in a nuclear dyad characterised by proximity, limited communication mechanisms and doctrinal opacity. The paper employs Escalation Control Theory and examines four variables i.e., signalling clarity, decision-time compression, ambiguity of intent and threshold permeability, to evaluate how hypersonic capabilities disrupt the processes through which India and Pakistan attempt to manage escalation. This study has used qualitative methodology for process-tracing, drawing on open-source reporting, doctrinal statements, technical assessments and two empirical episodes such as the BrahMos missile fired by India in March 2022 and the May 2025 Four-Day War initiated by India. The paper argues that the presence of hypersonic weapons magnifies pre-existing weaknesses in South Asian crisis management by compressing decision-making time, increasing the risk of misinterpreting signals and heightening fears of counterforce vulnerability, thereby reducing the practical space for calibrated escalation control. Hence, without operational communication channels, the introduction of hypersonic systems will compress the escalation ladder to a degree that undermines deterrence and strategic stability in the region.

Keywords: Hypersonic Weapons Technology (HWT), Deterrence, Escalation Control, India-Pakistan, Strategic Stability, BrahMos, Four-Day War

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Introduction

Hypersonic Weapons Technology (HWT) comprises missiles that can travel at speeds equal or above Mach 5 with high manoeuvrability. These systems are rapidly emerging as disruptive elements in global deterrence architecture.² China and Russia have operationally deployed these systems while the United States, North Korea and Iran have tested or claimed to possess such systems. India also claims to have conducted a hypersonic test in 2024.³ Since both India and Pakistan conducted nuclear tests in 1998, successive crises including the 1999 Kargil War and false flag operations such as the 2016 Pathankot and Uri incidents, have repeatedly resulted in heightened escalation.⁴ In each case, India blamed Pakistan and resorted to escalatory military measures that were intended to malign Pakistan and impose costs on it. However, air attack by India on 26 February 2019 on Balakot subsequent to Pulwama false flag operation and the May 2025 Four-Day War initiated by India following Pahalgam false flag operation have demonstrated that even limited strikes can lead to crisis instability.⁵ These crises have exposed the inadequacy of existing escalation control mechanisms in a nuclearised South Asia.

The international hypersonic arms race thus carries huge significance for South Asian strategic stability. Notably, India's pursuit of Hypersonic Technology Demonstrator Vehicle (HSTDV) program and BrahMos-II Mach 7 cruise missile could spark an action-reaction cycle and trigger an arms race, raising risks of miscalculation.⁶ The existing scholarship has not fully examined this specific intersection of hypersonic technology and India-Pakistan escalation control mechanisms and how hypersonic weapons could upset the delicate crisis-management dynamics between the two nuclear-armed neighbours?

² Aaron Shiffer, "Hypersonic Weapons on the Front Line: Deterrent or Detractor?" *Journal of JPACC* 36 (Summer 2023): 25-32.

³ Diya Ashtakala, "What Does India's Hypersonic Missile Test Mean?," *CSIS*, December 2, 2024, accessed October 14, 2025, <https://surl.li/qdyhoo>.

⁴ Rabia Akhtar, "Escalation Gone Meta: Strategic Lessons from the 2025 India-Pakistan Crisis," *The Belfer Center*, May 14, 2025, accessed October 14, 2025, <https://surl.li/lvbcql>.

⁵ Akhtar, "Escalation Gone Meta."

⁶ Adil Sultan and Ifa Khursheed, "Hypersonic Weapons in South Asia: Implications for Strategic Stability," *IPRI Journal* 21, no. 01 (Summer 2021): 61-81.

This research attempts to address existing gap by employing Escalation Control Theory (ECT) as its theoretical framework. ECT focuses on managing, limiting, or terminating armed conflict between adversaries to prevent the escalation, particularly nuclear warfare.⁷ Thomas Schelling famously argued that nuclear-armed adversaries can coerce or deter by carefully calibrated signalling and incremental threats.⁸ Herman Kahn and Glenn Snyder extended this by conceiving an “escalation ladder” of 44 rungs, ranging from diplomatic pressure up to nuclear use, which rational actors aim to climb cautiously to avoid total war.⁹ The theory assumes that leaders deliberately signal and exercise restraint at each rung to limit conflict.¹⁰ Its core insight is that technological or doctrinal shifts can either aid or undermine this control.¹¹

This paper hypothesises that India’s acquisition and operationalisation of hypersonic weapons shall enhance chances of inadvertent escalation in India-Pakistan crisis through three related mechanisms:

- a) compression of decision-time (inducing a short Observe, Orient, Decide, Act (OODA) loop that minimises deliberation time);
- b) decreased clarity in signalling (dual-capable delivery systems and unpredictable trajectories increasingly complicate assessments of intent and adversary calculations); and
- c) a higher threshold permeability (attack that can threaten C2 and survivable second-strike assets).

Notably, as compared to the previous work which considers HWT as a major technical innovation, the novelty of this paper is both in operationalisation of ECT to four quantifiable variables: (i) signalling clarity; (ii) decision-time compression; (iii) ambiguity of intent; and (iv) threshold permeability. Charting these variables to observable crisis behaviour (alerts, information delays, delegated C2, asymmetric counters) and testing these linkages through process-tracing of the recent May 2025 Four-Day War and the 2022 BrahMos missile launch. This is to demonstrate that hypersonic missiles not only modify deterrence, but also the mechanism by which they accomplish

⁷ W. M Jones, “A Framework for Exploring Escalation Control” (Washington, D.C: RAND Corporation, 1974).

⁸ Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966).

⁹ Herman Kahn, *On Escalation: Metaphors and Scenarios* (Westport: Praeger, 1965).

¹⁰ Glen H. Snyder, “The Balance of Power and the Balance of Terror,” in *The Balance of Power*, ed. Paul Seabury (San Francisco: Chandler, 1965), 184.

¹¹ Snyder, “The Balance of Power and Terror.”

this with proximate, doctrinally opaque dyads and adopt Confidence Building Measures (CBMs) to counter the aforementioned risks.

Research Methodology

This study employs a qualitative process-tracing methodology to assess how hypersonic weapons may affect escalation control in the India-Pakistan dyad. The case selection is purposive, focusing on the 2022 BrahMos missile launch on Pakistan and the May 2025 war, as both illustrate how speed, ambiguity and limited decision time can strain crisis management even without hypersonic deployment. The analysis draws on open-source materials, including official statements, policy documents, credible media reports and scholarly and think-tank literature, to reconstruct escalation dynamics and identify causal mechanisms. A key limitation is the reliance on publicly available data, which may be incomplete or politically framed, and the inability to access classified decision-making processes. Accordingly, the study does not claim definitive causality but instead traces plausible pathways through which hypersonic capabilities could deteriorate existing deterrence vulnerabilities.

1. Escalation Control Theory

ECT is rooted in the classic deterrence scholarship. Thomas Schelling, in his 1966 book titled “Arms and Influence”, has emphasised the “diplomacy of violence”, meaning states use military capabilities and the threat of escalation as bargaining tools.¹² Herman Kahn, in his 1965 book titled “On Escalation: Metaphors and Scenarios”, mapped out a 44-rung “escalation ladder”, which includes scenarios ranging from minor hostile acts up through the nuclear exchange.¹³ Glenn Snyder’s Deterrence Theory highlighted that rational nuclear adversaries would avoid actions likely to spiral into all-out war.¹⁴ ECT analyses states’ ability and willingness to limit conflict escalation, for instance, in situations of high stakes conflict initiated by confrontations between nuclear armed adversaries.¹⁵ The theory elaborates the role of communication, signalling, and calibrated responses to control conflicts from escalating out of hands.¹⁶ Escalation, in the context of international relations,

¹² Schelling, *Arms and Influence*.

¹³ Kahn, *On Escalation*.

¹⁴ Snyder, “The Balance of Power and Terror.”

¹⁵ William M. Jones, *A Framework for Exploring Escalation Control*, (Washington, D.C: RAND Corporation, 1974).

¹⁶ Jones, “Exploring Escalation Control.”

refers to response of adversaries to provocations with measures that are severely damaging, as they grow from mild to moderate to extreme, ultimately ending with full scale war.¹⁷ Escalation control that is effective attempts to break this cycle by reducing misunderstandings, miscalculations and unintended consequences.¹⁸

ECT's core assumptions state that decision-makers prefer to keep conflicts short of total war and can deliberately signal resolve or restraint at each escalation stage. Theoretically, a state can control how far a crisis escalates by calibrating threats and de-escalatory signals. For example, one side might publicly limit its demand or even allow mediation to signal that it does not seek a full-blown war, thereby giving adversaries room to de-escalate.

Furthermore, ECT treats crisis as a dynamic “ladder” of conflict intensification, with each rung representing a higher level of violence. The theory's value lies in mapping how states signal and respond at each rung. In the hypersonic age, this lens must incorporate new variables, especially decision-time compression (a faster OODA loop) and signal ambiguity. Hypersonic weapons shrink decision time mainly due to their extremely high speed and manoeuvrability. An incoming strike from India to neighbouring Pakistan can hit in minutes, leaving virtually no time for leaders to observe, orient and deliberate. The ‘overlapping of clocks’ of ballistic, hypersonic and other threats, leaves little time to check consistency and political evaluation. In effect, decision thresholds become blurred and there is little temporal buffer against “launch-on-warning” postures.¹⁹

Escalation control depends on decision cycles that permit calibrated signalling and reciprocal restraint. Compression of the OODA loop by high-speed systems reduces leaders' time to interpret incoming data and select proportionate responses. When decision time collapses, decision-makers lean towards worst-case assumptions, raising the probability of rapid, inadvertent escalation, collapsing the escalation ladder.

Signalling clarity is another important variable. As hypersonic weapons are dual-capable (capable of carrying both conventional or nuclear warheads)

¹⁷ Jones, “Exploring Escalation Control.”

¹⁸ Jones, “Exploring Escalation Control.”

¹⁹ Zahir Kazmi, “Overlapping Clocks: Protecting Decision Time in the Age of Hypersonic and Nuclear-Powered Threats,” *Strategic Forecast*, October 28, 2025, accessed November 1, 2025, <https://strategicforecast.cissajk.org.pk/?p=22838>.

they can lead to deep levels of ambiguity.²⁰ Even when the defender is under pressure, they cannot necessarily tell the intentions of an attacker based on the weapon used. Consequently, signalling can become extremely opaque, with a high-speed, low-altitude missile being able to camouflage a strategic decapitation strike as ordinary.²¹ In the absence of explicit channels of communication, states are likely to project worst-case intent. In South Asia, this is worsened by institutional gaps as India and Pakistan have “only a single operational hotline” and no formal comprehensive missile-notification regime.²² The absence of strong crisis-communication (pre-emptive or otherwise) ensures that delays in the flow of information and misunderstandings are not exceptions but the rule.

Hypersonic uncertainty also creates threshold permeability i.e., ease of crossing from a crisis into new territory (e.g. full-scale war or nuclear use).²³ In South Asia, the ambiguity surrounding India’s nuclear doctrine already blurs this threshold.²⁴ HWT threats to respective nuclear missile launch sites could further lower the threshold, incentivising a “use-it-or-lose-it” mentality.²⁵ In crises, such doctrines compress decision space even further as Pakistan may feel forced to assume an Indian attack is imminent and compelled to respond in kind.

Escalation theory variables can be operationalised in South Asia by observing concrete behaviour. Decision-time compression manifests in frantic, short-range missile exchanges and hair-trigger alerts. Signal ambiguity appears in the dual-use BrahMos and Shourya missiles. Threshold permeability is evident in India’s so-called calibrated conventional strikes under its Pro-Active Strategy. Signalling clarity is hampered by scant crisis management channels. Although a hotline exists between the DGMOs, India rarely uses it. Apart from this, there is no direct political or early warning mechanism between the two countries.

²⁰ Zohaib Altaf, “Hypersonic Arms in South Asia: Racing Toward Instability?,” *The Diplomat*, July 23, 2025, accessed October 14, 2025, <https://thediplomat.com/2025/07/hypersonic-arms-in-south-asia-racing-toward-instability/>.

²¹ Altaf “Hypersonic Arms in South Asia.”

²² Gen Sahir S. Mirza, “Regional Crisis-Management Mechanisms” (speech, The 22nd IISS Shangri-La Dialogue, Singapore, May 31, 2025).

²³ Altaf “Hypersonic Arms in South Asia.”

²⁴ Antoine Levesques, Desmond Bowen, and John H. Gill, *Nuclear Deterrence and Stability in South Asia: Perceptions and Realities*, (London: International Institute for Strategic Studies, 2021).

²⁵ Altaf “Hypersonic Arms in South Asia.”

2. Hypersonic Weapons Technology

HWT refers to missiles that combine very high speeds (generally above Mach 5) with manoeuvrability and precision.²⁶ Unlike traditional ballistic missiles (which follow a high-arc flight) or cruise missiles (which fly at subsonic or supersonic speeds), hypersonic missiles use novel trajectories and propulsion.

Broadly, there are two categories of HWT: (i) Hypersonic Glide Vehicles (HGVs); and (ii) Hypersonic Cruise Missiles (HCMs).²⁷ Technically, an HGV is carried to high altitude on a rocket booster. The Vehicle separates from booster at the end of boost phase, then glides through the upper atmosphere at hypersonic speeds, often performing extreme manoeuvres.²⁸ Whereas, an HCM, by contrast, is powered throughout its flight by an air-breathing engine (typically a scramjet). Notably, both can reach speeds well above Mach 5.²⁹

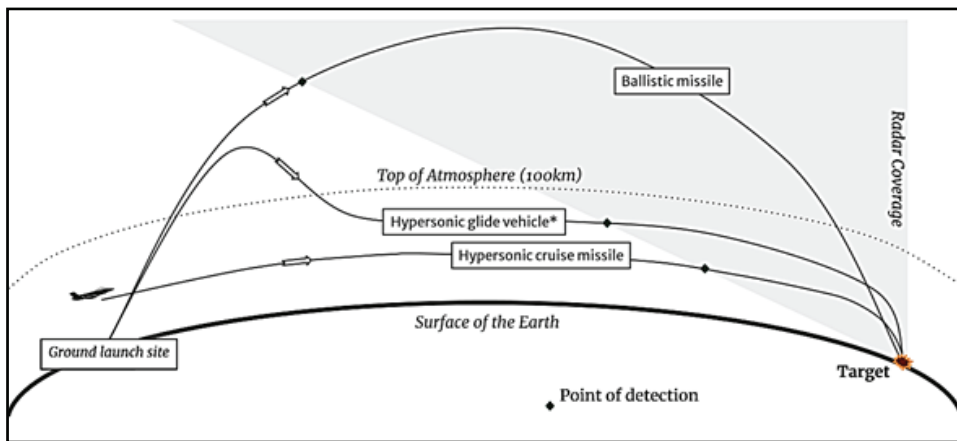


Figure 1: Example missile trajectories and radar coverage
(Source: Council on Geostrategy)

²⁶ Abdul Wassay, "Military novelties and the fate of great powers: An analysis of technological imperative model," *Comparative Strategy* 44, no. 2 (2025): 321, doi:10.1080/01495933.2025.2456428.

²⁷ Kolja Brockman and Dmitry Stefanovich, *Hypersonic Boost-Glide Systems and Hypersonic Cruise Missiles: Challenges for The Missile Technology Control Regime*, (Solna: SIPRI, 2022).

²⁸ Gabriel Elefteriu and William Freer, *Hypersonic weapon systems: High expectations*, (London: Council on Geostrategy, 2023).

²⁹ Elefteriu and Freer, "Hypersonic weapon systems."

Hypersonic weapons bring four disruptive traits: speed, altitude/trajectory, manoeuvrability and dual-use ambiguity. Broadly, these traits accelerate and complicate the escalation ladder. For example, speed reduces the reaction time for a proportional response to a few minutes.³⁰ A Mach 8 cruise missile leaves an adversary only seconds to confirm intent and decide how to respond. Altitude and trajectory further complicate detection as hypersonic glide vehicles operate at lower, variable altitudes, exploiting radar gaps and prolonging identification. Moreover, Hypersonic weapons “undermine predictability by manoeuvring at high speed and variable altitude, stressing both tracking and interception systems”.³¹ Manoeuvrability also undermines defensive strategies. A missile that can shift course mid-flight denies defenders’ ability to assign a target set quickly, further compressing the OODA loop. Dual-capability ambiguity means every hypersonic launch may carry an unknown payload. Uncertainty over a weapon’s warhead can trigger a nuclear-armed country to launch its nuclear weapons out of caution.

Globally, major powers have pursued HWT in recent years. The US and Russia have focused on boost-glide HGVs (e.g. Russia’s *Avangard* deployed on SS-19 ICBMs), while China has tested both HGVs (DF-ZF) and HCMs.³² In November 2024, India announced the test-launch of its first long-range hypersonic missile (HCM prototype).³³ A few days before Indian tests, China showcased a new glide vehicle and Russia was loading *Avangard* atop a heavy ICBM.³⁴ The US also flew test vehicles under its Long-Range Hypersonic Weapon program. Taken together, the developments signalled an intensifying global hypersonic arms race. It also became apparent that hypersonic capabilities were no longer confined to superpower arsenals. Even developing countries like India aspired to join this “elite club”.³⁵ Without equivalent advances in defensive systems, including space-based sensors or novel interceptors, such diffusion tends to destabilise deterrence as states may fear a first strike could be undetected or unstoppable. It is argued that:

³⁰ Zahir Kazmi, “Overlapping Clocks: Protecting Decision Time in the Age of Hypersonic and Nuclear-Powered Threats,” *Strategic Forecast*, October 28, 2025, accessed November 1, 2025, <https://strategicforecast.cissajk.org.pk/?p=22838>.

³¹ Kazmi, “Overlapping Clocks and Hypersonic Weapons.”

³² Kelley M. Saylor, *Hypersonic Weapons: Background and Issues for Congress*, (Washington DC: US Congressional Research Service (CRS), 2025).

³³ Ashtakala, “Indian Hypersonic Missile Test.”

³⁴ Rajat Pandit, “Amid Global Race, India Tests Its First Hypersonic Missile,” *The Times of India*, November 18, 2024, accessed October 14, 2025, <https://surl.li/vakcfcg>.

³⁵ Ashtakala, “Indian Hypersonic Missile Test.”

- i. High velocity compresses each rung of the escalation ladder. A hypersonic strike shortens decision windows from hours to minutes, making deliberate step-by-step escalation much harder to pace.³⁶
- ii. Erratic flight paths break assumptions that prompt flexible responses. The attacker can choose new targets in-flight, which “creates dangerous ambiguity” about the strike’s intent.³⁷
- iii. HWT often fly much lower than ICBMs, evading early-warning sensors. This further “reduces the reaction time” and can leave defenders uncertain until very late.³⁸
- iv. When the same missile can be armed with conventional or nuclear warheads, deterrence signalling weakens. Observers “have no reliable way to discern whether an incoming hypersonic strike is intended to disable conventional forces or to deliver a strategic decapitation blow”.³⁹

In each scenario, the technical trait translates into an escalation risk: (i) faster speed compresses room for deliberation; (ii) manoeuvrability possesses the surprise element; (iii) low altitude can dodge early warning systems; and (iv) dual-use capability may lead to an inadvertent nuclear response. These scenarios are not unique to South Asia. Arguably, in US-Russia or US-China dyads, analysts have noted the similar dangers. For example, any hypersonic flight could “exacerbate fears of surprise attack” and leave “no time for signalling”.⁴⁰ However, a 30-minute ICBM flight time gives the US and Russia more cushion than South Asian adversaries, India and Pakistan, whose capitals are only minutes apart.⁴¹ Importantly, hypersonic speed and ambiguity accelerate escalations everywhere, but proximate rivals like India and Pakistan face the most acute compression of the ladder.

2.1. Hypersonic Weapons of India

India has aggressively pursued hypersonic technology. The recent testing of a Mach 8 scramjet cruise missile under Project Vishnu demonstrates

³⁶ Zohaib Altaf, “Hypersonic Arms in South Asia: Racing Toward Instability?,” *The Diplomat*, July 23, 2025, accessed October 14, 2025, <https://thediplomat.com/2025/07/hypersonic-arms-in-south-asia-racing-toward-instability/>

³⁷ Altaf “Hypersonic Arms in South Asia.”

³⁸ Altaf “Hypersonic Arms in South Asia.”

³⁹ Yehoshua Kalisky, “Hypersonic Missiles: Threat and Deterrence?,” *Inss.org.il*, June 11, 2023, <https://www.inss.org.il/publication/hypersonic-weapon/>.

⁴⁰ Eleni Ekmektsioglou, “Hypersonic Weapons and Escalation Control in East Asia,” *Strategic Studies Quarterly*, Summer 2015, 59.

⁴¹ Kazmi, “Overlapping Clocks and Hypersonic Weapons.”

both range and dual-capability. India's BrahMos-II, which is under development in collaboration with Russia, is projected to fly at Mach 7–8 over 1,000–1,500 km, and its Shaurya solid-fuel rocket reached Mach 7.5 in trials.⁴² India is also exploring unmanned hypersonic drones such as the RHH-150. Notably, most of these systems are dual-capable and can carry nuclear or conventional warheads.

India's new platforms reflect a broader doctrinal evolution towards rapid and precise strikes under a "time-constrained escalation window".⁴³ During the May 2025 Four-Day War, India tested this approach by using drones to locate and strike Pakistani air-defence radars (suppression of an adversary's air defenses), then targeted Pakistani airbases with BrahMos missiles. The integration of such strikes with Intelligence, Surveillance and Reconnaissance (ISR) and drones suggests that India aimed to "disable Pakistan's retaliatory infrastructure before full mobilisation".⁴⁴

Importantly, India's rapid force modernisation and its accelerated technological pace threaten regional peace and security.⁴⁵ Practically, the Indian strategists might assume that speed and accuracy will discourage Pakistan without provoking it to use nuclear weapons.⁴⁶

India has also strengthened its command, control and security protocols to manage advanced weapons systems. In theory, the risks posed by India's pursuit of hypersonic capabilities could increase pressure for highly centralised control and rapid decision-making, particularly given the shorter timeframes associated with hypersonic delivery.⁴⁷ However, India's strategic posture continues to emphasise deterrence through the threat of a survivable second-strike force rather than reliance on rapid first-strike hypersonic use.⁴⁸

India's hypersonic arsenal, which is fast, dual-capable and integrated with drones, signals a posture of rapid retaliation. Its key escalation control objective is to convey India's intent to Islamabad. Without clear signalling, even conventional hypersonic strikes could risk escalation to nuclear response.

⁴² Altaf "Hypersonic Arms in South Asia."

⁴³ Altaf "Hypersonic Arms in South Asia."

⁴⁴ Altaf "Hypersonic Arms in South Asia."

⁴⁵ Akhtar, "Escalation Gone Meta."

⁴⁶ Altaf "Hypersonic Arms in South Asia."

⁴⁷ Ali Abbas, "Hypersonic Weapons and the Future of Strategic Stability between the Nuclear Rivals," *JSSA* 10, no. 2 (Winter 2024): 59-78.

⁴⁸ Sultan and Khursheed, "Hypersonic Weapons in South Asia," 17.

2.2. Hypersonic Weapons of Pakistan

By contrast, Pakistan currently has no declared hypersonic missile program. Pakistani analysts acknowledge that India's hypersonic push puts pressure on Islamabad's deterrent. Consequently, Pakistan could launch its own hypersonic effort for "tit-for-tat" parity.⁴⁹

Pakistan's inventory focuses on asymmetric counters: shoot-and-scoot SRBMs (e.g. NASR) and cruise missiles (Ra'ad, Babur) that can threaten high-value Indian assets.⁵⁰ During May 2025 crisis, Pakistani leaders warned India against its strike vectors, reflecting reliance on real-time early warning systems.⁵¹

If Pakistan were to field hypersonic weapons, the escalation calculus would shift. On the one hand, mutual possession could stabilise deterrence as India could no longer strike with impunity, and each side would fear the other's hypersonic counter-strike.⁵² This symmetry might raise the effective nuclear threshold, since a pre-emptive attack by either invites immediate hypersonic retaliation. On the other hand, introducing hypersonic missiles on both sides could spark an arms race and reduce crisis stability; both might rush to launch on warning, further eroding decision time.

Pakistan's response is likely to be defensive or asymmetric measures. Acquiring advanced air defenses (China's HQ-19 system) is one path, though such systems may struggle against manoeuvrable hypersonic missiles. Pakistan also emphasises mobility and redundancy as its SRBMs are road-mobile and its submarines carry cruise missiles (Babur) with sea-based second-strike capability. Command and control posture reflects these pressures.

⁴⁹ Saif U. Haq, "Indian Testing of Hypersonic Cruise Missiles: What Does It Mean for South Asian Strategic Stability?," *Strafasia*, January 10, 2025, accessed October 14, 2025, <https://strafasia.com/indian-testing-of-hypersonic-cruise-missiles-what-does-it-mean-for-south-asian-strategic-stability/>.

⁵⁰ Brig. (Retd.) Naeem Salik, "Comments: IISS Study on Nuclear Deterrence & Stability in South Asia," *Centre For International Strategic Studies, Islamabad*, April 18, 2024, accessed October 14, 2025, <https://ciiss.org.pk/comments-by-dr-naeem-salik-iiss-study-on-nuclear-deterrence-stability-in-south-asia/>.

⁵¹ Salik, "IISS Study on Nuclear Deterrence & Stability in South Asia,"

⁵² Abdul Moiz, "Evolving Missile Technologies in India and Pakistan," *The Diplomat*, March 22, 2025, accessed October 14, 2025, <https://thediplomat.com/2025/03/evolving-missile-technologies-in-india-and-pakistan/>.

Diplomatic and doctrinal measures are also part of Pakistan's strategy. Pakistan supports comprehensive CBMs between the two nuclear-armed states. Arguably, the inclusion of HWT in verification regimes could "manage ambiguity before it becomes catastrophic".⁵³ However, Full Spectrum Deterrence (FSD) covers "the entire spectrum of threats" to national sovereignty and territorial integrity of Pakistan.⁵⁴ In practice, Pakistan prefers signalling resolve (through military alerts or exercises) over triggering confrontation.⁵⁵

Pakistan's strategic options include FSD, enhancing surveillance to avoid ambiguity and surprise, and pushing for crisis-management frameworks that can address the new escalation dynamics. However, the introduction by Pakistan of hypersonic missiles would serve as a means of strengthening deterrence in South Asia.

3. Implications of Hypersonic Weapons on Escalation Control in South Asia

The introduction of HWT into South Asia fundamentally alters the variables that ECT identifies as critical. Hypersonic missiles travel well over Mach 5 with manoeuvring capability, drastically compressing decision times and blurring the intent of each strike. These attributes can undercut the signalling and measured escalation that ECT assumes as stabilising. Two recent India-Pakistan crises provide apt examples of how even in a non-hypersonic environment, the escalation control is precarious and addition of hypersonic speeds would augment this further.

The first is the launch of BrahMos supersonic missile on Pakistan by India in March 2022.⁵⁶ The missile flew about 124 km in only 3 minutes 46 seconds.⁵⁷ This short flight time "left essentially no time for reaction or assessment".⁵⁸ In practical terms, Pakistani decision makers had only a few minutes to observe, interpret and respond, a classic decision time compression

⁵³ Kazmi, "Overlapping Clocks and Hypersonic Weapons."

⁵⁴ Sultan and Khursheed, "Hypersonic Weapons in South Asia," 17.

⁵⁵ Sultan and Khursheed, "Hypersonic Weapons in South Asia," 17.

⁵⁶ Matt Korda, "Flying Under the Radar: A Missile Accident in South Asia," *Federation of American Scientists*, September 16, 2024, accessed November 19, 2025, <https://fas.org/publication/flying-under-the-radar-a-missile-accident-in-south-asia/>.

⁵⁷ Korda, "A Missile Accident in South Asia."

⁵⁸ Korda, "A Missile Accident in South Asia."

scenario.⁵⁹ As ECT predicts, such compression crowds the OODA loop and can induce panic or hasty counter moves.⁶⁰ Hypersonic missiles (which fly much faster) would shrink these windows even further, leaving virtually seconds to decide.

Equally concerning was how ambiguous the incident appeared. Initial ground reports described it as a drone strike, but Pakistani officials later identified the crashed object as an Indian surface launched missile.⁶¹ This confusion epitomises ECT's warning that signal clarity is degraded under HWT. In modern terms, many missiles (including BrahMos variants) are dual-capable and able to carry either conventional or nuclear warheads.⁶²

In the 2022 case, the BrahMos was unarmed, but its "supersonic" speed and erratic flight path generated intense alarm.⁶³ Without clear communication, an inbound supersonic or hypersonic missile could be assumed to be a nuclear first-strike, a problem that could deepen with hypersonic weapons.⁶⁴

The second example is that of the May 2025 Four-Day War initiated by nuclear armed India against nuclear armed Pakistan which further illustrates these dynamics. During the war, India launched long-range precision strikes on Pakistani territory. Pakistan responded with artillery, missiles and drones.⁶⁵ Throughout this crisis, neither side resorted to any nuclear signalling. In other words, this war did not spiral uncontrollably into nuclear threats, a credit to deterrence. However, the speed and intensity of conventional operations came close to the risk zone.⁶⁶

⁵⁹ Korda, "A Missile Accident in South Asia."

⁶⁰ Jones, "Exploring Escalation Control."

⁶¹ Julian Spencer-Churchill and Nasir Mehmood, "Accidental/Inadvertent Indian Missile Launch and Procedural Arms Control in South Asia," *Journal for Peace and Nuclear Disarmament* 8, no. 1 (2025): 265, doi:10.1080/25751654.2025.2494870.

⁶² Abdul Moiz, "Dual-Use Missiles in South Asia and Implications for India-Pakistan Crisis Stability," *South Asian Voices*, October 15, 2025, accessed November 20, 2025, <https://southasianvoices.org/sec-m-pk-r-dual-use-stability/>.

⁶³ Daryl G. Kimball, "India Accidentally Fires Missile Into Pakistan," *Arms Control Association*, April 2022, accessed November 20, 2025, <https://www.armscontrol.org/act/2022-04/news/india-accidentally-fires-missile-pakistan>.

⁶⁴ Korda, "A Missile Accident in South Asia."

⁶⁵ Christopher Clary, *Four Days in May: The India-Pakistan Crisis of 2025*, (Washington DC: Stimson Centre, 2025).

⁶⁶ Rabia Akhtar, ed., *Strategic Reckoning: Perspectives on Deterrence and Escalation Post-Pahalgam* (Islamabad: Institute for Regional Studies, 2025).

For example, during Operation Sindoor, India deliberately hit deep targets in Pakistan, effectively “skipping intermediate rungs” of the escalation ladder.⁶⁷ Advanced conventional systems (precision guided munitions, drones, supersonic BrahMos missiles) tried to overwhelm Pakistani air defenses in minutes but failed.⁶⁸ Pakistan Air Force (PAF) defended by shooting down 7 Indian fighter jets, including four Rafales.⁶⁹ Notably, Fatah-I and Fatah-II, advanced guided rocket systems characterised by fast reaction, long-range, high accuracy and high-density firepower, also played a decisive role in overwhelming India, ensuring victory for Pakistan in the Four-Day War and failure of Operation Sindoor.

HWT’s implications were evident. Even though no hypersonic weapons were actually used, the prospect of such ultra fast, dual capable strikes compressed the decision space. As a Pakistani official warned during the crisis, conflicting media narratives and limited time were heightening “the grave risks of strategic miscalculation in a nuclearised environment”.⁷⁰

These cases highlight how the four ECT variables are disrupted even without the presence of hypersonic weapons technology in South Asia. In the future conflicts, if hypersonic weapons are introduced, following variables could be impacted:

- i. Decision-time compression (extreme speeds give leaders only seconds–minutes to react)
- ii. Signalling opacity (high-speed, manoeuvring missiles, often dual-capable, make intent opaque)
- iii. Ambiguity of intent (conventional vs nuclear roles blur; every fast-moving projectile looks like a worst-case scenario)
- iv. Threshold permeability (quick, hard-to-intercept strikes on C2 or missile sites erode the barrier to nuclear exchange)

Collectively, these effects mean that hypersonic weapons shrink the “ladder” of escalation so severely that traditional crisis-control mechanisms (hotlines, incremental signalling, etc.) may be rendered ineffective. The 2022

⁶⁷ Akhtar, *Strategic Reckoning*.

⁶⁸ Clary, “The India-Pakistan war of 2025.”

⁶⁹ Alan Warnes, “Understanding the Rafale Kills,” *Air Forces Monthly*, September 19, 2025.

⁷⁰ Kazmi, “Overlapping Clocks and Hypersonic Weapons.”

BrahMos missile launch and 2025 aggression by nuclear-armed India against nuclear-armed Pakistan show how close the region came to the brink of a nuclear war. The use of hypersonic missiles would therefore heighten the risk of uncontrollable escalation in future conflicts.

3.1. Decision-time Compression

Even current supersonic missiles like BrahMos reach the other side in a few minutes. Hypersonic weapons would cut that down to minutes or seconds, leaving little margin to collect information. The 2022 incident showed that leaders had only moments to track, interpret incoming data, and decide before impact.⁷¹ With HWT, the “OODA loop” is severely shortened, making careful, staged escalation almost impossible.

3.2. Signalling Opacity

High speeds and low-altitude trajectories make missiles hard to track. In 2022, even videos from the ground misidentified the projectile as a drone. Hypersonic glide vehicles would be far more difficult to detect and identify until the last minute. Moreover, most emerging hypersonic systems in South Asia will be dual-capable.⁷² Without prior agreements or notifications, any fast missile launch might be interpreted as a nuclear first strike rather than a conventional attack. This “deep ambiguity” of intent forces each side to assume the worst under pressure.⁷³

3.3. Ambiguity of Intent

Building on signalling issues, hypersonic weapons introduce severe uncertainty about the type of warhead. This exactly matches ECT’s concern that dual-use weapons blur intent.⁷⁴ In the absence of robust communication channels, escalation control cannot happen. Analysts of the May 2025 crisis have noted that India’s emerging doctrine of “blistering speed” and advanced capabilities aims to pre-empt Pakistan’s retaliatory forces, compounding this ambiguity.⁷⁵

⁷¹ Churchill and Mehmood, “Accidental/Inadvertent Indian Missile Launch,” 265.

⁷² Moiz, “Dual-Use Missiles in South Asia.”

⁷³ Jones, “Exploring Escalation Control.”

⁷⁴ Jones, “Exploring Escalation Control.”

⁷⁵ Akhtar, *Strategic Reckoning*.

3.4. Threshold Permeability

Hypersonic strikes can target high-value assets (airbases, command bunkers) quickly, lowering the barrier between “conventional” and “nuclear” rungs on the escalation ladder. In May 2025, India attempted conventional strikes on Pakistan’s military bases.⁷⁶ With hypersonic missiles, India poses a grave threat to Pakistan’s conventional and nuclear forces or C2 nodes within minutes. Islamabad may therefore feel constrained to respond quickly to prevent possible decapitating strikes from India.⁷⁷ In practical terms, threshold permeability rises, crossing from a limited crisis into nuclear confrontation.

Critically, both case studies saw no uncontrolled nuclear escalation. Pakistan did not convene its NCA or signalled any intent to use nuclear weapons. Nonetheless, these episodes were extremely fast-paced and confusing.⁷⁸ The information “fog” was acute as leaders faced an “overload of inconclusive information” with only “mere minutes” to grasp reality.⁷⁹ The situation was managed owing to Pakistan’s massive conventional counterpunch and the US mediation at Indian request. In future conflicts, if hypersonic weapons are deployed without new safety nets, a single misinterpreted launch could break the fragile control.

In sum, the evidence confirms that HWT greatly magnifies South Asia’s escalation risks. Hypersonic weapons reduce reaction times and camouflage hostile intent, giving policymakers almost no breathing space to calibrate moves. Notably, hypersonic weapons “collapse normal decision time and blur signals,” threatening to swamp the traditional escalation ladder. The logical implication is that existing deterrence and crisis management mechanisms will be insufficient. Without improved transparency and communication (new hotlines, pre-notification agreements), even modest clashes could slide swiftly out of control. The deterrence in South Asia may soon have little margin for error. The BrahMos missile launch and May 2025 war illustrate current vulnerabilities, and indicate that hypersonic arms could turn any future conflict into a near “zero warning” spiral unless necessary safeguards are introduced.

⁷⁶ Akhtar, *Strategic Reckoning*.

⁷⁷ Zahir Kazmi, “In Defence of Deterrence: Why India’s Operation Sindoor Marks a Dangerous Drift Toward Compellence,” *Center For International Strategic Studies*, July 24, 2025, accessed November 20, 2025, <https://ciiss.org.pk/ciiss-strat-review-in-defence-of-deterrence-why-indias-operation-sindoor-marks-a-dangerous-drift-toward-compellence/>.

⁷⁸ Churchill and Mehmood, “Accidental/Inadvertent Indian Missile Launch,” 265.

⁷⁹ Churchill and Mehmood, “Accidental/Inadvertent Indian Missile Launch,” 265.

4. Conclusion

The analysis shows that the integration of hypersonic weapons into South Asia's deterrence environment would fundamentally reshape the mechanisms through which crises escalate. Operationalising ECT into four variables, signalling clarity, decision-time compression, ambiguity of intent and threshold permeability, reveal that both the 2022 BrahMos missile launch and the May 2025 Four-Day War initiated by India exposed structural vulnerabilities that hypersonic systems would intensify. Even without nuclear signalling, rapid and precise conventional strikes compressed reaction time and created conditions in which misinterpretation could have carried strategic consequences. Thus, hypersonic capabilities would further reduce decision windows and complicate assessment of intent, placing additional stress on crisis-management processes.

In conclusion, existing escalation-control arrangements are unlikely to remain adequate as regional militaries develop faster and more ambiguous strike options. Strengthening crisis stability will require targeted measures such as expanded test-notification regimes, more reliable senior-level communication channels and structured doctrinal transparency. Such steps would help mitigate the risks of miscalculation under time-compressed conditions. Without these adaptations, hypersonic proliferation may erode the limited space for calibrated signalling that currently helps to prevent crises from escalating beyond the conventional level.