Entangled Deterrence and Doctrinal Drift: Reassessing South Asia's Nuclear Stability

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Abstract

Advanced conventional and dual-use non-nuclear capabilities increasingly threaten dual-use command, control, communication, and intelligence (C3I) assets, which can lead to unintended nuclear escalation. This 'entanglement' of nuclear and non-nuclear capabilities heightens the risk of inadvertent escalation through 'crisis instability', 'misinterpreted warnings', and the disruption of the 'damage-limitation window', as identified by James Acton (2018). This study explores how the vulnerability of dual-use early-warning systems exemplifies these risks in the India–Pakistan context. This paper also analyses how the targeting of early-warning assets during a conventional conflict could unintentionally undermine either state's nuclear monitoring capabilities. The recurrence of such targeting in successive crises reflects an emerging pattern of doctrinal momentum towards escalatory postures, rather than isolated incidents, underscoring the cumulative erosion of crisis stability over time. The doctrinal adaptations among the South Asian arch-rivals may further add to the volatility of the regional deterrence stability framework. Additionally, the paper explores the dangers of cyber interference, especially in the fragile deterrence environment of South Asia, where cyber vulnerabilities might compromise deterrence stability. Consequently, these events could lead to an inadvertent escalation pattern that may interact with strategic nuclear affairs. To address these risks, the paper suggests measures such as organisational reforms to address these risks in planning and decision-making, subsequently leading to further enhanced cooperative measures in the future.

Keywords

India, Pakistan, nuclear entanglement, doctrinal shifts, risk reduction, CBMs

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Introduction

An effective and secure nuclear command and control system remains integral to the credibility of a state's nuclear deterrence. The effectiveness of such a system has three key requirements that include the following: the appropriate delegation of authority, maintenance of positive and negative controls, and accurate early warning and attack assessment (Shaheen, 2018). As the global security environment evolves, the intersection of technological innovation and strategic military doctrines presents new challenges that could reshape the future of international conflicts and introduce a variety of new triggers for escalation. This raises critical questions in the nuclear realm: what occurs when advancements in conventional capabilities become sufficient to pose a significant threat to a state's nuclear Command, Control, Communication, and Intelligence (C3I) systems? Or, put differently, what would happen when a state's C3I infrastructure becomes increasingly vulnerable to emerging technologies? The 2018 US Nuclear Posture Review highlighted this threat through the warning that Washington may consider nuclear retaliation in response to "significant non-nuclear strategic attacks […] on US or allied nuclear forces, their command and control, or warning and attack assessment capabilities" (U.S. Department of Defense, 2018).

This declaratory posture was reaffirmed in the 2022 Nuclear Posture Review, which retained the same ambiguity regarding non-nuclear attacks on NC3 infrastructure, signalling continuity in US thinking on this threshold (U.S. Department of Defense, 2022). Thus, strategic targeting via precision munitions poses a significant risk of escalation that does not necessarily have to be deliberate in nature. A key, yet elusive, driver of inadvertent escalation is the increasing overlap between nuclear and nonnuclear C3I capabilities, a phenomenon referred to as 'entanglement' (Acton, 2018a). While this issue of entanglement has been examined in the context of the US, Russia, and China, it remains underexplored in South Asia, home to two nuclear-armed neighbours that have engaged in limited conflicts under the nuclear overhang.

Nuclear and non-nuclear C3I assets may be entangled in two main ways: they can serve dual-use purposes (both in offensive and defensive operations) or be susceptible to non-nuclear attacks. Entangled assets include early warning satellites; communication, intelligence, surveillance, and reconnaissance; ground-based radars and transmitters; and communication aircraft (Acton, 2018a, p. 57). How the entanglement of these assets can lead to inadvertent escalation has been deliberated in various studies. Among notable works on inadvertent escalation through entanglement, James Acton has contributed remarkably by offering insights through developing different scenarios. This entanglement is increasingly compounded by the shift toward Multi-Domain Operations (MDO), an operational concept that integrates space, cyber, air, land, and maritime domains under unified sensor and command architectures, which makes the separation of nuclear and conventional C3I functions structurally more difficult.

James Acton describes how the C3I assets are becoming more entangled due to four main trends (Acton, 2018a, p. 59). First, advancements in nonnuclear technology are increasingly posing a threat to C3I systems. These technologies include cyber and related weapons, anti-satellite capabilities, and high-precision conventional munitions (Acton, 2018a, p. 63). Second, digitization and reduced redundancy, often caused by limited funding (especially in the case of South Asian nuclear rivals), are making C3I systems more vulnerable. Third, there is a growing reliance on dual-use assets like early-warning satellites, which are used both to detect incoming nuclear

attacks and to cue defences against conventional ballistic missiles. Finally, evolving conventional warfighting doctrines are increasingly underscoring the intent to target adversaries' C3I assets, including those with dual-use functions (Acton, 2018b, p. 67).

Increased entanglement raises the likelihood of incidental attacks, where a state may target its adversary's dual-use assets (C3I capabilities and weapons delivery platforms) in a conventional conflict to gain an advantage on the battlefield, but inadvertently also undermines the adversary's nuclear capabilities. Considering factors like the 'fog of war' and making interpretations based on worst-case scenarios, there are three pathways to inadvertent escalation: 'crisis instability,' 'misinterpreted warnings,' and 'damage limitation window.' However, given the limited advancement in technological capabilities necessary to support effective damage limitation doctrines in both India and Pakistan, this paper will focus on the implications of misinterpreted warnings and crisis instability in the region.

India and Pakistan rely on sophisticated dual-use C3I architectures encompassing satellites, radars, and communication networks that are shared across conventional and nuclear functions. This architectural entanglement is distinct from, though related to, entanglement at the level of weapon delivery platforms (discussed in the Dual-Delivery Means section below). At the C3I level, both states exhibit a degree of entangled command and control: Pakistan's consolidation of cyber, intelligence, and reconnaissance functions under the C4I2SR Directorate (discussed below) illustrates how conventional and strategic command functions increasingly share infrastructure.

Separately, at the weapons level, Pakistan aims to maintain strategic stability through its rejection of a No-First-Use (NFU) policy, passive defence measures, and low-yield battlefield nuclear weapons (Tasleem, 2016). In contrast, India's acquisition of advanced technologies like hypersonic glide vehicles, precision weapons, and missile defence systems shifts the strategic balance, contradicting its stated countervalue doctrine of massive retaliation and NFU.

Growing internal debate within India's strategic community further signals possible transitions in its nuclear doctrine, increasing the risk of misinterpretation by influencing Pakistan's threat perception (Rajagopalan, 2016). The increased automation of these systems also heightens the risk of cyber vulnerabilities, data manipulation, and technical failures, which could lead to inadvertent nuclear escalation. This is evidenced by India's reported integration of AI-based sensor fusion in its Integrated Air Command and Control System (IACCS) and growing reliance on autonomous ISR platforms for border surveillance, which reduce the window for human verification of ambiguous signals (Mahmood & Sultan, 2022). Similarly, reduced human oversight in automated systems raises the likelihood of misinterpreting conventional threats as nuclear ones, exacerbating the risks. India is expanding its inventory of armed drones (e.g., the indigenous Rustom-II/TAPAS and procured MQ-9B Predator systems) (Rasheed, 2025), alongside its development of AI-enabled loitering munitions.

This reflects a partial shift toward non-human interfaces in surveillance and strike roles, platforms whose signatures may be harder for Pakistan to distinguish from preparatory moves against strategic targets. In parallel, Pakistan's restructuring of its C3I Directorate into the C4I2SR Directorate by integrating cyber, intelligence, and reconnaissance operations also poses a challenge to the management of nuclear and non-nuclear forces, deepening entanglement risks (Khan, 2019). This restructuring unifies all assets related to cyber operations, intelligence, surveillance and reconnaissance (ISR), electronic warfare, and space assets under a single umbrella,

suggesting that conventional and nuclear-relevant functions now sit within the same organisational and technical chain of command, deepening entanglement risks (Khan, 2019). While this consolidation may enhance operational efficiency, it also introduces potential management challenges, particularly in handling both nuclear and conventional forces. This dual responsibility certainly contributes to entanglement issues.

While the developments within India and Pakistan may enhance the probability of inadvertent escalation through entanglement, the idea has not been new in the literary discourse. This study, thus, builds on the 2018 James Acton paper, "Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War." However, this study attempts to apply the said paper's findings to the Indo–Pak nuclear dyad by exploring the vulnerability of dual-use early-warning systems and their role in inadvertent escalation in the context of India and Pakistan. Since Acton's argument was centered on the multi-domain aspects of the integrated operations matrix the US exhibits, it is not being replicated but is being tested for the conditions of the multi-domain operational environment and experiences of South Asian rivals and the evolving strategic dynamics.

The study further assesses how technological advancements and shifting strategic postures contribute to crisis instability and misinterpretation. The paper concludes by proposing key measures to mitigate risks, including separating nuclear and conventional command systems, enhancing crisis communication, and reinforcing confidence-building measures. Bilateral as well as multilateral diplomatic engagements, along with clear declaratory policies, are essential for reducing the chances of inadvertent escalation and ensuring regional stability.

This paper will also focus on the implications of misinterpreted warnings and crisis instability in the region. Central to the 'misinterpreted warnings' pathway is the question of perceived intent, which seeks to probe whether the targeted state interprets an attack on its dual-use assets as incidental battlefield collateral or as a deliberate attempt to blind its nuclear forces. This is significant to establish the distinction explored in detail below. Two related dynamics compound this problem: 'warhead ambiguity,' where dual-use delivery platforms make it impossible for an adversary to know whether an incoming strike is conventional or nuclear, and 'launch ambiguity,' where the trajectory or launch signature of a missile does not reveal its payload until late in flight, if at all. Both dynamics are examined later in relation to dual-use C3I systems, alongside a third related risk, 'mischaracterization,' where the targeted state attributes hostile intent to an attack that was, in fact, aimed at a conventional target sharing infrastructure with nuclear-relevant systems.

Dual Use C3I Assets and Security Paradox

India and Pakistan rely on intricate command and control systems, including satellites, radars, and communication networks, to coordinate their nuclear and conventional military operations (Mian et al., 2003, p. 110). These systems are vital for surveillance, early warning, and communication, and often play dual roles, supporting both conventional and nuclear operations (Mian et al., 2003, p. 110). This dual-use reliance is driven by resource constraints because neither state can afford separate nuclear and conventional command systems. Since both states are modernising incrementally rather than comprehensively, entanglement risks will likely persist or deepen. The dual-use nature of these weapon systems may lead to establishing a "security paradox", whereby

the actions deemed necessary for achieving conventional military advantage by one of the adversaries (State A) may cause an undesired escalation by the other adversary (State B), thereby compromising the security interests of 'State A'. The 'security paradox' arises when these critical assets are susceptible to non-nuclear attacks to gain battlefield advantage in a conventional war. Such an attack on entangled assets could lead to escalation by inadvertently undermining the adversary's nuclear capabilities, essentially blinding them. In response, the target state may perceive the attacks to be deliberate attempts to undermine its nuclear response, prompting it to take escalatory measures to protect its nuclear assets. Additionally, the unique geography of South Asia, marked by proximity and short missile flight times, further intensifies the risks of misinterpretation and what Rebecca Hersman suggests as 'wormhole escalation' (Hersman, 2020).

Strikes on dual-use C3I systems, particularly communication and early-warning infrastructure, could lead to some of the most significant unintentional escalations (Acton, 2018b, pp. 67-69). The issue lies in the targeted side's struggle to distinguish between unintentional strikes and deliberate efforts to compromise its nuclear operations, including early detection of a nuclear attack. In the South Asian context, the challenge is further intensified by the fog of war and shorter reaction times, especially in a large-scale conventional conflict, and further elevated by strikes on intelligence, surveillance, and reconnaissance (ISR) systems. Hence, it is not necessarily a matter of targeting all or the majority of its early warning radars or other C3I assets but rather determining the critical point at which Pakistan or India perceives a sufficient threat to its nuclear deterrent, and ultimately its survival.

For example, in a conventional conflict, India may target Pakistan's communication systems to gain a battlefield advantage. Whereas Pakistan may interpret Indian actions targeting its dual-use assets as preparations for a pre-emptive counterforce strike targeting its strategic nuclear forces, or to slow down/disrupt its nuclear response. Attacks on C3I assets of either side could be perceived as ways to delay timely nuclear responses.

Additionally, Indian attacks on Pakistan's airborne early warning and control (AEW&C) systems, such as the Erieye AEW&C, which also provides over-the-horizon (OTH) coverage, have the potential to generate strong crisis instability (Sharma, 2024a). Such attacks could compromise the target state's nuclear response, especially when it already possesses limited capabilities. In this context, distinguishing limited conventional battlefield goals from preparations for a nuclear engagement would be challenging amid the uncertainty of war, leading to potential miscalculations. This analysis proceeds from the premise that the India-Pakistan escalation matrix is becoming relatively more hair-triggered (as India has moved from the so-called recessed, demoted posture towards operational nuclear warhead deployment and peacetime mating with launchers, whereby 12 warheads are now assessed as deployed with operational forces (Kazmi, n.d.), with limited institutionalised risk-acceptance thresholds for conventional operations near nuclear-relevant assets. This assumption is supported by both states' historical responses to limited conventional engagements discussed below.

In response to the Indian actions mentioned above, Pakistan could take measures to improve the survivability of its nuclear arsenal, which may include mobilising and dispersing its nuclear forces and delivery systems. This could exacerbate the crisis instability in the region. Additionally, Pakistan could also respond by raising the readiness of its nuclear delivery vehicles or issuing nuclear threats,

underscoring its no No-First-Use policy. Given this doctrine, India could perceive an opportunity to justify a pre-emptive counterforce strike, even if Pakistan has no immediate intention of using nuclear weapons. As a result, escalation in the region could become rapid and highly volatile.

New Delhi and Islamabad maintain centralised nuclear launch authority, with civilian leadership having formal control over the arsenals. However, Scott Sagan's organisational theory highlights the risks associated with centralised command during crises, as military leaders might potentially cover up incidents or bypass civilian control to protect their command's reputation (Ogilvie-White, 1996, p. 51). The 1999 Kargil crisis serves as a stark example, where Bruce Riedel reported that the Pakistani military began activating nuclear contingency plans without informing the civilian leadership (Talbott, 2004). This scenario demonstrates how, despite civilian oversight, military leaders can exert significant influence during crises, potentially leading to unauthorised or premature actions. While Kargil remains the starkest historical illustration of this dynamic, more recent crises, including the 2019 Balakot episode, the 2022 BrahMos incident, and the 2025 Pahalgam crisis, discussed in detail in the Past Experiences section below, suggest that similar organisational risks persist despite over two decades of crisis-management experience. The centralised nature of command may not fully mitigate the risks of rogue elements within the military acting independently, which could escalate tensions and contribute to the destabilisation of nuclear command and control in a high-pressure environment.

The inadvertent firing of a BrahMos missile into Pakistan in March 2022 exemplifies the challenges of unauthorized actions by subordinate personnel within a nuclear-armed state, raising profound concerns over the robustness and discipline of India's command and control structure. Thus, in a scenario where military generals control the nuclear 'button,' inadvertent escalation through entanglement could be more volatile due to organizational dynamics that may not fully prevent rogue actions or unauthorised decisions. Another perspective is that as tension levels rise, political leadership might not have sufficient time to delve into actions at the operational level, thereby delegating decisions to lower-level personnel. This delegation increases the risk of misinterpretation and hasty actions, further exacerbating crisis instability and the likelihood of inadvertent escalation. Distinguishing between limited conventional goals and preparations for nuclear engagement remains a challenge (Shaheen, 2018, p. 17).

Space Situational Awareness

The growth of India's military space program for both nuclear and conventional use, bolstered by agreements like BECA, COMCASA, and LEMOA with the U.S. that give access to dual-use satellite technologies, enhances its military operations through real-time geospatial intelligence, secure communications, and logistical support (SVI Administrator, 2020). These agreements not only enhance India's military operations but also encourage a more assertive posture, enabling India to maintain round-the-clock surveillance of Pakistan's conventional and strategic installations, boosting its confidence in a potential first strike and also required for BMD capabilities, given Pakistan's limited strategic nuclear arsenal. The operational value of this access was illustrated during the post-Pahalgam 2025 standoff, where Indian forces reportedly leveraged satellite-based ISR, facilitated in part by these agreements, to enhance situational awareness along the Line of Control, underscoring how dual-use space assets translate strategic agreements into tactical advantage. However, this integration of nuclear and conventional capabilities through military space assets increases the

risks of entanglement, where an attack (whether physical or virtual) on dual-use systems, such as satellites, could be misinterpreted as an attempt to undermine nuclear command and control, triggering escalatory responses, including nuclear retaliation.

Dual-Delivery Means

Both nuclear adversaries possess a range of dual-use and advanced missile systems that may contribute to crisis instability in South Asia. These systems are further evolving towards greater accuracy, payload capacity, and range. For instance, Pakistan also has dual-use fighter aircraft, including 24 nuclear-capable F-16A/Bs (1,600 km) and 36 nuclear-capable Mirage III/Vs (2,100 km), modified for nuclear missions. Additionally, Pakistan has been arming JF-17s with nuclear-capable cruise missiles (Business Standard, 2024). The Indian BrahMos missile (range 500 km), developments in hypersonic vehicles such as HGV-202F, the nuclear-capable Mirage 2000H, and the Nirbhay cruise missile (800-1,000 km) further raise the risks of nuclear entanglement and crisis instability in the region (Arms Control Association, 2023).

Another scenario of entanglement arises from Pakistan's deployment of conventional submarines armed with nuclear-capable cruise missiles, such as the Babur-3, which could introduce significant strategic complexity. The Babur-3, capable of delivering various payloads, is launched from Pakistan's Agosta 90-B/Khalid Class diesel-electric submarines (DAWN, 2018). While conventional submarines are typically employed in non-nuclear operations such as anti-ship warfare, surveillance, and conventional strike missions, Pakistan's lack of nuclear-powered submarines creates ambiguity about their role in nuclear strategy. This ambiguity makes them vulnerable to targeting for battlefield gains in a conventional conflict, which could be perceived as a direct threat to Pakistan's second-strike capability, potentially leading to an escalatory response. Conversely, India's nuclear-armed submarines, such as the INS Arihant, and the deployment of the extremely precise dual K-15 (Sagarika) SLBM, with claims of \almost zero circular error probable (Panda, 2016), signify a capability that diminishes collateral damage and allows India to carry out precision nuclear strikes against an adversary's military targets.

Technological Advancements and Entanglement

Despite the challenges posed by technological innovations and their dual-use nature, India and Pakistan continue to modernise their command-and-control systems. According to official statements, Pakistan's National Command Authority (NCA) has implemented a 'fully automated Strategic Command and Control Support System' that provides resilient command and control for all strategic resources, ensuring continuous situational awareness in a digitised, network-centric environment (Inter Services Public Relations, 2012). Similarly, the Indian Army has developed a 'fully automated communication network' designed to manage its nuclear assets effectively (Kumar, 2006).

Hence, the sophistication of these systems does not eliminate the risks associated with cyber warfare, particularly given the entanglement between nuclear and non-nuclear capabilities. Both countries must grapple with the fact that cyber operations, whether intentional or accidental, could disrupt communications, sensor networks, or decision-making processes, thereby creating significant risks. Similarly, cyber weapons that could compromise both C3I systems and nuclear forces, along with non-nuclear strategic ballistic missile defence systems capable of intercepting nuclear weapons post-launch, also pose considerable risks.

The Play of Doctrinal Trends and Past Experiences

The evolution and transformation of the doctrinal postures of South Asian nuclear rivals present another significant challenge to crisis stability and, if not managed appropriately, may lead to misinterpreted warnings. Following Acton's inadvertent escalation model, the introduction of doctrinal ambiguities, without strategic contemplation, by the asymmetrically dominant conventional power may lead to a wormhole escalation. Rebecca Hersman's articulation of spiralling escalation in relation to domestic pressure points may be better explained through the lens of doctrinal drift, as visible in South Asia.

India's Doctrinal Evolution

India has developed several military doctrines and postures, both declared and undeclared, over the years. Since the 2000s, New Delhi has continuously evolved its doctrines to address operational gaps and enhance synergy and integration across its tri-services, with a focus on military operations that are confined in scope, geography, and duration, and on executing actions before crossing Pakistan's nuclear thresholds (Khan, 2019). These include the Draft to Official Nuclear Doctrine (2003), the Cold Start Doctrine (2004), India's Joint Armed Forces Doctrine (2017), the Land Warfare Doctrine (2018), and the most recent initiative, i.e., the creation of three integrated theatre commands, though these remain under development and are unlikely to be fully operational by 2025.

Moreover, India's doctrine of massive retaliation, which abandons the concept of flexible response or escalation control, further complicates the situation (Sethi, 2023). This heightens crisis instability and nuclear escalation, making them more sudden and explosive, particularly in their interaction with Pakistan's nuclear doctrine. While technological advancements and C3I vulnerabilities certainly increase the threat of entanglement, doctrinal trends play a critically significant role in the context of Pakistan and India.

In October 2017, Indian Air Force Chief B.S. Dhanoa stated that, if necessary, India could conduct a surgical strike, with its aircraft capable of targeting and destroying Pakistan's nuclear installations (Iqbal, 2017). Since Pakistan has no official nuclear doctrine, Lieutenant General Khalid Kidwai is widely regarded as the official spokesperson. Accordingly, under his four scenarios, this would violate Pakistan's 'military threshold' (Yamin, 2008, p. 22). In the words of former NSA Shivshankar Menon, 'After a Pakistani TNW strike, India can go for Pakistan's nuclear arsenal' (Shukla, 2017). These statements and threats underscore capabilities, intentions, and inherent risks, as even non-nuclear attacks on nuclear forces, or retaliatory strikes, whether targeting counterforce or counter-value assets, carry the risk of pre-emption. In scenarios where there is a credible threat of a decapitating strike against nuclear installations or command-and-control centres, such actions could be highly escalatory and risk sparking a nuclear conflict.

Such doctrinal advancements have been accompanied by a growing number of statements from serving and retired Indian political and security personnel, as well as from broader academic circles in India, suggesting that pre-emptive counterforce strikes against Pakistan are not only strategically beneficial but also consistent with India's doctrine. Tanvi Kulkarni and Sitara Noor highlighted the debate that was sparked in the aftermath of a former Indian Defence Minister's statement that cast

uncertainty over the NFU's continuity within India's nuclear doctrine (Kulkarni, 2019). The Indian Journal of Asian Affairs also published a paper suggesting subtle shifts in India's nuclear posture towards pre-emptive counterforce options, within broader flexible response patterns, projecting a remarkable shift from an NFU based on massive retaliation to a more ambiguous stance (Iqbal, S., 2023). On similar lines, Christopher Clary and Vipin Narang also suggested a possible shift in India's 'No-First-Use' nuclear policy to accommodate 'pre-emptive strikes' against Pakistan (Clary & Narang, 2019). These developments hint at India's growing intent to consider and develop strategies aimed at targeting Pakistan's strategic nuclear systems in a conflict. In contrast to its counter-value assured retaliation approach towards China, there is a growing body of evidence in support of hard nuclear counterforce strike options against Pakistan. Reportedly, India is also aspiring to maintain a ready-to-use nuclear arsenal, which in itself is a threat to Pakistan and underscores the arduous challenge of dealing with a nuclear India (Syed, 2024).

In addition, India's public declaration of its aggressive 'limited war doctrine under the nuclear overhang' may be aimed at exploiting Pakistan's perceived nuclear threshold (Z. Khan, 2013, p. 2). Similarly, the concept of 'New Normal' is sought to capitalise on the strategic gap between the ongoing low-intensity conflicts at sub-conventional levels (Chaudhry, 2023). This mindset among Indian policymakers also led to the adoption of 'surgical strikes', which is based on the concept of 'pre-emptive counterforce' actions against Pakistan. The conception of the surgical strike option further extends to averting intervention from a third power, particularly the United States, to defuse the crisis or pressurising India into settling for some "symbolic" token retaliation. This approach aims to deliver a swift and decisive strike that inflicts sufficient damage to the adversary, signalling resolve and capability to test Pakistan's nuclear threshold (Ali & Bukhari, 2022, p. 79).

India adopted these strategies of waging a limited war through surgical strikes under the full-spectrum response option, stating: "India has moved to a pro-active and practical philosophy to counter conflict situations" (Directorate of Doctrine, 2017). This is formally outlined in India's Joint Armed Forces Doctrine (2017) (Khattak et al., 2019, p. 142). It also highlights that India's conventional war would encompass offensive operations aimed at addressing the adversary's centre of gravity. This is achieved by attacking the enemy's criticalities, either simultaneously or sequentially (Directorate of Doctrine, 2017). The same doctrine describes disruption as a "lower form of armed conflict destroying elements essential for cohesion, such as the command and control (C2) systems" (Directorate of Doctrine, 2017, n.d.). On the Pakistani side, the evolution of the Dynamic Response Strategy, emphasising rapid, calibrated conventional responses to sub-conventional provocations, has similarly been accompanied by growing integration of Multi-Domain Operations concepts and unmanned systems (including armed drones and loitering munitions), reflecting a parallel doctrinal convergence that further compresses decision timelines on both sides.

More recently, the post-Pahalgam crisis pushed Indian designs for military offensives to even more alarming levels, with the use of standoff weapons across various platforms and AI-enhanced loitering munitions introducing a multi-domain strategic apparatus. These engagements, involving multi-domain effects and significant misinformation campaigns, lay the foundations for what Rebecca Hersman suggested as wormhole escalation. This pathway has grim potential to trigger critical points of (inadvertent) nuclear escalation. A serious misperception by either side in such a conflict would lead to misinterpretation of the so-called sub-conventional domains, as

attacks using standoff weapons, including BrahMos-like dual-capable platforms, 5th-generation aerial platforms, and AI-enhanced loitering munitions, may not be perceived by the other side as sub-conventional. Attacking the other side's nuclear arsenals inadvertently or compromising dual-use communication networks in hostile environments may lead to wormhole escalation. To put it plainly, what may be a 'limited conventional strike' for India may be perceived as a 'total nuclear war' from Pakistan's perspective.

Past Experiences and Crisis Instability

The overlap between nuclear and conventional strategies in both India and Pakistan has created an environment of crisis instability. In South Asia, this is particularly acute because of geographical proximity, short missile flight times, and fragile communication channels between the two states. A notable example of crisis instability occurred in April 2022, when Indian officials claimed that the land-attack, nuclear-capable BrahMos missile was 'accidentally fired' into Pakistan's territory. However, some Pakistani experts have alleged that India conducted the launch 'on purpose' to assess Pakistan's reaction time (Sharma, 2024b). In such a high-stakes crisis, the potential for misjudgement and swift escalation is significant. If Pakistan were to launch a pre-emptive strike based on perceived threats, India would almost certainly retaliate with its full military might. The pressure to act decisively, especially during an active crisis, coupled with misinterpreted warnings, makes the risk of rapid and uncontrolled escalation a very real concern.

Furthermore, poor communication during the Pulwama-Balakot incident and the ongoing lack of cooperation after the BrahMos missile accident (and more recently in the aftermath of the Pahalgam crisis) raise serious concerns about the impact of these new technologies on an already fragile deterrence equilibrium. The Indian reply to the Delhi High Court (DHC) disclosing 'reasons behind accidental firing' also raises eyebrows about the command and control of Indian nuclear and strategic assets, fuelling apprehensions that, with the rapid increase in Indian arsenals and stockpiles, there is a growing risk of losing effective control and management over these critical weapons systems (Hassan, 2024). This is particularly troubling given that both states signed the 'Agreement on Reducing the Risk from Accidents Relating to Nuclear Weapons'on February 21, 2007 (Stimson Center, 2007) and have had a 2004 'Hotline Agreement' in place (Arms Control Association, 2020). These agreements were intended to reduce the risks associated with nuclear weapons and prevent accidental or unauthorised use, yet the recent incidents highlight loopholes in their effectiveness.

According to sources, the Pakistan Air Force was unable to detect the Indian fighter jets during the Balakot operations because their surveillance systems had been jammed by the Indian Air Force (Business Standard, 2019). The Indian aircraft involved in the operation were equipped with electronic warfare (EW) systems that effectively disrupted Pakistani radar capabilities (Business Standard, 2019). Likewise, during Operation Swift Retort, Pakistan also utilized electronic warfare (EW) techniques to disorient Indian air defences that possibly led to the destruction of their own helicopters in the Indian Occupied Kashmir sector (Sharma, 2024c).

The failure of the Pakistan Air Force to detect Indian fighter jets due to radar jamming during the post-Pulwama crisis can have significant implications for future conflicts. Notably, in January 2024, Pakistan's air defence system suffered a major setback when Iranian missiles and drones evaded detection and targeted the bases of a Sunni militant group called Jaish al-Adl in Baluchistan province (Jehangir, 2024). This

incident is significant for the entanglement argument because it demonstrates that radar or surveillance failures attributable to third parties can be misread as signals from the primary adversary, precisely the kind of misinterpretation risk this paper identifies as a driver of inadvertent escalation between India and Pakistan. If, in the near future, when tensions between Pakistan and New Delhi are on the verge, Islamabad discerns that its radar systems are ineffective, it might perceive this as a sign of an imminent or potential attack from India, though it may be jammed by third parties, as in this case, possibly Iranian militants.

Hence, a conventional attack on dual-use C3I assets, either by the primary adversarial dyad or any third-party irritants, could lead a state to interpret the degradation of its nuclear forces as a deliberate strategy based on the assumption that its adversary is targeting its nuclear deterrent, especially given that both states maintain dual-use command and control structures. Consequently, this would prompt a swift and possibly disproportionate response to safeguard its strategic assets. Even in the case of a hardware malfunction or a signal degradation problem in the transmitter of the radar, Pakistan or India may discern it to be jammed due to experience.

Another challenge is that, in the case of Pakistan and India, the close geographical proximity makes it difficult to assess the levels of war, namely sub-tactical, tactical, operational, and strategic (Abdullah, 2024, p. 84). These levels may overlap and are not clearly differentiated in the doctrine and thus are open to interpretation.

Matthew Kroenig has proposed the superiority-brinkmanship synthesis and its implications for deterrence (Ashraf & Haq, 2023, p. 17). In this framework, nuclear superiority shifts the balance of power in favour of one state, giving it a strategic edge in initiating atomic conflict, as seen in India. Brinkmanship theorists such as Schelling argue that states deliberately escalate crises to test their opponent's resolve, a concept illustrated by India's sub-conventional and surgical strikes (Ashraf & Haq, 2023, p. 17). This further transformed power struggles into nuclear posturing, as illustrated by the BJP's 2014 election manifesto, which announced that its government would revise India's nuclear doctrine (Sultan, 2019). In this context, the concept of 'demonstrable versus inferred deterrence' becomes crucial, as India's visible nuclear capabilities and actions are intended to be demonstrable, reinforcing its deterrent posture, whereas Pakistan's inferred deterrence relies more on ambiguity to maintain strategic stability.

Recommendations to Prevent Inadvertent Escalation through Entanglement

The evolving nature of military capabilities and strategies in South Asia significantly heightens the risks of nuclear entanglement and inadvertent escalation. However, these risks stem from factors that differ from those in other nuclear-weapon states. Doctrinal ambiguity, lower technological sophistication, a history of limited conventional conflict under the nuclear umbrella, and asymmetric conventional and nuclear capabilities all alter the equation in South Asia. As both nations expand their arsenals-India with its advanced missile systems and ballistic missile defences, and Pakistan with its asymmetric strategies to counter-balance India's conventional superiority; the region becomes increasingly susceptible to crisis instability. The interlinking of conventional and nuclear forces, including dual-use C3I systems, early warning radars, and satellites, exacerbates the risk of misinterpreted warnings, potentially leading to catastrophic outcomes.

Addressing these dangers requires a comprehensive and holistic approach, beginning with the following recommendations to enhance strategic stability, reduce

the likelihood of inadvertent escalation, and prevent conflicts driven by crisis instability and misinterpretation.

Establishing Risk-Reduction Teams

Pakistan and India should establish risk-reduction teams within their defence establishments to institutionalise these efforts. These teams would provide critical advice in peacetime and during crises, guiding the political and military elite on the risks of entanglement and ensuring these risks are considered in strategic planning and acquisitions. The teams should comprise civilian strategists, military planners, and intelligence officials familiar with one another's perspectives. In peacetime, they could propose unilateral risk-reduction measures, such as adjustments to declaratory policies and the design of C3I systems, to ensure a clearer distinction between nuclear and conventional C3I functions and reduce misinterpretation during attacks on these assets.

A More Robust C3I Architecture

In the long run, both states should invest in developing more resilient and less entangled C3I systems. One approach would be to create separate systems for nuclear and conventional operations, thereby reducing the risks associated with dual-use capabilities. However, this would require convincing the other side that such separation is real and verifiable, a challenging task given the current levels of mistrust. It would also entail trade-offs of its own, including the financial costs incurred and the diversion of limited defence funds.

Moving Toward Cooperative Risk-Reduction Measures

While the current political climate may not seem conducive to cooperative risk-reduction measures, future opportunities should not be ruled out. Improved relations or deeper ties could incentivise both states to take joint action to mitigate risks. For example, they could agree to prohibit cyber interference with each other's nuclear C3I systems. To make this work, both states would need to overcome significant technical and political challenges. Hence, unilateral risk-reduction measures could lay the groundwork for future cooperation by deepening understanding of the risks and building expertise in managing them.

Enhancing Bilateral Nuclear CBMs and Declaratory Policies

Pakistan and India should focus on strengthening and expanding their bilateral agreements and confidence-building measures (CBMs) to reduce the risk of nuclear escalation. Existing agreements, including the 1988 Agreement on the Prohibition of Attacks on Nuclear Installations, the 1991 Non-Nuclear Aggression Agreement, and the 2005 Pre-Notification of Missile Tests Agreement, should be fully implemented. These CBMs are vital for preventing miscommunication and fostering understanding.

Both states have maintained unilateral moratoriums on nuclear testing. Pakistan has pledged not to resume testing, and India made a similar commitment in a 2005 joint statement with the U.S., linked to U.S. legislation. Rather than relying on external interventions, Pakistan and India should formalise these moratoriums in a treaty, reinforcing their shared commitment to restraint and reducing escalation risks. International actors, particularly the USA and China, can support cooperation between the two adversaries.

Strengthening communication channels, such as the Hotline between Directors General of Military Operations (DGMOs), and ensuring they function during crises are crucial to preventing miscalculations. Additionally, agreements such as the

2007 Agreement on Reducing Risks from Nuclear Accidents are essential for crisis management.

Finally, both countries should adopt declaratory policies to deter attacks on C3I assets, clearly signalling the associated risks. Consistent communication of these policies, alongside commitments to existing agreements, would enhance strategic stability in South Asia.

Conclusion

This paper has examined how the entanglement of nuclear and non-nuclear dual-use C3I assets in South Asia heightens the risk of inadvertent nuclear escalation, primarily through two pathways identified by James Acton: crisis instability and misinterpreted warnings. The central argument is that a conventional strike on dual-use C3I infrastructure, even one undertaken for purely battlefield objectives, can be perceived by the targeted state as a deliberate attempt to degrade its nuclear command, control, and early-warning capabilities. This risk is compounded by two related dynamics examined throughout the paper: warhead ambiguity, in which dual-use delivery platforms leave an adversary unable to distinguish a conventional strike from a nuclear one, and launch ambiguity, in which a missile's trajectory does not reveal its payload until late in flight. Together, these dynamics create conditions under which mischaracterisation of intent is not merely possible but, under crisis conditions, increasingly probable.

The paper grounds this argument in both structural and empirical evidence. Structurally, Pakistan's consolidation of cyber, intelligence, surveillance, and reconnaissance functions under the C4I2SR Directorate, and India's parallel movement towards integrated, multi-domain command architectures, illustrate how conventional and nuclear-relevant C3I functions are becoming organisationally and technically harder to separate. This reflects a dynamic broadly consistent with Acton's "integrated operations matrix," though less mature than in the US context from which that concept was derived. This entanglement is reinforced by doctrinal evolution on both sides: India's growing inventory of precision-strike, hypersonic, and missile-defence capabilities sits uneasily alongside its declared no-first-use and massive-retaliation posture, while Pakistan's rejection of NFU, its development of dual-use systems such as the Babur-3 submarine-launched cruise missile, and the evolution of its Dynamic Response Strategy towards multi-domain and unmanned-systems integration reflect a parallel compression of decision-making timelines. Empirically, the analysis of past crises, including the 2019 Balakot episode, the 2022 BrahMos incident, the January 2024 Iran-Pakistan exchange, and the post-Pahalgam crisis of 2025, demonstrates that radar, ISR, and electronic-warfare failures attributable to one party or a third party have repeatedly created conditions ripe for misattribution, lending the paper's theoretical argument empirical weight rather than leaving it as a purely speculative scenario.

These dynamics unfold against the backdrop of fragile India-Pakistan relations, a hair-trigger regional escalation matrix with limited institutionalised tolerance for ambiguity, and an emerging geo-technological landscape in which automation, AI-enabled sensor fusion, and unmanned systems are steadily narrowing the window for human verification of contested signals. It is this combination of structural entanglement, doctrinal momentum, a low-tolerance crisis environment, and accelerating automation that elevates the entanglement risks identified above from a theoretical possibility to a live policy concern for decision-makers in both capitals.

Accordingly, the recommendations in this paper aim to narrow the space in which such misinterpretation can occur. These include reinforcing and fully operationalising existing bilateral confidence-building measures (the 1988 Agreement on the Prohibition of Attacks on Nuclear Installations, the 1991 Non-Nuclear Aggression Agreement, and the 2005 Pre-Notification of Missile Tests Agreement), alongside formalising the existing unilateral testing moratoria into a binding bilateral commitment. Equally important is ensuring that crisis-communication mechanisms, particularly the DGMO hotline, remain functional and are actively used during periods of heightened tension, as supported by the 2007 Agreement on Reducing Risks from Nuclear Accidents. Finally, both states would benefit from clearer declaratory policies that explicitly address the status of dual-use C3I assets, reducing the scope for an adversary to miscalculate the consequences of targeting such assets or to misread their loss as a deliberate decapitation attempt. Taken together, these measures would not eliminate the structural entanglement documented in this paper, but they would meaningfully reduce the likelihood that such entanglement translates into inadvertent escalation, a risk that, as this study has shown, is not remote and one that Indian and Pakistani decision-makers would be well advised to take into account as both states continue to modernise their conventional and strategic forces.

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