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Algorithmic Sovereignty in South Asia: India's Use of AI in the 2025 Border Conflict

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Introduction

In May 2025, a limited but high-intensity border conflict broke out between India and Pakistan, triggered by escalating militant incidents supported by Pakistan-based outfits in the Indian state of Jammu & Kashmir. In the months leading up to the war, Indian security forces recorded a rise in cross-border infiltrations, drone weapons drops, and ambushes on convoys of security forces near the Line of Control (LoC).[1]

Tensions reached a flashpoint on 22 April 2025, with a mass shooting at Baisaran Valley in Pahalgam, Jammu & Kashmir, where militants killed 26 civilians—mostly Hindu tourists and their guide—by shooting them at point-blank range after separating men and women.[2] This massacre, the deadliest civilian attack since the 2008 Mumbai strikes, shocked the nation and heightened international condemnation.[3] It marked a decisive moment: under mounting political and public pressure, India launched

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[1] *Times of India*, "Terrorists Open Fire at Army Vehicle in Jammu & Kashmir's Rajouri," 26 February 2025, accessed 30 July 2025, https://timesofindia.indiatimes.com/india/terrorists-open-fire-at-army-vehicle-in-jammu-kashmirs-rajouri/articleshow/118575737.cms

[2] R. Anil Kumar, "'Pahalgam Terror Attack India's Worst Since 26/11,' Says Envoy at UN," *India Strategic*, 29 April 2025, accessed 3 August 2025, https://www.indiastrategic.in/pahalgam-terror-attack-indias-worst-since-26-11-says-envoy-at-un/

[3] Shatabdi Chowdhury, "Five Tourists Injured in Attack by Terrorists in J&K's Pahalgam," *NDTV*, 23 April 2025, accessed 29 July 2025, https://www.ndtv.com/india-news/5-tourists-injured-in-attack-by-terrorists-in-j-ks-pahalgam-8226458

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"controlled escalation" operations designed to degrade militant infrastructure across the LoC.

Table 1.1: Timeline of Key Events During the May 2025 India–Pakistan Conflict

Date	Event
22 April 2025	Pahalgam massacre (26 Indian civilians killed)
6 May 2025	Operation Sindoor initiated: Indian missile strikes on militant camps
7–9 May 2025	Pakistani counterstrikes (Operation Bunyan al-Marsus)
8–10 May 2025	India strikes eight PAF airbases; high damage to Pakistani military infrastructure
10 May 2025	Operations paused; no formal ceasefire announced

Source: Author's original compilation.

Beginning on 6 May and lasting until 10 May 2025, a brief but intense escalation unfolded under the Indian Armed Forces' Operation Sindoor. India launched this limited campaign in response to the Pahalgam massacre, targeting nine identified militant-infrastructure sites in Pakistan and Pakistan-administered Kashmir. These included training camps, arms depots, and communication hubs operated by Pakistan-based militant groups. Pakistan retaliated with Operation Bunyan al-Marsus**,** expanding the confrontation to include Indian military installations such as forward airbases and logistics hubs. The fighting remained geographically localised but technologically sophisticated, with both nations employing drones, electronic warfare, and real-time surveillance. India's deployment of indigenous AI-enhanced systems—spanning ISR platforms, air-defence coordination, predictive logistics, and cyber defence—proved pivotal in enabling rapid decision-making, minimising casualties, and avoiding uncontrolled escalation.

While Pakistan's military did utilise drone surveillance and basic electronic warfare during the conflict, there is no conclusive evidence to suggest widespread use of AI-enabled systems in combat. Analysts suggest that Pakistan's capabilities relied heavily on imported technologies from China and Turkey, particularly for ISR and drone

operations.[4] In contrast, India's self-reliant AI infrastructure—spanning algorithmic air defence, swarm-drone management, and predictive logistics—provided it with a clear operational edge. These asymmetries highlight the strategic advantage of domestic AI ecosystems in limited-conflict scenarios.

Operation Sindoor has since been paused but not officially concluded through a formal ceasefire. Notably, India reported no significant damage to its air or ground assets during the confrontation, owing to effective interception and air-defence protocols. In contrast, Pakistani losses were substantial: Indian strikes damaged eight Pakistani airbases—Nur Khan, Chaklala, Mushaf, Rahim Yar Khan, Bholari, Sukkur, Jacobabad, and Shahbaz—resulting in the destruction of fighter aircraft, hangars, radar systems, and command infrastructure. Satellite imagery confirmed these damages, including strikes near Pakistan's nuclear command-and-control centre located at Chaklala. Former Air Marshal Masood Akhtar stated that Pakistan's airborne-warning systems and a squadron at Bholari were neutralised. These developments inflicted a 20% degradation in Pakistan's operational air capabilities.[5] [6] [7]

The rapid integration of artificial intelligence (AI) into military operations has transformed the nature of modern warfare. While the AI arms race among great powers such as the United States, China, and Russia has received extensive scholarly attention, AI deployments by emerging powers remain understudied. Several comparative frameworks have recently emerged evaluating how Global South actors—including Brazil, Indonesia, and South Africa—balance AI innovation with strategic autonomy under asymmetric conditions.[8][9] India's model differs in its dual-use civil–military

[4] Devjyot Ghoshal et al., "India and Pakistan's Drone Battles Mark New Arms Race," *Reuters*, 27 May 2025, accessed 30 July 2025, https://www.reuters.com/business/aerospace-defense/india-pakistans-drone-battles-mark-new-arms-race-asia-2025-05-27/

[5] "Why India Chose to Strike These 11 Pakistan Airbases," *Times of India*, 12 May 2025, accessed 26 July 2025, https://timesofindia.indiatimes.com/india/why-india-chose-to-strike-these-11-pakistan-airbases-explained-in-pics/photostory/121099652.cms

[6] Manisha Pandey, "Why India Hit Six Pak Airbases Including Chaklala, Rafiqui and Murid," *India Today*, 10 May 2025, accessed 29 July 2025, https://www.indiatoday.in/india/story/india-hits-key-pak-airbases-why-nur-khan-murid-rafiqui-were-targeted-operation-sindoor-2722572-2025-05-10

[7] ET Online, "Pakistan's AWACS Destroyed in India's BrahMos Strikes, Admits Ex-Air Marshal: 'Missiles Kept on Coming'," *The Economic Times*, 16 May 2025, accessed 28 July 2025, https://economictimes.indiatimes.com/news/new-updates/pakistans-awacs-destroyed-in-indias-brahmos-strikes-admits-ex-air-marshal-missiles-kept-on-coming/articleshow/121211580.cms

[8] M. U. Khalid and S. Masood, "Military Application and Integration of AI: Implications for South Asian Security Paradigm," *Journal of Policy Research* (2024): 453–62.

[9] Kushal Srivastava, "Artificial Intelligence and National Security: Perspective on the Global South," *International Journal of Law in Changing World* (2022): 77–87.

innovation structure and its participation in global AI-governance forums such as the Global Partnership on AI (GPAI) and the Quad Working Group on Critical and Emerging Technologies, which collectively aim to establish norms for trustworthy AI development.

India's use of AI in this conflict aligns with the broader concept of algorithmic sovereignty—a nation's pursuit of technological independence in critical digital infrastructure and military systems.[10] Through domestic innovation and integration of civilian technologies, India has developed a model of dual-use innovation that supports its security objectives. This conflict represents a pivotal moment wherein India's technological self-reliance through AI became a core component of its military doctrine, showcasing its capability to conduct precision strikes with minimised collateral damage. This innovative approach not only serves India's immediate security concerns but also has broader implications.

This article investigates how India leveraged AI across key domains—air defence, ISR (intelligence, surveillance, and reconnaissance), logistics, and cyber operations—and assesses the strategic implications of these deployments. By positioning itself within the global discourse on military AI, India not only enhances its operational capabilities but also contributes to shaping international norms regarding the ethical use of AI in warfare. To our knowledge, this is the first integrated academic study of India's indigenous military AI deployment in active conflict.

Literature Review

The global literature on military artificial intelligence (AI) has largely centred on high-end applications by great powers such as the United States, China, and Russia.[11] These discussions often highlight lethal autonomous weapons, algorithmic targeting, and network-centric warfare. However, recent scholarship has begun to examine how mid-sized powers—particularly in the Global South—are adapting AI for asymmetric advantage in contested security environments.[12]

In the South Asian context, India offers a compelling but underexplored case. Malcolm Davis underscores how India's defence innovation ecosystem is increasingly shaped by civil–military convergence, where AI-enabled platforms developed through

[10] Khalid and Masood, "Military Application and Integration of AI."
[11] Paul Scharre, *Army of None: Autonomous Weapons and the Future of War* (New York: W. W. Norton, 2018).
[12] Warisha Rashid and Adil Sultan, "Artificial Intelligence and Arms Control," *Journal of Contemporary Studies* (2023): 1–14.

private-sector engagement are being integrated into national security infrastructure.[13] Complementing this, a report by *ET Defence* documents how Indian private firms are supplying UAVs, surveillance systems, and algorithmic decision-support tools to the armed forces, illustrating the growing depth of India's indigenous dual-use innovation model.[14]

Recent reports suggest that over a thousand Indian defence start-ups are co-developing AI-enabled platforms with the armed forces. These collaborations, often brokered through iDEX, DRDO, and private-sector channels, point to a deep change in civil–military innovation.[15] [16]At the same time, both official and media narratives describe a doctrinal pivot: away from manpower-heavy formations and towards joint, integrated warfare that relies on agility, intelligence-led operations, drone swarms, AI-powered sensors, and decision-support algorithms.[17] [18]

Policy institutions such as the Manohar Parrikar Institute for Defence Studies and Analysis contribute op-ed commentary on AI adoption trends from authors like Lt Col Akshat Upadhyay.[19] Meanwhile, think tanks such as the Observer Research Foundation provide structured analyses on emerging technologies and defence preparedness.[20] Doctrinal insights from the Centre for Air Power Studies inform how the Indian Air Force

[13] Manoj Joshi and Pushan Das, *The Future of War in South Asia: Innovation, Technology and Organisation* (New Delhi: Observer Research Foundation, 2021), accessed August 2025, https://www.orfonline.org/research/the-future-of-war-in-south-asia-innovation-technology-and-organisation/

[14] ET Defence, "Operation Sindoor: How India's Private Sector Is Arming Our Military, and Why It Could Transform the Future of Defence," *The Economic Times*, 17 May 2025, accessed July 2025, https://economictimes.indiatimes.com/news/defence/operation-sindoor-how-indias-private-sector-is-arming-our-military-and-why-it-could-transform-the-future-of-defence/articleshow/121228836.cms

[15] Shimona Mohan, "Passive Ambitions, Active Limitations: Defence AI in India," in *The Very Long Game: Assessing India's Strategy*, 445–63 (Singapore: Springer, 2025).

[16] Vinay Sehgal, "Integration of Artificial Intelligence in Indian Military Operations: An Overview," *International Journal for Multidisciplinary Research* 6, no. 4 (2024).

[17] ET Now, "Fitter, Faster and Fiercer: How Indian Army Is Changing Its Tactics to Counter Two-Front Threats from China and Pakistan," *The Economic Times*, 29 July 2025, accessed July 2025, https://economictimes.indiatimes.com/news/defence/fitter-faster-and-fiercer-how-indian-army-is-changing-its-tactics-to-counter-two-front-threats-from-china-and-pakistan/articleshow/122971085.cms

[18] Mohan, "Passive Ambitions, Active Limitations."

[19] Akshat Upadhyay, "Artificial Intelligence Shaping the Future of Military Warfare," *The Tribune*, 2 December 2023, accessed August 2025, https://www.tribuneindia.com/news/features/artificial-intelligence-shaping-the-future-of-military-warfare-568036

[20] Kartik Bommakanti, Yogesh Joshi, Shimona Mohan, Karthik Nachiappan, and Antara Vats, *Emerging Technologies and India's Defence Preparedness* (New Delhi: Observer Research Foundation, 2023), accessed July 2025, https://www.orfonline.org/research/emerging-technologies-and-indias-defence-preparedness/

plans to integrate AI into air operations.[21] Yet, much of this remains policy-oriented or anticipatory; few publicly available peer-reviewed studies offer empirical assessments based on combat or operational performance.

Comparatively, states like Iran have used AI-enhanced cyber capabilities—driven by proxy networks and disinformation campaigns—to exert asymmetric influence in contested domains.[22] Meanwhile, Brazil has deployed large-scale public–private facial-recognition and predictive-policing systems in urban and border regions, reshaping local security landscapes and raising concerns about algorithmic bias and rights infringement.[23] These examples underscore the Global South's emerging models of AI-enabled sovereignty, offering relevant parallels to India's path.

The concept of algorithmic sovereignty—originating in European data-governance debates—has evolved to encompass the pursuit of technological independence in artificial intelligence, especially for defence purposes.[24] For India, this concept holds strategic relevance. The country has historically faced restrictions on dual-use technologies, sanctions following nuclear tests, and dependency on imported defence platforms. Achieving algorithmic sovereignty means more than self-sufficiency; it signifies the ability to sustain military operations and innovation without external choke points.

Indian scholars have begun to contextualise this in national security terms, particularly as India seeks to decouple critical defence technologies from foreign supply chains.[25] Key initiatives signal this intent. The Ministry of Defence's policy document on AI in Defence outlines institutional frameworks for integrating AI across mission-critical systems.[26] Similarly, the Semicon India Programme—launched in 2022 with a budget of ₹76,000 crore—aims to build a full-stack semiconductor ecosystem encompassing chip

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[21]B. D. Giri and Abhinav Agarwal, "Artificial Intelligence in Air Operations Planning Process," *Air Power Journal* (2024): 135–53.

[22] Institute for Security and Technology, *Iran's AI Ambitions: National Security, Global Influence, and Strategic Imperatives* (San Francisco: Institute for Security and Technology, 2024), 5, https://assets.recordedfuture.com/insikt-report-pdfs/2025/ta-ir-2025-0417.pdf

[23] A. E. D. R. Peron and R. Evangelista, "Beyond Instrumentarianism: Automated Facial Recognition Systems in Brazil and Digital Colonialism's Violence," *Science, Technology and Society* (2024): 535–54.

[24] Laura DeNardis, *The Global War for Internet Governance* (New Haven: Yale University Press, 2020).

[25] H. Suthar, H. Rawat, M. Gayathri, and K. Chidambarathanu, *Techno-Nationalism and Techno-Globalization: A Perspective from the National Security Act* (Hoboken, NJ: Wiley, 2023).

[26] Ministry of Defence, Government of India, *Artificial Intelligence in Defence* (New Delhi: Department of Defence Production, 2023), accessed July 2025, https://www.ddpmod.gov.in/sites/default/files/2023-11/ai.pdf

design, fabrication, and advanced packaging.[27] By late 2025, India is projected to begin domestic production of AI-grade GPUs through the Digital India RISC-V microprocessor programme and partnerships under the India Semiconductor Mission.[28] [29] These initiatives, if sustained, would enhance India's capacity to deploy sovereign AI systems in real-time combat scenarios, reducing vulnerability to export controls, platform dependency, and third-party data exposure.

Alongside its hardware progress, India has begun building indigenous large-language models (LLMs) under the IndiaAI Mission and through projects such as Bhashini.[30] [31]The goal is to secure software-level algorithmic sovereignty by training these models on local datasets and in Indian languages.

Together, these initiatives represent a bid for full-spectrum algorithmic sovereignty. Yet challenges persist. India still depends on imported extreme ultraviolet (EUV) lithography systems, lacks advanced AI-chip fabrication nodes (<7nm), and must often license foreign cloud infrastructure for AI training. Luciano Floridi and colleagues rightly note that algorithmic autonomy is only as strong as the weakest link in the AI stack—be it data, hardware, or regulatory capacity.[32]

India's innovation ecosystem is characterised by its ability to integrate civilian technologies into military applications. The Aadhaar biometric system, UPI financial interface, and e-governance frameworks serve as incubators for large-scale data handling and AI-algorithm training.[33] These capabilities feed into defence programmes via

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[27] Ministry of Electronics and Information Technology (MeitY), *India Semiconductor Mission* (New Delhi: Government of India, 2021), accessed July 2025, https://ism.gov.in/about-semiconindia

[28] Ashwini Vaishnaw, "India's First Homegrown Semiconductor Chip to Launch by End 2025: Ashwini Vaishnaw," *India Today*, 9 April 2025, accessed 3 August 2025, https://www.indiatoday.in/technology/news/story/indias-first-homegrown-semiconductor-chip-to-launch-by-end-2025-ashwini-vaishnaw-2706589-2025-04-09

[29] Ashutosh Mishra, "Govt to Use 50% of India AI Mission Funds for GPU Procurement: MeitY," *Business Standard*, 4 July 2024, accessed 3 August 2025, https://www.business-standard.com/technology/tech-news/govt-to-use-50-of-india-ai-mission-funds-for-gpu-procurement-meity-124070400728_1.html

[30] Press Information Bureau (PIB), "IndiaAI Mission Gets Union Cabinet Approval," *Press Information Bureau*, 7 March 2024, accessed July 2025, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2012375

[31] Bhashini, *National Language Translation Mission*, 2025, accessed 27 July 2025, https://bhashini.gov.in/about-bhashini

[32] Luciano Floridi et al., "AI4People — An Ethical Framework for a Good AI Society," *Minds and Machines* 28, no. 4 (2018): 689–707.

[33] A. Desai and A. P. Manoharan, "Digital Transformation and Public Administration: The Impacts of India's Digital Public Infrastructure," *International Journal of Public Administration* 47, no. 9 (2024): 575–78.

platforms such as iDEX and partnerships with firms like ideaForge and 114ai.[34] Unlike traditional contractor-led models in the West, India relies on agile start-ups and state-backed research labs like DRDO and CAIR. This dual-use dynamic presents a hybrid model of military innovation that reflects India's broader developmental and strategic constraints.[35]

As India advances in military AI, questions about accountability, bias, and compliance with international law become more urgent. Existing frameworks from the UN Convention on Certain Conventional Weapons[36] and Human Rights Watch[37] offer limited guidance for non-Western states. India lacks a consolidated national framework for military AI ethics. While civilian privacy laws such as the 2023 Digital Personal Data Protection Act offer some constraints, the application of AI in military contexts remains unregulated and opaque.[38] Indian scholars like Sauer call for localised ethical frameworks that account for both democratic accountability and national security imperatives.[39]

In short, India's path to algorithmic sovereignty and AI-based defence autonomy is its own—shaped by unique strategic aims and constraints. Yet, the journey faces intertwined technical, industrial, and operational challenges. Addressing them will demand closer alignment of policy, ethics, and international law with AI strategy.

While a growing body of literature exists on military AI, this review primarily emphasises works pertaining to India and similar contexts within the Global South.

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[34] Ajay Kumar, "From Assembly to Innovation: India's Defense Industry Transformation Through iDEX," *The India Center*, University of Central Florida, April 2025, accessed August 2025, https://theindiacenter.ucf.edu/from-assembly-to-innovation-indias-defense-industry-transformation-through-idex/

[35] Ministry of Defence (India), *Defence Acquisition Procedure (DAP) 2020* (New Delhi: Ministry of Defence, 2020), accessed August 2025, https://www.mod.gov.in/dod/sites/default/files/DAP2030new.pdf

[36] Heather M. Roff and Richard Moyes, "Meaningful Human Control, Artificial Intelligence and Autonomous Weapons," April 2016, accessed August 2025, https://www.article36.org/wp-content/uploads/2016/04/MHC-AI-and-AWS-FINAL.pdf

[37] Human Rights Watch, *Stopping Killer Robots: Country Positions on Banning Fully Autonomous Weapons and Retaining Human Control*, 10 August 2020, accessed 3 August 2025, https://www.hrw.org/report/2020/08/10/stopping-killer-robots/country-positions-banning-fully-autonomous-weapons-and-retaining-human-control

[38] Ministry of Electronics and Information Technology (MeitY), "Acts and Policies," 11 August 2023, accessed July 2025, https://www.meity.gov.in/documents/act-and-policies?page=1

[39] Frank Sauer, "Autonomy in Weapons Systems and the Struggle for Regulation," Centre for International Governance Innovation, 2022, accessed July 2025, https://www.cigionline.org/articles/autonomy-in-weapons-systems-and-the-struggle-for-regulation/

Recent studies highlight the implications of AI technologies in asymmetric warfare, tailored to smaller powers navigating geopolitical tensions.[40] Notably, the intersection of military technology and national strategies remains underexplored, particularly regarding India's unique position and capabilities.[41]

India's AI ecosystem runs on far fewer resources than the programmes of the United States, China, or Russia. Even so, its modular and dual-use innovation model has produced sharp, targeted strengths in certain niches. By contrast, U.S. initiatives aim for global force projection, while China invests heavily in large-scale data integration. India has instead concentrated on its own neighbourhood—building agile ISR (intelligence, surveillance, and reconnaissance) capabilities, resilient air-defence systems, and predictive logistics. This narrower focus allows it to match or even outmanoeuvre more technologically advanced rivals in chosen mission areas, without paying the heavy price of duplicating a superpower's entire arsenal.

Methodology

The study draws on a mixed-methods approach. At its core is a qualitative review of open-source intelligence (OSINT), supported by semi-structured interviews with subject-matter experts and a review of secondary documents. Military operations are, of course, inherently sensitive, and much of the relevant information remains classified. For that reason, this combination offers a practical way to examine India's AI deployment in the May 2025 border conflict without sacrificing rigour.

Use of Open-Source Intelligence (OSINT)

We assembled a detailed dataset drawing on open sources: government white papers, policy documents, defence press releases, corporate filings from firms such as ideaForge, Tonbo Imaging, and NewSpace Research, and extensive news coverage. Within this material, priority went to information on AI-system capabilities, deployment timelines, mission roles, and integration patterns, especially relating to the Integrated Air Command and Control System (IACCS), the Akashteer platform, AI-driven logistics, and autonomous UAVs.

[40] Rashid and Sultan, "Artificial Intelligence and Arms Control."
[41] Khalid and Masood, "Military Application and Integration of AI."

Social Media Metadata Analysis

Open-source information and social-media posts reveal that the Indian Air Force (IAF) shared drone footage and other media highlighting precision strikes carried out during Operation Sindoor. Notably, on 20 May 2025—just after the operation ended—the IAF posted a video titled "Indian Air Force – Responds with resolve always…" on its official X (formerly Twitter) account.[42] This post emphasised the speed and accuracy of the strikes, describing them as "unseen, unstoppable, unmatched." The post attracted strong public engagement, reflected in substantial likes, shares, and comments, underscoring its impact.

In addition, the *Times of India* published an article covering a precision-led campaign between 8 May and 10 May 2025, which reportedly involved strikes on 11 military airbases in Pakistan.[43] Although a secondary source, the post's timestamps and content support the reported progression and scale of the strikes, aligning with AI-enabled logistics frameworks. This post also received considerable audience attention.

Furthermore, the Indian Army's official X account (@adgpi) posted on 6 May 2025, indicating that the Army was "responding appropriately in a calibrated manner," suggesting real-time operational adjustments. [44] This post likewise demonstrated meaningful engagement from its audience.

This analysis draws from publicly available data including timestamps, content, source reliability, and notable engagement metrics. While some metadata such as geolocation was unavailable, the combined information effectively illustrates the timing, precision, and public resonance of Operation Sindoor as reflected on social media.

Interviews with Defence Experts

Semi-structured interviews were conducted remotely between 20 May and 28 May 2025, with a purposive sample of six experts, including two retired senior Indian Army

[42] Indian Air Force (@IAF_MCC), "Indian Air Force – Responds with resolve always… 'Unseen, unstoppable, unmatched,'" video posted on X (formerly Twitter), 20 May 2025, accessed 3 August 2025, https://x.com/IAF_MCC/status/1924679929377259796

[43] "How IAF Grounded Pakistan's Air Power," *Times of India*, 13 May 2025, accessed 3 August 2025, https://timesofindia.indiatimes.com/india/operation-sindoor-how-iaf-grounded-pakistans-air-power/articleshow/121094154.cms

[44] Indian Army (@adgpi), "Indian Army Is Responding Appropriately in a Calibrated Manner," post on X (formerly Twitter), 7 May 2025, accessed 3 August 2025, https://x.com/adgpi/status/1919862908671922301

officers with prior operational command experience, one former Air Vice Marshal involved in drone-deployment strategy, two defence technologists working with AI start-ups supplying systems to DRDO and iDEX, and one academic specialising in AI policy and civil–military integration. Interview themes included AI-system performance during live operations, interoperability challenges, doctrinal relevance, and strategic implications. All respondents were granted anonymity to encourage candour and were quoted in aggregate or paraphrased form to avoid attribution.

Analytical Framework

The study employed a manual thematic-coding approach using spreadsheet-based tagging of interview transcripts and OSINT materials, following Braun and Clarke's six-phase methodology.[45] Codes were developed both deductively (informed by the concept of algorithmic sovereignty and AI-deployment categories such as ISR, cyber, and logistics) and inductively (emerging from the data corpus). The coded data were organised thematically into categories such as tactical effectiveness of AI systems, integration with legacy defence platforms, role of start-ups and public–private partnerships, constraints posed by hardware dependence, and perceptions of sovereignty and strategic autonomy. Themes were cross compared across data sources to ensure consistency and eliminate bias, with claims validated against technical reports, satellite data, and official statements where possible.

This methodology is situated within a constructivist epistemology, recognising that knowledge about military technology—especially in active conflicts—is mediated by institutional narratives and access asymmetries. Nonetheless, the convergence of independent OSINT streams, corroborative expert insights, and empirical documentation strengthens the study's reliability.

Limitations

The research acknowledges several limitations: many AI systems deployed in active combat are classified or semi-classified, restricting comprehensive validation; both government sources and open-source platforms may reflect strategic messaging or propaganda, necessitating rigorous triangulation to mitigate bias; and the recent nature

[45] Virginia Braun and Victoria Clarke, "Using Thematic Analysis in Psychology," *Qualitative Research in Psychology* 3, no. 2 (2006): 77–101.

of the conflict (May 2025) means long-term assessments of doctrinal or strategic shifts remain provisional. Additionally, while anonymity in interviews enabled more open responses, it limits direct attribution or validation of certain statements. There is also a lack of open-source data on Pakistan's use of AI, due to access and censorship constraints, which remains limited and indirectly inferred.

Operational Deployment of AI in the 2025 Conflict

Enhancing Air Defence and Command through AI

During the 2025 border conflict, India's air defence capabilities took a decisive step forward with the integration of AI-enabled systems. These platforms were built to sharpen situational awareness, accelerate decision-making, and improve interception accuracy. At the core stood the Integrated Air Command and Control System (IACCS), developed by Bharat Electronics Limited (BEL), serving as the central hub for airspace monitoring and coordinated response.[46]

IACCS incorporated multi-sensor data fusion, combining inputs from ground-based radars, airborne early warning systems, satellite feeds, and electronic intelligence (ELINT) sources. Through advanced machine-learning algorithms, the system could filter noise, identify potential threats, and generate predictive trajectories to anticipate adversary movements. This AI-powered fusion compressed reaction times from minutes to seconds, thereby facilitating near real-time command decisions. Complementing IACCS was the Akashteer battle-management platform, developed by the Defence Research and Development Organisation.[47] Akashteer utilised neural networks trained on historical combat data and simulated scenarios to classify airborne threats and prioritise targets based on threat level, proximity, and trajectory. The platform also implemented decision-tree algorithms to recommend optimal countermeasures, including interceptor-missile assignments or electronic-warfare tactics.

Significantly, these systems embodied a doctrinal shift from an operator-in-the-loop model—where human operators manually controlled engagements—to an operator-on-the-loop paradigm, where AI autonomously conducts real-time threat assessment and engagement, with human oversight retained for critical judgments. This

[46] L. M. Singh, "Evolution of Indian Control and Reporting System for Future Aerospace Warfare," *Blue Yonder* (2024): 59–69.
[47] Lt Gen Sunil Srivastava, "Joint C4ISR for the Indian Armed Forces — Quo Vadis?" *Synergy* 1, no. 1 (2022).

paradigm shift reflects the broader move toward machine-speed warfare, reducing human latency and cognitive overload in high-stress environments.[48]

Moreover, the integration of AI reduced false alarms and minimised fratricide risks by leveraging probabilistic modelling and confidence scoring for target validation. In the 2025 conflict, this capability proved critical in preventing escalation from misidentified aerial objects, ensuring calibrated responses aligned with strategic objectives.

The effectiveness of IACCS and Akashteer relied on India's ability to design and field indigenous AI systems at speed. This was made possible through partnerships between government agencies and private start-ups specialising in AI and sensor technology.[49] Together, they created a defence posture more resilient to electronic warfare and cyber threats, reinforcing the country's strategic autonomy.

Autonomous ISR and Swarm Surveillance

ISR (intelligence, surveillance, and reconnaissance) work during the May 2025 border conflict benefited greatly from AI-enabled autonomous aerial platforms. Leading this effort were firms such as ideaForge and Tonbo Imaging, which supplied UAVs equipped with advanced computer-vision software. In practice, these systems could classify terrain and detect objects in real time, a capability that improved both speed and accuracy in reconnaissance.[50]

The SWITCH and Octane drone series featured embedded convolutional neural networks (CNNs) trained to analyse multispectral and thermal imagery, facilitating the detection of camouflaged enemy installations and movement patterns under diverse environmental conditions. These autonomous ISR platforms significantly reduced reliance on manned reconnaissance missions, which traditionally incurred higher risks and longer operational cycles.

A distinctive innovation during this conflict was the operational deployment of swarm-drone architectures developed by NewSpace Research & Technologies. These drones leveraged decentralised AI agents that enabled cooperative behaviour such as

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[48] Scharre, *Army of None*.
[49] Press Information Bureau (PIB), "Make in India Powers Defence Growth," 3 April 2025, accessed July 2025, https://static.pib.gov.in/WriteReadData/specificdocs/documents/2025/apr/doc202543531401.pdf
[50] W. R. Bhojraj, "From Ideas to Action: The Role of Defence and Aerospace Start-ups in Strengthening India's National Security Industry," in *The Quest for Strategic Autonomy*, 192–216 (London: Routledge, 2025).

dynamic task allocation, adaptive flight-path adjustment, and redundancy management in contested environments.[51] This swarm intelligence allowed the drones to maintain persistent surveillance despite potential drone losses or electronic countermeasures, thereby enhancing battlefield situational awareness.

AI-driven swarm coordination also enabled the drones to autonomously identify priority reconnaissance targets and relay critical data to command centres with minimal human intervention. The system's ability to self-heal and reconfigure in response to threats exemplified resilience and flexibility, traits essential for modern ISR operations in contested airspace.[52]

Furthermore, the integration of AI-enabled ISR with other battlefield systems facilitated a feedback loop wherein data from drone swarms was rapidly analysed using machine-learning models at the Centre for Artificial Intelligence and Robotics (CAIR).[53] This synergy enhanced predictive modelling of enemy movements and provided commanders with actionable intelligence in near real time.

Collectively, these autonomous ISR and swarm-surveillance systems underscored the shift toward AI-enabled persistent reconnaissance as a force multiplier. They allowed Indian forces to maintain a continuous, detailed operational picture, thereby optimising tactical decision-making and force deployment during the conflict.

Terrain and Satellite Intelligence

The integration of artificial intelligence into terrain and satellite intelligence significantly enhanced India's operational capabilities during the 2025 border conflict. The Defence Research and Development Organisation's (DRDO) Centre for Artificial Intelligence and Robotics (CAIR) played a pivotal role by deploying deep-learning algorithms to analyse high-resolution satellite imagery and geospatial data.[54]

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[51] Livefist, "India's Own Long-Range Swarming Killer Drone Flies," *Livefist Defence*, 15 February 2025, accessed July 2025, https://www.livefistdefence.com/indian-own-long-range-swarming-killer-drone-flies/

[52] Amoha Basrur, "The Use of Drones Marks a New Phase in India-Pakistan Hostilities," *Raisina Debates*, 13 May 2025, accessed July 2025, https://www.orfonline.org/expert-speak/the-use-of-drones-marks-a-new-phase-in-india-pakistan-hostilities

[53] Ananta Centre, "AI as a Multi-domain Enabler for the Army," Ananta Centre, accessed 3 August 2025, https://anantacentre.in/ai-as-a-multi-domain-enabler-for-the-army/

[54] Defence Research and Development Organisation (DRDO), *Technology Focus*, July–August 2025, accessed July 2025, https://drdo.gov.in/drdo/sites/default/files/publication-document/TF_JulyAug2025.pdf

Using convolutional neural networks (CNNs) and recurrent neural networks (RNNs), CAIR's systems processed multispectral and synthetic-aperture radar (SAR) imagery to detect subtle anomalies such as camouflaged enemy positions, concealed equipment, and unusual heat signatures indicative of military activity. This capability was critical in overcoming traditional limitations posed by terrain complexity and seasonal vegetation cover, which often hinder visual reconnaissance.

A key feature of CAIR's terrain-intelligence system was its use of probabilistic modelling and Bayesian inference to predict enemy troop movements and possible attack vectors based on historical data and real-time observations. This approach enabled commanders to anticipate adversary tactics and adjust deployment strategies proactively.

Satellite data was further augmented by AI-enabled feedback loops connecting reconnaissance UAVs and ground sensors to the National Geospatial Agency. This facilitated near real-time digital terrain mapping and created dynamic geospatial situational-awareness dashboards that highlighted threat zones and safe corridors for troop and supply movements. Moreover, the system employed reinforcement-learning algorithms to optimise route selection for logistics and troop deployments, considering factors such as terrain difficulty, weather conditions, and enemy presence. This integration of AI in terrain intelligence not only improved operational resilience but also reduced exposure to ambushes and collateral damage.

The success of these technologies underscores India's growing expertise in leveraging AI for geospatial intelligence—a domain traditionally dominated by Western powers. The operational experience gained during the conflict highlights the strategic importance of indigenous AI research in maintaining battlefield superiority and securing national borders.

Predictive Logistics and Operational Resilience

The May 2025 India–Pakistan border conflict underscored the critical importance of resilient and adaptive logistics in sustaining prolonged military operations. Artificial intelligence played a transformative role in enhancing the efficiency and reliability of

India's logistical networks, primarily through predictive analytics and reinforcement-learning techniques embedded within DRDO's Pro-HM+ system.[55]

The Pro-HM+ system used time-series forecasting and reinforcement learning to predict maintenance and spare-parts needs across a wide range of equipment—from armoured vehicles to aircraft and communication systems. Put simply, it sifted through sensor data and historical maintenance records to flag likely wear or component failures before they happened, enabling pre-emptive repairs and cutting downtime during critical moments in the conflict.

India's battlefield logistics emerged as a critical testbed for India's AI-driven military capabilities. The Indian Army operationalised AI-based logistics simulations to manage rapid troop movements and sustain resupply across forward posts under contested conditions. These simulations—leveraging stochastic modelling and decision-tree algorithms—were used to stress-test multiple combat contingencies including artillery interdiction, cyber disruption, and road blockades. Defence sources noted that firms such as 114ai, in collaboration with partners like General Atomics, contributed situational-awareness tools and AI-enabled platforms to optimise supply-chain decisions under pressure.[56] [57] This deployment marked one of the first live-combat scenarios where India's AI logistics framework supported real-time tactical decision-making under asymmetric threat conditions.

Decentralisation of mission command further benefited from predictive logistics. Field commanders were empowered with AI-generated insights, enabling agile decision-making at the tactical level without awaiting centralised directives. This approach enhanced operational tempo and mitigated risks associated with communication breakdowns or cyber-attacks on command infrastructure.

In essence, the fusion of predictive analytics and operational-resilience mechanisms through AI not only streamlined India's military logistics but also reinforced

[55] Ministry of Defence, Government of India, *Artificial Intelligence in Defence*, May 2025, accessed 27 July 2025, https://www.ddpmod.gov.in/sites/default/files/2023-11/ai.pdf

[56] General Atomics, "GA-ASI Partners with Indian AI Company for Multi-Domain Situational Awareness," *General Atomics*, 28 September 2022, accessed July 2025, https://www.ga.com/ga-asi-partners-with-indian-ai-company-for-multi-domain-situational-awareness

[57] Indian Defence News (IDN), "Indian Army Undergoing Transformative Shift by Integrating AI into Its Operational Framework," *Indian Defence News*, 12 April 2025, accessed 28 July 2025, https://www.indiandefensenews.in/2025/04/indian-army-undergoing-transformative.html

the broader strategic posture. It demonstrated how intelligent systems can fortify supply chains and maintain combat readiness in high-intensity conflict environments, providing a critical advantage in modern warfare.

Cyber Operations and Cognitive Warfare

Cyber and cognitive warfare took on a new shape in the 2025 India–Pakistan border conflict. AI systems stood at the centre of this transformation, protecting critical networks and influencing the information space. The Indian Computer Emergency Response Team (CERT-IN) rolled out advanced tools to spot, dissect, and shut down threats—ranging from phishing attempts and malware infections to orchestrated disinformation drives.[58]

This cognitive warfare extended beyond defensive measures. Indian cyber-command units utilised AI to launch proactive information operations aimed at disrupting adversary communication channels and sowing confusion within opposing ranks. Machine-learning models analysed enemy communication patterns to identify critical nodes and vulnerabilities, guiding cyber-offensive operations with precision.

Moreover, deep-fake detection algorithms were employed to counter fabricated audio-visual materials that could undermine military or governmental credibility. These tools ensured that authentic information prevailed amidst an increasingly complex digital battlespace where misinformation could cause tangible harm.

The convergence of kinetic and non-kinetic domains, facilitated by AI, blurred traditional boundaries of warfare. By integrating cyber and cognitive operations into a unified command structure, India demonstrated a holistic approach to conflict management that recognised the strategic value of information dominance.

This integration also raised ethical and legal questions regarding AI's role in influencing civilian populations and the potential for unintended escalation. Nonetheless, the 2025 conflict illustrated the growing indispensability of AI in safeguarding national security within cyberspace and the broader cognitive domain.

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[58] Gowri Ramakrishnan, "Cyber Warfare: Dual Operational Fronts in Contemporary India-Pakistan Conflicts," *Centre for Air Power Studies – Forum for National Security Studies*, 2025, accessed 3 August 2025, https://capsindia.org/cyber-warfare-dual-operational-fronts-in-contemporary-india-pakistan-conflicts/#_edn26

Table 4.1: Operational Impact of AI Systems Deployed by Indian Armed Forces During the May 2025 Conflict

AI Application Domain	System / Technology	Function	Observed Impact (May 2025)
Air Defence	AI-enhanced radar coordination	Missile threat detection and response	100% interception rate of incoming threats
ISR	Autonomous drone swarms	Surveillance, target acquisition	Enabled 24/7 monitoring in mountainous zones
Logistics	Predictive AI logistics system	Troop movement, med-evac coordination	20% faster deployment across LoC sectors
Cyber Operations	Defensive AI threat mitigation	Real-time breach prevention	Prevented three major network intrusion attempts

Source: Author's original compilation.

Each military AI application examined reflects an innovative approach to addressing specific challenges faced in the conflict. However, evidence linking these applications to decisive outcomes remains scant. For example, while AI-driven surveillance enhanced situational awareness, its role in altering operational tactics or outcomes merits further exploration. This analysis strives to demonstrate how these technologies led to improvements in efficiency rather than transformative changes in military operations.

Strategic Implications of India's AI Deployment

India's 2025 AI-enabled military operations provide key insights into the emerging role of artificial intelligence in limited wars under nuclear overhangs. AI applications were most effective in three domains: reducing decision latency, enabling precision strikes, and improving system resilience. These advantages cumulatively shifted the tactical tempo in India's favour during the conflict. While AI was not singularly

responsible for operational success, it augmented India's ability to anticipate, neutralise, and manage battlefield risks.

Further, the conflict marked a transition from experimentation to active deployment of AI systems under combat conditions. Indian defence planners, informed by real-time ISR data and predictive analytics, adapted quickly to Pakistani countermeasures. Interviews confirm that the Indian Air Defence Command relied on AI-aided threat-evaluation engines to intercept multiple incoming UAVs and ballistic missiles, maintaining a near-total denial of airspace penetration.

Logistics was another domain transformed by AI-supported platforms. Predictive deployment models allowed Indian Army commands to preposition medical teams and equipment in anticipation of casualty events. According to interviewees, this capability led to a 20% reduction in medevac time and a significantly higher survival rate for injured personnel.

The doctrinal takeaway is equally significant. The integration of AI has reinforced calls for expanded simulation-based wargaming and an overhaul of staff-training curricula to incorporate algorithmic thinking.[59] Several military colleges have initiated pilot modules on AI-led command decision-making, reinforcing the institutionalisation of algorithmic tools within operational frameworks.

In short, the conflict validated India's ongoing investments in indigenous AI and dual-use digital infrastructure. The experience revealed bottlenecks in integration, training, and hardware dependency—but also demonstrated that algorithmic tools can deliver measurable battlefield impact when supported by institutional reforms and doctrinal clarity.

The Indian approach to AI for national security emphasises alignment with official defence policies. Notable policy documents, such as the national AI strategy for defence, articulate India's ambitions in leveraging AI, reflecting a broader strategy to enhance military readiness and achieve algorithmic sovereignty.[60] This perspective is crucial in understanding how AI technologies are envisioned as integral components of future military infrastructure.

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[59] Rahul Rawat, "The Case for Tech-Based Wargaming in the Indian Armed Forces," *Observer Research Foundation*, 18 December 2024, accessed 3 August 2025, https://www.orfonline.org/research/the-case-for-tech-based-wargaming-in-the-indian-armed-forces/

[60] Ministry of Defence, Government of India, *Artificial Intelligence in Defence*.

Regional Implications and Norm-Setting for Mid-Range Powers

India's deployment of AI-enabled systems in the 2025 conflict sets a precedent for other mid-range powers navigating the AI–security nexus. Most Global South nations lack the scale or capital to match the AI capabilities of the United States or China. India's approach—relying on modular innovation, civilian–military synergies, and selective autonomy—offers a replicable model for countries aiming to achieve algorithmic sovereignty within strategic constraints.

Comparative analysis shows that Pakistan's AI integration during the same conflict was limited to off-the-shelf ISR tools and rudimentary cyber operations, many of which were thwarted by Indian air-defence and cybersecurity frameworks. While Pakistan has initiated AI research programmes, its reliance on foreign platforms and absence of a robust semiconductor or dual-use ecosystem limits its sovereignty.

From a normative standpoint, India's engagement in multilateral initiatives such as the Global Partnership on AI (GPAI), the Quad AI Working Group, and the UN Group of Governmental Experts (GGE) positions it as a credible voice in shaping global standards. These platforms allow India to advance principles of responsible AI use in defence—anchored in democratic oversight, privacy safeguards, and operational accountability.

This shift toward an AI-enabled military posture has doctrinal and strategic implications. India's 2020 Defence AI Roadmap and the Integrated Capability Development Plan (ICDP) prioritise scalable, indigenous AI systems as force multipliers.[61] The 2025 conflict underscores how such platforms can provide not just tactical efficiencies, but also strategic signalling—demonstrating deterrence and escalation control in complex regional theatres.

Finally, the India–Pakistan conflict illustrates that algorithmic sovereignty is not an end state but a dynamic process. Mid-range powers can gain asymmetric leverage by combining technological innovation with strategic restraint and multilateral engagement. As the geopolitical AI race accelerates, India's experience may become a template for others seeking to balance innovation, autonomy, and international responsibility.

[61] Press Information Bureau (PIB), "Enhancement of Capacity of Defence Forces," *Press Information Bureau*, 4 February 2022, accessed 30 July 2025, https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=1795536

Doctrinal and Organisational Shifts

The operational deployment of AI during the 2025 India–Pakistan conflict prompted early doctrinal introspection within India's military establishment. While the Ministry of Defence, Government of India, had already prioritised "information dominance" through institutional mechanisms like the Defence Artificial Intelligence Council[62], the conflict marked a shift from digital enablement to automation and decision-assistive command frameworks. Recent articles underscore that despite structural advances, India's defence-AI strategy remains constrained by institutional fragmentation and a lack of doctrinal coherence.[63]

However, efforts to implement Integrated Theatre Commands signal a foundational transition toward jointness and AI-enabled operational tempo.[64] Writing in a national outlet, Lt Gen (Retd.) Raj Shukla similarly emphasised that India's security posture must evolve toward technologically driven force structures, requiring cultural shifts within defence institutions and the adoption of AI as a doctrinal core.[65] Together, these sources reflect an inflection point in how India's armed forces are reconceptualising command and control under asymmetric threat conditions.

Organisational and Industrial Shifts

Indian decision-makers increasingly relied on AI-generated threat assessments and predictive models for targeting and logistics during the April–May 2025 India–Pakistan confrontation. Although final decision authority remained with human operators, several non-kinetic functions—such as drone-based ISR coordination and predictive logistics routing—were executed through AI-enabled subroutines. This semi-autonomous structure significantly reduced latency and allowed for the scaling of operations without increasing personnel risk.

The conflict also accelerated institutional dialogue around the future of mission command and the acceptable level of AI integration within the kill chain. According to

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[62] Ministry of Defence (India), "Task Force for Implementation of AI," *Press Information Bureau*, 28 March 2022, accessed 30 July 2025, https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1810442

[63] Mohan, "Passive Ambitions, Active Limitations."

[64] P. Vinayagamurugan, "Integrated Theatre Command: Strategic Synergy between the Armed Forces of India," *International Journal for Multidisciplinary Research* (2024).

[65] Raj Shukla, "Future of Warfare in the Changing Technological Context: An Indian Military Perspective," in *Future Warfare and Technologies: Issues and Strategies* (New Delhi: Observer Research Foundation, 2022).

the Ministry of Defence's task force reports, this transformation builds on earlier institutional investments in AI-based command-support systems.[66] Most notably, the DRDO-developed Akashteer and the Integrated Air Command and Control System (IACCS) were deployed as real-time battle-management platforms during the conflict—automating target tracking, threat prioritisation, and air-defence coordination.[67] [68] Recent assessments also highlight the growing use of data-analytics tools for enhancing operational efficiency in logistics and planning, pointing to an increasingly AI-assisted battlefield posture.[69]

The wartime record of private-sector players like ideaForge, 114ai, and Big Bang Boom Solutions highlighted how much civilian-led innovation matters to India's defence industry. Initiatives such as the INDUS-X framework, working through iDEX and the Ministry of Defence, are now linking start-ups with global partners, accelerating the shift toward dual-use AI capabilities.[70]

During the April–May 2025 border escalation, ideaForge secured emergency army contracts for hybrid UAVs—proving battlefield readiness[71], while Big Bang Boom Solutions gained traction for its AI-combat drone and anti-drone systems integrated under defence procurement contracts.[72] In Tamil Nadu, a hub for drone manufacturing, multiple start-ups reported fivefold demand increases and heightened public–private

[66] Ministry of Defence (India), "Task Force for Implementation of AI."
[67] Press Information Bureau (PIB), "Akashteer: The Unseen Force Behind India's New War Capability," *Press Information Bureau*, 16 May 2025, accessed 29 July 2025, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2129132
[68] "Akashteer Shifts Battlefield Balance: India's Indigenous Air Defence System Proves Decisive in Operation Sindoor," *The Economic Times*, 23 May 2025, accessed 30 July 2025, https://economictimes.indiatimes.com/news/defence/akashteer-shifts-battlefield-balance-indias-indigenous-air-defence-proves-decisive-in-operation-sindoor/articleshow/121357278.cms
[69] Sehgal, "Integration of Artificial Intelligence in Indian Military Operations."
[70] Ajay Kumar and Tejas Bharadwaj, "One Year of the INDUS-X Defense Innovation Between India and the US," *Carnegie Endowment for International Peace*, 18 June 2024, accessed July 2025, https://carnegieendowment.org/research/2024/06/one-year-of-the-indus-x-defense-innovation-between-india-and-the-us?lang=en
[71] Miriam McNabb, "Indian Army Awards Emergency UAV Contract to ideaForge," *DroneLife*, 23 June 2025, accessed July 2025, https://dronelife.com/2025/06/23/indian-army-awards-emergency-uav-contract-to-ideaforge/
[72] Vennapusala Ramya, "Big Bang Boom Solutions on a Mission to Build India's Future Combat Systems," *The New Indian Express*, 3 July 2025, accessed July 2025, https://www.newindianexpress.com/cities/hyderabad/2025/Jul/03/big-bang-boom-solutions-on-a-mission-to-build-indias-future-combat-systems

collaboration following Operation Sindoor. These developments have contributed to a reconfiguration of procurement and R&D logic under iDEX, shifting toward performance-driven, agile acquisition models.[73]

Inter-Service AI Integration

Previously siloed AI deployments—largely confined to the Indian Air Force's Integrated Air Command and Control System (IACCS) and separate Army signal units—were integrated for the first time through unified command platforms and inter-service data fusion during the April–May 2025 India–Pakistan conflict. Official reports confirm the operational convergence of the DRDO-developed Akashteer system with the IAF's IACCS, enabling real-time coordination across air and ground domains and demonstrating a proof of concept for AI-enhanced joint operations.[74]

Strategic analysis also underscores the institutional push for Integrated Theatre Commands, which embed AI-enabled command architectures at the core of India's future warfighting doctrine and inter-service synergy.[75] [76] Together, these developments mark a shift toward coordinated, AI-infused force structures spanning air, land, and cyber domains.[77]

War Outcomes Analysis

Although short in both duration and scale, the 2025 India–Pakistan border conflict revealed the asymmetric advantages that AI-enabled forces can achieve when backed by institutional innovation and strategic planning. Operation Sindoor, launched on 6 May 2025, began with strikes on terrorist launchpads and infrastructure in Pakistan-occupied

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[73] B. Vaitheeswaran, "Tamil Nadu Emerging as Key Contributor in Manufacturing Drones for the Armed Forces and Other Electronic Defence Systems," *Times of India*, 23 June 2025, accessed July 2025, https://timesofindia.indiatimes.com/city/chennai/tamil-nadu-emerging-as-key-contributor-in-manufacturing-drones-for-the-armed-forces-and-other-electronic-defence-systems/articleshow/122009497.cms

[74] Press Information Bureau (PIB), "Akashteer: The Unseen Force Behind India's New War Capability."

[75] Prateek Tripathi and Kartik Bommakanti, *Air Defence Mechanisms: A Primer on India and Pakistan*, ORF Issue Brief No. 809 (Observer Research Foundation, 29 May 2025), accessed August 2025, https://www.orfonline.org/research/air-defence-mechanisms-a-primer-on-india-and-pakistan/

[76] Tripathi and Bommakanti, *Air Defence Mechanisms*.

[77] ET Online, "Govt Activates Theatre Command: What We Know About the Tri-Service Integration That Can Make Armed Forces More Deadly," *The Economic Times*, 29 May 2025, accessed 29 July 2025, https://economictimes.indiatimes.com/news/defence/govt-activates-theatre-command-what-we-know-about-the-tri-service-integration-that-can-make-armed-forces-more-deadly/articleshow/121484987.cms

territories following the Pahalgam civilian massacre. Pakistan's air and artillery mobilisation prompted India to widen the campaign to military facilities in Gilgit-Baltistan and along the LoC.

Over the course of four days (May 6–10), India's AI-integrated military posture yielded significant operational dividends. Autonomous ISR drones maintained persistent surveillance across difficult terrain, enabling real-time adjustments in artillery targeting and reducing friendly fire incidents. AI-coordinated air-defence networks (e.g., IACCS and Akashteer) achieved a 100% interception rate of incoming Pakistani munitions[78], further validated by CAPS's post-operation assessment.[79] Predictive logistics platforms ensured operational resilience and allowed sustained supply at pace under combat conditions—even in challenging terrain—supporting artillery units with timely ammunition and support. These impacts—summarised in Table 4.1 under the operational deployment section—underscore the tactical gains from multi-domain AI integration.

In operational terms, these AI-enabled capabilities allowed India to dictate the tempo of engagements, constrain Pakistani counteraction, and maintain a posture of escalation control throughout the conflict. This operational dominance—especially in air-defence interception and persistent ISR coverage—provided India with strategic leverage disproportionate to the conflict's scale and duration.

Open-source intelligence—including satellite-imagery analysis by commercial firms like Maxar—confirmed significant damage to Pakistani airbases during Operation Sindoor, with visible destruction at bases such as Sargodha, Bholari, Nur Khan, Jacobabad, Sukkur, and Rahim Yar Khan, and likely impacts to radar and munitions infrastructure in sectors like Pasrur and Sialkot. [80] Open-source intelligence also confirmed the destruction of a possible communication-relay hub near Skardu, Pakistan.[81]

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[78] Press Information Bureau (PIB), "Akashteer: The Unseen Force Behind India's New War Capability."
[79] Centre for Air Power Studies (CAPS), "CUAS and Air Defence Triumph in Operation Sindoor," 4 June 2025, accessed July 2025, https://capsindia.org/cuas-and-air-defence-triumph-in-operation-sindoor/
[80] "Clear Satellite Pics Show Extensive Damage to Pak Bases After Indian Strikes," *India Today*, 13 May 2025, accessed July 2025, https://www.indiatoday.in/india/story/satellite-images-pakistan-air-bases-nur-khan-india-operation-sindoor-2723934-2025-05-13
[81] ET Bureau, "India Conducts Precision Strikes on Pakistan's Military Bases, Satellite Imagery Confirms Skardu Was Hit," *The Economic Times*, 12 May 2025, accessed July 2025, https://economictimes.indiatimes.com/news/politics-and-nation/operation-sindoor-exhibits-ability-to-strike-pak-without-crossing-loc-border/articleshow/120973887.cms.

Pakistan did respond with limited air and missile strikes, but Indian air-defence networks intercepted every incoming drone and ballistic missile. As a result, damage to both civilian and military infrastructure was minimal.[82] In the first week of fighting, India reported no fatalities. Pakistan, by contrast, sustained losses in air and ground assets, and even saw disruptions to a key strategic command node.[83]

Despite these outcomes, no formal ceasefire was reached. Instead, Operation Sindoor was temporarily paused on May 10, 2025, under unconditional request from the Pakistan military. As of this writing, Indian forces maintain heightened alert along the LoC, and limited skirmishes persist in northern sectors.

The battlefield results helped push India's doctrine away from deterrence by punishment toward deterrence by denial—an approach made possible through technological pre-emption and faster decision cycles. Though Operation Sindoor did not produce major territorial gains, it underscored how algorithmic command support and home-grown AI systems can influence escalation patterns in contested regions.

The 2025 conflict demonstrated the asymmetric advantage that AI-enabled forces can wield when supported by institutional innovation and strategic foresight.

Conclusion and Future Directions

The May 2025 India–Pakistan conflict marked a decisive shift in India's defence thinking. It demonstrated, in concrete terms, how AI-enabled platforms can shape tactical outcomes, quicken operational tempo, and send strategic signals—even in the confines of a limited war. While these systems did not secure territorial gains, they sharpened precision targeting, accelerated decision-making, and strengthened command-and-control resilience. By denying an adversary's objectives while retaining its own flexibility, India transformed AI from a technical asset into a strategic lever.

Operation Sindoor underscored that algorithmic tools, when coupled with institutional reform and clear doctrine, can provide credible escalation control in nuclear-shadowed confrontations. This approach is part of India's wider pursuit of algorithmic sovereignty—an evolving doctrine that blends industrial autonomy, civil–military innovation, and geopolitical signalling. For other mid-range powers in the Global South,

[82] CAPS, "CUAS and Air Defence Triumph in Operation Sindoor."
[83] CAPS, "CUAS and Air Defence Triumph in Operation Sindoor."

the experience highlights how dual-use ecosystems can enable defence innovation without mirroring Western procurement models or alliance structures.

The study presented here offers, to our knowledge, the first integrated academic analysis of indigenous military AI deployed in live combat. Beyond its immediate findings, it situates India's approach within broader debates on techno-nationalism, digital sovereignty, and asymmetric deterrence, drawing lessons that may be relevant for other states facing similar resource and technology constraints.

Sustained investment will be critical to maintaining India's AI advantage. Priorities include building semiconductor independence, advancing indigenous foundational models, and embedding ethical governance into defence AI programmes. Engagement in multilateral platforms such as the Global Partnership on AI (GPAI) and the Quad AI initiatives could further strengthen India's role in shaping global norms for responsible military AI use. As future conflicts place an even greater premium on rapid information processing, agile response mechanisms, and trustworthy autonomous systems, these investments will carry strategic weight.[84]

Several limitations of this analysis should be acknowledged. It relies on open-source intelligence and anonymized expert interviews; key operational details remain classified. Pakistan's AI posture could only be partially assessed, limiting the depth of bilateral comparison. These constraints mean that conclusions—particularly on long-term doctrinal shifts—should be regarded as provisional.

From a policy standpoint, the lessons of Operation Sindoor point to the value of accelerating domestic AI hardware production, expanding simulation-based training for AI-enabled operations, and establishing a consolidated military AI ethics framework that balances democratic oversight with operational security. Collaboration among government, start-ups, and academic institutions will remain essential to sustaining innovation cycles.

Going forward, research should examine the scalability of these technologies, evaluate whether India can retain its AI advantage through sustained institutional and technical investment, and assess the longer-term strategic implications. Such work is central to understanding how mid-range powers can incorporate advanced technologies into credible defence strategies in an increasingly competitive security environment.

[84] Srivastava, "Artificial Intelligence and National Security."

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