

The Future of Electronic Warfare in South Asia

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Background

The military environment in South Asia has changed as much as it no longer relies on traditional, intensive conflict. It now operates within a multi-domain, high-sophistication paradigm. This paradigm shift will be electromagnetic spectrum, in which accuracy-controlled munitions, sensors, and communications play a crucial role. This change is the outcome of the confrontation between Pakistan and India in May 2025, which revealed that electronic warfare (EW) is altering the deterrence calculus between the two contested countries.

The doctrines of the strategy and paradigm are asymmetric and reflect assumptions. South Asia is engaged in a long-lasting security dilemma as India possesses traditional military supremacy in the region, and Pakistan has been relying on asymmetric measures to make sure the inter-country

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military interventions are costly.² The Indian Army's reliance on quantities and the high technology from the international partners is being subject to a reevaluation with the advent of new challenges. The current Indian policy is retaliation with holds barred. That means to attack its adversaries and not to exceed nuclear level while implementing precision standoff and integrated EW suites.

On the other hand, Pakistan's asymmetric approach depends on electronic warfare. The reason is that Islamabad is more likely to be dependent on a force multiplier strategy, even though it cannot afford a similar defense spending to keep pace with that of India. The doctrine relies on soft kills: disruption of command links, navigation of messages, and data spoofing.³ This is intended to undermine the Indian technological advantage by reducing the cost to a very slight margin. This tactic is also a strategic step to disable technology before mutating to a platform-directed threat rather than on platforms.

The Integrated Kill Chain and Networked Airpower

The two countries differ in terms of the integration of electronic assets in the command and control. The modernized airpower in Pakistan follows an analogous kill chain of the U.S. doctrine of the Combined Joint All -domain Command and Control (CJADC2).⁴ It constitutes a system that combines land, air, sea, and electronic resources into a straightforward sensor-to-shooter network. Pakistan has become technologically homogeneous, depending on Chinese technology, where the problem of compatibility is often reduced.

Half of the principal nodes include the JF -17 Thunder Block -III and the J -10C Vigorous Dragon.⁵ To provide distributed lethality, they radiated real-time targeting information in the KJ- 500 AEW Control and Ground Radar Systems.⁶ The strike platform does not need to be a detection platform,

² Zohaib Altaf, "Next Generation Air Warfare in South Asia: Risks and Way Forward," *South Asian Voices*, January 1, 2026, <https://southasianvoices.org/sec-m-pk-r-next-gen-air-warfare-in-south-asia-1-1-2026/>.

³ Heather R. Penney, *Scale, Scope, Speed & Survivability: Winning the Kill Chain Competition*, 2023; admin, "Pakistan's Integrated Kill Chain Exposes India's Airpower Vulnerability, Says Top US Aerospace Analyst," *Defence Security Asia*, December 15, 2025, <https://defencesecurityasia.com/en/pakistan-integrated-kill-chain-india-airpower-vulnerability-us-analyst/>; Onzila Aziz, "Electronic Warfare: Reshaping South Asian Skies," *Paradigm Shift*, June 1, 2025, <https://www.paradigmshift.com.pk/electronic-warfare/>.

⁴ Aziz, "Electronic Warfare"; Joanna Bailey, "Kill Chain: China J-10C & How Old Fighter Jets Can Beat Modern Stealth," *AGN*, August 5, 2025, <https://aerospaceglobalnews.com/news/kill-chain-china-j-10c-beat-stealth/>.

⁵ Hira Arshid Dr. Zainab Murtaza, *DECODING SIXTH-GENERATION WARFARE IN SOUTH ASIA: LESSONS FROM THE 2025 INDIA-PAKISTAN WAR*, December 28, 2025, <https://doi.org/10.5281/ZENODO.18181527>.

⁶ Bailey, "Kill Chain."

either ground radar or drone, and is less damaging to the front-line resources and complicates countermeasures by the enemy. The heart of the doctrine is the PL-15E of the beyond-visual-range (BVR) type, having an active radar seeker and shoot-and-forget capability. In most cases, pilots of Pakistan can act over a range of over 200km before the opponent can take measures to react.

India Air doctrine possesses strong individual aircrafts which include the Rafale and Su-30MKI.⁷ However, India is yet to come up with all digitized combat cloud. Real-time information exchange is hampered by service silos as well as a technical ecosystem based on Russian systems, French systems, Israeli systems, and home systems. To do this, theatrical reforms are being applied in India. The Chief of Defence Staff can make binding joint orders, and integration of the three services in unified commands is being achieved. This is another way of enhancing coordination on the command level, where the air and naval forces can be appropriated to support warfare on the land in case an initial strike is carried out.

Operational Reality: 2025 Warfare

It was known as Operation 2025 because the new doctrines were tried out in the war of May 2025. It had most of its weapons standing off and dependent on electronic warfare suites in preference to manoeuvrability. During its four-day exercise, Pakistan displayed electromagnetic interference and tactical deception to demonstrate the use of soft-kill. They said they had killed off over 80 Indian drones and even five Indian planes, including Rafale planes.

To counterattack the Indian air-defenses, Pakistan employed fake air-defense systems, radar decoys, and India was deprived of resources, and the president had access to Indian communications that were used to frustrate radar lock-ons. One event was when an Indian PL-15 missile was launched at Indian installations.⁸ Even though this missile failed to strike its target, the Indian tracking system failed, and the formation had to break, so the Indian countermeasures turned out to be vulnerable. As a reaction, India put its integrated air-defending grid into practice, consisting of S -400 Triumph and Barak -8 air-defense systems, and destroyed 77 Pakistani

⁷ Penney, *Scale, Scope, Speed & Survivability: Winning the Kill Chain Competition*; John Tirpak, "The Biggest News from India-Pakistan Air Battle: The Kill Chain," *Air & Space Forces Magazine*, May 19, 2025, <https://www.airandspaceforces.com/india-pakistan-air-battle-kill-chain/>.

⁸ Bodhideep Roy, "List of India's Directed Energy Weapons Projects » DefenceXP - Indian Defence Network," *DefenceXP - Indian Defence Network*, April 27, 2025, <https://www.defencexp.com/list-of-indias-directed-energy-weapons-projects/>.

drones.⁹ Another instance of the use of Israeli supply SEAD weapons was the Israeli supply of Harop loitering missiles, offensively deployed by India to attack Paki radar.

The BrahMos supersonic cruise was one of the best in India. It featured terrain -following profiles and next-generation electronic counter-countermeasures, which were immune to jamming by Pakistan. This assured that India is going into standoff precision platforms, having the capability to annihilate key infrastructure without firing across the border. The policy minimises the potential to kill innocent people and retains a plausible risk of counterattack.

Technological Advances: Cognitive Hybridization of EW/AI

The future of electronic warfare in the region changes very fast, including the inclusion of artificial intelligence (AI) and machine learning (ML). This idea is known as Cognitive EW by scholars. The old EW systems rely on library sets of known threat indicators that need to be pre-programmed, although they do not keep up with the new, dynamic RF emitters that rapidly reconfigure their frequency sets. It involves the implementation of cognitive EW systems on the edge, which classify and detect unrecognized signals in real time, carry out adaptive countermeasures, and enhance situational awareness of the contested environments.¹⁰

India considers AI the key to its defense policy. It created the Centre of AI and Robotics (CAIR) and the Defense AI Council. In a bid to enable modernization of its systems to support frequency-hopping and signal discrimination, the Indian Air Force incorporates AI to manage complex operations, thus helping to shorten decision-making cycles. The developments have made the OODA loop become a Super OODA, which allows machines to analyze and react to threats a lot quicker than human beings.¹¹

In Pakistan, there is also the development of similar technologies in its Centre of Artificial Intelligence and Computing (CENTAIC).¹² It is centered on threat recognition and data fusion automation, to counteract its smaller fleet with AI-enforced cognitive EW to ensure its sensors do not become irrelevant with the scale and sophistication of the sensor network size India has offered.

⁹ Aziz, "Electronic Warfare"; Narayan Dhital, "Electronic Warfare in Asia-Pacific: Geopolitical Strategies and Implications," *Modern Diplomacy*, April 12, 2025, <https://moderndiplomacy.eu/2025/04/13/electronic-warfare-in-asia-pacific-geopolitical-strategies-and-implications/>.

¹⁰ ndc-editor-2, "The Cognitive Battlefield of Hybrid Warfare," *Nato Defense College Foundation*, October 17, 2025, <https://www.natofoundation.org/food/the-cognitive-battlefield-of-hybrid-warfare/>.

¹¹ Manpreet Sethi, "Understanding the Nuclear Landscape in Southern Asia: Complexities and Possibilities," *Journal for Peace and Nuclear Disarmament* 5, no. 2 (2022): 224–42, <https://doi.org/10.1080/25751654.2022.2156253>; "Cognitive Electronic Warfare: An Artificial Intelligence Approach," accessed March 8, 2026, <https://ieeexplore.ieee.org/document/9538834>.

¹² Dr. Zainab Murtaza, *DECODING SIXTH-GENERATION WARFARE IN SOUTH ASIA*.

The fact that AI is becoming militarized, however a great strategic threat. Replacing human-directed decision-making with AI-based one has the potential to minimize human control and concentrate more on pre-programmed, goal-oriented decisions instead of situational decisions. False positives or spoofed missile signals in a nuclear escalation situation, such as in South Asia, may enable autonomous retaliation to take place, bypassing politics and escaping the situation in a few seconds. Such a hybrid existence of both tactical EW and strategic decision-making enhances predictability and increases the likelihood of nuclear escalation by chance.

KALI Project and Directed Energy Weapons

One of the primary aspects of India's future in electronic warfare (EW) is the Directed Energy Weapons (DEW). They can kill targets virtually as soon as they are spotted and at minimal cost, thus the ideal in combating cheap drone swarms that were prevalent in the conflict of 2025. The Project KALI, or Kilo Ampere Linear Injector, is one of the greatest secret research projects carried out by the Bhabha Atomic Research Centre and DRDO.¹³

KALI is not a laser. It is a linear accelerator that generates intense pulses of relativistic beams of electrons. These pulses may be converted into high-power microwave (HPM) or X-ray bursts intended to take down the internal electronics of incoming missiles or aircraft. KALI can put a platform out of commission without any harm to it, potentially flooding its sensors, microchips, and onboard computers to make it blind and unusable.¹⁴ Cases of a big avalanche that was possibly triggered by a test taking place in the Siachen sector in 2012 are not confirmed.

In the meantime, DRDO is working on a special HPM counter-drone system in its Microwave Tube Research and Development Centre (MTRDC).¹⁵ Prolonged 2km Show In 2026, prototype systems also demonstrated the capability of clearing commercial quad stunts within a 2km radius, and this was extended to 5km by mid 2026. The system is S-band with a maximum power at the output of 450MW, which disrupts the coordination of the swarm through the application of an ultra-short pulse of 20 nanoseconds.

¹³ "Project KALI: The Classified Truth about India's Electromagnetic 'God of Destruction,'" Wion, accessed March 8, 2026, <https://www.wionews.com/world/project-kali-the-classified-truth-about-india-s-electromagnetic-god-of-destruction-1757515400284>.

¹⁴ Roy, "List of India's Directed Energy Weapons Projects » DefenceXP - Indian Defence Network."

¹⁵ Atheena Fathima Riyas, *Directed Energy Weapons - ClearIAS*, Current Affairs Notes, March 31, 2023, <https://www.clearias.com/directed-energy-weapons/>.

EW Convergence and Strategic Stability in Cyberspace

Electronic warfare is turning out to be more intertwined with cyber warfare throughout South Asia that poses a cross-domain threat. Tactical battlefield requirements are now taken care of with the help of cyber operations. Remarkably, purportedly, Pakistani cyber specialists were involved in the May 2025 dispute, by adding to disrupt the Indian BrahMos missile and drone flight guidance by way of GPS spoofing and hacking, typical soft-kill approaches.

These technologies are a threat to the nuclear command, control, and communications (C3I).

¹⁶Military infrastructure has a high vulnerability to speech as digital infrastructure is based on old technology and is targeted by new measures of intrusion. It may be interpreted as a military strike on the battlefield since digital systems can be used to generate tactical discouragement as well as battlefield awareness. As an illustration, to have a radar paralyzed tactically would be seen as a preliminary action leading to a strategic nuclear attack if the radar ended up offering early-warning provisions.

Cyber-attacks have a very vague nature of attribution, making it challenging to manage the crisis. Both countries consider cyberspace as an existential threat, although they do not have a clear definition of what constitutes an armed cyberattack.¹⁷ In combination with the role of non-state actors and the media-driven nationalism, it leaves the probability of miscalculations in the high-tension conditions rather high.

Geopolitical Changes and Industrial Strategies

Electronic warfare is highly influenced by the high competition between the U.S. and China. Pakistan's recent military accomplishments emerged as one of the displays of the Chinese arms, as highlighted in the U.S.-China Economic and Security Review Commission in 2025. Pakistan is no longer dependent on American equipment but rather on a Chinese-oriented ecosystem where the state can share information without any complications. In 2026, Pakistan will correspond to the advanced systems, including HQ 9 air-defense systems, PL-15 missiles, and the J-35 stealth airplanes, as a quantum leap in the low-observability and network-centric warfare.¹⁸

¹⁶ Sethi, "Understanding the Nuclear Landscape in Southern Asia."

¹⁷ Angel Rivera-Novoa and Daniel Augusto Duarte Arias, "Generative Artificial Intelligence and Extended Cognition in Science Learning Contexts," *Science & Education*, ahead of print, June 11, 2025, <https://doi.org/10.1007/s11191-025-00660-1>.

¹⁸ admin, "Pakistan's Integrated Kill Chain Exposes India's Airpower Vulnerability, Says Top US Aerospace Analyst"; Catherine A. Theohary and John R. Hoehn, "Convergence of Cyberspace Operations and Electronic Warfare," *Congressional Research Service*, 2019.

However, India is tightening its relations with the United States. Its collaboration in the Initiative on Critical and Emerging Technology (iCET) and the U.S.-India Huge Defense Association is not limited to procurement.¹⁹ It is now in the business of collaborative development and manufacture of big technologies, which include the GE F-414 mobile jet engines, combat drones planned for MQ-9B, and space-based ISR resources. The Aatmanirbharta programme spends billions on the local defense industry in India so that it can lessen reliance on Russian and European suppliers and ultimately become a world leader in defense by 2047.²⁰

India cannot enjoy the full benefits of its defense budget, which is larger in comparison to the Pakistani expenditure. Massive levels of pension payments and a force of a standing army of 1.4 million people all use a large portion of resources. India uses around 2231 percent of its budget on capital acquisitions, compared to Pakistan, which pursues lean technology and strategy, and invests in high-impact EW and stealth capabilities.

Strategic Stability and Nuclear Threshold

The primary strategic issue is the impact of the EW developments on nuclear deterrence stability. The prospects of nuclear annihilation traditionally kept the conflicts between India and Pakistan below the nuclear threshold. The 2025 crisis proved that the use of EW and precision drones can bring the conflicts to the stage of a full-scale war.²¹

The risk is that the crossing of the nuclear threshold can take place accidentally due to the EW operations. A pretextive use-or-lose decision may be made to appear when one side employs EW to put the other incommunicado by crippling their early-warning satellites or their nuclear command and telecommunications. The situation is already complicated by India and all-capable MIRV Agni -V missiles as well as Pakistan and its tactical nuclear weapons.²² Also, the

¹⁹ MAJ Micheal Senft, "Convergence of Cyberspace Operations and Electronic Warfare Effects," The Cyber Defense Review, 2016, <https://cyberdefensereview.army.mil/CDR-Content/Articles/Article-View/Article/1136055/convergence-of-cyberspace-operations-and-electronic-warfare-effects/>; Michael T. Klare, *Assessing the Dangers: Emerging Military Technologies and Nuclear (In)Stability*, 2023; The Financial Express, "Is BIMSTEC Failing?," The Financial Express, 2026, <https://thefinancialexpress.com.bd/views/opinions/is-bimstec-failing>.

²⁰ INIS, "Artificial Intelligence in Digital & Hybrid Warfare," *Institute for National and International Security*, April 9, 2025, <https://intelligence-security.rs/inis-activities/artificial-intelligence-in-digital-hybrid-warfare/>; Dhital, "Electronic Warfare in Asia-Pacific."

²¹ Roy, "List of India's Directed Energy Weapons Projects » DefenceXP - Indian Defence Network"; Penney, *Scale, Scope, Speed & Survivability: Winning the Kill Chain Competition*; Sethi, "Understanding the Nuclear Landscape in Southern Asia."

²² Dhital, "Electronic Warfare in Asia-Pacific."

militarization of AI reduces the response periods and increases the chance of nuclear war in case of technical error or decisions made by the algorithm.

Inferences and Regional Perspective

South Asian Electronic warfare is moving towards platform-based to network-based doctrines, with success depending on the speed and integrity of the signal. The inclusion of modern technology in the military forces of Pakistan by the Chinese compounds it with a huge asymmetric role in that they will be able to balance the airpower of their traditional counterparts, such as India, by applying soft kills or a strong kill chain. The reaction of India, which consists of increased military expenditure, the focus on the indigenization process, and the use of AI and directed-energy weapons, is focused on restoring a qualitative advantage and combating the influence of China in the north.

Cognitive EW and AI-based systems proliferation pose the biggest threat to the stability in the region. The advent of Super OODA loops and the solidarity of tactical EW and nuclear command systems do not allow much room for error. Devoid of clear cyber-EW standards, reputation management, or even establishing the boundaries of the use of digital and electromagnetic force, the chances of disastrous miscalculation will continue to increase. In the next ten years, the two nations will have to deal with the difficulty of operating this technological revolution without derailing human effort in control of the escalation decision-making processes.