AI Arms Race And Strategic Stability Between India And Pakistan

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Abstract

How are Artificial Intelligence (AI) and emerging technologies impacting the military offence/defence systems of India and Pakistan? This study delineates the impacts of these dual-use technologies on the intrinsic security dilemma and the ways they can affect strategic stability in the region. Drawing on existing literature, expert opinions, and defence strategy documents, it argues that the integration of AI in the military systems of India and Pakistan will lead to an AI-driven arms race and security dilemma. Furthermore, AI integration disturbs deterrence dynamics and increases the risk of inadvertent escalation between the competitive dyad. India has been leading the AI-driven arms race in South Asia, forcing Pakistan to follow suit and undertake the policy of quid-pro-quo. The paper argues that cooperative and confidence-building measures are required at bilateral and multi-lateral levels to establish and strengthen an AI governance framework to prevent an escalating arms race and a possible conflict.

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Introduction

International politics has always been influenced by the technological innovations dotted throughout most of human history. Most of these technologies have been categorised as dual use, both for commercial and military purposes. States, in most cases, have tried to regulate and control development, deployment, and spread of these technologies. Some of these technologies, such as railways, used for military transportation and communication, and also for societal development, have remained non- or less destructive. On the other hand, both nuclear technology and Artificial Intelligence (AI) are highly useful but also immensely destructive. Three features can be discerned about these technological innovation: 1) dual-use, 2) its expansion, and 3) its destructive power. Rarely has any technological innovation in history been able to fulfil all three criteria till the arrival of nuclear technology and then AI. Schmidt notes that AI is dual-use, can spread easily as it is no more than a few lines of code, and is highly destructive.[1] AI can enhance the existing conventional, nuclear, or cyber military capabilities to an unimaginable level. And above all, it is very difficult to regulate, control, and contain.

Contemporarily, Pakistan and India are developing and utilising AI for social, economic, defence, and security purposes. Though they are prioritising civilian applications of AI, information technology, and emerging technologies to deal with issues ranging from the control of social media to the industrial and educational development of the state and society, yet their use and role in military and strategic domains have long been a debated topic of the South Asian politics. India, for example, in 1988, showed its concerns at the Conference on Disarmament in Geneva as:

[1] Eric Schmidt et al., *Final Report: "National Security Commission on Artificial Intelligence,"* (Washington D.C.: Government of the United States, 2021).

> *"The combination of the most recent advances in the field of electronics with the lethality of nuclear explosive power will prove to be deadly. At the same time, the functions of [reconnaissance], surveillance, target identification, kill assessment, and evaluation are being re-designed to make greater use of all satellite and other sophisticated sensor technologies and data processing using fifth-generation computers. With such deployments, the command and control systems stand in danger of becoming increasingly automated."*[2]

Those concerns are now long gone, and India has made effective use of AI in its military modernisation campaign. It has deployed 140 AI-based surveillance systems along its borders with Pakistan and China. These systems include high-resolution cameras, sensors, and unmanned aerial vehicles (UAVs).[3] It has even been using AI in counter-terrorism operations. In 2023, India acquired the first batch of Autonomous Surveillance and Armed Drone Swarm (A-SADS) systems, commonly known as swarm drones,[4] having the capability to target any type of target, specifically nuclear delivery vehicles. In 2024, India announced to invest US$ 1.25 billion in AI projects and intends to increase the investment to US$ 5.1 billion by 2027.[5] Meanwhile, Pakistan has also been trying to invest in AI-related projects, yet its investment has remained minimal. In 2018, for example, it announced the establishment of the National Center

[2] Natwar Singh, Indian Minister of State for External Affairs, Statement in the plenary of the Conference on Disarmament, Indian Ministry of External Affairs, *Foreign Affairs Record*, vol. 34, no. 1 (Jan. 1988), p. 74, quoted by Petr Topychkanov "Introduction: *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk: South Asian Perspective,"* (Stockholm International Peace Research Institute, 2020).

[3] Murali Krishnan, "Indian Army Ramps up AI, but How Effective Will It Be?" *The Business Standard*, October 20, 2023, https://www.tbsnews.net/thoughts/indian-army-ramps-ai-how-effective-will-it-be-723062.

[4] Akhil Kadidal, "Indian Army Receives 'swarming' UAVs," *Janes*, March 6, 2023, https://www.janes.com/osint-insights/defence-news/defence/indian-army-receives-swarming-uavs.

[5] Vidyashree Srinivas, "India's AI Spending to Triple to $5 Bn by 2027," *Analytics India Magazine*, May 14, 2024, https://analyticsindiamag.com/ai-news-updates/indias-ai-spending-to-triple-to-5-bn-by-2027/; Munsif Vengattil, "India Announces $1.2 Bln Investment in AI Projects," *Reuters*, March 7, 2024, sec. Technology, https://www.reuters.com/technology/india-announces-12-bln-investment-ai-projects-2024-03-07/.

for Robotics and Automation, which consisted of 11 labs in 13 universities of Pakistan, with an estimated cost of US$ 1.67 million.[6] Pakistan Air Force established the Center for Artificial Intelligence and Computing (CENTAIC) in 2020, and the Pakistan Army established the Army Center for Emerging Technologies within its Cyber Command in 2022.[7]

Today, competition between India and Pakistan has increased manifold as both states are acquiring new weapons and technologies. They are also integrating AI and other disruptive technologies into their weapon systems, such as unmanned aerial vehicles and cruise missiles.[8] These advancements in technology and its integration into sophisticated weapons systems has engendered an AI arms race leading to a security dilemma between India and Pakistan while posing a threat to South Asian strategic stability.

This study tries to answer the questions on what AI is and how are India and Pakistan trying to integrate it in their military strategies and defence systems. It also endeavours to deliberate on the origin, nature, and dynamics of the AI arms race and security dilemma between them and their impact on the strategic stability of South Asia. While employing the qualitative case study and content analysis as methodology, this study highlights the convergence of three significant phenomena, that is, technological innovation, strategic thinking, and risk escalation.

What is a Security Dilemma?

John Herz coined the term security dilemma in the 1950s, and noted that states being threatened accumulate more power to ensure their security.

[6] NCRA, "National Centre of Robotics and Automation," Government of Pakistan, 2018, https://ncra.org.pk/.

[7] News Desk,"Firepower, Cyber Have Emerged as Mainstay of Future War: COAS," *The Express Tribune*, August 5, 2022, sec. News, https://tribune.com.pk/story/2369646/firepower-cyber-have-emerged-as-mainstay-of-future-war-coas; Staff Reporter, "PAF Opens Artificial Intelligence and Computing Centre," *Dawn*, August 28, 2020, sec. newspaper, https://www.dawn.com/news/1576836.

[8] Shannon N. Kile and Hans M. Kristensen, "'Indian Nuclear Forces' and 'Pakistani Nuclear Forces'," in *SIPRI Yearbook 2019: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2019), 325–31 and 332-37.

This accumulation of power for one state's security drives the other state's insecurity, which ultimately enhances its power, leading to a security-insecurity spiral.[9] He further argued that a security dilemma is inevitable because it is driven by uncertainty about the others' intentions, and a universal escape from it is not possible because it is "a necessary consequence of social life."[10] Herbert Butterfield equated the security dilemma to "Hobbesian fear," arguing that it can force states to war, even when they are not offensive towards each other.[11] Robert Jervis brought the security dilemma into mainstream theories of international relations and argued that a security dilemma exists because of structural anarchy in the international system. [12]

There are three preconditions for a security dilemma. Anarchy in the international system,[13] lack of malicious intentions on both sides, and accumulation of power.[14] The security dilemma model can be used to examine the influence of military AI technology on uncertainties such as adversaries' motives and intentions, and the way they foster insecurities between the nuclear dyad.

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[9] Herz notes that, "Groups and individuals who live alongside each other without being organised into a higher unity … must be … concerned about their security from being attacked, subjected, dominated, or annihilated by other groups and individuals. Striving to attain security from such attacks, they are driven to acquire more and more power in order to escape the effects of the power of others. This, in turn, renders the others more insecure and compels them to prepare for the worst. Because no state can ever feel entirely secure in such a world of competing units, power competition ensues, and the vicious circle of security and power accumulation is on." John H. Herz, *Political Realism and Political Idealism: A Study in Theories and Realities,* (Chicago: University of Chicago Press, 1951).

[10] Herz.

[11] Herbert Butterfield, *History and Human Relations,* (London: Collins, 1951).

[12] Robert Jervis, *Perception and Misperception in International Politics,* (New Jersey: Princeton University Press, 1976).

[13] Glenn Snyder considers that "Uncertainty about the aims of others is inherent in structural anarchy." Glenn H. Snyder, "The Security Dilemma in Alliance Politics," *World Politics* 36, no. 4 (July 1984): 461–95, https://doi.org/10.2307/2010183.

[14] Charles L. Glaser, "Political Consequences of Military Strategy: Expanding and Refining the Spiral and Deterrence Models," *World Politics* 44, no. 4 (1992): 497–538, https://doi.org/10.2307/2010486; Shiping Tang, "The Security Dilemma: A Conceptual Analysis," *Security Studies* 18, no. 3 (September 18, 2009): 587–623, https://doi.org/10.1080/09636410903133050.

Artificial Intelligence (AI) is considered a Dual-Use Technology

When John McCarthy coined the term "AI" in the mid-1950s, it only meant making intelligent machines with the help of science and engineering.[15] In the following decades, the research on AI underwent several key developments, such as "AI summer" in the 1960s and "AI winter" in the 1970s.[16] However, the interest in AI suddenly skyrocketed in the 2010s when four critical developments, that is, advances in cloud computing, advances in machine learning (ML) and deep "neural networks," availability of "big data" sources, and an increase in commercial interest in AI, converged.[17] Since then, AI and Machine Learning (ML) have attracted huge interest and investments. An example of this is machine automation, where machines perform complex tasks without any significant human supervision or assistance, relying on interactions between computer programming and the surrounding environment.[18] Currently, AI deals with the development of machines that have the potential to imitate capabilities that are generally associated with human intelligence, such as learning, language, reasoning, heuristics, and observations.[19] The United States Congressional Report defines AI as; "Any artificial system that performs tasks under varying and unpredictable circumstances, without significant human oversight, or can learn from their experience and improve their performance may

[15] Pearl Andy, "John McCarthy: Homage to the Father of Artificial Intelligence (AI)," *Artificial Solutions*, June 2, 2017, www.artificial-solutions.com/blog/homage-to-john-mccarthy-the-father-of-artificialintelligence.

[16] Nils J. Nilsson, *The Quest for Artificial Intelligence, 1st ed.* (Cambridge: Cambridge University Press, 2009), https://doi.org/10.1017/CBO9780511819346.

[17] John P. Holdern and Megan Smith, *Preparing for the Future of Artificial Intelligence,* (Executive Office of the President of the United States: National Science and Technology Council Committee on Technology, October 2016), https://publicintelligence.net/white-house-preparing-artificial-intelligence/.

[18] Andrew Williams, "Autonomous Systems: Issues for Defence Policymakers, ed. Paul Scharre," (NATO Allied Command Transformation, 2015), 27 - 62.

[19] Margaret A. Boden, *AI: Its Nature and Future, Illustrated edition* (Oxford, United Kingdom: Oxford University Press, 2016).

solve tasks requiring human-like perception, cognition, planning, learning, communication, or physical action."[20]

Three qualities of AI are used to distinguish its use in the civilian and military domains: 1) technological differentiation, 2) concentrated control, and 3) the magnitude of effect.[21] The term "differentiated technologies" refers to technologies that are exclusively limited to military or civilian domains, while concentrated control refers to government control or monopoly to manage the development and deployment of certain technologies. The disruptive and destructive potential of technology relates to the magnitude of its impact on society and the potential harm it could cause.[22] AI is dual-use, can spread easily, and is highly destructive.[23]

AI and India's Military Modernisation

Integrating AI capabilities into its military arsenal remains an integral part of the Indian military modernisation programme.[24] The implementation of autonomy in India's military systems will augment its conventional war-fighting capabilities with Autonomous Weapons Systems (AWS), also known as killer robots.[25] In 2023, India was one of the only four states that voted against the UN General Assembly Resolution 78/241 that raised

[20] Daniel S. Hoadley and Nathan J. Lucas, *Artificial Intelligence and National Security*, Congressional Research Service, April 26, 2018, 1–2. Similarly, the United States Department of Defense (DoD) defined AI as: "The ability of machines to perform tasks that typically require human intelligence—for example, recognising patterns, learning from experience, drawing conclusions, making predictions, or taking action—whether digitally or as the smart software behind autonomous physical systems." R Alan Blackburn, "Summary of the 2018 Department of Defense Artificial Intelligence Strategy: Harnessing AI to Advance Our Security and Prosperity," 2018.

[21] Henry A. Kissinger, Eric Schmidt, and Daniel Huttenlocher, *The Age of AI: And Our Human Future, First ed*, (New York Boston London: Little, Brown and Company, 2021).

[22] Kissinger, Schmidt, and Huttenlocher...

[23] Schmidt et.al., "Final Report: National Security Commission on Artificial Intelligence."

[24] Attiq ur Rehman, "Indian Growing Reliance on the Military Application of Artificial Intelligence Technology and Its Impacts on South Asian Regional Security," *Journal of Indian Studies* Vol. 9, No. 1 (June 2023).

[25] C. Raja Mohan, "India, 'Killer Robots' and the China Challenge," *The Indian Express*, November 14, 2023, https://indianexpress.com/article/opinion/columns/c-raja-mohan-writes-india-killer-robots-and-the-china-challenge-9026293/.

serious concerns about Lethal Autonomous Weapons Systems (LAWS) and highlighted challenges posed by "new technological applications in the military domain, including those related to AI and autonomy in weapons systems."[26] Pakistan voted in favour of the resolution.

India has already started integrating AI and ML in the civilian and military domains alike. It has signed several strategic partnerships with different states regarding AI. It has launched the Defence Artificial Intelligence Dialogue with the US and also the India-US Initiative on Critical and Emerging Technology (iCET) where both sides reiterated the importance of AI in their strategic partnership.[27] The Indian Ministry of Defence (MoD) AI Task Force in its 2018 report suggested that India should strive to become a 'significant power of AI in defence specifically in the area[s] of aviation, naval, land systems, cyber, nuclear, and biological warfare.'[28]

Robert M. Geraci has argued that India's reliance on AI in the military sphere is deeply ingrained in its strategic thinking.[29] The 2018 Land Warfare Doctrine of India formally acknowledged the importance of modern technologies to enhance operational effectiveness and situational awareness.[30] It discussed that AI and other emerging technologies will shift

[26] Other three states were Belarus, Russia, and Mali. HRW, "*Killer Robots: UN Vote Should Spur Action on Treaty*," (Human Rights Watch, January 3, 2024), https://www.hrw.org/news/2024/01/03/killer-robots-un-vote-should-spur-action-treaty.

[27] Amlan Mohanty and Ashima Singh, "Advancing the India-U.S. Partnership on AI," (Carnegie Endowment for International Peace, February 20, 2024), https://carnegieendowment.org/posts/2024/02/advancing-the-india-us-partnership-on-ai?lang=en; Krishnan, "Indian Army Ramps up AI, but How Effective Will It Be?"

[28] Indian Ministry of Defence, Press Information Bureau, "AI Task Force Hands over Final Report to RM," June 30, 2018, https://pib.gov.in/newsite/PrintRelease.aspx?relid=180322. At the same time, India asserts that its national AI strategy is more civilian, i.e., it intends to 'leverage AI for economic growth, social development, and inclusive growth.' Arnab Kumar, "National Institution for Transforming India (NITI Aayog)," *National Strategy for Artificial Intelligence: #AIforall, Discussion Paper*, NITI Aayog: New Delhi, June 2018, p. 7.

[29] Robert M. Geraci, *Futures of Artificial Intelligence: Perspectives from U.S and India*, (Oxford: Oxford University Press, 2022).

[30] Summar Iqbal Babar and Muhammad Nadeem Mirza, "Indian Strategic Doctrinal Transformation: Trends and Trajectory," *Journal of Security & Strategic Analyses* 6, no. 2 (2020): 79–100, https://doi.org/10.57169/jssa.006.02.0122.

the focus of warfare toward robotics, drones, and autonomous systems.[31] The doctrine also advocated for a network-centric approach to warfare. Moreover, it's Defence Research and Development Organisation (DRDO) is continuously working to integrate advanced technologies into India's military arsenal. DRDO has founded the Centre for Artificial Intelligence and Robotics (CAIR) to develop AI robotics and control systems. To fulfil the aims laid down in the Land Warfare Doctrine, CAIR has developed network-centric systems for Tactical Command, Control, and Communication Systems. Its main task is to facilitate situational awareness for military commanders to make optimal and time-efficient decisions.[32]

Moreover, CAIR successfully developed C3RI systems (command, control, and communication, reconnaissance, and intelligence systems). These systems include communication and networking intended for tactical communication, and the Geographical Information System (GIS) for electronic navigation. CAIR has also done significant work in speech signal processing by developing a Linear Predictive Coder (LPC), which has the potential to code voice as it encodes '4 kHz band limited telephone quality analog speech into a 2.4 kbps digital stream.'[33] CAIR has also developed language-independent speaker identification and speaker-independent speech recognition programmes. These systems possess the ability to efficiently navigate and operate in semi-structured environments and warzones, while also sensing roadblocks and delivering real-time information and feedback. Another initiative of CAIR is the development

[30] Summar Iqbal Babar and Muhammad Nadeem Mirza, "Indian Strategic Doctrinal Transformation...

[31] Indian Army, "Land Warfare Doctrine - 2018," To be Read in Conjunction with "Joint Doctrine of the Indian Armed Forces - 2017" (Indian Army, 2018), https://www.ssri-j.com/MediaReport/Document/IndianArmyLandWarfareDoctrine2018.pdf.

[32] "Centre for Artificial Intelligence & Robotics (CAIR) | Defence Research and Development Organisation - DRDO, Ministry of Defence, Government of India," accessed January 16, 2024, https://www.drdo.gov.in/labs-and-establishments/centre-artificial-intelligence-robotics-cair.

[33] "Technologies | Defence Research and Development Organisation - DRDO, Ministry of Defence, Government of India," accessed January 16, 2024, https://www.drdo.gov.in/labs-establishment/technologies/centre-artificial-intelligence-robotics-cair.

of a Multi-Agent Robotics Environment (MARF) project, which is developing different types of robots, including Snake and Wall Climbers,[34] that can effectively be used in the military domain.

Furthermore, the Ministry of Defence, India, also established the Defence Artificial Intelligence Council (DAIC) in February 2019, whose main function is to transition AI-defence projects from experimental into operational zones.[35] In 2022, the Indian Defence Minister, Rajnath Singh, stated that India would develop "25 defence-specific AI products" by 2024.[36] Most of those systems are already operational in India. New Delhi has also established other institutions, such as the Defence AI Project Agency (DAIPA) to advance AI defence militarisation and Artificial Intelligence for Air Defence. Indian Air Force also has an operational structure of Unit for Digitisation, Automation, Artificial Intelligence, and Application Networking (UDAAN).[37] India has also developed another AI-oriented military institution to provide the Indian armed forces a simulation and situation-based training utilising AI and virtual reality for war-games, and is known as The War-game Research and Development Centre (WARDEC).[38]

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[34] P.K. Chakravorty, "Artificial Intelligence and Its Impact on the Indian Armed Forces," *Indian Defence Review* (blog), May 5, 2017, https://www.indiandefencereview.com/news/artificial-intelligence-and-its-impact-on-the-indian-armed-forces/.

[35] Ministry of Defence, "Enhancement of Capabilities of AI Technology: Defence Artificial Intelligence Council (DAIC), Defence AI Project Agency (DAIPA), Defence Institute of Advanced Technology (DIAT), Unit for Digitization, Automation, Artificial Intelligence and Application Networking (UDAAN)" (Government of India, August 1, 2022), https://pib.gov.in/pib.gov.in/Pressreleaseshare.aspx?PRID=1846937.

[36] Rajat Pandit, "India Finally Taking Some Steps to Leverage AI for Military Applications," *Times of India*, February 24, 2022, https://timesofindia.indiatimes.com/india/india-finally-taking-some-steps-to-leverage-ai-for-military-applications/articleshow/89559262.cms.

[37] Ministry of Defence, "Enhancement of Capabilities of AI Technology."

[38] Vaibhav Jha, "Explained: Project WARDEC – India's Upcoming AI-Powered Wargame Centre," *The Indian Express*, May 21, 2022, https://indianexpress.com/article/explained/explained-project-wardec-india-ai-powered-wargame-centre-7928387/.

In July 2022, the Indian MoD introduced its first-ever AI-supported defence-oriented products in the 'Artificial Intelligence in Defence' exhibition.[39] DRDO of India also has developed Himshakti, which is an integrated electric warfare system that can be used for signal intelligence, surveillance, interception, analysis, position fixing, direction finding, and to jam radar signals and communication process of the adversary while also protecting India's electronic assets, specifically in the mountainous region.[40] To acquire situational awareness, Intelligence, Surveillance, and Reconnaissance (ISR) is the key component as it facilitates quick data collection and processing to make timely decisions. For ISR purposes, unmanned aerial vehicles (UAVs) and unmanned underwater vehicles (UUVs) are being developed and used by India to monitor and gather information and data. Some of the UAVs that DRDO has successfully developed are Rustom, Lakshaya, Nishant, and several micro & mini UAVs.[41] Netra is a mini UAV having an autonomous guidance and navigation system, which DRDO and IdeaForge jointly developed.[42] The Rustom-2 UAV system has been developed, and Ghatak is under development. They have double capacity, that is, they can detect targets, gather information, and can also be used to strike.[43]

[39] Ministry of Defense, "First Ever 'Artificial Intelligence in Defence' Exhibition & Symposium to Be Held in New Delhi on July 11," July 8, 2022, https://pib.gov.in/pib.gov.in/Pressreleaseshare.aspx?PRID=1840142.

[40] Staff, "Himshakti EW: India Indigenous Electronic Warfare System," *Indian Defence News* (blog), August 4, 2018, https://defenceupdate.in/himshakti-ew-india-indigenous-electronic-warfare-system/.

[41] DRDO, "Unmanned Aerial Systems (UAS)," Defence Research and Development Organisation, Ministry of Defence, Government of India, 2025. https://drdo.gov.in/drdo/unmanned-aerial-systems-uas.

[42] DRDO, "Netra: The Indigenous Airborne Early Warning & Control System," Defence Research and Development Organisation, Ministry of Defence, Government of India, 2025, https://www.drdo.gov.in/netra-indigeneous-airborne-early-warning-control-system.

[43] Dinakar Peri, "Indigenous UAV Rustom-2 to Complete User Trials by August 2023," *The Hindu*, October 19, 2022, sec. India, https://www.thehindu.com/news/national/indigenous-uav-rustom-2-to-complete-user-trials-by-august-2023/article66032155.ece.

Indian Center for Artificial Intelligence and Robotics (CAIR) has established a knowledge-driven framework known as a Decision Support System (DSS) and has developed different algorithms, including Swarm algorithms, Multi-Criteria Decision Making (MCDM), Search algorithms, and algorithms based on Game theory to allocate resources. These systems are highly efficient in transport allocation, coastal surveillance, giving informed and intelligent solutions, and providing decision support for force deployment.[44] Thus, the Early Warning and ISR systems developed by India can both evaluate threats and provide different response options. It is done by analysing adversaries' intentions, capabilities, credibility and severity of the threat, and historical data related to such threats.

For communication security, CAIR has developed a Linear Predictive Coder (LPC) to secure data, speech, text, and fax that is communicated or transmitted within the military.[45] Its purpose is to ensure the smooth transmission of critical information to militaries in conflict zones without getting intercepted or destroyed by the adversary. [46] AI, ML, and autonomous systems can automate threat detection, while also facilitating capabilities that are necessary to counter cyber threats. To protect India from cyber threats, CAIR has been working to develop systems that ensure secure communication, traffic analysis, and authentication such as speech biometrics, and network intrusion detection systems (IDS). It has also developed several systems such as secure e-mail, IP security, high-speed traffic analysis software, information security gateway, personal firewall, multi-layered network firewall, smart card-based authentication, and online disk encryption to secure data storage, and Network and Host Intrusion Detection Systems.[47]

[44] "Centre for Artificial Intelligence & Robotics (CAIR) | Defence Research and Development Organisation - DRDO, Ministry of Defence, Government of India."
[45] "Centre for Artificial Intelligence & Robotics (CAIR)."
[46] B. Poornima, "Cyber Preparedness of the Indian Armed Forces," *Journal of Asian Security and International Affairs* 10, no. 3 (December 1, 2023): 301–24, https://doi.org/10.1177/23477970231207250.
[47] Poornima.

New Delhi is also integrating AI and ML into its resource management, logistics support, decision support systems, and battlefield planning and simulation systems. Furthermore, it is also focused on developing AI-enhanced land-based weapons. For example, in 2017 it developed Muntra, an unmanned ground vehicle (UGV) which is also considered as an armoured tank. In the next years, India developed its many variants, such as Muntra M, Muntra N, and Muntra S.[48] These unmanned vehicles possess the ability to clear mines (M-variant), conduct ISR operations (S-variant), and operate in challenging terrains and harsh environments, such as in nuclear and chemical contaminated areas (N-variant). Furthermore, India is also developing a Multi-Agent Robotic Framework (MARF), which is being designed to perform as a team of troops on the battlefield.[49] India has also developed more DAKSH remotely operated vehicles (ROV) or robots, which are currently being used by the Indian military to disarm mines and explosives.[50] The Indian Navy is also working to integrate AI to increase marine security, surveillance, inventory management, and marine domain awareness. Currently, the Indian Navy is working on more than 30 AI projects.[51] Although India has greatly advanced in several areas, including Autonomous Systems, Decision Support Systems, Battlefield Planning and Simulation, Predictive Systems, Detection Systems, Cybersecurity, and Intelligence, Surveillance, and Reconnaissance (ISR), their integration into the military arsenal and mission-critical systems is a slow process. Yet Post-

[48] Staff, "DRDO Develops India's First Unmanned Tank, Muntra; Rolls It out of Chennai Lab-India News," *Firstpost*, July 29, 2017, https://www.firstpost.com/india/drdo-develops-indias-first-unmanned-tank-muntra-rolls-it-out-of-chennai-lab-3870693.html, accessed on June 27, 2025.

[49] Vincent Boulanin et al., "*Artificial Intelligence, Strategic Stability and Nuclear Ris*k" (Stockholm: *SIPRI*, June 2020), https://www.sipri.org/publications/2020/policy-reports/artificial-intelligence-strategic-stability-and-nuclear-risk, accessed on June 23, 2025.

[50] DRDO, "Daksh Remotely Operated Vehicle (ROV)," Army Technology, March 19, 2021, https://www.army-technology.com/projects/remotely-operated-vehicle-rov-daksh/, accessed on June 17, 2025.

[51] Mayank Singh, "Indian Navy Ropes in New-Age Tech, 30 Artificial Intelligence Projects in the Works," *The* N*ew Indian Express*, January 28, 2022, https://www.newindianexpress.com/nation/2022/Jan/28/indian-navy-ropes-in-new-age-tech-with30-artificial-intelligence-projects-in-the-works-2412338.html, accessed on June 11, 2025.

Pahalgam episode depicted that despite being risk-averse, India has been successful in integrating the AI-enabled systems in its war-fighting capabilities. To further improve its AI-augmented military capabilities, it has all the support in the form of technology and training from the United States, Russia, Israel, and several other states.

AI and Pakistan's Military Modernisation

In terms of AI applications in military systems, the Pakistan Air Force (PAF) launched the Center for Artificial Intelligence and Computing (CENTAIC) in 2020, which aims to integrate AI into Pakistan's military defence systems. Pakistan is collaborating with different countries through bilateral and multilateral research and development initiatives. They also assist PAF in developing sensor fusion technology, which can combine sensory data obtained from multiple sources to enhance intelligence gathering and work on key domains of AI, such as 'Big Data, Machine Learning, Deep Learning, Predictive Analysis, and Natural Language Processing (NLP).'[52] CENTAIC enhances the efficiency of Project AZM/Azam by developing many advanced weapons such as autonomous Unmanned Aerial Vehicles (UAVs), Medium-Altitude Long-Endurance (MALE), and fifth-generation stealth fighter jets of the PAF.[53] Algorithms for image processing for TV/1R seekers, air-to-air, and air-to-surface missiles, and human-machine interfaces (HMI) will also be developed under this project. Moreover, under CENTAIC, PAF launched the Cognitive Electronic Warfare (CEW) programme with the objective of making use of AI and ML for effective tactical decision-making and analysis.[54] Indian defence analyst Pravin Sawhney believes that PAF has already operationalised CEW and used it in its Operation Swift Retort

[52] National Center of Artificial Intelligence (NCAI).
[53] Air Vice Marshal Faheem Ullah Malik (retd), Maham S. Gillani, Zuhaib Anwar, "Military's Guide to Artificial Intelligence," 5 (Centre for Aerospace & Security Studies, Islamabad, October 2022), https://casstt.com/wp-content/uploads/2022/11/AI-Study-Abridged-RV5-17-Oct-2022-Formated-HM3-ED-SSA.pdf.
[54] Ali, "Comparing the AI-Military Integration by India and Pakistan."

against India in response to the attack on Balakot in 2019.[55] In May 2025 Pakistan responded to Indian Operation *Sindoor* with Operation *Bunyan-un-Marsoos* which showcased its multi-domain warfare capabilities including air, land, sea, and cyber realms.[56] It is believed that Pakistan made effective use of CEW in the operation.

The National Security Policy (NSP) of Pakistan 2022 has formally acknowledged the role of emerging technologies in warfare. According to NSP, Pakistan would leverage emerging technologies to increase battlefield awareness, network centricity, and electronic warfare capabilities as technology is a force multiplier. It also highlights Pakistan's need and resolve to invest in its cyber capabilities to minimise incidents of cyber intrusion.[57]

In 2022, the Pakistan Army established its Cyber Command, which consists of two divisions: 1) Cyber Division (CD), and 2) the Army Center of Emerging Technologies (ACET). The ACET directly deals with the applications of AI in the cyber domain.[58] This indicates that Pakistan recognises the importance of AI in modern warfare, and has used AI-ML combination to deal with threats posed by emerging disruptive technologies.

Pakistan's military possesses a variety of AI-enabled weapons to deter India's growing dominance in the region. Some are domestically produced,

[55] *China Helps Pakistan Upset Military Balance against India*, 2020, https://www.youtube.com/watch?v=xaAKlKoNoVU.

[56] ISPR, "No PR-152/2025-ISPR: Marka-e-Haq - 22 April 2025 to 10 May 2025 The conduct of Pakistan Armed Forces Operation "Bunyanum Marsoos" on 10 May 2025 as part of the military conflict Marka-e-Haq, was in response to Indian military's dastardly attacks that began on the night of 6 & 7 May 2025, resulting in the loss of innocent civilian lives, including women, children, and the elderly," (Inter services Public Relations, May 12, 2025). https://ispr.gov.pk/press-release-detail?id=7283

[57] "National Security Policy of Pakistan 2022 – 2026" (Islamabad: National Security Division, Government of Pakistan, January 14, 2022), https://static.theprint.in/wp-content/uploads/2022/01/NSP.pdf.

[58] Admin PSF, "Pakistan Army's Cyber Command," *Pakistan Strategic Forum* (blog), August 9, 2022, https://pakstrategic.com/pakistan-armys-cyber-command/.

some are jointly produced with China and Turkiye, while others are acquired from allies, specifically China. For example, in 2018, the Pakistan Aeronautical Complex (PAC) and the Aviation Industry Corporation of China (AVIC) reached a mutual agreement to jointly produce 48 Wing Loong II UAV drones.[59] The Wing Loong II is specifically designed for surveillance, reconnaissance, and precision strikes.[60] Islamabad acquired LY-80 SAM missiles from China, which possess the capability to intercept and destroy cruise missiles and aircraft flying at low to medium altitudes.[61] Moreover, it has also purchased CH-4 medium-altitude long-endurance drones from China.[62]

Pakistan has also acquired Bayraktar Akinci combat drones from Turkiye and received its first batch in April 2023. Bayraktar Akinci TB is a more advanced and lethal UAV having extended operational range, increased endurance, and higher payload capacity, and can even be classified as a High-Altitude Long Endurance (HALE).[63] The acquisition of Bayraktar Akinci has given Pakistan an edge, surpassing India's progress in acquiring unmanned UAVs.[64]

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[59] Franz-Stefan Gady, "China, Pakistan to Co-Produce 48 Strike-Capable Wing Loong II Drones," *The Diplomat*, October 9, 2018, https://thediplomat.com/2018/10/china-pakistan-to-co-produce-48-strike-capable-wing-loong-ii-drones/.

[60] Admin PSF, "Details of Chinese Drones Acquired by Pakistan Armed Forces," *Pakistan Strategic Forum, Blog*, December 11, 2022, https://pakstrategic.com/details-of-chinese-drones-acquired-by-pak-armed-forces/; PSF.

[61] Colonel Mandeep Singh, "Pakistan Army Inducts Chinese Made LY-80 Surface to Air Missile System For Protecting Strategic Assets," *Delhi Defense Review*, April 5, 2017, https://delhidefencereview.com/2017/04/05/pakistan-army-inducts-chinese-made-ly-80-surface-air-missile-system-protecting-strategic-assets/.

[62] "Pakistan Air Force Received First Chinese CH-4 Drones," Global Defense Corp, January 28, 2021, https://www.globaldefensecorp.com/2021/01/28/pakistan-air-force-received-first-chinese-ch-4-drones/#google_vignette.

[63] Syed Eesar Mehdi, "Pakistan's Acquisition of Turkish Drones and India's Option," *International Center for Peace Studies*, October 13, 2023, https://www.icpsnet.org/comments/pakistan-acquisition-of-turkish-drones-091023#_ftn1.

[64] Neeraj Rajput, "Pakistan's 'Acquisition' Of Cutting-Edge Turkish Bayraktar Akinci Drones Raises Red Flag In India," *EurAsian Times*, April 19, 2023, https://www.eurasiantimes.com/pakistans-acquisition-of-turkish-akinci-drones-raises-red-flag/.

Moreover, Pakistan has domestically produced multiple AI-enabled UAVs such as Uqab, Burraq,[65] Ababeel, Mukhbar, Shahpar,[66] Sarfirosh kamikaze drone, GM 500 Turah Stealth Loitering Munition, and several others. Recently, Pakistan has also unveiled its Shahpar II Combat MALE UAV, which is Pakistan's most lethal autonomous weapon as it can autonomously take off, land, intercept, surround, and destroy adversary targets.[67] In AI-enhanced missile systems, the military forces of Pakistan have introduced Ra'ad (Hatf-8), which is a cruise missile having a range of 350km, Shaheen III, which is a medium-range ballistic missile (MRBM) having a range of 2750km, and Ababeel, which is also MRBM designed to carry multiple nuclear warheads.[68] Shaheen III is equipped with AI and other cutting-edge technologies. It can attack the most distant locations in India, such as Northeast India and the Nicobar and Andaman Islands, because of its long (2750km) range.[69] The second test of Ababeel in October 2023 made Pakistan the first country in South Asia to have reached the testing phase of MIRVs.[70]

In the civilian domain, the Ministry of Information Technology and Telecommunication drafted the Pakistan National Artificial Intelligence Policy in 2022, providing "a complete AI-enabling ecosystem covering all aspects of awareness, skill development, standardisation, and ethical use.' It further noted 'to augment AI and allied technologies through balanced demand and supply-side interventions, inducing the establishment of

[65] Muhammad Nadeem Mirza et al., "Unmanned Aerial Vehicles: A Revolution in the Making," *South Asian Studies* 31, no. 02 (December 2016): 625–38.
[66] Khansa Qureshi, "Increasing Relevance of Drone Technology and Pakistan's Position by Khansa Qureshi," *CASS Blog*, March 3, 2023, https://casstt.com/increasing-relevance-of-drone-technology-and-pakistans-position/.
[67] Tanmay Kadam, "Pakistan 'Shows Off' Its Indigenous Shahpar-2 Combat UAV That Can 'See, Surround & Smash' Enemy Targets," *EurAsian, Times*, November 22, 2022, https://www.eurasiantimes.com/pakistans-indigenous-shahpar-2-combat-uav-ready/.
[68] "Missiles of Pakistan," Missile Threat, June 30, 2022, https://missilethreat.csis.org/country/pakistan/.
[69] "Pakistan Carries out Successful Flight Test of Shaheen-III Ballistic Missile," *DAWN*, October 9, 2022, https://www.dawn.com/news/1684188.
[70] Antoine Levesques, "Pakistan Missile Test Confirms Its MIRV Ambitions," *IISS*, November 7, 2023, https://www.iiss.org/online-analysis/missile-dialogue-initiative/2023/10/pakistan-missile-test-confirms-its-mirv-ambitions/#.

research and innovation centers in AI for developing, test-bedding, deploying, and scaling AI solutions.'[71] Since the last two years, no further development has been made, and this policy is still in its draft phase. It has not been approved yet. Moreover, the draft policy has no single mention of the word 'military,' giving the impression that it solely is focused on civilian use, regularisation, and standardisation of AI. Moreover, 'Vision 2025' highlighted that Pakistan's AI strategy is focused on "developing human and social capital, achieving sustained indigenisation and inclusive growth, democratic governance, institutional reform and modernisation of the public sector."[72]

In 2019, Pakistan launched 'Digital Pakistan,' aimed at achieving public welfare with the help of cutting-edge technologies.[73] Under its banner, Pakistan has mandated different institutions specifically dedicated to AI. For example, the Presidential Initiative for Artificial Intelligence and Computing (PIAIC) promotes research, education, and business in Pakistan with the help of cutting–edge technologies, such as blockchain, augmented reality, cloud computing, data science, and AI.[74] Similarly, the Punjab government launched the National Initiative for Artificial Intelligence and Security (NIAIS) to close the skill gap between the labour market and the educational system. It is the only document that also talks about the implications of these capabilities on national security.[75] Moreover, the

[71] Tahir Amin, "Ministry Drafts 'National Artificial Intelligence Policy,'" *Business Recorder*, May 16, 2023, https://www.brecorder.com/news/40242327.
[72] MoPD&R, *"Pakistan 2025 One Nation - One Vision,"* (Islamabad: Ministry of Planning Development & Reform, Government of Pakistan, 2018), https://www.pc.gov.pk/uploads/vision2025/Pakistan-Vision-2025.pdf.
[73] News Desk, "PM Imran Launches 'Digital Pakistan' Initiative," *The Express Tribune*, December 5, 2019, https://tribune.com.pk/story/2112360/1-digital-pakistan-pm-imran-addresses-launch-ceremony.
[74] "Presidential Initiative for Artificial Intelligence & Computing," Presidential Initiative for Artificial Intelligence & Computing, accessed January 22, 2024, https://www.piaic.org.
[75] Umaima Ali, "Comparing the AI-Military Integration by India and Pakistan," *Centre for Strategic and Contemporary Research*, September 7, 2023, https://cscr.pk/explore/themes/defense-security/comparing-the-ai-military-integration-by-india-and-pakistan/.

National Center of Artificial Intelligence (NCAI) aims to boost the knowledge-based economy in Pakistan.[76]

AI-Driven India-Pakistan Conflict: Post-Pahalgam Study

On April 22, 2025, twenty six tourists in the Pahalgam region of the Indian Illegally Occupied Jammu & Kashmir (IIOJ&K) were killed in a terrorist attack.[77] The Indian Ministry of External Affairs, while alleging Pakistan, stated that 'this attack came in the wake of the successful holding of elections in the Union Territory (Indian administered Jammu and Kashmir) and its steady progress towards economic growth and development.'[78] As a response to the attack, India unilaterally 'held in abeyance the Indus Waters Treaty of 1960,' a World Bank-brokered water-sharing agreement between India and Pakistan. Pakistan also responded by holding Simla Agreement and other bilateral agreements in abeyance in a knee-jerk reaction. Pakistan's Foreign Office condemned the attack and offered participation in any 'neutral, transparent and credible' investigation of the attack.[79]

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[76] "Overview – National Center of Artificial Intelligence (NCAI)," 2023, https://ncai.pk/overview/.

[77] Farzana Shaikh, "Rising Tensions Resurface Pakistan's Credibility Problem– and India's Backfiring Policy on Kashmir," Chatham House, May 13, 2025, https://www.chathamhouse.org/2025/05/rising-tensions-resurface-pakistans-credibility-problem-and-indias-backfiring-policy; MEA India, "Statement by Foreign Secretary on the Decision of the Cabinet Committee on Security (CCS)," Ministry of External Affairs, Government of India, April 23, 2025, https://mea.gov.in/Speeches-Statements.htm?dtl/39442/Statement_by_Foreign_Secretary_on_the_decision_of_the_Cabinet_Committee_on_Security_CCS.

[78] MEA India, "Statement by Foreign Secretary on the Decision of the Cabinet Committee on Security (CCS)."

[79] PTI, "Pakistan Offers to Join 'neutral, Transparent' Probe in Pahalgam Terror Attack," *The Hindu*, April 26, 2025. https://www.thehindu.com/news/international/pahalgam-attack-pakistan-pm-sharif-says-ready-for-neutral-investigation/article69493641.ece; Pakistan Foreign Office, "Statement by the Spokesperson Regarding Attack in Anantnag District of the Indian Illegally Occupied Jammu and Kashmir," Ministry of Foreign Affairs, Government of Pakistan, April 23, 2025, https://mofa.gov.pk/press-releases/statement-by-the-spokesperson-regarding-attack-in-anantnag-district-of-the-indian-illegally-occupied-jammu-and-kashmir.

On the contrary, India launched *Operation Sindoor* on the night of May 06/07, 2025, against Pakistan,[80] in response to which Pakistan launched *Operation Bunyan-un-Marsoos* on the morning of May 10, 2025.[81] However, following US President Donald Trump's intervention, India and Pakistan declared a ceasefire on May 10, 2025.

This approximately 96-hour conflict saw several 'new' and 'firsts,' never seen in the history of the wars. The first being an aerial combat on the night of May 06/07, 2025, in which no fighter plane from either side crossed the international border and used long-range missiles to target the belligerent positions. Pakistan, using beyond-visual-range-missiles and effective electronic warfare, shot down several Indian modern aircraft – three Rafale (French), one Mirage 2000 (French), one SU-30MKI (Russian), and one MiG-29 (Russian) – and that too within a short span.[82] This was the first time that French Rafale, laced with the most advanced electronic warfare, lethal weapons systems, and AI capabilities, were shot down in an active combat. Indian Rafale has been upgraded with Israeli Helmet Mounted Display, which allows its pilots to target missiles using line-of-sight

[80] MEA India, "Statement by Foreign Secretary: OPERATION SINDOOR," Ministry of External Affairs, Government of India, May 7, 2025, https://mea.gov.in/Speeches-Statements.htm?dtl/39473.

[81] MEA India, "Statement by Foreign Secretary Vikram Misri: OPERATION SINDOOR," Ministry of External Affairs, Government of India, May 7, 2025, https://mea.gov.in/Speeches-Statements.htm?dtl/39473/Statement_by_Foreign_Secretary_OPERATION_SINDOOR; ISPR, "No PR-152/2025-ISPR: Marka-e-Haq - 22 April 2025 to 10 May 2025 The Conduct of Pakistan Armed Forces Operation 'Bunyanum Marsoos', on 10 May 2025 as Part of the Military Conflict Marka-e-Haq, Was in Response to Indian Military's Dastardly Attacks That Began on the Night of 6 & 7 May 2025, Resulting in the Loss of Innocent Civilian Lives, Including Women, Children, and the Elderly.," Inter Services Public Relations Pakistan, May 12, 2025, https://ispr.gov.pk/press-release-detail?id=7283.

[82] Baqir Sajjad Syed, "Air Force Credits Cobras with 'six IAF Kills', *Dawn* , June 6, 2025, https://www.dawn.com
Mayank Singh, "Military Chief Admits IAF Jet Loss in Op Sindoor, Says Tactics 'rectified' to Strike Deep inside Pakistan," *The New Indian Express*, June 1, 2025, https://www.newindianexpress.com/nation/2025/May/31/military-chief-admits-iaf-jet-loss-in-op-sindoor-says-tactics-rectified-to-strike-deep-inside-pakistan.

tracking and quick decision making.[83] It is also equipped with Meteor, MICA, SCALP-EG, AASM Hammer missiles for air-to-air and air-to-ground operations.[84] Most interestingly, it is equipped with the highly advanced Thales SPECTRA Electronic Warfare System capable of jamming, deception, Radar Warning Receivers (RWR), Electronic Countermeasures (ECM), Infrared and Laser Warning Systems, and Active Cancellation Technology, which have been integrated into its airframe.[85] Despite having these great technological marvels equipped with AI features, still, Pakistanis were able to shoot down three Rafale jets, forcing India to change its strategy. For the following 90-plus hours, the Indian Air Force did not send its jets towards Pakistan. Instead, it changed its strategy and relied more on drones and long-range missiles to hit targets in Pakistan.[86] Pakistan mostly used J-10C and JF-17 Block III fighter jets to respond to Indian aggression.[87] It was the first combat operation involving J-10C fighter jets using PL-15 missiles.[88] This air combat will provide lessons for the militaries throughout the world on planning and conducting successful military operations against adversaries while using cyber, AI,

[83] Danvir Singh, "The Rafale: Indian Quest for Air Supremacy," *Indian Defence Review*, September 22, 2020, https://indiandefencereview.com/the-rafale-indian-quest-for-air-supremacy/.

[84] Meteor is an air-to-air missile, often exceeding the range beyond 200km. MICA is a medium-range air-to-air missile which can be used both for Beyond-Visual-Range (BVR) and Within-Visual-Range (WVR). SCALP-EG is the air-to-surface cruise missile having a range beyond 500 km. AASM Hammer missiles are precision-guided air-to-surface missiles having a range from 15-70 km. India acquired Hammer specifically after the Galwan Valley clash of 2020. Because Hammer are highly precise missile having the capacity of operating in complex terrain like the Himalayas. Gupta Anchit and Angad Singh, "Locked On: How Air-to-Air Missiles Shaped India-Pakistan Combat," *IAF History*, June 7, 2025, https://iafhistory.in/2025/06/07/india-pakistan-air-to-air-missile-race/. Singh, "The Rafale."

[85] Singh, "The Rafale."

[86] "India General Admits Jet Losses in Clash with Pakistan: Here's What He Said," *Al Jazeera*, June 1, 2025, https://www.aljazeera.com/news/2025/6/1/india-general-admits-jet-losses-in-clash-with-pakistan-heres-what-he-said.

[87] Christopher Clary, "Four Days in May: The India-Pakistan Crisis of 2025," *Stimson Center*,*Blog*, May 28, 2025, https://www.stimson.org/2025/four-days-in-may-the-india-pakistan-crisis-of-2025/.

[88] Clary.

emerging technologies, and the most advanced toolkit, coupled with intensive and highly professional training.

Similarly, it was the first time in history that two states effectively used AI, AI-augmented weapons, and cyber warfare against their adversaries. India used BrahMos and SCALP-EG Cruise Missiles, along with other highly advanced precision-guided and AI-augmented weapons, against Pakistan.[89] It attacked mosques and other places in Bahawalpur, Muridke, Muzaffarabad, and several military installations, including Nur Khan, Rafiqui, Bholari, Rahim Yar Khan, and other bases.[90] Pakistan used Fatah-I and Fatah-II ballistic missiles to target Indian installations.[91] Pakistan claimed to have hit the Udhampur, Pathankot, Sirsa, Adampur and Bhuj Air bases. It also claimed to have hit BrahMos Storage sites at Beas and Nagrota, a Brigade Headquarter, and a logistic supply Depot in Uri.[92] Moreover, it also claimed to have destroyed several Indian artillery positions in IIOJK and a military intelligence training centre in Rajouri. It was the first time since 1971 that India and Pakistan attacked each other's installations across the international borders.

Another first remained the first drone warfare between two adversaries where both used swarm drones, loitering munitions, Kamikaze drones, surveillance and several other types of drones.[93] Pakistan reportedly used Shahpar II, Asisguard Songar, Bayraktar, Wing Loong, YIHA-III, Jasoos, and several other drones during these 96 hours.[94] Pakistan launched around

[89] Clary.
[90] Clary.
[91] Christopher Clary, "Four Days in May: The India-Pakistan….
[92] Pakistan claimed to have struck 26 targets in India, including airfields, missile silos, air and missile defense batteries, intelligence centers, a brigade headquarter and several other installations. It claimed to have hit only those installations which have been involved in operations against Pakistan. ISPR, "Marka-e-Haq: Operation Bunyan-Un-Marsoos."
[93] Usman Haider, "The First India-Pakistan Drone War," *The Diplomat*, May 30, 2025, https://thediplomat.com/2025/05/the-first-india-pakistan-drone-war/.
[94] John Haltiwanger, "Drones Are Transforming South Asian Warfare," *Foreign Policy*, June 11, 2025, https://foreignpolicy.com/2025/05/15/drones-india-pakistan-changing-south-asia-warfare/; Haider, "The First India-Pakistan Drone War;" Brandon J.

400-500 drones that penetrated deep inside Indian Territory.[95] India, on the other hand, used Warmate R, Warmate 3, Nagastra-1, ASL, Skystriker, and Israeli Harop, Harpy, Heron, IAI Searcher Mk II drones.[96] This drone war became a classic case study for future generations to learn about the effective utilisation of UAVs against the enemy. The objective remains intelligence, surveillance, reconnaissance (ISR), SEAD (Suppression of Enemy Air Defence) operations,[97] Kamikaze suicide drones, activating and identifying the enemy radar and air defence positions, and precision destruction. Moreover, in this conflict, India and Pakistan utilised drones to acquire the list of the would-be targets to be destroyed. It is believed that Pakistan acquired the positions of Indian S-400, BrahMos missiles batteries, silos, and other important installations by the use of drones. Drones would automatically activate the radars of air defence systems, thus sending the exact coordinates to the home base. Both sides used hundreds of drones against each other in these 96-plus hours.[98] They claimed to have neutralised the drones using hard and soft kill methods. Hard kills may have involved anti-aircraft guns guided by the AI-enabled radar systems, while soft-kill involves the biggest employment of electronic warfare in neutralising the enemy drones and even incoming missiles or jets. Pakistan claimed to have misguided the incoming Indian missiles and UAVs. Reports also claim that using Electronic Warfare Pakistan captured a

Weichert, "How Pakistan's Drone Army Won the War against India," *The National Interest*, May 13, 2025. https://nationalinterest.org/blog/buzz/how-pakistans-drone-army-won-the-war-against-india; Vijainder K. Thakur, "Swarm & Strike: How Pakistan's Drones 'Tested' Indian Defenses & Questioned India's Very Capable A Systems," *Eurasian Times*, May 11, 2025. https://www.eurasiantimes.com/swarm-strike-how-pakistans-drone-superiority/; Devjyot Ghoshal, Ariba Shahid, and Shivam Patel, "India and Pakistan's Drone Battles Mark New Arms Race," *Reuters*, May 27, 2025. https://www.reuters.com/business/aerospace-defense/india-pakistans-drone-battles-mark-new-arms-race-asia-2025-05-27/.

[95] Weichert, "How Pakistan's Drone Army Won the War against India."

[96] Haltiwanger, "Drones Are Transforming South Asian Warfare"; Haider, "The First India-Pakistan Drone War;" Weichert, "How Pakistan's Drone Army Won the War against India." Thakur, "Swarm & Strike"; Ghoshal, Shahid, and Patel, "India and Pakistan's Drone Battles."

[97] Haider, "The First India-Pakistan Drone War."

[98] Haider; Haltiwanger, "Drones Are Transforming South Asian Warfare."

complete Warmate drone. This could be a game-changer in future conflicts between the two.

The May 2025 military confrontation between India and Pakistan provides an opportunity to look at both states' capability to integrate AI, cyber, and emerging technologies in military doctrines. While the conflict de-escalated because of the intervention of the US, the whole episode redefined the future of war and its closeness to unstoppable escalation ladder.[99]

Impact on Strategic Stability in South Asia

Currently, there exists a stability-instability paradox between India and Pakistan after the acquisition of nuclear weapons in 1998. Though they have managed to avoid a full-scale conventional or nuclear war, there have been multiple instances of confrontation, such as the Kargil crisis of 1999, the 2001 military standoff, Pulwama, Balakot, and the most recent Pahalgam incident. In the wake of these confrontations, policymakers on both sides have managed to de-escalate the situation – often with the help of the extra-regional power – but instability continues to exist. Recently, Indian rhetoric has strengthened its perception that it can engage Pakistan in a limited conflict because of its conventional superiority. If AI is brought into an equation, it could enhance the strategic confidence, and the chances of inadvertent escalation in times of crisis may rise.

The Global AI index ranks India 10^{th,} while Pakistan is at 76th position in the world in terms of AI capacity.[100] Sandford AI Index Report notes that India ranked 2nd only after the United States in the number of AI projects submitted on the GitHub – even greater than the projects submitted by the

[99] Shah Meer Baloch and Hannah Ellis-Petersen, "From Missiles to Ceasefire: How India and Pakistan Pulled Back from the Brink," *The Guardian*, May 12, 2025. https://www.theguardian.com/world/2025/may/12/how-india-and-pakistan-conflict-turned-from-brink-of-war-to-ceasefire-in-days.

[100] "The Global AI Index," Tortoise, accessed June 20, 2025, https://www.tortoisemedia.com/intelligence/global-ai/.

whole Europe.[101] One factor behind India's increasing AI capabilities is its aspirations for regional dominance and as a counterweight to China. Nonetheless, its active acquisition and integration of AI capabilities in military systems pose serious threats to Pakistan. Pakistan has been trying to match Indian advancements with efficient planning, stringent training standards, qualitative development and acquisition. Still Pakistan is facing challenges because of the inadequate academia-industry linkages, scarce economic resources reserved for research and development, and an unstable domestic political situation. This complicates the situation as the development of AI-augmented weapons systems by India and its perception of winning limited conflicts on the basis of its capability of launching unmanned operations against Pakistan has increased the risks of inadvertent escalation. Moreover, ambiguities and uncertainties associated with AI may result in miscalculations, leading to recurrence of crisis.

AI-Arms Race and Security Dilemma between India and Pakistan

James Johnson argued that AI is *primus inter pares* and an aggravator of the existing security dilemma.[102] He notes that several structural and non-structural factors intensify or exacerbate different dynamics of the AI-security dilemma in ways that would increase power accumulation, fear, and insecurity, leading to armed conflict between strategic rivals.

Integration of AI and other disruptive technologies in the military offence and defence systems of Pakistan and India has aggravated the strategic tensions, leading to an AI security dilemma. The uncertainties regarding others' motives and intentions will compel both states to make decisions, such as the development of similar or advanced AI-integrated weapons, accumulation of both offensive and defensive capabilities, and preventive

[101] Nestor Maslej et al., "The AI Index 2025 Annual Report," AI Index Steering Committee, Institute for Human-Centered AI, Stanford University, Stanford, CA, April 2025.

[102] James Johnson, *AI and the Bomb: Nuclear Strategy and Risk in the Digital Age*, (Oxford, New York: Oxford University Press, 2023).

or pre-emptive attacks if AI-generated/gathered data, analysis, and decisions create a crisis.

A look at India and Pakistan's strategic rivalry shows that they fulfil all three prerequisites of the security dilemma mentioned above. There exists uncertainty, mistrust, and fear between India and Pakistan regarding each other's motives and intentions. Both states are accumulating offensive and defensive AI-driven capabilities. And finally, the presence of nuclear deterrence is a major restraining factor. Structurally, India is trying to dominate the region and challenge Chinese pre-eminence. Pakistan is consequently compelled to adjust its priorities and prevent an Indian regional preponderance. Thus, both structural and non-structural factors are intensifying the security dilemma between the two. This dilemma has been intensified by the dual-use nature of AI, domestic political constraints, regime type, and asymmetric distribution of power.

Moreover, the way state actors perceive information or an adversary's intentions would impact confidence-building measures and arms-control agreements, which are the basic tenets of reducing the chances of security dilemmas. The solution to deal with this problem is not to disarm AI, but to build confidence-building measures between the two or at a multilateral level to regulate its use. The rejection of the UNGA resolution by India about the LAWS, which talked about AI and other emerging technologies, clearly defines its disinterest in any such measures. Preventing non-state actors from using AI to cause mass disruptions and cyber-attacks is currently its only interest.

AI is here to stay. Weapons, whether nuclear or cyber, exist and will continue to exist. They cannot be un-invented, and AI is already amplifying their intensity manifolds. The AI technology's impact on strategic stability, whether positive or negative, greatly depends on the pace and scope of AI.

Conclusion

AI is an enabler technology, which means that it can increase the intensity and lethality of existing and new weapons systems. AI has applications in early-warning systems, ISR capabilities, autonomous vehicle systems, UAVs, MIRVs, and the like. It can increase the lethality of both conventional and non-conventional weapons systems. However, in terms of nuclear command and control, there is a consensus among nuclear states and experts that AI should not be directly involved in making decisions regarding nuclear C2 functions, i.e., nuclear command and control, even if the technology allows.[103] However, the question is not whether AI will be integrated into nuclear command and control, but rather which country will do it, when, and to what degree.

The study finds that Pakistan and India are moving toward an AI arms race. There is no probability of AI arms control between India and Pakistan because of the long-standing history of rivalry and lack of trust. Another reason is that India is the world's 5th largest economy and is in a better position to exhaust Pakistan's limited resources by trapping it in the costly arms race. So Pakistan has to make decisions very carefully and make efficient utilisation of its resources for target-oriented projects and avoid unnecessary expenditures. The research found that unchecked integration of AI into military systems will greatly impact strategic stability and increase the risk of inadvertent crisis escalation. Moreover, these confidence and security-building measures can prevent this arms race, for which a multilateral consensus is required.■

[103] James Johnson, "Delegating Strategic Decision-Making to Machines: Dr. Strangelove Redux?," *Journal of Strategic Studies* 45, no. 3 (April 16, 2022): 439–77, https://doi.org/10.1080/01402390.2020.1759038.