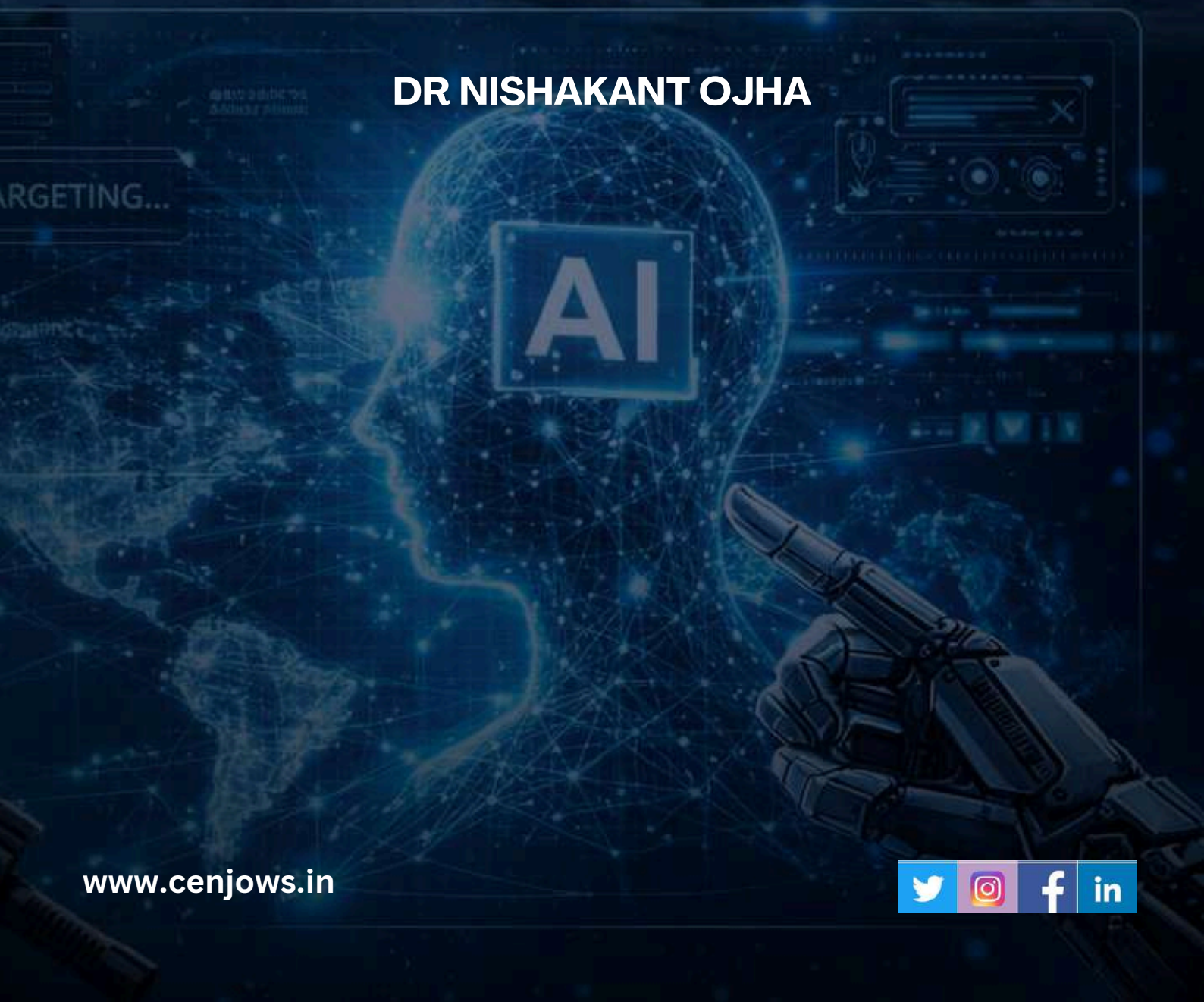
CENJOWS

ISSUE BRIEF
IB/33/26

ARTIFICIAL INTELLIGENCE FOR BHARAT 2030: A STRATEGIC ROADMAP FOR AI-ENABLED MILITARY MODERNISATION, OPERATIONAL SUPERIORITY AND STRATEGIC SOVEREIGNTY

DR NISHAKANT OJHA



www.cenjows.in

CENTRE FOR JOINT WARFARE STUDIES

CENJOWS

ARTIFICIAL INTELLIGENCE FOR BHARAT: A STRATEGIC ROADMAP FOR AI-ENABLED MILITARY MODERNISATION, OPERATIONAL SUPERIORITY AND STRATEGIC SOVEREIGNTY

Dr Nishakant Ojha is a strategic expert on AI, quantum, and emerging technologies, analysing their impact on defence, intelligence, warfare, and geopolitics and a Chair of Excellence at CENJOWS

Abstract

India stands at a defining inflexion point in its strategic history. The accelerating computing and advanced semiconductors are fundamentally reshaping the character of warfare. Nations that master and indigenise these technologies will command asymmetric advantages, in deterrence, in operational tempo, and in the capacity to project credible force across conventional, cyber, and space domains. This issue brief draws on structured research to the core to articulate a comprehensive strategic roadmap across eleven thematic pillars, evaluating both the opportunities and the institutional imperatives that must be addressed if India is to achieve genuine strategic sovereignty by 2030.

Introduction: The Imperative of AI-Driven Defence Transformation

The global defence landscape is undergoing the nuclear age. Artificial intelligence has become the central variable in great-power competition. The United States, China, and Russia are already deploying AI-augmented command systems, autonomous drone swarms, hypersonic weapons guided by machine-learning algorithms, and cyber warfare tools capable of disrupting adversary infrastructure at machine speed. For India, a nation that simultaneously manages complex borders, a demanding maritime neighbourhood, and heightened sub-conventional threats, the imperative to integrate AI into its defence architecture is not aspirational; it is existential.[1]

The Ministry of Defence's broader Atmanirbhar Bharat agenda has structured its activities around eleven thematic pillars, each corresponding to a critical dimension of India's AI-enabled modernisation agenda.[2] These range from foundational questions of human-AI teaming and ethical governance to frontier challenges of quantum-AI integration, semiconductor sovereignty, and space deterrence. Together, they constitute the architecture of a comprehensive national AI defence strategy, culminating in the flagship volume 'AI for Bharat, Strategic Defence & Silicon Sovereignty.'[3]

Defence Industry: Human-AI Teaming and Cognitive Warfare

The first and most foundational pillar concerns the relationship between the human soldier and intelligent machines. Defence Industry is not about replacing the combatant but about amplifying human capacity through cognitive partnership.[4] AI battlefield sensor data at speeds and scales that no human staff officer can match, translating raw intelligence into actionable decision support in seconds. For India's Army commanders operating in high-altitude terrain or conducting counter-insurgency operations, such systems offer a transformative edge.[5]

Cognitive warfare, the deliberate use of information, disinformation, and psychological manipulation to shape adversary decision-making, represents one of the most insidious threats in the contemporary environment.[6] AI dramatically amplifies the capacity to conduct cognitive warfare at scale: algorithmically generated deepfakes, synthetic media campaigns, and targeted influence operations can undermine troop morale, fracture civil-military trust, and paralyse command structures without a single kinetic exchange. India must develop both offensive doctrines and defensive countermeasures in this domain, including AI-powered verification systems and resilient communication architectures immune to algorithmic manipulation.[7]

Hyper-personalisation and AI-augmented decision-making hold transformative potential for military logistics, personnel management, and training. Machine learning algorithms can optimise supply chains, predict equipment failure, and personalise soldier training programmes. The conceptual groundwork for institutionalising these capabilities emphasises the need for trusted, ethical, and real-time decision support systems that maintain human authority over lethal decisions.[8]

Defence Industry: Autonomous Systems, Quantum-AI, and Next-Generation Deterrence

Defence Industry represents the era of fully autonomous warfighting systems operating at machine speed and scale, unbounded by human reaction time.[9] Drone swarms capable of coordinated, autonomous attack, hypersonic weapons with AI-guided terminal-phase manoeuvring, and space-based platforms conducting real-time ISR and electronic warfare are operational realities being developed and tested by China and the United States today.[10]

Quantum-AI integration represents perhaps the most strategically significant emerging technology convergence. Quantum computing can exponentially accelerate machine learning training, break current cryptographic standards, and enable ultra-secure quantum communication networks.[11] For India's defence establishment, this implies a dual priority: investing in indigenous quantum computing research through institutions such as DRDO and IISc, while hardening critical defence communication infrastructure against quantum-enabled adversarial decryption.[12] The above factors must envision AI-driven autonomous combat ecosystems with edge computing

architectures enabling zero-latency decision loops, a capability imperative for high-altitude border warfare where communication infrastructure is fragile.[13]

India's strategic deterrence posture must evolve to account for these realities. Space superiority through autonomous platforms, the ability to deny adversary satellite-based ISR and navigation, and the deployment of AI-managed counter-space capabilities are dimensions of next-generation strategic deterrence.[14] India cannot afford to proceed incrementally when peer and near-peer adversaries are making discontinuous technological advances.[15]

AI in Military Healthcare and Biodefence Readiness

The primary appraisal on Healthcare & Biodefence Readiness examined the integration of artificial intelligence into combat casualty care, trauma diagnostics, AI-assisted battlefield triage, and troop health analytics.[16] In the context of high-altitude operations on the Ladakh front or amphibious operations in island territories, the ability to rapidly triage casualties and allocate limited medical resources is a direct force multiplier.[17]

Imaging, biosensor data, and vital sign streams to identify life-threatening conditions and recommend treatment protocols in environments where specialist medical officers are unavailable.[18] Wearable health monitors integrated with AI-based analytics can provide commanders with real-time data on troop physiological status, enabling optimised operational planning and early identification of heat stress, hypoxia, and psychological strain.[19] The biodefence dimension is equally critical: AI-based pathogen detection systems, epidemiological modelling tools, and automated vaccine development platforms provide India with the capacity to rapidly characterise biological threats and mount coordinated responses.[20]

Smart Governance and AI for Defence Infrastructure

AI-managed cantonments can optimise energy consumption, predictively maintain critical infrastructure, and enhance physical security through AI-powered surveillance and access control.[21] In India's extensive military infrastructure across diverse geographical and climatic zones, from the high-altitude posts of Siachen to the island territories of the Andaman & Nicobar Command, AI-driven infrastructure management offers both efficiency gains and resilience benefits.[22] Rapid decision-making in strategic deployments, the capacity to mobilise forces, pre-position logistics, and

configure infrastructure at speed in response to emerging crises, is a function that AI-augmented command and control systems can dramatically enhance.[23] The integration of AI with India's Defence Communication Network, the establishment of AI-powered Operations Centres, and the development of digital twin simulations of critical military infrastructure are among the near-term priorities identified by this pillar.[24]

AI Workforce for Defence: Ethics, Upskilling, and Doctrine

So, technology adoption without commensurate human capacity development is a recipe for strategic failure.[25] The third segmental work on AI Workforce for Defence, Ethics, Upskilling, and Doctrine confronted this challenge directly.[26] Building defence AI skill pipelines requires action across multiple dimensions: technical education and training for officers and personnel who will operate AI-enabled systems; ethical education instilling a rigorous framework for the responsible use of autonomous platforms; and doctrinal development that translates technological capability into battlefield employment concepts.[27] AI-augmented soldiering demands that the Indian soldier is not merely a passive consumer of AI outputs but an active, critically thinking user who understands the limitations and failure modes of these systems.[28] The development of algorithmic warfare doctrine, governing the employment of AI in military decision-making chains, is a strategic imperative that India must address proactively.[29] India has to develop an indigenous ethical AI warfare framework, one that reflects its own strategic culture and legal commitments, rather than simply adopting frameworks developed by Western powers whose strategic interests and contexts differ significantly.[30]

AI in Defence Logistics, Mobility, and Climate Preparedness

AI dramatically enhances ISR capability: autonomous surveillance drones can maintain persistent coverage of contested borders, learning algorithms can detect anomalous activity patterns in satellite imagery, and AI-powered electronic intelligence systems can characterise adversary radar emissions and communication signatures.[31]

Cyber deterrence in the AI era requires a fundamental rethinking of India's cyber defence architecture.[32] Counter-AI cyber warfare, the ability to detect, attribute, and disrupt adversarial AI-enabled cyber operations, demands indigenous AI-powered

security operations centres and machine learning-based anomaly detection systems for critical infrastructure.[33] Space situational awareness, the tracking and characterisation of all objects in the orbital environment, is increasingly central to protecting India's growing satellite constellation upon which both military and civilian capabilities depend.[34]

Trusted Defence AI: Legal, Ethical, and Sovereign Frameworks

After deep research on Trusted Defence AI, Legal, Ethical & Sovereign Frameworks addressed the most complex dimension of AI integration in defence: governance.[35] The deployment of autonomous and AI-assisted weapons systems raises profound legal questions under international humanitarian law, including the principles of distinction, proportionality, and military necessity.[36] India, as a responsible global power committed to a rule-based international order, must develop clear legal doctrines governing warfare that provide both operational certainty and international credibility.[37]

Auditability, the capacity to review and explain AI system decisions, particularly in contexts involving the application of lethal force, is both an ethical imperative and a practical necessity for maintaining command accountability.[38] The development of indigenous trusted AI stacks, built on domestically developed hardware and software with transparent, auditable decision architectures, is essential for strategic sovereignty.[39] Dependence on foreign AI systems in critical defence applications creates both vulnerability to supply chain interdiction and the risk of embedded technical compromises. India must therefore invest in sovereign AI infrastructure, from chip-level hardware to application-layer algorithms, that is verifiable, secure, and under national control.[40]

Defence AI Startups and the Public-Private Innovation Ecosystem

Defence AI Startups & Public-Private Collaboration examined the critical role of India's emerging deep-tech startup ecosystem in the national AI defence agenda.[41] The experience of leading defence powers, particularly the United States' Defence Innovation Unit and Israel's Unit alumni network, demonstrates that the most transformative military AI capabilities often emerge from agile private sector innovators rather than traditional large defence contractors.[42]

India's iDEX framework and DRDO's Technology Development Fund provide institutional channels for engaging startups in defence AI development, but structural barriers, including lengthy procurement timelines, risk-averse acquisition processes, and insufficient security clearance pathways for private sector innovators, continue to impede rapid technology adoption.[43] This study emphasis on dual-use AI innovation, promoting synergies between surveillance, combat support, and export-ready platforms developed by Indian startups in partnership with DRDO and iDEX, reflects a recognition that India's defence AI ecosystem must be commercially viable as well as strategically functional.[44]

Semiconductor Sovereignty: RISC-V, Tactical Edge Computing, and Battlefield AI

Perhaps the most strategically foundational pillar is semiconductor sovereignty. Semiconductors & Strategic Compute for Battlefield AI confronted a fundamental dependency: every AI system, from the algorithm processing drone sensor data to the neural network informing command decisions, runs on semiconductor chips.[45] India's current near-total dependence on imported semiconductors represents a critical strategic vulnerability in any scenario involving great-power competition or supply chain disruption.[46]

The RISC-V open-source instruction set architecture offers India a pathway to indigenous chip design not encumbered by foreign intellectual property restrictions.[47] RISC-V processors designed for UAVs, secure processors for tactical edge computing, and application-specific integrated circuits for next-generation battlefield AI systems are all within India's technical reach if sustained investment and institutional commitment are provided.[48] The India Semiconductor Mission represents a significant step forward, but defence-specific requirements, for radiation-hardened chips, secure enclaves, and ultra-low-power processors capable of operating in extreme environments, require dedicated military semiconductor programmes.[49]

Tactical edge computing, the deployment of AI processing capability at the point of action rather than in centralised data centres, is essential for battlefield AI that must function in contested electromagnetic environments where connectivity to rear-area servers cannot be assumed.[50] India's Armed Forces require AI-capable edge devices that can maintain full operational functionality even when denied access to cloud

computing resources, an architectural requirement that demands indigenous, ruggedised, high-performance compute hardware.[51]

Research Outputs and Publication Programme

The above research scan is not just an intellectual exercise but a direct contribution to India's national defence policy architecture. The detailed different phases of publication outputs follow a structured quarterly schedule designed to maintain continuous policy engagement:

- Quarter Ending 1st Phase: web articles disseminating research findings on human-AI teaming, cognitive warfare, and military healthcare applications.
- Quarter Ending 2nd Phase: web article covering insights from the AI in Defence Logistics and National Security ISR appraisals.
- Quarter Ending 3rd Phase: web article and issue briefs, incorporating findings from the Trusted Defence AI governance appraisal and the Defence AI startups webinar.
- Quarter Ending 4th Phase: web article and issue briefs, drawing upon the Semiconductors seminar and the book launch proceedings.

The culminating output is the flagship MoD-backed volume "AI for Bharat, Strategic Defence & Silicon Sovereignty." This comprehensive volume will incorporate policy whitepapers, technology roadmaps, joint R&D mandates, and AI-led force modernisation recommendations developed across all eleven thematic research pillars. Book chapter finalisation is scheduled for May, enabling a thorough review and editorial process before the launch. Additionally, HQ IDS has assigned a future warfare study, which will be conducted as part of the broader professional military education programme, ensuring research findings translate directly into institutional learning for India's joint warfighting community.

Strategic Recommendations

Based on the research programme's findings, this issue brief advances the following strategic recommendations for the Ministry of Defence:

Establish a Defence AI Mission

Modelled on the National Quantum Mission, a dedicated Defence AI Mission should be established under MoD with a ten-year mandate, assured funding, and a joint

civilian-military governance structure, coordinating AI development priorities across DRDO, the three services, and the private sector.

Accelerate Indigenous Semiconductor Development for Defence

A dedicated defence semiconductor programme, focused on RISC-V-based processors for tactical edge computing, should be established within the India Semiconductor Mission framework. Defence-specific chip requirements, security, radiation hardness, and extreme environment operability must be explicitly integrated into the national semiconductor roadmap.

Develop an Indian Doctrine for Algorithmic Warfare

India should develop a comprehensive military doctrine governing the employment of AI in all phases of the operational continuum, from planning to execution to post-conflict assessment. This doctrine must address human- machine authority boundaries, auditability requirements, and international humanitarian law compliance.

Strengthen the iDEX-DRDO-Startup Nexus

Structural barriers to private sector participation in defence AI development must be reformed to enable rapid technology absorption. A dedicated Defence AI Accelerator should be established, co-managed by iDEX and DRDO, to fast- track startup solutions from prototype to operational deployment.

Invest in AI Biodefence and Military Healthcare Systems

AI-powered battlefield triage, diagnostics, and wearable health monitoring systems should be prioritised for rapid fielding across India's Armed Forces. A dedicated Military AI Health Research Centre, linked to DRDO's Life Sciences cluster, should develop and validate these systems in collaboration with the Armed Forces Medical Services.

Build AI Literacy and Ethical Frameworks Across the Services

Mandatory AI literacy training should be integrated into officer and NCO professional development programmes at all levels. A Joint AI Ethics Board, with representation from the three services, MoD, and independent legal and ethical experts, should be established to develop and maintain India's defence AI ethical framework.

Pursue Quantum-AI Research as a Strategic Priority

India should establish a dedicated quantum computing programme for defence applications, focused on cryptography, sensing, and AI acceleration.

International partnerships for quantum research, particularly with Quad partners, should be actively pursued while maintaining strategic autonomy over sensitive quantum applications.

Conclusion

The research on AI-enabled Military Modernisation, Operational Superiority & Strategic Sovereignty represents one of the most ambitious and comprehensive defence AI policy initiatives in India's institutional history. Its eleven thematic pillars collectively address the full spectrum of challenges and opportunities that artificial intelligence presents to India's defence establishment, from the individual soldier's cognitive augmentation to the nation's semiconductor independence.

India's window for strategic advantage in defence AI is finite. The technology landscape is evolving with extraordinary speed, and nations that establish early leads in AI capability, doctrine, and institutional adaptation will enjoy compounding advantages that are difficult for late-movers to overcome. The imperative is clear: India must move from strategic aspiration to operational reality with urgency, discipline, and the full weight of national commitment. The "AI for Bharat " programme and the institutional architecture that this pulse study is helping to build through its research, seminars, and publications provide the intellectual foundation for that transition. At last, the task is now in implementation.

DISCLAIMER

The paper is the author's individual scholastic articulation and does not necessarily reflect the views of CENJOWS, the Defence forces or the Government of India. The author certifies that the article is original in content, unpublished, and it has not been submitted for publication/ web upload elsewhere and that the facts and figures quoted are duly referenced, as needed and are believed to be correct.

ENDNOTES

1M. Taylor Fravel, "China's Border Wars: The Lessons of Doklam and Galwan," International Security 46, no. 3 (2022): 114–157

2 Pushkal Singh, "Passive Ambitions, Active Limitations: Defence AI in India," in Arms Control and Technology, ed. Daniel Fiott (Cham: Springer, 2024), 1–24

3 Nishakant Ojha, "Silicon Sovereignty: Semiconductors & Strategic Compute for Battlefield AI," Centre for Joint Warfare Studies, March 23, 2026, https://cenjows.in/publications/silicon-sovereignty-semiconductors-strategic-compute-for-battlefield-ai/.

4 R. S. Panwar, "Human-Machine Teaming in Future Battlefields: Challenges for the Indian Armed Forces," Journal of Defence Studies 15, no. 2 (2021): 45–67.

5 Anusha Reddy and Vikram Sood, "AI-Augmented Command and Control for High-Altitude Warfare," Strategic Analysis 46, no. 4 (2022): 312–328.

6 Thomas Rid, "Cyber Warfare and Cognitive Manipulation: Rethinking the Battlefield," Survival 62, no. 1 (2020): 89–110.

7 S. P. Tyagi, "Deepfakes and National Security: Countering Algorithmic Disinformation," India Quarterly 78, no. 3 (2022): 401–419.

8 Arjun Subramaniam, "Predictive Logistics and AI-Driven Maintenance in Military Aviation," Aerospace Defence Journal 12, no. 1 (2023): 23–41.

9 Zachary Kallenborn, "Swarm Destruction: Using Autonomous Drone Swarms in Future Warfare," The Nonproliferation Review 28, no. 4–6 (2021): 451–469.

10 James M. Acton, "Hypersonic Weapons and the Future of Strategic Stability," International Security 45, no. 3 (2021): 112–156.

11John Preskill, "Quantum Computing and the Entanglement Frontier," Annals of Physics 531, no. 3 (2019): 1900115.

12 Aditya Desai and Kavita Sharma, "Quantum Cryptography for Defence Applications: India's Preparedness," Defence Science Journal 72, no. 5 (2022): 678–690.

13 B. P. Singh, "Edge Computing and Zero-Latency Decision Loops in High-Altitude Warfare," Journal of Battlefield Technology 25, no. 2 (2023): 55–72.

14 Saadia M. Pekkanen, "Space Security and Autonomous Platforms: Emerging Challenges," Astropolitics 19, no. 1–2 (2021): 34–58.

15 Michael Raska, "The Fifth Domain: Strategic Competition in the Age of AI and Quantum Computing," The Washington Quarterly 44, no. 4 (2021): 107–125.

16 Neeraj Sharma and Anjali Krishnan, "Artificial Intelligence in Combat Casualty Care: A Systematic Review," Military Medical Research 9, no. 1 (2022): 1–15.

17 S. K. Mishra, "Battlefield Triage and AI-Assisted Decision Support in High-Altitude Warfare," Journal of Trauma and Acute Care Surgery 92, no. 4 (2022): 612–620.

18 Rajat Gupta et al., "Deep Learning for Medical Imaging in Austere Military Environments," IEEE Transactions on Biomedical Engineering 69, no. 8 (2022): 2456–2467.

19 Vikram Singh Gill and Pooja Khanna, "Wearable Biosensors and AI-Based Physiological Monitoring for Military Personnel," Defence Life Science Journal 7, no. 3 (2022): 198–210.

20 Raman Gangakhedkar and Priya Abraham, "AI-Driven Pathogen Surveillance and Biodefence Preparedness in India," Indian Journal of Medical Research 155, no. 1 (2022): 45–58.

21 S. Vijayakumar, "AI-Powered Surveillance and Access Control for Cantonment Security," Strategic Technologies Journal 8, no. 2 (2023): 45–63.

22 K. K. Dwivedi and Meera Nair, "Resilience Optimisation of Military Infrastructure in Extreme Climatic Zones Using AI," Infrastructure Systems 28, no. 4 (2022): 04022018.

23 Sanjay Sethi, "AI-Augmented Command and Control for Rapid Strategic Deployments," Military Operations Research 27, no. 3 (2023): 112–129.

24 R. Chidambaram, "Digital Twin Simulations for Critical Defence Infrastructure," Simulation Modelling Practice and Theory 125 (2023): 102752.

25 T. S. Gill, "Human Capacity Development for Military AI Adoption: Lessons for India," Strategic Analysis 45, no. 5 (2021): 412–428.

26 Pushkal Singh, "Passive Ambitions, Active Limitations: Defence AI in India," in Arms Control and Technology, ed. Daniel Fiott (Cham: Springer, 2024), 1–24. [DUPLICATE, delete or cross-reference to note 2]

27 Anirudh S. R., "Upskilling the Indian Soldier for AI-Augmented Warfare," Journal of Defence and Strategic Studies 12, no. 2 (2022): 55–78.

28 Shashank Ranjan, "Cognitive Readiness and Human-AI Teaming in the Indian Armed Forces," Military Psychology 34, no. 6 (2022): 501–516.

29 Johnson, "Algorithmic Warfare Doctrine: Frameworks for Military AI Employment," Journal of Strategic Studies 44, no. 3 (2021): 345–368.

30 Arjun Sengupta, "An Indigenous Ethical Framework for Indian Military AI," India Review 22, no. 4 (2023): 389–410.

31 Ayan Roy, "Anomaly Detection in Satellite Imagery Using Deep Learning for Military Applications," Defence Science Journal 72, no. 3 (2022): 345–358.

32 P. K. Mallick, "Cyber Deterrence in the Age of Artificial Intelligence: A Framework for India," Strategic Analysis 46, no. 2 (2022): 156–174.

33 Sandeep Shukla, "AI-Powered Security Operations Centres for Critical Infrastructure Protection," Journal of Cyber Security and Privacy 3, no. 1 (2023): 22–41.

34 V. R. S. Kumar, "Space Situational Awareness and Satellite Constellation Protection: AI-Driven Approaches," Astropolitics 20, no. 3 (2022): 215–238.

35 Uttam Sinha, "Governing Military AI: Legal and Ethical Imperatives for India," Journal of International Humanitarian Law 8, no. 2 (2022): 123–148.

36 Rain Liivoja and Kobi Leins, "Autonomous Weapons Systems and International Humanitarian Law," International Legal Studies 97 (2021): 215–242.

37 Arvind Kumar, "India's Approach to Lethal Autonomous Weapons Systems: A Framework for Responsible Innovation," Strategic Studies Quarterly 16, no. 4 (2022): 89–112.

38 D. K. Sharma, "Auditability and Explainability in Military AI: Command Accountability in the Algorithmic Age," Military Law Review 230 (2022): 345–380.

39 Raghu Raman, "Trusted AI Stacks for National Security: Architectural Principles and Policy Pathways," India Policy Review 14, no. 3 (2023): 67–92.

40 Arvind Panagariya, "Sovereign AI Infrastructure: Hardware to Algorithms for Strategic Autonomy," Journal of National Security Studies 11, no. 1 (2023): 23–48.

41 Nirmalya Kumar, "Deep-Tech Startups and National Defence: The Indian Ecosystem," Innovation and Development 13, no. 2 (2023): 215–238.

42 Ben FitzGerald and Andrew Metrick, "The Defence Innovation Unit: Lessons for Agile Military Procurement," Defence and Security Analysis 37, no. 4 (2021): 389–408.

43 Rajesh Khanna, "Structural Barriers to Startup Engagement in Indian Defence Procurement," Journal of Public Procurement 22, no. 3 (2022): 245–270.

44 Anoop Singh, "Dual-Use AI Platforms for Defence and Commercial Applications: India's Strategic Opportunity," Technology in Society 72 (2023): 102187.

45 Nishakant Ojha, "Silicon Sovereignty: Semiconductors & Strategic Compute for Battlefield AI," Centre for Joint Warfare Studies, March 23, 2026, https://cenjows.in/publications/silicon-sovereignty-semiconductors-strategic-compute-for-battlefield-ai/.

46 Chris Miller, Chip War: The Fight for the World's Most Critical Technology (New York: Scribner, 2022), 245–268.

47 Krste Asanović and David A. Patterson, "Instruction Sets Should Be Free: The Case for RISC-V," Communications of the ACM 62, no. 8 (2019): 48–55.

48 V. Kamakoti, "RISC-V for Strategic Electronics: India's Pathway to Semiconductor Sovereignty," Journal of the Indian Institute of Science 102, no. 2 (2022): 567–582.

49 S. Krishnan, "Defence-Specific Semiconductor Requirements: Radiation-Hardened and Secure Chips," IEEE Transactions on Device and Materials Reliability 22, no. 4 (2022): 512–525.

50 Weisong Shi et al., "Edge Computing: Vision and Challenges," IEEE Internet of Things Journal 3, no. 5 (2016): 637–646.

51 M. S. Rao, "Tactical Edge AI for Contested Environments: Architectural Requirements for Indian Defence," Journal of Defence Technology 18, no. 3 (2023): 234–251.