





Navigating Critical Ethical Dilemmas of the Advancement of Military Technology

Debasis Dash*¹ and VMD Jagannath²

¹Mukesh Patel School of Technology Management and Engineering,
SVKM's NMIMS Deemed to be University, Vile Parle, Mumbai, India
dashdebasis76@gmail.com

² Indian Navy

Abstract. As military technologies advance rapidly, particularly with the rise of artificial intelligence, they raise serious questions about ethics and responsibility. Throughout history military technological advancements have reshaped national defence systems and global power relations, which continue to influence worldwide stability. The nations must evaluate AI technology development with critical thinking because they need to preserve or build military dominance. The research employs two primary methods to examine military technology ethics, utilising a qualitative conceptual approach that combines historical synthesis and textual analysis. The research evaluation process uses three established frameworks to analyse the results through virtue ethics, deontology and consequentialism. The evaluation of military technology ethics depends on these frameworks because they establish essential assessment methods which reduce accidental damage and measure social impacts. The main goal involves creating ethical standards which protect civilians from harm while achieving military operational success. The research investigates sophisticated military systems to understand their ethical consequences and operational effects. The research needs to examine ethical standards to solve complex military problems by assessing technological progress against moral standards and international rules.

Keywords: Technological advancements, Collateral damage, Virtue Ethics, Deontology, Consequentialism, Precision warfare.

“The reliance on technical capabilities is not easily criticised by ethicists, since the development of these weapons is made in the name of ethics.”
- John Kaag and Whitley Kaufman -

1 Introduction

The advancement of military technology presents significant ethical challenges that necessitate thorough evaluation. War naturally brings destruction and death, but ethical principles exist to protect civilians from unnecessary harm during conflicts [1]. The moral defence of military technology development requires immediate evaluation because nations create new weapons systems and must assess their effectiveness in mini-

minimising civilian harm and meeting international humanitarian standards [2]. The research investigates the main ethical issues, which stem from automated systems used in precision warfare and the possible loss of human elements during military operations. The use of autonomous systems in military operations creates two distinct challenges because it becomes unclear who bears responsibility while machines make critical decisions about life and death [3]. Additionally, while precision warfare aims to minimise unintended harm, its effectiveness and ethical ramifications require scrutiny to ensure compliance with international norms and ethical frameworks.

As a matter of principle, weapons are meant to be a form of deterrence, but actual use leads to killing and injuring, which may not be legitimate. The starting point for this article is to determine that while there are large-scale hunger and poverty in many parts of the globe, it is ethical to accept the modernisation of weapon technologies, which has always presented numerous challenges and difficulties [4]. Contrary to this, restricting specific categories of military technologies may be considered unintentionally sanctioning other forms of violence or even providing tacit acceptance of broader patterns of conflict [4]. Next, we can further explore how humanity and military necessity are balanced. However, the challenging efforts to minimise negative consequences are all ingrained in moral standards in limiting the means and methods of warfare, confounding decision-making on wide use of technology, the high and irreversible costs of damage to humans and the environment, the complexity of operational situations, and the potential lag between harm and attempts to correct [4].

While technological changes have transformed military strategy, their adoption has to be tempered by strong ethical frameworks that minimise harm and uphold humanitarian standards. The integration of modern technology into military operations encounters numerous challenges due to the complex interactions among political conflicts, financial interests, and moral principles. Every person must join forces to support ethical innovation because nations need to access modern warfare technology benefits while dealing with the emerging challenges these advancements create. The research paper presents current military spending data from different countries worldwide. The study examines key military spending patterns and identifies leading defence budget nations while exploring the drivers behind rising defence expenditures and proposed ethical solutions to address this issue.

2 Research Methodology

The research employs qualitative methods to analyse ethical conflicts which result from modern military technology development. The research team conducted an extensive review of existing studies by concentrating on historical research methods through their study. The researchers integrated findings from prior research by conducting a secondary source synthesis. The analysis provided a clear view of how military technology development has produced different ethical problems throughout history. The researchers analysed selected texts through content analysis (historical synthesis) to perform their structured examination. The process allowed the researchers to find and classify the main subjects and ethical discussions which appeared throughout the literature. The research team employed narrative analysis through textual examination to study the

evolution of military technology and its historical progression. The research method investigated both the physical components and the functional mechanisms and hidden meanings of these technological advancements. The two methods worked together to build a solid base for the study, which examined past military ethical problems and current military ethical developments.

3 The Role of Technology in Warfare

New technologies have had a big impact on how military strategies are planned and carried out. Modern technologies allow military operations to run more efficiently while producing better results during field missions. Precision-guided weapons and Unmanned Aerial Vehicles (UAVs) have completely revolutionised the methods of warfare operations. The military achieves unmatched target precision through these systems, which enables them to strike with unprecedented accuracy. These systems help to reduce accidental damage, which leads to improved operational results [3]. Military equipment development through technological advancement creates multiple fundamental ethical challenges because these weapons function in intricate and unpredictable combat situations. The automated systems of drones and advanced weaponry create issues about who takes responsibility for making decisions during critical situations [2].

3.1 Ethics as a Strategic Imperative in Technologically Driven Warfare

Nations in the current era strive to achieve technological supremacy because of increasing geopolitical competition and economic interdependence between countries. Military development requires ethical assessments as an essential step instead of treating them as optional measures. Sovereign nations tend to compete for defence superiority because of the political instability that exists across international relations. The implementation of ethical frameworks stands as a vital requirement for both the design process and operational use of new technological systems. Walzer [1] explains that policymakers and defence planners must find a balance between using advanced military technologies for strategic advantage and fulfilling moral duties such as minimising harm and following humanitarian principles. The ethical obligations must take precedence over operational objectives because they determine how technology should operate for achieving humanitarian objectives.

3.2 Fragmented Global Order and Ethical Transparency Challenges in Military Innovation

The pursuit of deterrence (i.e., *military edge*) by states and the commercial motivations of arms manufacturers have been the key challenges (i.e., *nations prioritise technological advancement over ethical scrutiny*) for transparent and accountable ethical governance of military technologies. This leads to creating barriers to open discussion about the implications of these innovations. Rappert et al. [4] argued that due to the profit-driven motives, the defence manufacturer's commercial objectives many a time outshine ethical considerations, and accordingly, the motive conflicts with the broader societal need for responsible innovation. These dual dynamics of state-driven military

motives often lead to the difficulty in fostering ethical transparency to develop and deploy advanced military systems. Further, the government military goals mixed with the private business interests make it difficult to ensure development and use of advanced military systems with ethical transparency.

While the world is moving towards a multipolar world order, where several states have near-equal power and influence and each has substantial economic, military, cultural, and political clout, there is no formal global consensus on integrating ethical principles into military innovation. Although there are emerging efforts, international dialogues, and guiding frameworks that aim to address the issue. Diverging ethical standards remain highly fragmented due to geopolitical tensions, national security interests, dual-use technologies, and different cultures and regimes having different views on human rights, use of force, and acceptable risk. The path forward may involve multilateral agreements on specific technologies (e.g., autonomous weapons), common principles for dual-use research, and increased transparency and accountability measures in national defence innovation programmes.

3.3 Navigating Ethical Challenges, Global Frameworks, and the Governance of Emerging Military Technologies

As technologies such as artificial intelligence, autonomous systems, and cyber capabilities become more prevalent, the risk of their misuse or unintended consequences grows (i.e., compromise of fundamental human rights or international stability). The mutually agreed international agreements, sustained dialogue between governments, industry leaders, and ethicists, and implementable cooperative frameworks could be pivotal in addressing these concerns. Full consensus among states are essential for the existing global efforts (i.e., UN Charter & International Humanitarian Law (IHL), which provide a baseline for ethical conduct during armed conflict but are not specific to innovation; UN Group of Governmental Experts (GGE) on Lethal Autonomous Weapon Systems (LAWS) forum, which that discusses ethical and legal concerns around AI and automation in warfare, so far, no binding agreement has been reached; Geneva Conventions & Additional Protocols, where these outline ethical conduct in war-protection of civilians but do not regulate innovation processes directly; OECD & EU, where the OECD AI Principles (2019) promote responsible stewardship of trustworthy AI, including in defense, but compliance is voluntary and the EU's Ethical AI Frameworks, which is mostly civilian-focused, some aspects extend to defense-funded projects, e.g., dual-use technology oversight.

4 The Current Landscape of Military Expenditure

The states are investing heavily in advanced weapons, autonomous systems, and next-generation military technologies to serve strategic goals. The modern technological progress has brought about significant moral challenges since these developments occur during ongoing poverty and social inequality issues. For instance, according to [5], around 700 million people survive on less than \$2.15 a day. The COVID-19 pandemic revealed that inadequate healthcare systems expose countless people to dangerous preventable diseases. According to the United Nations, ending extreme poverty would

need about \$175 billion each year, which stands as a small portion of worldwide military expenditures. The financial gap between rich and poor nations shows why countries must rethink their spending choices. A small amount of military spending that gets redirected toward poverty reduction efforts and healthcare system development would create major positive outcomes for human health results. The ethical duty to solve worldwide poverty and inequality challenges takes precedence over national security defence. Nations must strive to balance investments in defence with a commitment to fostering global equity and human development [6].

4.1 Military Expenditure by Countries and Regions

Countries are moving away from conventional military equipment by dedicating substantial resources to modern defence systems, which include advanced fighter jets and naval vessels along with next-generation land combat vehicles. Major military powers continue to focus on maintaining their nuclear arsenals as their top priority. The military spending shows an upward trend in absolute values because of economic conditions which affect defence budgets. The defence spending of countries with strategic defence priorities remains steady or rises during economic recessions. Recent estimates (Table 1) show that global military expenditures will reach a new peak, emphasising nations' prioritisation of security and technological dominance.

Table 1: Global military expenditure

Rank 2023	Rank 2022	Country	Military Spending (\$b), 2023
1	1	United States	916
2	2	China	296
3	3	Russia	109
4	4	India	83.6
5	8	Saudi Arabia	75.8
6	6	United Kingdom	74.9
7	7	Germany	66.8
8	11	Ukraine	64.8
9	8	France	61.3
10	9	Japan	50.2
11	10	South Korea	47.9
12	12	Italy	35.5
13	13	Australia	32.3
14	19	Poland	31.6
15	15	Israel	27.5
16	14	Canada	27.2
17	17	Spain	23.7
18	16	Brazil	22.9
19	28	Algeria	18.3

20	22	Netherlands	16.6
21	20	Taiwan	16.6
22	23	Türkiye	15.8
23	21	Singapore	13.2
24	26	Mexico	10.8
25	27	Colombia	10.7
26	33	Iran	10.3
27	28	Indonesia	9.5
28	32	Sweden	8.8
29	30	Norway	8.7
30	24	Pakistan	8.5
31	38	Denmark	8.1
32	31	Kuwait	7.8
33	29	Greece	7.7
34	34	Belgium	7.6
35	46	Finland	7.3
36	37	Switzerland	6.3
37	36	Oman	5.9
38	35	Thailand	5.8
39	40	Romania	5.6
40	43	Chile	5.5

Source: Tian et al. (2024) [7]

The Stockholm International Peace Research Institute (SIPRI) identifies the United States, along with China, Russia, India, and Saudi Arabia, as the leading five countries that spend the most on military expenses. The United States maintains its position as the leading nation in global military spending through its 2023 defence budget of more than \$916 billion, which makes up nearly 37% of worldwide expenditures. China follows the United States as the second largest military spender in the world because it plans to spend about \$300 billion on defence [7]. The Chinese defence budget expansion shows the country's goal to build a modern military force which will support its territorial ambitions and strengthen its power base in the Indo-Pacific region.

Western defence spending reaches steady levels, but Asian emerging economies choose to increase their military expenditures. These countries are dedicated to upgrading their military capabilities because they must compete in a world that has multiple power centres. Though smaller than China's, Russia's budget reflects the country's strategic military presence in Europe and the Middle East. The ongoing conflict in Ukraine has caused European countries which border Russia to drastically increase their defence budgets. The ongoing changes in worldwide security patterns will probably keep this pattern going.

India's spending has shown a steady increase because of its security issues with Pakistan and China, which are its neighbouring countries. Saudi Arabia dedicates its defence budget toward purchasing modern military equipment for protecting its territory from external threats. The countries of Southeast Asia, including Vietnam, Indonesia, and Malaysia, have increased their defence spending because of security problems in the South China Sea region. The Middle East continues to be a top region for military spending because Saudi Arabia, the UAE and Israel allocate large amounts for defence. The growing regional conflicts with Iran have led to higher military spending for defence purposes. Turkey has increased its defence spending because of its current geographical location and its participation in local military operations.

NATO, together with other defence alliances, continues to impact how nations develop their defence plans. Some European nations meet their NATO obligations, yet other member states choose to boost their defence spending to improve joint security operations. The United Kingdom, together with Japan, France, and Germany, stands as a major defence spender that serves NATO members that back collective defence operations. The countries work on military modernisation while keeping their forces ready for action because of European security threats that emerged after Russia's military operations [8].

4.2 Factors driving the global military expenditure

Nations increasingly invest in cyber defence capabilities to protect against digital threats and advanced technologies such as autonomous weapons systems, AI, and space defence. The new technological advancements need substantial financial backing to become operational. The worldwide military spending patterns result from multiple elements which include technological progress and international conflicts and local defence issues and economic circumstances. The United States, China and Russia lead the world in defence spending, yet nations across the globe are boosting their military budgets. Military budgets that continue to grow will reshape global diplomatic ties through emerging security problems and potential solutions. The ongoing trend of defence budget increases demonstrates how countries select their strategic priorities because military forces protect national security during times of global instability.

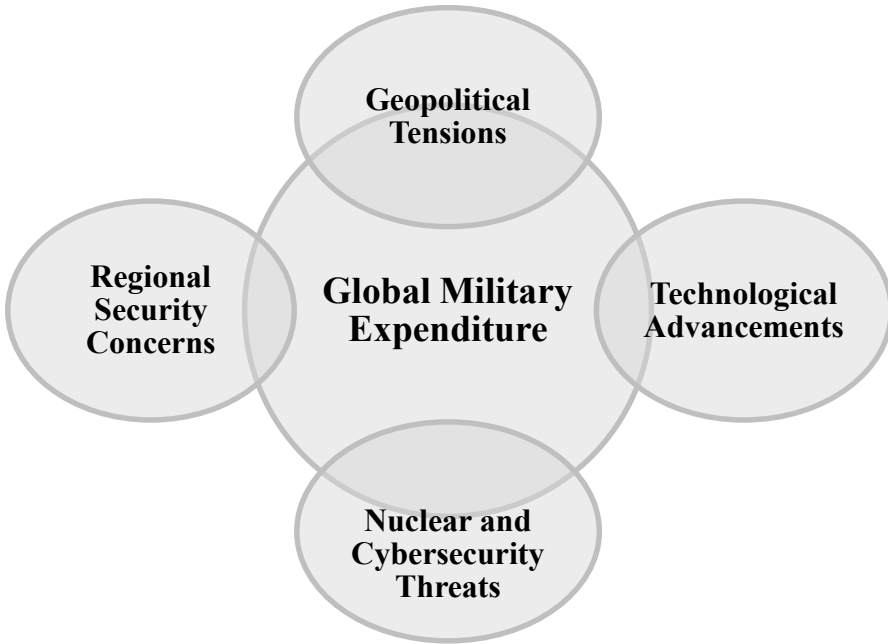


Fig. 1: Factors Driving the Global Military Expenditure (Source: Authors)

As explained in Fig. 1, due to geopolitical tensions, multiple conflicts such as those in Ukraine, Syria, and the South China Sea have led to rising defence budgets, particularly among nations directly or indirectly involved in these disputes [8]. [9]. The military spending of nations experiences growth because of technological advancements, which include the acquisition of unmanned systems and cyber capabilities and artificial intelligence and modern air and naval platforms [10], [11]. The defence and security budgets have increased because nuclear threats and cybersecurity issues have become more dangerous, while military powers from conventional and new nations allocate their defence funds based on these two critical security areas [12], [13]. Regional security concerns have forced Asian and Middle Eastern countries to build up their military forces because they fight against each other in nearby areas [14]. [15].

5 How AI Works

The fundamental structure of AI systems depends on human cognitive operations because they need to replicate human thinking, which includes learning and decision-making and reasoning processes. Machine learning (ML) serves as the foundation for contemporary AI systems because it enables algorithms to process extensive datasets for pattern recognition, which then leads to self-improvement without requiring specific programming for each task. Deep learning, a specialised subset of ML, utilises artificial neural networks modelled loosely on the human brain to handle complex tasks like image recognition, natural language processing, and autonomous decision-making.

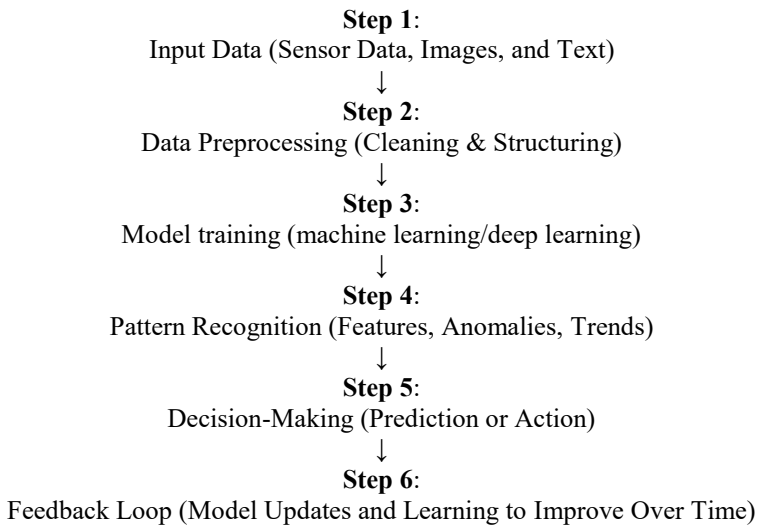


Fig. 2. AI Process Flow (Source: Authors)

In the military, AI systems handle huge amounts of real-time data from sensors. They use this data to make predictions (predictive models) and either suggest or carry out actions with little help from humans with key technical concepts in the planning process. One method is supervised learning, where AI learns from labelled examples. Other methods include reinforcement learning, where AI learns by trial and error, and unsupervised learning, where it finds patterns in data without labels.

In real-world explainable AI (XAI), which learns from data by adapting to new situations, decisions are made more transparent, building trust in defence. The steps for AI learning and decision-making begin with data intake, as shown in *Fig. 2*. The system continues to enhance its performance through the operation of feedback loops. The AI system stays current through its regular performance evaluations and retraining processes, which handle fresh data and emerging situations.

6 Ethical Frameworks and Human Rights in Military AI

Artificial Intelligence (AI) functions as a transformative power which alters the operational methods of military activities. The system enables organisations to accelerate their operations while achieving improved intelligence and operational excellence. The new technology creates various ethical problems which current regulations fail to manage properly. The three-stage ethical model by Islam and Wasi [16] provides guidance for handling military AI through design and deployment and post-use phases.

The three-stage ethical model works to safeguard human rights throughout all stages of AI utilisation. The document establishes guidelines for AI development and deployment and its post-implementation oversight. The model identifies two main problems, which include system bias and insufficient regulatory frameworks. AI systems face

challenges because they might break international humanitarian laws. AI technology has developed to the point where it makes decisions independently.

Unfortunately, our current laws and ethical rules, primarily the reactive approaches, are not evolving fast enough and are less effective at handling these new challenges. Anneken et al. [17] suggest using the FATE principles – Fairness, Accountability, Transparency, and Ethics – for military visual reconnaissance so that the less effective reactive approach gap can be closed. They also recommend using Explainable AI (XAI) to make AI decisions easier to understand. Their approach focuses on fairness, openness, and human control to ensure AI is used ethically. The actual combat environment operates at high speed while maintaining multiple layers of complexity. The complete human control over AI decisions disappears during these situations. The research by Islam and Wasi [16], together with Anneken and colleagues [17], supports the idea that military AI systems require ethical integration during their initial design phase instead of receiving it as a later addition.

7 Ethical Dilemmas in AI-driven Military Technology

The world demands continuous international cooperation and transparent communication to achieve military objectives while maintaining ethical standards [18]. This is especially important because of many critical dilemmas.

7.1 Autonomy vs. accountability dilemma

Fully autonomous weapons systems, which people refer to as "killer robots", create substantial problems about who should be held accountable for their actions. The ability of these systems to operate independently for target selection and attack creates uncertainty about which party should bear responsibility when errors occur. The scholars warn that international law and ethics could face deterioration because international law lacks specific provisions about maker responsibility, user accountability and state deployment responsibility. Arkin [19] points out that autonomous systems can behave in unexpected ways if humans aren't watching closely. Severe and fatal effects occur when these substances combine in the human body. The legal responsibility becomes unclear because machines handle critical life-or-death choices while creating moral issues.

7.2 Distinction and proportionality challenges

Military AI systems must adhere to international humanitarian law through essential regulations, which begin with the distinction rule that requires systems to identify soldiers from civilians. The principle of distinction requires military forces to identify soldiers from civilians in battle zones. The principle of proportionality requires military operations to keep all civilian harm at its lowest possible level while achieving their operational objectives. AI systems demonstrate limited ability to choose proper targets during complex military operations which take place in dynamic battle zones. Sharkey [20] warns that mistakes in recognising targets could seriously harm civilians and break the rules of ethical warfare. AI systems need to undergo rigorous testing procedures

which include safety checks because they show random behaviour during these particular events.

7.3 Dehumanisation of warfare

Using AI and robots in war means fewer human soldiers are present on the battlefield. The situation causes leaders to lose connection with the actual human pain that war inflicts on people. The ethical problem emerges because this separation creates a moral distance between operators and their responsibility for their actions. Leaders develop emotional detachment from warfare through psychological and moral distancing, which leads to their increased willingness to initiate conflicts, according to Crootoof [21]. The military leaders view war as a low-risk operation when it comes to human casualties. The military leaders view combat operations as having no threat to human survival. The increasing use of automated warfare demands a thorough ethical analysis to maintain our moral principles during combat operations.

7.4 Decision-making in life-or-death scenarios

AI systems function through rapid decision-making operations which result in human deaths. Machines experience an ethical problem because they lack human judgement abilities which would let them decide who lives and who dies. Organisations require established rules and values to guide their decision-making processes during this stage. Roff and Moyes [22] warn that letting algorithms make such choices could weaken human responsibility and moral judgement. When no human is clearly in charge, it becomes harder to hold anyone accountable. The establishment of precise AI operational guidelines for life-threatening situations stands as a fundamental requirement to safeguard both ethical principles and legal regulations.

7.5 Algorithmic bias and fairness

AI systems develop bias because they receive their training data from sources which contain existing discriminatory information. The process of algorithmic bias leads to harmful and unfair decision outcomes. Military operations become highly dangerous because of these discriminatory practices, which produce severe adverse effects on operational activities. Eubanks [23] warns that if we don't control these biases, AI could end up reinforcing stereotypes and causing more injustice, which would go against the ethical use of technology. The solution requires ongoing system evaluation through audits that track AI systems' decision processes.

7.6 Escalation of asymmetric warfare

When non-state groups or rogue nations misuse AI, it can make wars more one-sided and dangerous. The groups would use artificial intelligence to obtain military advantages, which could lead to more intense asymmetric warfare. The various elements, in combination, create uncertain conflict dynamics, which produce increased death counts. Singer [3] observes that AI adoption by non-traditional organisations leads to increased potential for abuse. The world requires strict international regulations to prevent this issue. Nations need to join forces for developing protective measures which block advanced AI technology from reaching unauthorised users.

7.7 Ethical use of surveillance and data collection

Military AI systems need huge amounts of data to learn properly and deliver their best performance during operational tasks. The process depends on two main elements, which consist of large-scale surveillance operations and extensive data collection activities. People must understand what happens to their personal information after they share it. The main difficulty arises from protecting the nation while respecting personal freedoms. According to Etzioni and Etzioni [24], unrestricted data collection results in privacy violations, which subsequently destroys public trust. That's why we need clear ethical rules to ensure that data is used responsibly and fairly.

7.8 Risk of malfunctions and unintended consequences

AI systems operate through complex systems, yet they fail to function correctly all the time. Because of this, they can malfunction or misunderstand the data they receive. These factors unite to create major effects which ultimately result in catastrophic outcomes. Scharre [2] stresses the importance of having strong safety systems in place. The absence of these safeguards would result in AI deployment during warfare, which would intensify existing conflicts. The fast-moving events would create dangerous conditions for unarmed civilians to be harmed.

7.9 Unequal technological access

Most advanced military AI technologies are being developed by a few powerful countries. The distribution of high-tech tools remains unequal because certain countries lack access to these advanced resources. The existing differences between worldwide military forces will lead to an expansion of economic inequality between wealthy and impoverished nations. The practice of water privatisation leads to increased worldwide tensions which create an unstable global environment. Geist [25] points out that this imbalance raises serious moral questions. The solution demands international cooperation to establish equitable technology distribution systems between nations.

7.10 Ethical development and deployment

AI developers face major difficulties when they must handle complex ethical problems which arise from their work being used for military purposes. The team members have concerns about their technology ending up in the wrong hands during the development process. Binns [26] explains that developers must consider the potential applications of their work from the beginning. The team must establish prevention systems to stop any potential misuse. Developers need to develop a solid ethical foundation because it proves essential for their professional work.

7.11: Blurring the lines between civilian and military technologies

AI technologies exist in two distinct versions which serve military applications and civilian needs separately. The dual usage of tools generates worries about their transformation into weapon systems. People experience anxiety because technologies which provide assistance might be converted into military applications. The authors Bryson and Winfield [27] recommended that we should establish specific rules to handle this

risk effectively. The guidelines need to protect innovation while protecting against potential dangers. The development of new military technologies requires absolute support. The prevention of their abuse presents a critical problem which defies simple solutions.

7.12 Proliferation and arms race

The development and deployment of AI-based weapon systems by nations occurs at a rapid pace. The fast development of AI technology could start a worldwide arms race because countries will try to build stronger military AI systems. International competition among nations generates multiple negative effects which simultaneously increase the chance of military conflicts and create more dangerous global conditions. Altmann and Sauer [28] state that the uncontrolled development of military AI systems will result in more severe and unpredictable warfare. Strong international rules need to be established to stop this from happening. The rules should establish guidelines for military organisations to manage their use of AI technology. Proper agreements between nations will enable military innovation through AI use while maintaining global peace and security and stability.

8 Ethical Frameworks and Justifications

The ethical theories serve as a framework to determine proper conduct regarding new technologies in warfare operations. The frameworks present multiple methods to evaluate how military victory stands against human value preservation. These methods enable us to develop essential questions which guide our decision-making process about deploying powerful military equipment during combat operations. The military environment demands ethical principles from virtue ethics and deontology and consequentialism to direct both fair justice practices and harm minimisation and responsible development and application of advanced military technologies.

8.1 Virtue Ethics – Moral Character and Resource Allocation

The moral character of people and the actions they take constitute virtue ethics. The military's operations depend on technologies that protect civilian populations from harm. The use of precision-guided weapons shows how tools can help achieve fairness through their ability to decrease unintentional harm [31]. The viewpoint shows that creating systems to distinguish soldiers from civilians represents an ethical duty that protects both military fairness and human compassion during warfare. Military leaders who practise virtue ethics need to show moral character when making decisions about military operations by choosing to use limited resources with great care.

8.2 Deontology – The Moral Duty to Prioritise Human Welfare

Deontological ethics evaluates the essential moral value of actions through their compliance with rules and principles instead of their results. The establishment and operation of military technologies which reduce civilian harm serve as essential moral duties under this system. The commitment to just war principles becomes visible through precision-guided weapons which obey the rules of proportionality and discrimination [32].

The armed forces employ these technologies to fight targets while minimising collateral damage, which aligns with their duty to follow international humanitarian laws during warfare. The military operations need to follow the ethical principles of deontology, which protect human dignity and save civilian lives.

8.3 Consequentialism – Maximising Overall Good

The evaluation of actions through their results according to consequentialism requires achieving beneficial results to determine their moral worth. The military evaluates technology ethics through its ability to achieve beneficial outcomes, which include protecting non-combatants and preventing damage to civilian structures. The system operates better because its precision targeting abilities help it perform exact operations and decrease unintentional damage to the surrounding area [3]. The ethical framework of consequentialism demands military technology development to focus on protecting human life and essential infrastructure while achieving operational goals. The approach demands ongoing technological progress to achieve maximum positive results during military operations.

8.4 Collateral Damage – A Central Ethical Concern

Collateral damage refers to the unplanned harm that affects civilians and their built environment, which continues to present a major ethical problem in military conflicts. Historical warfare reveals through World War II bombings that random attacks produce devastating consequences during warfare. Modern military operations benefit from precision technology through drones and guided missiles, which strike targets with high accuracy while reducing collateral damage. The International Committee of the Red Cross [33] establishes international humanitarian standards which require ethical responsibility to give precedence to these particular developments. States need to spend money on these technologies while implementing them to reduce damage during military operations and protect moral values.

9 Operational and Social Implications

Advanced technology systems help military forces to improve their strategic operations, which results in advanced defence and offensive systems. Network-centric systems with real-time surveillance technology enable better operational performance by minimising human errors. The military achieves enhanced decision-making capabilities through these systems, which deliver precise and current information. Users gain better environmental knowledge from the system, which enables them to create improved plans. The military encounters a major challenge because its technological systems threaten to eliminate human choice freedom during critical operational moments [20]. Machines need human oversight because they execute tasks that used to require human ethical judgement.

People from different regions of the world engage in ongoing discussions about autonomous weapon systems and their effects on ethical conduct and legal frameworks. People experience discomfort when they think about machines taking control over life-or-death situations for humans. The process of fault determination lacks established

procedures, which makes the situation worse when errors happen [18]. People are worried about how autonomous systems might affect global security. These technologies have both the capability for misuse and also create risks of accidents.

Organisations must establish a balance between technological development and human rights protection according to international standards. Public views require attention because they assist leaders in revealing their policy choices to the public. The approach addresses public concerns while maintaining military technology compliance with ethical standards and public values. Military organisations achieve responsible technology implementation through their ability to manage both technical and social elements. The method allows organisations to uphold vital humanitarian principles through the introduction of new technological developments.

10 Ethical Counterarguments and Challenges

The main concern of technological militarisation opponents becomes apparent because advanced military technologies create a distant experience of war while drones allow operators to launch attacks from remote locations. The two groups exist apart from each other, which causes their emotional bond to weaken, so they struggle to care about what happens to those who suffer [18]. Remote operation of combat through drone technology enables people to fight from protected positions, which safeguards their safety. The physical distance between them creates a barrier to their moral obligation to protect human life, according to Crotoof [21].

The military faces a vital problem with how it distributes its financial support for technological progress in defence systems. Advanced military systems require substantial financial backing for their development and deployment, which creates uncertainty about optimal resource allocation. The financial resources that military research and development consume could be reallocated to solve critical social problems through healthcare and educational and social welfare system improvements [23]. The critics express that government choices to focus on military technology development instead of social welfare represent distorted policy decisions which ignore fundamental human requirements.

These counterarguments demonstrate that military advancement must maintain ethical and social responsibility at all times. The government officials need to evaluate military technology advantages against its potential harmful effects on social structures and moral values. The government needs to create open systems which integrate citizen involvement and monitoring structures to uphold ethical standards when using military technology for solving these issues.

11 The Need for Ethical Oversight

Military technologies produce numerous ethical issues which need immediate resolution. The development and deployment of new technologies require dedicated systems to guide their responsible creation and implementation. Military technology operations require international regulations and conduct standards to function effectively.

The organisation ensures that defence progress will continue to follow ethical guidelines and humanitarian standards. The rules must demonstrate clear and exact definitions about how to handle modern military technologies. The enforcement of these rules requires strict adherence to their established procedures. Altmann and Sauer [28] explain that scientists and policymakers need to work together across borders to accomplish this objective. The two organisations must unite their efforts to shield national defence systems while defending human rights standards.

Ethical oversight represents a vital requirement for handling sophisticated military technology systems. Global nations must unite their efforts to resolve these complicated international problems. Organisations reach their cooperation goals through developing relationships with essential stakeholders who support their operations. Through these partnerships, nations establish shared rules and duties, which become common standards for all parties involved. Organisations that implement shared standards achieve better accountability and ethical conduct among their members. The method needs to include all voices through open discussions, which preserves equality in the process. The particular kind of conversation operates as a protective measure against technological abuse while at the same time it guards against unintended harmful consequences. The system functions as a protective measure, which prevents military forces from using powerful systems in dangerous ways.

The public needs to join discussions about military technology because their participation remains essential. Advocacy organisations need to participate in these discussions through their organizational representation. Additional participants for this event help people understand the moral problems that these new technologies bring about. The public needs access to the decision-making procedures which organisations and authorities create together. The developers need to provide explanations about the specific technologies they chose to build or implement. Military technology development requires ethical principles to guide every stage of its advancement process. Proper oversight combined with public involvement will create a better system for reducing risks associated with these technologies. The programme establishes global security while safeguarding essential human rights.

12 India's Ethical Standpoint: Upholding Human Control in AI Warfare

The technology systems which power Autonomous Weapon Systems (AWS) operate with insufficient reliability to establish complete operational trust. The authors, Cools and Maathuis [34], present evidence that shows AWS systems should not be reliable during their initial deployment phase. According to their perspective, trust emerges through open design systems and well-defined responsibility frameworks and expert team collaboration. Their study reveals that AWS systems continue to exhibit bias and unpredictable behaviour while they struggle to function correctly with human teams, which creates major doubts about their suitability for essential military tasks.

The ethical problems about machine decision-making for human survival persist with international cooperation, according to Roy [35], who studies this issue through

Indian cultural viewpoints. The author discusses dharmayuddha (just war) while showing India's preference for human control over AI systems. The Indian military strategy operates with strict opposition to total weaponised AI system control. The organisation promotes a defensive stance for AI applications in defence operations. The core belief is that human consciousness (atman) should always guide decisions and never be overpowered by machines (yantras).

The worldwide trend to increase weapon autonomy faces opposition from this particular perspective. The existence of trust-building systems exists as a fundamental requirement, but these systems alone fail to achieve sufficient trust levels. Real trust needs stronger moral values that put human dignity and responsibility first, not just speed or efficiency. The approach of India shows that technical methods alone cannot establish proper accountability systems. The world requires a complete transformation in its perception of military AI, which should lead to a total ethical transformation. The lack of this advancement in technology makes it dangerous to trust Autonomous Weapon Systems (AWS) because it creates major risks for strategic operations and human safety.

13 Preserving Military Values Amid Human Enhancement: Balancing Superiority with Ethical Legitimacy

Military operations benefit from human enhancement technologies because they produce superior performance and physical strength (*operational superiority*). The practice of human enhancement technologies in military operations leads to major ethical issues about maintaining ethical standards and preserving human dignity (*ethical integrity*). Schneider and Sparrow [36] discuss how psychostimulants and neurostimulation and implantable technologies improve physical and mental capabilities yet threaten essential military values of courage and merit and sacrifice. The traditional virtues have established the way soldiers see themselves and how military groups function together morally. Enhanced soldiers show improved focus, yet their military actions and recognition face ongoing ethical disputes about their legitimacy. The fundamental changes brought by enhancements to courage and risk-taking behaviour would cause existing systems for valour and reward to become unstable. Human enhancement provides operational benefits but requires strict oversight to safeguard military institutions from losing their core values and operational effectiveness.

The implementation of technological progress needs to maintain ethical standards because it protects AI and enhancement technologies from causing harm to people and preserves public trust in these systems (*Table 2*). The military faces a threat to its operational effectiveness and battlefield legitimacy and public support for its operations because of insufficient ethical practices, according to [36].

Table 2: Ethical Imperatives for Responsible Innovation in Military AI, Autonomous Weapon Systems (AWS), and Human Augmentation Technologies

Policy Recommendation	Rationale
-----------------------	-----------

1. Prohibit Fully Autonomous Lethal Decision-Making	Retain <i>meaningful human oversight</i> over life-and-death decisions to uphold international humanitarian law and preserve human moral responsibility [34].
2. Mandate Integration of eXplainable AI (XAI)	Ensure AWS decisions are transparent, interpretable, and traceable, enhancing operational accountability and trust among human operators [34].
3. Institutionalise Independent Ethical Audits	Implement external and continuous ethical evaluations to identify biases, operational failures, and risks in both AI systems and enhancement technologies [34] [36].
4. Regulate Human Enhancement Technologies	Military organisations need to establish ethical guidelines which protect their fundamental values of courage, merit and sacrifice from any negative effects caused by neurostimulation and psychostimulant enhancements [36].
5. Embed Cultural-Ethical Frameworks like <i>Dharmayuddha</i>	Military operations need to stay legitimate through the application of culturally based ethical rules, which include India's atman over yantra principle that prioritises human self-awareness above machine operation [35].

14 Case Study – Ethical and Strategic Challenges in the Military Adoption of Artificial Intelligence: A Global Perspective

The increasing use of Artificial Intelligence (AI) systems in military operations generates various complex ethical and operational and strategic problems, according to Morgan and Boudreaux [38]. Studies conducted during recent times show that artificial intelligence systems help organisations gain operational advantages yet create vital questions about their stability and human oversight and their effects on military operations. The United States, together with China and Russia, dedicates major financial resources to military artificial intelligence development. These nations direct their efforts toward autonomous system development, which includes rapid decision-making systems and advanced combat operational equipment. AI technology delivers better operational performance and accuracy for military systems, yet autonomous weapons systems generate critical ethical problems. The United Nations continues to discuss autonomous weapons systems while no worldwide prohibition or strict regulatory framework exists. The world needs to prepare itself for an upcoming period when artificial intelligence will become a fundamental element in military operations. Every operational area of the military will implement these systems.

The United States faces strong military AI competition from China and Russia because these nations accelerate their efforts to enhance their military artificial intelligence capabilities. The technologies exist at present, but they pose a threat to spread through international borders and into the hands of dangerous non-state organisations. AI systems encounter three major operational risks which intensify their ethical dangers because they can experience system failures and security breaches and produce unpredictable results during military operations.

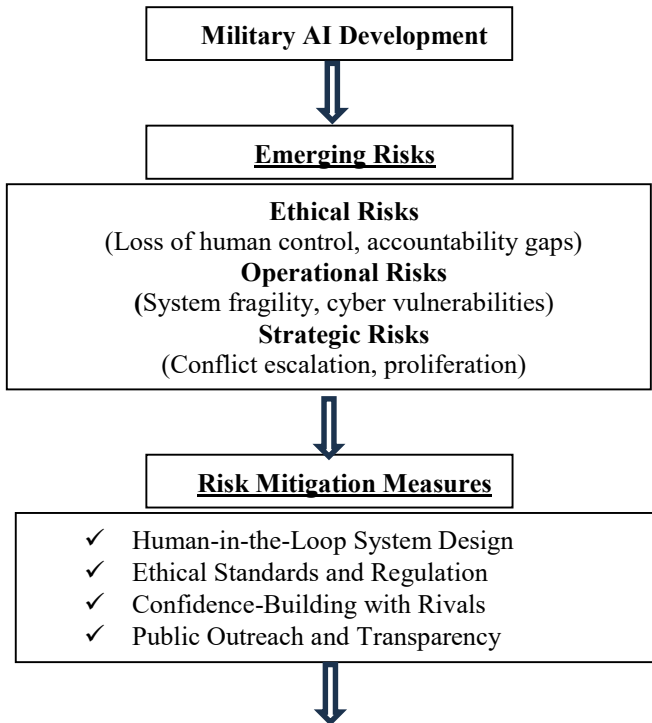
The American public supports military AI funding because they recognise its value in protecting the nation from security threats. The ethical principles determine the way

this support operates. All participants in AI deployment require human commanders to maintain control during every phase of operation because human oversight functions as a fundamental component which ensures military operations comply with legal and ethical standards.

Experts have suggested several policy steps to deal with these complex challenges [38] [39]. Among the three policies is the first: military teams need to be properly trained, organised, and equipped to work with AI technologies. The military needs to operate in AI environments, which are present everywhere, while maintaining open public communication to build trust that shows ethical AI usage commitment, and states must unite with allies to develop common defence AI rules and values.

AI systems used in military operations provide beneficial results, but operators must exercise great caution when handling these systems. Modern technological advancement needs to find a balance between its advantages and its effects on core human values for proper human value protection. AI militarisation will create major problems unless we develop strict ethical guidelines and international partnerships. The risks associated with accidental wars and widespread loss of accountability could lead to greater harm than any potential benefits.

The success of military AI development rests on technical advancement alongside the implementation of ethical leadership frameworks. The systems need responsible supervision which uses clear guidelines to maintain ethical governance standards. *Figure 3* presents a flowchart which demonstrates the sequence of steps for identifying risks and developing solutions and smart policies to ensure military AI technology safety.



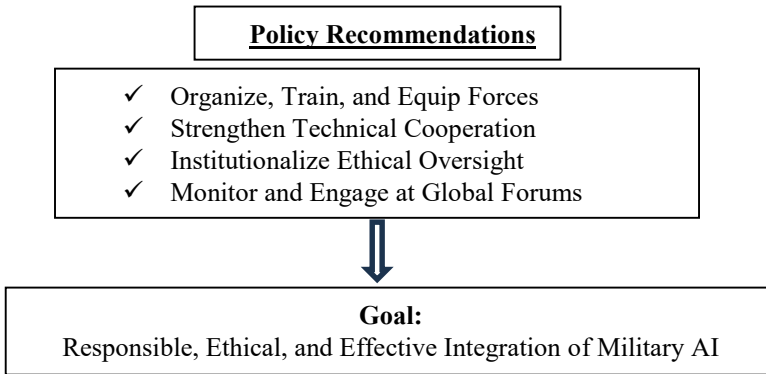


Fig. 3. Flowchart: Ethical and Strategic Management of Military AI (Source: Authors)

15 Conclusion

The evaluation of military technology progress requires a thorough assessment because the world faces extreme poverty and hunger crises. The ethical defence of military development spending becomes doubtful because essential needs remain unavailable to numerous people while frameworks like virtue ethics, deontology and consequentialism continue to stress the importance of reducing collateral damage and upholding moral standards. The decision to use financial resources for fighting world hunger and poverty faces opposition from critics who believe these funds would create more substantial humanitarian benefits. The decision to allocate military funding instead of social welfare programmes creates ethical problems about fair distribution of resources and proper moral duties. Nations need to perform thorough financial assessments before deciding on their spending amounts to protect national security and promote worldwide welfare.

The authors Rappart et al. [4] express that civil society organisations should independently focus on formalised review mechanisms, which include Article 36 of Additional Protocol I, 1977, of the Geneva Conventions of 1949, to enhance standard setting for new military technologies.

The ethical evaluation of technology development needs to move past military applications because it must guarantee fair distribution of resources to fight human suffering. Global policy needs to maintain the fight against poverty and hunger as its main focus because militarisation continues to receive excessive attention despite ongoing humanitarian emergencies, which matches the perspectives of Singer [3] and Altmann & Sauer [28].

Disclosure of Interests: The authors declare that no conflicting interests exist which could affect the content of this article.

References

1. Walzer, M. (2006). *Just and unjust wars: A moral argument with historical illustrations*. 4th Ed., xxviii, 361 p., New York: Basic Books.
2. Scharre, P. (2018). *Army of None: Autonomous Weapons and the Future of War*, 448 pp., New York: W. W. Norton & Company.
3. Singer, P. W. (2009). *Wired for war: The robotics revolution and conflict in the 21st century*. 499 p., New York: Penguin Press.
4. Rappert, B., Moyes, R., Crowe, A., & Nash, T. (2012). The roles of civil society in the development of standards around new weapons and other technologies of warfare. *International Review of the Red Cross*, 94(886), 765–785. <https://doi.org/10.1017/s1816383112000744>.
5. World Bank. (2022). *Poverty and shared prosperity 2022: Correcting course*. Washington, DC: World Bank Group.
6. Sachs, J. D. (2021). *The end of poverty: Economic possibilities for our time*. Penguin Random House.
7. Tian, N., da Silva, D.L., Liang, X., and Scarazzato, L. (2024). Trends in World Military Expenditure, 2023, *Stockholm International Peace Research Institute (SIPRI) Fact Sheet, April 2024*. Retrieved from <https://www.sipri.org>.
8. Berthe, A., & Kassen, J. (2020). Geopolitical tensions and their influence on defense spending in Europe and Asia. *International Security Review*, 35(2), 50-72. <https://doi.org/10.1016/j.isr.2020.03.002>.
9. Cheng, H., & Li, T. (2021). The strategic implications of military spending in the South China Sea. *Asian Politics & Policy*, 13(1), 113–130. <https://doi.org/10.1111/aspp.12244>.
10. Smith, R. E., & Johnson, K. (2021). The role of artificial intelligence in defense budgets: A case study of unmanned systems and cyber capabilities. *Technology & Innovation in Military Affairs*, 28(4), 199–220. <https://doi.org/10.1080/tima.2021.1860210>.
11. Zhang, Q., & Liu, M. (2022). Advances in military technology: How cyber capabilities and artificial intelligence are reshaping defense expenditures. *Defense Technology Journal*, 37(3), 148-159. <https://doi.org/10.1016/j.detech.2022.02.007>.
12. Harris, S. M. (2020). Cybersecurity in defense: The critical need for increased defense spending in the age of digital warfare. *Cybersecurity & Defense*, 14(2), 61–74. <https://doi.org/10.1002/cyd.1547>.
13. Jones, S. D., & Walker, C. B. (2021). The evolving threat of nuclear and cyberattacks and their impact on global military budgets. *International Journal of Nuclear Security*, 12(3), 225–245. <https://doi.org/10.1016/j.ijns.2021.05.008>.
14. Parker, R. W., & Wang, J. X. (2020). Regional rivalries in Asia and the Middle East: Implications for military expenditures. *Asian Military Affairs*, 9(2), 189-205. <https://doi.org/10.1016/j.ama.2020.01.004>.
15. Gore, T., & Foster, P. (2021). National security priorities in the Middle East and Asia: A comparative analysis of defense investments. *Global Security Review*, 15(1), 43–59. <https://doi.org/10.1016/j.gsr.2021.02.012>.
16. Islam, M. R., & Wasi, A. T. (2024). “Balancing power and ethics: A framework for addressing human rights concerns in military AI”. *Harms and Risks of AI in the Military Workshop 2024*. <https://arxiv.org/abs/2411.06336arXiv> (accessed on 27 April 2025), <https://doi.org/10.48550/arXiv.2411.06336>.
17. Anneken, M., Burkart, N., Jeschke, F., Kuwertz-Wolf, A., Mueller, A., Schumann, A., & Teutsch, M. (2025). *Ethical considerations for the military use of artificial intelligence in visual reconnaissance*. <https://arxiv.org/abs/2502.03376arXiv>, (accessed on 27 April 2025), <https://doi.org/10.48550/arXiv.2502.03376>.

18. Roff, H. M. (2019). The frame problem: AI, ethics, and the moral consequences of automated warfare. *Journal of Military Ethics*, 18(2), 137–154.
19. Arkin, R. C. (2009). *Governing lethal behavior in autonomous robots*. CRC Press.
20. Sharkey, N. (2010). Saying “no!” to lethal autonomous targeting. *Journal of Military Ethics*, 9(4), 369–383.
21. Crootoof, R. (2015). The killer robots are here: legal and policy implications. *Cardozo Law Review*, 36(5), 1837-1915.
22. Roff, H. M., & Moyes, R. (2016). Meaningful human control, artificial intelligence, and autonomous weapons. *Article 36*.
23. Eubanks, V. (2018). *Automating inequality: How high-tech tools profile, police, and punish the poor*. St Martin's Press.
24. Etzioni, A., & Etzioni, O. (2017). AI-assisted ethics. *Ethics and Information Technology*, 19(2), 117-128.
25. Geist, E. (2016). It is already too late to stop the AI arms race. *Bulletin of the Atomic Scientists*, 72(5), 318–321.
26. Binns, R. (2018). Fairness in machine learning: Lessons from political philosophy. *Proceedings of the 2018 Conference on Fairness, Accountability, and Transparency*.
27. Bryson, J. J., & Winfield, A. F. (2017). Standardizing ethical design for artificial intelligence and autonomous systems. *Computer*, 50(5), 116-119.
28. Altmann, J., & Sauer, F. (2017). Autonomous weapon systems and strategic stability. *Survival*, 59(5), 117-142.
29. McThomas, M. (2022). Theories of Ethics. In: Farazmand, A. (eds) *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Springer, Cham. pp 12725–12729. https://doi.org/10.1007/978-3-030-66252-3_931.
30. Kaptein, M. and Wempe, J. (2023). Three General Theories of Ethics and the Integrative Role of Integrity Theory. In the book *The Balanced Company: A theory of corporate integrity*, Chapter 2, Oxford University Press, 2002, Chapter in SSRN Electronic Journal, January 2003. <https://doi.org/10.2139/ssrn.194039>.
31. Hursthouse, R. (1999). *On virtue ethics*. Oxford University Press.
32. Rawls, J. (1999). *The law of peoples: With "The idea of public reason revisited"*. Harvard University Press.
33. ICRC. (2024). International humanitarian law and the challenges of contemporary armed conflicts. *International Committee of the Red Cross (ICRC)*.
34. Cools, K., & Maathuis, C. (2024). “Trust or bust: Ensuring trustworthiness in autonomous weapon systems”. *IEEE Military Communications Conference October 28- November 01, 2024, Washington, DC, USA*. <https://arxiv.org/abs/2410.10284> (accessed on 27 April 2025), <https://doi.org/10.48550/arXiv.2410.10284>.
35. Roy, K. (2024). *Artificial intelligence, warfare, and ethics in India*. *Journal of Military Ethics*. <https://www.tandfonline.com/doi/full/10.1080/15027570.2024.2409999> PhilPapers+2Taylor & Francis Online+2Taylor & Francis Online+2.
36. Schneider, S., & Sparrow, R. (2020). *Military enhancement: Technologies, ethics and operational issues*. In *Military ethics and emerging technologies* (pp. 123–140). Springer. https://link.springer.com/chapter/10.1007/978-3-030-36319-2_8SpringerLink.
37. Chinkin, C., & Kaldor, M. (2017). *International law and new wars*. Cambridge University Press.
38. Morgan, F. E., & Boudreaux, B. (2019). *Military applications of artificial intelligence: Ethical concerns in an uncertain world*. RAND Corporation. https://www.rand.org/pubs/research_reports/RR3139-1.htmlRAND Corporation+1RAND Corporation+1 (accessed on 27 April 2025).

39. Stix, C. (2021). Actionable principles for AI policy. *arXiv preprint arXiv:2102.12406*. <https://doi.org/10.48550/arXiv.2102.12406>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

