

UAVs in Modern Warfare: Strengthening National Defence or Raising Ethical Concern?

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Introduction

Unmanned Aerial Vehicles (UAVs) commonly known as drones, have become pivotal in modern warfare, offering unprecedented capabilities in surveillance, intelligence gathering, and precision strikes. Initially deployed for reconnaissance, UAVs have evolved into powerful tools for conducting airstrikes with minimal human involvement, enhancing the operational efficiency of military forces². Their use in counterterrorism, border control, and surveillance operations has led to their widespread adoption by several nations, enhancing national defense capabilities³. UAVs allow for targeted operations that reduce the risk to soldiers while increasing precision in eliminating threats, thus providing a tactical advantage in modern conflict.

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² Singer, P.W. 2010. 'Wired for War: The Robotics Revolution and Conflict in the 21st Century'. *Industrial Robot: An International Journal* 37 (5). doi:[10.1108/ir.2010.04937eae.001](https://doi.org/10.1108/ir.2010.04937eae.001).

³ Boyle, Michael J. 2015. 'The Legal and Ethical Implications of Drone Warfare'. *The International Journal of Human Rights* 19 (2). Routledge: 105–26. doi:[10.1080/13642987.2014.991210](https://doi.org/10.1080/13642987.2014.991210).



Source: People's Project.Com

However, the growing reliance on UAVs in military operations has sparked ethical debates. Critics argue that the use of drones for targeted killings, especially in regions with civilian populations, often leads to unintended casualties, raising serious concerns about the adherence to international humanitarian laws⁴. The lack of accountability and transparency in drone strikes, particularly when conducted by foreign powers, complicates the ethical implications of their use⁵. Additionally, concerns regarding privacy violations and the erosion of national sovereignty in drone strikes have fueled public debate about the legitimacy of UAVs in warfare⁶. Thus, while UAVs strengthen national defense capabilities, their ethical and legal challenges present a complex dilemma that requires careful consideration by policymakers

Technological Advancements and Tactical Superiority

UAVs have revolutionized military operations with advanced capabilities in intelligence, surveillance, and reconnaissance, granting a tactical edge in modern warfare. These systems,

⁴ Walsh, James, and Marcus Schulzke. 2018. *Drones and Support for the Use of Force*. *Drones and Support for the Use of Force*. doi:[10.3998/mpub.9946611](https://doi.org/10.3998/mpub.9946611).

⁵ Brooks, Rosa. 2014. 'Drones and the International Rule of Law'. *Ethics & International Affairs* 28 (1): 83–103. doi:[10.1017/S0892679414000070](https://doi.org/10.1017/S0892679414000070).

⁶ Butler, Des. 2019. 'Drones and Invasions of Privacy: An International Comparison of Legal Responses'. *University of New South Wales Law Journal*, September. doi:[10.53637/YEBG1009](https://doi.org/10.53637/YEBG1009).

equipped with sophisticated sensors and high-resolution cameras, enable real-time monitoring of vast areas, thus improving situational awareness for military commanders⁷. For instance, UAVs like the MQ-9 Reaper can capture detailed imagery and relay actionable intelligence within seconds, allowing for rapid decision-making in critical scenarios⁸. The integration of UAVs into military operations also enhances the precision and effectiveness of reconnaissance missions. By utilizing technologies like synthetic aperture radar and thermal imaging, UAVs can detect and track enemy movements even in challenging terrains or under adverse weather conditions⁹. This capability not only mitigates risks to ground troops but also ensures the success of operations with minimal collateral damage¹⁰.



Reaper Unmanned Aerial Vehicle (MQ-9). Source: Missile Defense Advocacy Alliance

⁷ Singer, P.W. 2010. 'Wired for War: The Robotics Revolution and Conflict in the 21st Century'. *Industrial Robot: An International Journal* 37 (5). doi:[10.1108/ir.2010.04937eae.001](https://doi.org/10.1108/ir.2010.04937eae.001).

⁸ Joronen, Mikko. 2018. 'Predator Empire: Drone Warfare and Full Spectrum Dominance'. *The AAG Review of Books* 6 (July): 180–81. doi:[10.1080/2325548X.2018.1471937](https://doi.org/10.1080/2325548X.2018.1471937).

⁹ Gruszczak, Artur, and Sebastian Kaempf. 2023. *Routledge Handbook of the Future of Warfare*. doi:[10.4324/9781003299011](https://doi.org/10.4324/9781003299011).

¹⁰ Finn, Rachel, and David Wright. 2012. 'Unmanned Aircraft Systems: Surveillance, Ethics and Privacy in Civil Applications'. *Computer Law & Security Review* 28 (April): 184–94. doi:[10.1016/j.clsr.2012.01.005](https://doi.org/10.1016/j.clsr.2012.01.005).

Moreover, the ability of UAVs to operate for extended periods without risking human lives provides a strategic advantage. Long-endurance drones can conduct persistent surveillance over conflict zones, offering unparalleled insights into enemy activities and reducing the element of surprise in adversarial attacks¹¹. As technology advances, the incorporation of AI-driven analytics further strengthens the operational capabilities of UAVs, ensuring their pivotal role in modern military strategies¹².

Cost-Benefit Analysis of UAV Deployment

The deployment of unmanned aerial vehicles (UAVs), commonly known as drones, has significantly transformed modern defense strategies due to their cost-effectiveness, precision and ability to mitigate human risks. UAVs offer reduced operational costs compared to traditional military assets, such as manned aircraft, which require substantial investment in training and maintenance. Studies indicate that UAV operations can cost up to ten times less than manned missions¹³. Furthermore, UAVs are designed to minimize fuel consumption and can be operated remotely, thus reducing the financial burden on defense budgets¹⁴. Their modular design allows for quick upgrades, ensuring prolonged usability without incurring the costs associated with replacing manned systems.

In terms of precision, UAVs excel due to their advanced technological capabilities. They have high-resolution imaging systems, artificial intelligence, and real-time data transmission, enabling

¹¹ Williams, Alison. 2009. 'A Crisis in Aerial Sovereignty? Considering the Implications of Recent Military Violations of National Airspace'. *Area* 42 (June): 51–59. doi:[10.1111/j.1475-4762.2009.00896.x](https://doi.org/10.1111/j.1475-4762.2009.00896.x).

¹² Chamayou, Gregoire. 2024. 'A Theory of the Drone'. *The New Press*. Accessed December 8. <https://thenewpress.com/books/theory-of-drone>.

¹³ Lyu, Mingyang, Yibo Zhao, Chao Huang, and Hailong Huang. 2023. 'Unmanned Aerial Vehicles for Search and Rescue: A Survey'. *Remote Sensing* 15 (13). Multidisciplinary Digital Publishing Institute: 3266. doi:[10.3390/rs15133266](https://doi.org/10.3390/rs15133266).

¹⁴ Mohsan, Syed Agha Hassnain, Nawaf Qasem Hamood Othman, Yanlong Li, Mohammed H. Alsharif, and Muhammad Asghar Khan. 2023. 'Unmanned Aerial Vehicles (UAVs): Practical Aspects, Applications, Open Challenges, Security Issues, and Future Trends'. *Intelligent Service Robotics* 16 (1): 109–37. doi:[10.1007/s11370-022-00452-4](https://doi.org/10.1007/s11370-022-00452-4).

precise targeting and decision-making¹⁵. This precision reduces collateral damage, a critical concern in military operations, particularly in urban and densely populated areas¹⁶. Their ability to perform prolonged surveillance and reconnaissance missions provides defense forces with accurate intelligence, enhancing operational efficiency while reducing risks of miscalculation. UAVs that military operations remain strategic, targeted, and cost-effective in achieving objectives¹⁷.

UAVs also mitigate human risks by reducing the reliance on direct human involvement in hazardous operations. This is particularly beneficial in combat zones, where deploying personnel could lead to significant casualties¹⁸. UAVs can be used for intelligence gathering, mine detection, and combat missions without endangering human lives, demonstrating their importance in high-stakes environments¹⁹. Additionally, their capacity to operate in extreme weather conditions and inaccessible terrains further emphasizes their value in safeguarding human operatives. Consequently, UAVs enhance not only operational efficiency but also the ethical considerations of military engagement by prioritizing personnel safety²⁰.

Ethical Dilemmas in Targeted Strikes

Targeted drone strikes, often employed in modern warfare, pose significant ethical dilemmas, particularly concerning collateral damage and civilian casualties. Proponents argue that drones

¹⁵ Mohsan, Syed Agha Hassnain, Nawaf Qasem Hamood Othman, Yanlong Li, Mohammed H. Alsharif, and Muhammad Asghar Khan. 2023. 'Unmanned Aerial Vehicles (UAVs): Practical Aspects, Applications, Open Challenges, Security Issues, and Future Trends'. *Intelligent Service Robotics* 16 (1): 109–37. doi:[10.1007/s11370-022-00452-4](https://doi.org/10.1007/s11370-022-00452-4).

¹⁶ Javaid, Shumaila, Nasir Saeed, and Bin He. 2024. 'Large Language Models for UAVs: Current State and Pathways to the Future', May. doi:[arXiv:2405.01745v](https://arxiv.org/abs/2405.01745v).

¹⁷ Dillenburger, Steven P. n.d. 'Minimization of Collateral Damage in Airdrops and Airstrikes'.

¹⁸ Vestner, Tobias. 2024. 'From Strategy to Orders: Preparing and Conducting Military Operations with Artificial Intelligence'. In *Research Handbook on Warfare and Artificial Intelligence*, edited by Robin Geiß and Henning Lahmann, 116–34. Edward Elgar Publishing. doi:[10.4337/9781800377400.00012](https://doi.org/10.4337/9781800377400.00012).

¹⁹ Walsh, James, and Marcus Schulzke. 2018. *Drones and Support for the Use of Force*. *Drones and Support for the Use of Force*. doi:[10.3998/mpub.9946611](https://doi.org/10.3998/mpub.9946611).

²⁰ Krishnan, S. 2017. 'The Ethics of Drone Warfare'.

enable precision in eliminating high-value targets, potentially reducing harm to non-combatants. However, the reality often diverges with misidentification of targets and technological errors leading to unintended fatalities²¹. Civilian casualties not only raise moral concerns but also violate international humanitarian laws, which emphasize the necessity of distinguishing between combatants and civilians during armed conflicts²². This persistent risk questions the ethical foundation of drone strikes, suggesting that their use may be inconsistent with just war principles like proportionality and discrimination.

Beyond the immediate loss of life, collateral damage resulting from drone strikes has profound psychological and societal repercussions. Families affected by these strikes endure trauma and loss, often fueling animosity toward the nations deploying drones²³. Such incidents can destabilize communities and create grievances that terrorist organizations exploit to recruit and radicalize individuals. The ethical dilemma thus extends beyond civilian deaths, encompassing the broader implications of exacerbating conflict dynamics and perpetuating cycles of violence²⁴. This suggests that the strategic advantages of drone warfare may be overshadowed by its long-term consequences on peace and security.

²¹ Boyle, Michael J. 2013. 'The Costs and Consequences of Drone Warfare'. *International Affairs (London)* 89 (1). Blackwell Publishing Ltd: 1–29. doi:[10.1111/1468-2346.12002](https://doi.org/10.1111/1468-2346.12002).

²² ICRC. 2015. 'International Humanitarian Law and the Challenges of Contemporary Armed Conflicts'. International Committee of the Red Cross. <https://www.icrc.org/en/document/international-humanitarian-law-and-challenges-contemporary-armed-conflicts>.

²³ D'Errico, Jonathan. 2018. 'Executive Power, Drone Executions, and the Due Process Rights of American Citizens'. *Fordham Law Review* 87 (3): 1185.

²⁴ Stanford International Human Rights and Conflict Resolution Clinic (IHCRC), and NYU School of Law. 2024. 'Living Under Drones: Death, Injury, and Trauma to Civilians From US Drone Practices in Pakistan'. Accessed December 8. doi:[10.1163/2468-1733_shafir_SIM260090013](https://doi.org/10.1163/2468-1733_shafir_SIM260090013).



Source: E-International Relations

Their limited accountability and transparency further amplify the moral tension surrounding drone strikes. Governments conducting these operations often fail to disclose detailed reports on civilian casualties, making complicated efforts to evaluate their ethical legitimacy²⁵. This lack of oversight erodes public trust and raises questions about adherence to international norms. While drones offer tactical benefits, their ethical challenges necessitate re-evaluating policies to mitigate harm and ensure compliance with humanitarian principles²⁶. The ongoing ethical debate underscores the importance of balancing operational efficiency with moral responsibility in warfare.

Legal and Accountability Frameworks

The absence of robust international laws regulating the use of unmanned aerial vehicles (UAVs) presents significant challenges to ensuring accountability, particularly for cross-border operations and incidents causing civilian harm. International humanitarian law (IHL) provides a general framework for armed conflict, emphasizing principles such as distinction, proportionality, and

²⁵ Boyle, Michael J. 2020. 'The Future'. In *The Drone Age: How Drone Technology Will Change War and Peace*, edited by Michael J. Boyle, 0. Oxford University Press.
doi:[10.1093/oso/9780190635862.003.0009](https://doi.org/10.1093/oso/9780190635862.003.0009).

²⁶ Alston, Philip, and Summary or Arbitrary Executions UN. Human Rights Council. Special Rapporteur on Extrajudicial. 2011. 'Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, Philip Alston :: Addendum', May. UN., <https://digitallibrary.un.org/record/705553>.

necessity, but it lacks specificity for UAV operations²⁷. This legal ambiguity makes it difficult to determine whether states are adhering to or violating existing rules, leaving room for varied interpretations and selective compliance, which undermines accountability mechanisms²⁸.

Cross-border UAV strikes, often conducted by powerful nations under the pretext of self-defense or counterterrorism, further complicate accountability due to jurisdictional challenges. The principles of sovereignty and non-intervention enshrined in the UN Charter clash with state practices involving UAV strikes in other territories without explicit consent²⁹. These strikes often bypass national legal systems, and their extrajudicial nature raises concerns about the lack of transparency and mechanisms to hold perpetrators accountable³⁰. The disparity in state capacities to respond to violations exacerbates the situation, as affected states are often unable to challenge the actions of more powerful states in international forums³¹.

Additionally, civilian harm resulting from UAV strikes exposes the inadequacies of current accountability frameworks. Evidence collection and attribution of responsibility are inherently difficult due to the remote nature of UAV operations and the classified status of many missions³². Victims face significant barriers in seeking redress, with legal recourse often dependent on the cooperation of the offending state. These gaps in accountability not only undermine justice for victims but also erode the credibility of international norms governing armed conflict.

²⁷ Ruys, Tom, Olivier Corten, and Alexandra Hofer. 2018. *The Use of Force in International Law: A Case-Based Approach*. Oxford University Press. <https://academic.oup.com/book/57866>.

²⁸ Hall, Rebecca L. 2022. 'The Law of Armed Conflict: International Humanitarian Law in War'. *Journal of Conflict and Security Law* 27 (1): 123–29. doi:[10.1093/jcsl/krac004](https://doi.org/10.1093/jcsl/krac004).

²⁹ Rogers, A. P. V. 1996. *Law on the Battlefield*. Manchester University Press.

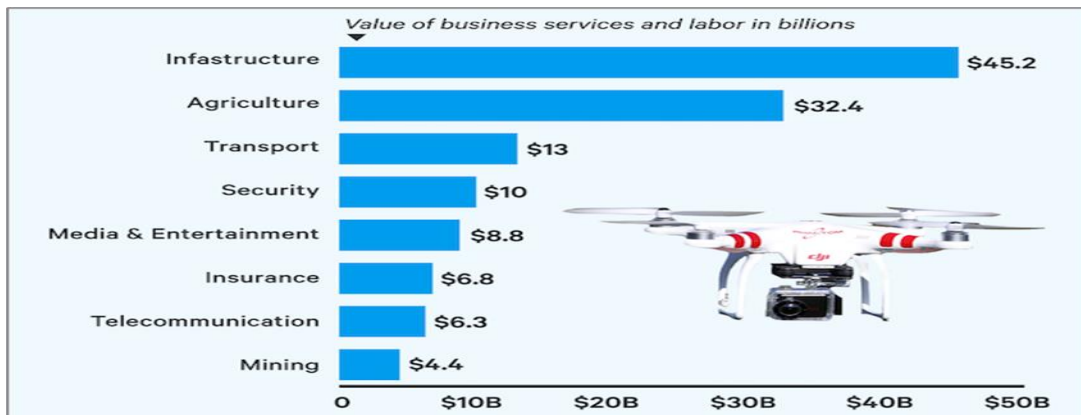
³⁰ Abresch, W. 2009. 'Targeted Killing in International Law'. *European Journal of International Law* 20 (2): 449–53. doi:[10.1093/ejil/chp012](https://doi.org/10.1093/ejil/chp012).

³¹ Ruys, Tom, Olivier Corten, and Alexandra Hofer. 2018. *The Use of Force in International Law: A Case-Based Approach*. Oxford University Press. <https://academic.oup.com/book/57866>.

³² Schmitt, Michael N., and David S. Goddard. 2016. 'International Law and the Military Use of Unmanned Maritime Systems'. *International Review of the Red Cross* 98 (902): 567–92. doi:[10.1017/S1816383117000339](https://doi.org/10.1017/S1816383117000339).

Global Security and Proliferation Risks

The proliferation of unmanned aerial vehicle (UAV) technology to non-state actors is increasingly threatening global security and stability. UAVs, once exclusive to state actors, have become accessible due to advancements in commercial technology, allowing non-state groups to exploit their capabilities for asymmetric warfare. These actors, including terrorist organizations, criminal networks, and insurgent groups, use UAVs for reconnaissance, propaganda dissemination, and attacks, creating a new dimension of conflict that undermines traditional security frameworks³³. For example, groups like ISIS have deployed drones for reconnaissance and weaponized purposes, complicating counterterrorism operations and increasing risks to civilian infrastructure³⁴.



Predicted value of drone by industry, Source: RPX Aviation

The misuse of UAVs poses unique challenges due to their cost-effectiveness, ease of deployment, and capacity to bypass traditional defense systems. Non-state actors are using them to smuggle contraband, disrupt airspace, and conduct targeted attacks against high-value assets, which

³³ Boyle, Michael J. "Drones in Global Security." *Oxford Research Encyclopedia of International Studies*. 21 Dec. 2022; Accessed 8 Dec. 2024. doi:
<https://doi.org/10.1093/acrefore/9780190846626.013.690>

³⁴ Rae, James DeShaw. 2014. 'National Security and the Efficacy of Drone Warfare'. In *Analyzing the Drone Debates: Targeted Killing, Remote Warfare, and Military Technology*, edited by James DeShaw Rae, 19–50. New York: Palgrave Macmillan US. doi:[10.1057/9781137381576_2](https://doi.org/10.1057/9781137381576_2).

destabilizes regions and escalates geopolitical tensions. Such operations are difficult to anticipate or counter, especially in urban and densely populated areas where drones are hard to detect³⁵. Furthermore, the unregulated trade and transfer of UAV components facilitate their acquisition by rogue groups, amplifying the risks of these technologies falling into the wrong hands³⁶.

Addressing the risks of UAV proliferation requires international cooperation to regulate drone technology and limit its transfer to potentially malicious actors. Establishing robust export controls, enhancing counter-drone technologies, and fostering collaborative security measures are critical to mitigating these risks³⁷. Policymakers must also prioritize legal frameworks that address the misuse of UAVs while balancing the legitimate commercial and humanitarian applications of the technology³⁸. Failure to act could enable non-state actors to escalate asymmetric threats, further destabilizing global security.

The Path Forward

The use of Unmanned Aerial Vehicles (UAVs), or drones has revolutionized modern warfare by providing military forces with enhanced precision, surveillance, and strike capabilities. However, the growing reliance on UAVs has raised significant ethical concerns, particularly regarding civilian casualties, accountability, and transparency in military operations. As UAV technology continues to advance, policymakers must address these concerns by implementing clear regulations and fostering international cooperation. The path forward requires a careful balance

³⁵ Cortright, David, Rachel Fairhurst, and Kristen Wall, eds. 2017. *Drones and the Future of Armed Conflict: Ethical, Legal, and Strategic Implications*. Chicago, IL: University of Chicago Press. <https://press.uchicago.edu/ucp/books/book/chicago/D/bo20299026.html>.

³⁶ Boyle, Michael J. "Drones in Global Security." *Oxford Research Encyclopedia of International Studies*. 21 Dec. 2022; Accessed 8 Dec. 2024. doi: <https://doi.org/10.1093/acrefore/9780190846626.013.690>

³⁷ Krebs, Shiri. 2023. 'Above the Law: Drones, Aerial Vision and the Law of Armed Conflict – a Socio-Technical Approach'. *International Review of the Red Cross* 105 (November): 1–39. doi:[10.1017/S1816383123000413](https://doi.org/10.1017/S1816383123000413).

³⁸ Grossman, Nicholas. 2018. *Drones and Terrorism: Asymmetric Warfare and the Threat to Global Security*. I.B. Tauris. doi:[10.5040/9781350986169](https://doi.org/10.5040/9781350986169).

between leveraging the strategic advantages of UAVs and ensuring their use aligns with humanitarian standards and global ethical frameworks. Such as,

1. **Develop Clear Regulations:** As the use of UAVs (Unmanned Aerial Vehicles) expands in modern warfare, it is crucial to establish clear international regulations governing their deployment. These regulations must outline specific rules of engagement, ensuring that drone strikes adhere to established humanitarian laws such as the Geneva Conventions. By setting these standards, policymakers can ensure that UAVs are used responsibly and that military operations are accountable. Regulations should address issues like target identification, proportionality, and the minimization of civilian casualties.
2. **Promote Transparency:** Transparency is essential in maintaining public trust in military operations involving UAVs. Governments and military authorities must disclose the scale, purpose, and outcomes of drone strikes. This includes making information available about targets, the decision-making process behind each strike, and the number of civilian casualties. Such transparency will not only help counter misinformation but also hold governments accountable for their use of UAVs, ensuring that military actions are justifiable in the eyes of both domestic and international communities.
3. **Enhance Verification Mechanisms:** To reduce the risk of unintended civilian casualties, policymakers must invest in technologies that enhance the verification of UAV strikes. Independent third-party mechanisms, such as on-the-ground assessments or satellite surveillance, should be employed to verify the accuracy and impact of drone strikes. By improving these verification systems, governments can ensure that drone operations meet humanitarian standards and avoid unnecessary harm to innocent civilians.
4. **Encourage Multilateral Cooperation:** Since UAVs are increasingly used by various nations, international cooperation is essential to prevent the misuse of this technology. Multilateral dialogue should focus on establishing universal UAV regulations that prioritize ethical considerations. By fostering international cooperation, policymakers can create a global framework that balances military advantages with moral responsibility, ensuring that

technological advancements in warfare do not outpace the development of ethical guidelines.