



Drones Add A Whole New Dimension To Warfare: Lessons From The War In Gaza

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Abstract

The evolution of modern warfare has been significantly influenced by the advent and proliferation of drone technology. This study examines the impact of drones in contemporary conflicts, with a particular focus on the lessons learned from the ongoing war in Gaza. Drones, or Unmanned Aerial Vehicles (UAVs), have revolutionized military strategy, tactics and operations, offering unprecedented capabilities in surveillance, reconnaissance, intelligence gathering and targeted strikes. The war in Gaza highlights how both state and non-state actors leverage drones to achieve strategic and tactical objectives, shift power dynamics and alter the traditional understanding of asymmetrical warfare. This research explores the multifaceted role of drones in shaping battlefield outcomes, the ethical and legal implications of their use and the lessons that can be drawn from the conflict in Gaza.

Key Words. Drones, Operations, Strategy, Technology

Introduction

1. The evolving landscape of warfare has been dramatically reshaped by technological advancements, with drones at the forefront of this transformation. The recent conflict in Gaza has once again highlighted the significant role unmanned aerial vehicles (UAVs) play in modern combat, underscoring both their strategic advantages and the complex ethical and operational challenges they present.

Types of Drones Used by Israel

2. Israel's military arsenal includes a diverse range of drones tailored for various purposes, from surveillance to direct attacks. The Israeli Defence Forces (IDF) have integrated drones into their military strategy, leveraging their capabilities to enhance operational efficiency and effectiveness.

(a) **Surveillance and Reconnaissance Drones.** Israel employs several types of surveillance and reconnaissance drones, including the Heron and Hermes series.¹ These drones are equipped with high-

¹ Daniel R. Faust, *Military Drones*, Rosen Publishing Group, December 15, 2015

resolution cameras, infrared sensors, and other advanced technologies that provide real-time intelligence and situational awareness. The Heron, developed by Israel Aerospace Industries (IAI), can fly at high altitudes for extended periods, making it ideal for persistent surveillance missions over Gaza.²

(b) **Combat Drones.** For direct combat operations, Israel utilizes armed drones like the IAI Harop and the Elbit Hermes 900. The Harop, also known as a "loitering munition," can hover over a target area before engaging. This drone is designed to destroy enemy radar and anti-aircraft systems, making it a crucial asset in neutralizing threats before they can harm manned aircraft. The Hermes 900, on the other hand, is a versatile platform capable of carrying various payloads, including precision-guided munitions, enhancing its role in targeted strikes against high-value targets.

(c) **Electronic Warfare Drones.** Israel also employs drones equipped for electronic warfare, such as the Skylark series.³ These drones can jam enemy communications and disrupt their radar systems, providing a strategic advantage in electronic warfare. The ability to interfere with enemy systems without engaging in direct combat underscores the multifaceted utility of drones in modern military operations.

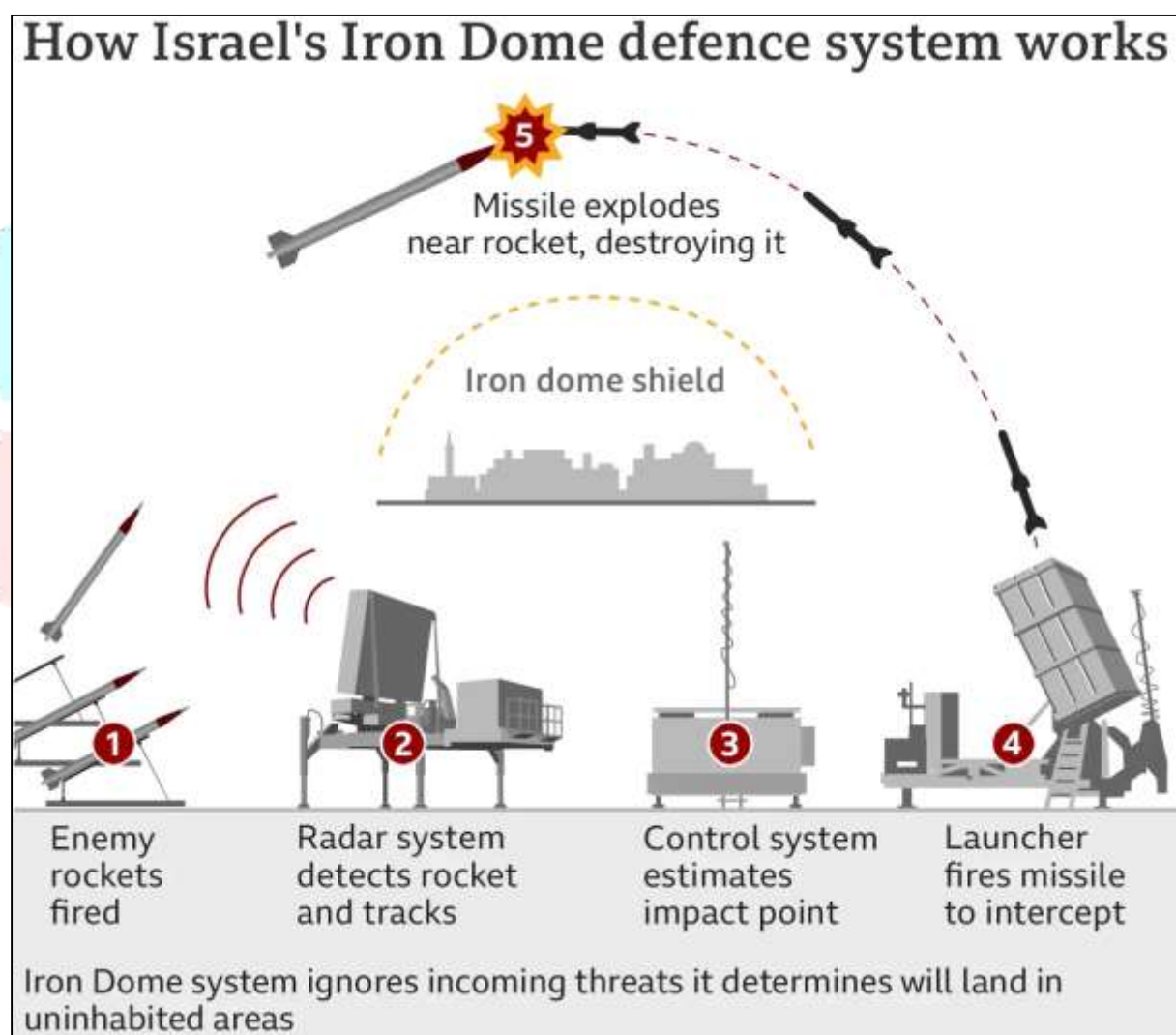


Diagram 1: Israel Intercepted 99% of Iran's Drones and Missiles.⁴

² Seth J. Frantzman, *The Drone Wars: Pioneers, Killing Machines, Artificial Intelligence, and the Battle for the Future*, Bombardier Books, June 21, 2021.

³ M. Murugappan, Saravanan Krishnan, *Internet of Drones, Applications, Opportunities and Challenges*, CRC Press, May 15, 2023.

⁴ 'Israel hails interception of drones and missiles in unprecedented attack by Iran,' *Metro Vaartha*, April 14, 2024 <https://english.metrovaartha.com/news/international/the-latest-israel-hails-interception-of-drones-and-missiles-in-unprecedented-attack-by-iran>, (accessed on May 15, 2024).

Drones Used in Attack by Iran on April 13, 2024

3. On April 13, 2024, Iran launched a significant drone attack that highlighted the increasing sophistication and reach of its UAV capabilities. This attack involved various types of drones, each designed for specific roles in the offensive strategy.

(a) **Kamikaze Drones**. Iran's use of kamikaze drones, such as the Shahed-136, marked a significant aspect of the attack.⁵ These drones are designed to crash into targets, detonating their explosive payloads upon impact. The Shahed-136 has a relatively long range, allowing it to strike targets deep within enemy territory. This type of drone is particularly effective for high-impact missions against critical infrastructure.

(b) **Surveillance and Reconnaissance Drones**. In addition to Kamikaze drones, Iran deployed surveillance and reconnaissance drones like the Mohajer-6.⁶ These drones provided real-time intelligence, allowing Iranian forces to identify and prioritize targets accurately. The Mohajer-6, equipped with advanced optics and sensors, can conduct extended surveillance missions, feeding crucial data back to command centres.

(c) **Combat Drones**. Iran's combat drones, such as the Qods Mohajer-4 and Shahed-129, played a vital role in delivering precision strikes. These drones can carry various munitions, including guided missiles and bombs, enabling them to engage targets with high accuracy. The Shahed-129, in particular, has a significant payload capacity and long endurance, making it a formidable platform for sustained combat operations.

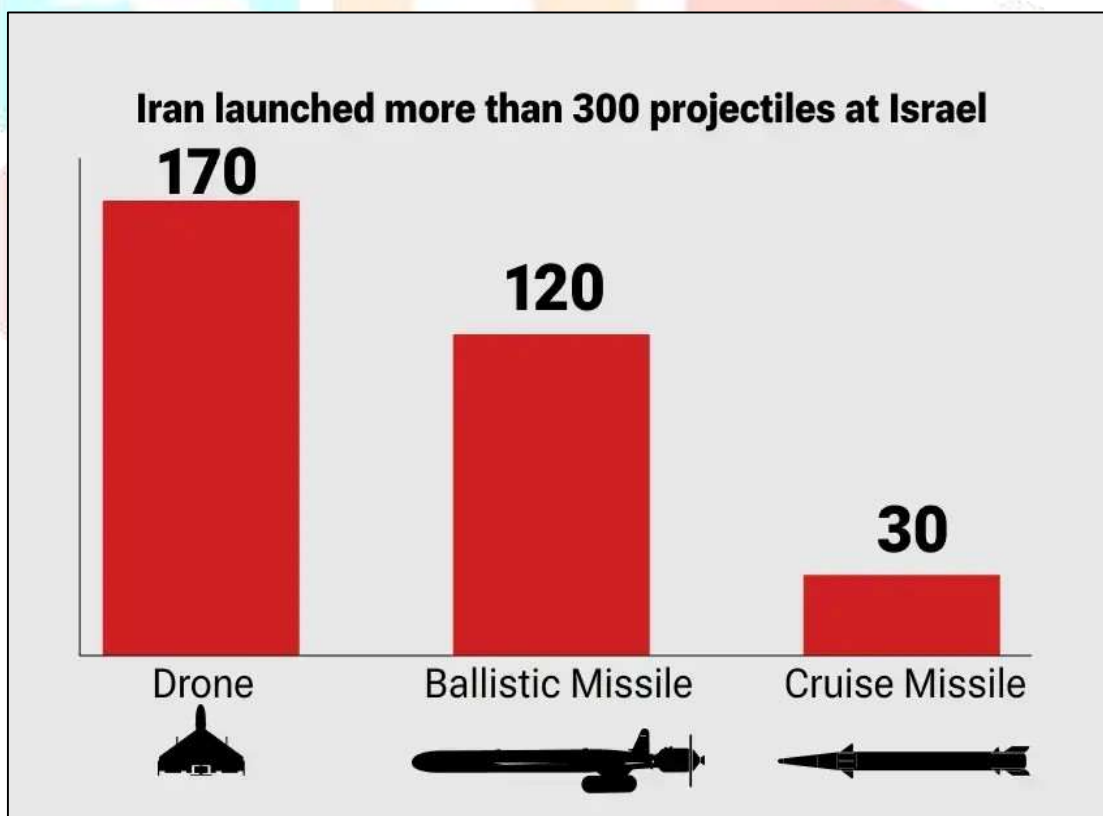


Diagram 2: Drones an Economical Option Vis a Vis Missiles.⁷

⁵ Mehran Riazaty, *Iranian Drones: A New Menace From the Ayatollah*, Xlibris US, June 30, 2023.

⁶ Oleg I. Sukharevsky, Vitaly A. Vasilets, *Ground Radar Objects*, CRC Press, June 24, 2024.

⁷ Namid Hamzavi, 'How Did Israel Intercept 99% Of Iran's Drones and Missiles?', *Iran International*, April 15, 2024, <https://www.iranintl.com/en/202404152333> (accessed on May 15, 2024).

Use of Drones by the Houthis

4. The Houthi rebels in Yemen have increasingly relied on drones to compensate for their technological and numerical inferiority. Their innovative use of UAVs has posed significant challenges to their adversaries, particularly the Saudi-led coalition.

- (a) **Surveillance and Reconnaissance Drones.** The Houthis use drones like the Qasef-1 for surveillance and reconnaissance. These drones are relatively simple but effective in providing the Houthis with real-time intelligence on enemy movements and positions. The Qasef-1 can loiter over target areas, capturing video and transmitting it back to Houthi commanders.
- (b) **Attack Drones.** For offensive operations, the Houthis deploy attack drones such as the Sammad series. These drones can carry explosive payloads and are used in kamikaze attacks against high-value targets. The Sammad-3, for example, has been used in strikes against Saudi oil facilities, demonstrating the Houthis' ability to conduct long-range attacks with significant impact.
- (c) **Improvised and Modified Drones.** In addition to purpose-built UAVs, the Houthis have also used improvised and modified commercial drones for attacks. These modified drones are equipped with explosive devices and are used in asymmetric warfare tactics to harass and disrupt enemy forces. The use of commercially available drones underscores the accessibility and adaptability of UAV technology in modern conflicts.

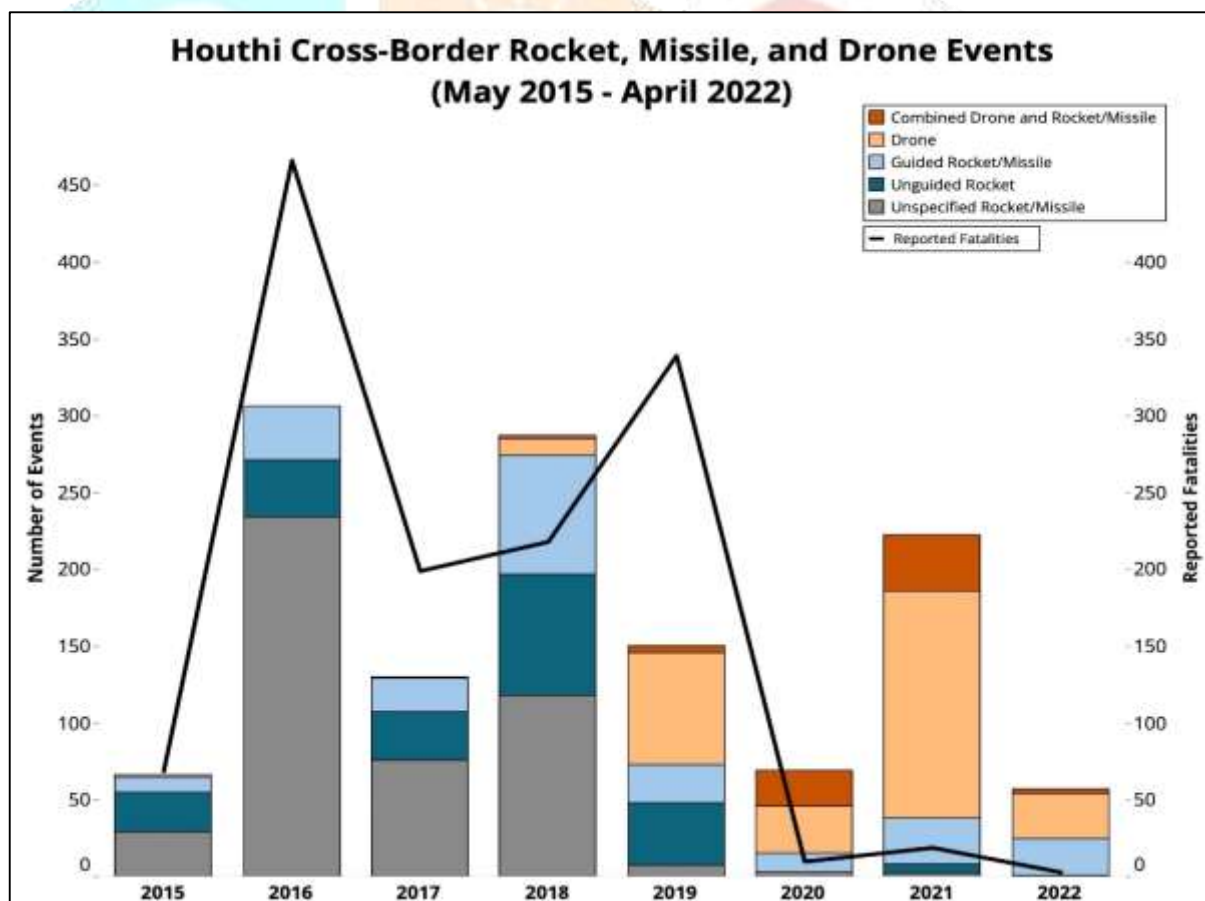


Diagram 3: Increasing Capability of Non State Actors to Wage War Using Drones.⁸

⁸ Maria-Louise Clausen, 'Non-state armed groups in the sky', *DIIS Policy Brief*, April 15, 2024, <https://www.diis.dk/en/research/non-state-armed-groups-in-the-sky>, (accessed on May 15, 2024).

Use of Drones by Hezbollah to Launch Missiles into Israel

5. Hezbollah, the militant group based in Lebanon, has also incorporated drones into its arsenal, using them to enhance its missile capabilities and conduct surveillance operations.

(a) **Surveillance Drones.** Hezbollah employs surveillance drones like the Mirsad series to monitor Israeli military movements and gather intelligence on potential targets. These drones provide real-time data that aids in planning and executing missile strikes. The ability to conduct surveillance without risking personnel has been a significant advantage for Hezbollah.

(b) **Attack Drones.** In addition to surveillance, Hezbollah has used attack drones to launch missiles into Israel. These drones, equipped with guided missiles, have been used to target military installations and infrastructure. The integration of UAVs with missile systems enhances the precision and effectiveness of Hezbollah's attacks posing a significant threat to Israeli security.

(c) **Coordinated Attacks.** Hezbollah has also demonstrated the ability to conduct coordinated attacks using multiple drones. These swarm tactics can overwhelm enemy defences and deliver simultaneous strikes on various targets. The use of drone swarms reflects a strategic evolution in Hezbollah's operational capabilities, allowing for more complex and effective attack scenarios.

How Drones are Complementing Missiles and Making Up for Deficiency in Airplanes

6. The integration of drones into military arsenals has revolutionized warfare, particularly in terms of complementing traditional missile systems and compensating for deficiencies in manned aircraft capabilities.

(a) **Enhanced Precision and Intelligence.** Drones provide unparalleled precision in targeting, enhancing the effectiveness of missile strikes. Equipped with advanced sensors and real-time data transmission capabilities, drones can identify and track targets with high accuracy.⁹ This precision reduces collateral damage and increases the likelihood of mission success, making drones a valuable complement to missile systems.

(b) **Force Multiplication.** Drones act as force multipliers, allowing military forces to conduct operations with fewer resources. The ability to deploy UAVs for reconnaissance, surveillance, and direct attacks reduces the need for manned aircraft, which are more expensive and riskier to operate.¹⁰ This force multiplication effect is particularly valuable for countries with limited air force capabilities.

(c) **Flexibility and Adaptability.** The flexibility and adaptability of drones make them suitable for a wide range of missions, from tactical reconnaissance to strategic strikes. Drones can operate in environments where manned aircraft may be vulnerable, such as heavily defended airspace or difficult terrain. This adaptability ensures that drones can be deployed in various scenarios, providing a versatile tool for modern militaries.

(c) **Cost-Effectiveness.** Compared to manned aircraft, drones are significantly more cost-effective. They require less maintenance, have lower operational costs, and can be produced at a fraction of the cost of traditional fighter jets. This cost-effectiveness allows for the deployment of larger numbers of drones, enhancing the overall operational capacity of military forces.

⁹ Josh Lubersse, *Eyes in the Sky: A Global Perspective on the Role of UAVs in Intelligence, Surveillance, Reconnaissance, and Security*, Fortis Novum Mundum, 2023.

¹⁰ John E Jackson, *One Nation Under Drones, Legality, Morality, and Utility of Unmanned Combat Systems*, Naval Press Institute, November 15, 2018.

Future of Drones

7. The future of drones in warfare is poised to see continued advancements and increased integration into military strategies. Several trends and developments are likely to shape the next generation of UAVs.

- (a) **Advanced AI and Automation.** The integration of advanced artificial intelligence (AI) and automation will significantly enhance the capabilities of drones. AI-powered drones can operate autonomously, making decisions based on real-time data without human intervention. This autonomy will allow for more complex missions and reduce the burden on operators.
- (b) **Swarm Technology.** Swarm technology, where multiple drones operate in a coordinated manner, is expected to become more prevalent. Drone swarms can conduct simultaneous attacks, overwhelm enemy defences, and gather extensive intelligence. This technology will revolutionize battlefield tactics and provide a significant strategic advantage.
- (c) **Enhanced Stealth and Survivability.** Future drones will likely feature enhanced stealth capabilities to evade detection by enemy radar and air defences. Improvements in materials and design will increase the survivability of drones in contested environments, allowing them to operate more effectively in hostile airspace.
- (d) **Integration with Other Systems.** Drones will increasingly be integrated with other military systems, including satellites, ground-based sensors, and manned aircraft. This integration will create a comprehensive network of platforms that share information and coordinate actions, enhancing the overall effectiveness of military operations.
- (e) **Ethical and Legal Frameworks.** As drone technology advances, the development of ethical and legal frameworks will be crucial. Ensuring that the use of drones complies with international law and ethical standards will be essential to address concerns about accountability, civilian casualties, and the potential for misuse.

Lessons for India

8. India, with its complex security environment and diverse range of threats, can draw several lessons from the use of drones in the Gaza conflict and other theatres of war.

- (a) **Investment in Indigenous Drone Technology.** India should invest in developing indigenous drone technology to reduce reliance on foreign suppliers and enhance its strategic autonomy. This includes research and development in AI, automation, and advanced materials to produce state-of-the-art UAVs.
- (b) **Integration into Military Strategy.** The integration of drones into India's military strategy should be a priority. This includes incorporating UAVs into reconnaissance, surveillance, and combat operations to enhance situational awareness and operational effectiveness.
- (c) **Development of Counter-Drone Capabilities.** As drones become more prevalent, developing effective counter-drone capabilities will be crucial. This includes technologies to detect, track, and neutralize hostile drones, ensuring that India's airspace remains secure.
- (d) **Ethical and Legal Considerations.** India should establish robust ethical and legal frameworks for the use of drones. This includes ensuring compliance with international law, protecting civilian populations, and maintaining accountability for drone operations.
- (e) **Collaboration and Partnerships.** India can benefit from collaboration and partnerships with other countries and international organizations in the field of drone technology. Sharing knowledge, conducting joint exercises, and participating in international forums will enhance India's capabilities and ensure it remains at the forefront of UAV advancements.

Conclusion

9. In conclusion, drones have undeniably added a new dimension to warfare, offering strategic and tactical advantages that are transforming military operations. The conflict in Gaza serves as a stark reminder of the ethical and operational challenges that accompany this technological revolution. Balancing the benefits of drone warfare with the imperative to protect civilian lives and uphold international norms is the key to harnessing this powerful tool responsibly and effectively. For India, the lessons learned from global drone usage underscore the importance of investing in technology, integrating drones into military strategy, and developing comprehensive counter-drone measures to secure its future in modern warfare.

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