

MILITARY DRONES: HOW UNMANNED AERIAL VEHICLES ARE TRANSFORMING MODERN MILITARY OPERATIONS

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Military drones, commonly referred to as Unmanned Aerial Vehicles (UAVs), have emerged as one of the defining features of contemporary warfare. UAVs' integration into military doctrines has significantly strengthened intelligence gathering, surveillance and border monitoring. With technological advancements, the drones have evolved from platforms used for reconnaissance to highly sophisticated systems capable of identifying targets, carrying out precision strikes, and supporting joint military operations. Integration of Artificial Intelligence (AI) and machine learning algorithms in drone technology has further enhanced its capabilities by allowing it to efficiently interpret sensor data, identify targets, and navigate complex military tasks with minimal human input.

UAVs are defined as a “powered aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload.”¹ On the basis of

¹ “Unmanned Aerial Vehicles: Background and Issues for Congress,” Defense Technical Information Center, April 25, 2003, <https://apps.dtic.mil/sti/citations/ADA467807>.

the operational capabilities, the UAVs are further classified into different types, although the individual system may fulfil more than one task.



Intelligence, Surveillance and Reconnaissance (ISR) Drones: These specialized platforms are equipped with advanced sensors, imaging technology, radar, and communication systems. They collect and transmit real-time data, track targets, and provide situational awareness and intelligence.

Loitering Munitions: Usually referred to as the ‘kamikaze drone’ or ‘suicide drone’ is a hybrid weapon system that combines the surveillance capabilities of the UAV and precision strike ability of the guided missiles. It loiters over the target area or region, identifies the target, and detonates its built-in warhead.²

Drone Swarms and Autonomous Systems: They mark a paradigm shift from the individually piloted platforms to the collectively operating systems. These systems utilize AI, sensor edge, and decentralized mesh systems to continuously collect and share real-time data and adapt to the changing environment and circumstances.³ They are used to overwhelm the adversary’s defense system.

² Evan Beebe, “Loitering Munitions 101: What They Are and Why They Matter,” *IDGA*, August 22, 2025, <https://www.idga.org/command-and-control/articles/loitering-munitions-101-what-they-are-why-they-matter>.

³ Pramod Rajeha, “Drone Swarms Are Coming: The Future of Autonomous Operations - Autonomy Global,” *Autonomy Global*, July 2, 2025, <https://www.autonomyglobal.co/drone-swarms-are-coming-the-future-of-autonomous-operations/>

Armed combat drones, or Unmanned Combat Aerial Vehicles (UCAVs): Equipped with sensors and aircraft ordnance (Like missiles or guided bombs), these platforms perform surveillance and targeted strikes. UCAVs are operated both remotely by ground crews and via semi-autonomous AI algorithms.⁴

Proliferation of Drone Technology

The use of drones in military operations is not a new phenomenon. However, an increase in their use, frequency, and operational significance has been observed, particularly since Russia-Ukraine war. Although the conflict was initially characterized by the extensive employment of the conventional capabilities such as heavy artillery and armour, the use of the unmanned aerial systems progressively assumed a central role in the battlefield operations. Confronted with relative disadvantage in conventional air power and heavy weaponry, Ukraine increasingly relied on the cost effective, First Person View (FPV), kamikaze drones for reconnaissance operations, target acquisition and precision strikes. Subsequently, Russia scaled up its employment of drones, resulting in the large scale integration of UAVs on both sides.

Similar trend was observed during the Pakistan-India conflict in May 2025, which demonstrated the first large-scale use of drones in direct military confrontation between the two nuclear armed countries. India deployed the IAI Harpy and Harop developed by the Israel Aerospace Industries, whereas Pakistan used the domestically produced Shahpar-II UAV and Turkish-origin YIHA-III. In the aftermath of the conflict, spending on the procurement of drones increased significantly. According to Reuters, India is expected to order more than US\$ 2 billion worth of military drones from domestic firms, with the tactical drone procurement possibly exceeding Indian ₹200 billion.

The ongoing US-Israel war on Iran has highlighted another aspect of the utility of drones in warfare. Following the launch of the US-Israel joint strikes against Iran on 28 February 2026, Iran responded with sustained missile strikes and drone attacks against Israel and targets across the Gulf. Iran used large volume of One-way attack drones (OWADs) for conducting

⁴ Alec Smith, "Unmanned Combat Aerial Vehicles (Ucavs): The Future of Aerial Warfare?," Grey Dynamics, August 27, 2024, <https://greydynamics.com/unmanned-combat-aerial-vehicles-ucavs-the-future-of-aerial-warfare/>.

the long range retaliatory strikes and placing sustained pressure on air defence networks. This highlighted how UAVs can extend the geographical scope of retaliation thus allowing strikes against dispersed military, infrastructure and energy targets across the region.

According to market estimates, a significant surge in the global Drone-as-a-Service market is expected, rising from US\$8-10 billion in 2025 to approximately US\$35 billion by 2030, and further exceeding US\$80 billion by 2035, driven possibly by increased government and defense spending.⁵ Iran has emerged as one of the crucial producers of drones. Its indigenous one-way attack drones (Kamikaze) such as Shaheed-131 and Shaheed-136 have gained prominence. The Shaheed-136 drones have been rebranded by Russia as Geran-2 and have been used in its campaign against Ukraine's air defenses.⁶

Turkey has also made significant advancements in this aspect, led by its leading drone manufacturers such as Baykar. As per the estimate, Turkey exported approximately US\$255M of drones, thus making it the 6th largest exporter of drones (most of the drones were exported to Romania, Poland, and Ukraine).⁷ Turkey's Bayraktar TB2, medium-altitude long-endurance (MALE) unmanned combat aerial vehicle (UAV), has gained prominence. Similarly, China dominates the global commercial drones market, but it has also established itself as a significant exporter of the combat drones. According to Al Jazeera, drawing on the data of the Stockholm International Peace Research Institute (SIPRI), China has exported approximately 282 combat drones to 17 countries, including Algeria, Morocco, Egypt and Pakistan, over the past decade.⁸

Why Drones?

As countries increase their spending on the procurement of military drones, it remains significant to analyze the role these military platforms play in modern warfare. Drones have

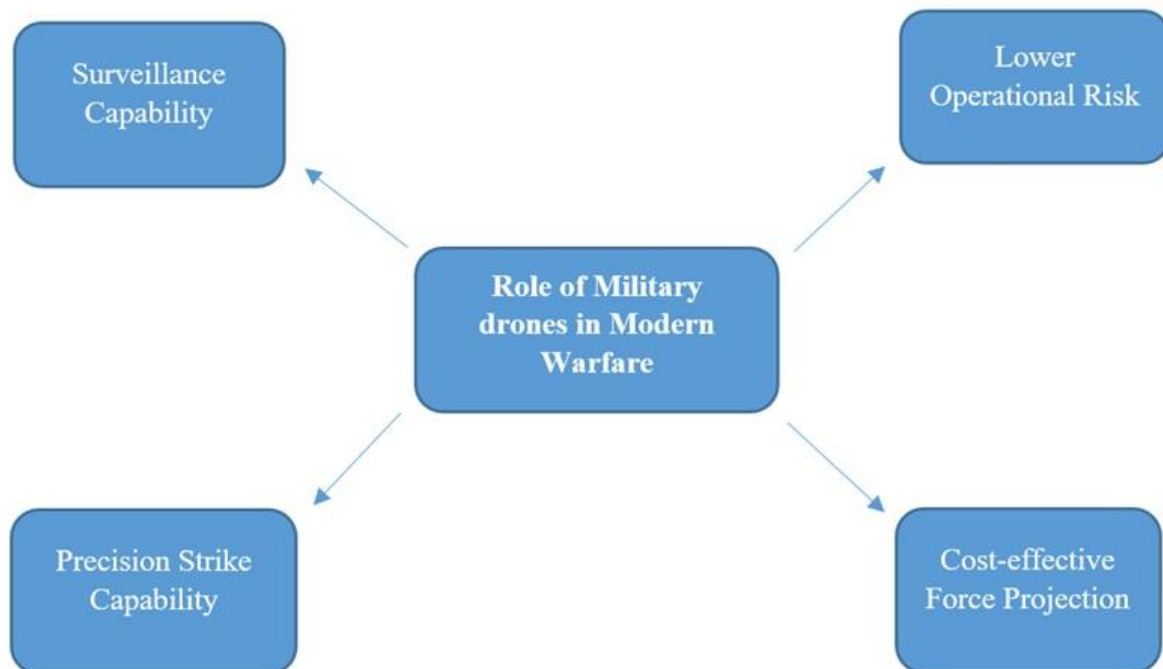
⁵ "Billions Pour into Defense Drone Technology as Drones-as-a-Service Gains Momentum," Trading View, 2026, <https://www.tradingview.com/news/prnewswire:e4855bf458bcf:0-billions-pour-into-defense-drone-technology-as-drones-as-a-service-gains-momentum/>

⁶ Bea Castañeda, "The Shahed Drone: How Iran's Cheap Weapon is Reshaping Modern Warfare," *The Defense Post*, July 4, 2026, <https://thedefensepost.com/2026/07/04/shahed-drone-guide/>.

⁷ "Drones in Turkey," OEC, accessed July 9, 2026, <https://oec.world/en/profile/bilateral-product/drones/reporter/tur>.

⁸ Zaheena Rasheed, "How China Became the World's Leading Exporter of Combat Drones," Al Jazeera, January 24, 2023, <https://www.aljazeera.com/news/2023/1/24/how-china-became-the-worlds-leading-exporter-of-combat-drones>.

emerged as an attractive strategic option for countries because they are cost-effective, provide intelligence and increased surveillance, precision strike capability with relatively lower operational risks.



Firstly, the drones entail strong surveillance capabilities. Usually equipped with electro-optical, infrared sensors, radar, and communication systems, drones can help monitor the hostile region for an extended period of time and provide the operators with real-time information. The introduction of AI in drone technology effectively increased their strategic and operational value.

Secondly, drones help improve the precision strike capabilities. Armed combat drones combine the surveillance and attack function, meaning they help locate, track, and engage the target through the same platform, which helps reduce the time between target recognition and engagement. Precision-guided weapons carried by the drones help target high-value targets, vehicles, and logistics with greater accuracy, thus inflicting great damage.

Thirdly, the use of military drones reduces the operational risk. Drones are mostly piloted by their operators who are stationed on the ground at a distance from the conflict zones. This helps the military personnel to access intel of the hostile region without direct exposure to

the life-threatening circumstances of the battlefield. This provides the countries with a strategic edge.

Lastly, the cost-effective nature of the drones makes it an attractive option for the countries. Compared to aircraft, missiles, tanks, and helicopters, drones are cheaper to produce, deploy, and operate. For instance, during the Israeli and the U.S. attack on Iran, Tehran fired a large number of missiles and drones to overwhelm Israel's and Washington-allied countries' defense. In this scenario, the approach relied heavily on volume rather than precision. According to the estimate presented by *Reuters*, one Shaheed drone cost approximately between US\$20,000 and US\$50,000, whereas the cost of one Patriotic interceptor is nearly US\$4 million.⁹

Conclusion

Combat drones, due to its cost effective nature and operational flexibility, have become an attractive option for the countries seeking to enhance their military capabilities. As discussed above, the India-Pakistan conflict of May 2025 has reaffirmed the relevance of the combat drones for the strategic environment of South Asia. Pakistan has both developed the indigenous drone system and acquired advanced combat drones from its partners such as China and Turkey. While Pakistan has made notable progress in this domain, the rapidly evolving strategic environment, requires sustained investment in research, development and technological innovation. Greater emphasis should be placed on strengthening the indigenous drone capabilities. Increased cooperation between the defense industry and private technology firms can help further accelerate the development of the locally produced unmanned aerial system in line with country's evolving security requirements.

More importantly, the proliferation of the unmanned aerial system and their deployment in the military operations has challenged the traditional air defence approaches and has increased the need for the dedicated, cost effective counter-drone capabilities. Employment of the high-end air defence systems such as expensive surface-to-air missile interceptors against relatively low cost UAVs can produce the unfavorable cost-exchange ratio. Thus there is a need to complement the country's existing air defence architecture with dedicated

⁹ "Cheap Drones Are Reshaping the War in the Sky," *Reuters*, March 17, 2026, <https://www.reuters.com/graphics/IRAN-CRISIS/DRONES/dwpkyamxqpm/>.

Counter Unmanned Aerial System (CUAS) to tackle the varying range of drone threats. Pakistan has made progress in this regard, it has developed indigenous Spider counter drone system and SAFRAH drone-damaging guns.¹⁰ Both these platforms, relies on electronic soft kill methods such as jamming and spoofing to damage their targets however, their effectiveness may prove limited against the targets operating outside their range. With rapid technological advancements, defense capabilities and operational concepts associated with them are becoming increasingly sophisticated. It is therefore pivotal for Pakistan to closely monitor these developments and adopt relevant policies, capabilities to remain responsive to the evolving strategic environment.

¹⁰ "How Pakistan's Indigenous Spider Counter Drone System Is a Game Changer against Indian UAV Threats?," Times of Islamabad, April 15, 2026, <https://timesofislamabad.com/15-04-2026/how-pakistans-indigenous-spider-counter-drone-system-is-a-game-changer-against-indian-uav-threats/>.