

The Future of Warfare: Autonomous Technologies in Modern Conflict

by Brandon Schingh, 01.28.2025



The emergence of unmanned, autonomous technologies has fundamentally transformed modern warfare, pushing the boundaries of conventional and irregular military tactics. The integration of these technologies with artificial intelligence (AI) has amplified their impact, enhancing precision, adaptability, and strategic insight.

This fusion not only redefines conflict but **reshapes military doctrines**, demanding new approaches to rules of engagement, surveillance, and precision-targeted strikes. As we grapple with these advancements, their implications echo across the global military landscape, creating opportunities and challenges in equal measure.

Evolution of Unmanned Systems

Over the last two decades, unmanned aerial vehicles (UAVs), autonomous land vehicles, and unmanned maritime systems have transitioned from experimental concepts to essential tools of warfare. Their affordability, accessibility, and sophistication have driven widespread adoption by both state and non-state actors. This evolution reflects a paradigm shift where technological innovation and battlefield ingenuity intersect, redefining combat operations.

For example, improvised explosive devices (IEDs) once dominated unconventional tactics in Iraq and Afghanistan. Now, inexpensive commercial drones have taken center stage, exemplified by their extensive use in the ongoing Russia-Ukraine conflict. Ukrainian forces have repurposed these devices for **reconnaissance, precision strikes, and direct engagement**. In July 2024, a Ukrainian operator successfully used a **commercial drone to destroy a Russian Mi-8** helicopter, highlighting the rapid evolution of these tools in asymmetric warfare.

Advanced Threats: Integrated Autonomous Systems

The proliferation of drones has led to even more alarming possibilities: integrated autonomous systems. These systems combine drones, robotics, and AI to execute complex, coordinated operations. Robotic kits, such as those from **ELECFREAKS**, can be weaponized with relative ease, while British companies have

provided Ukraine with **robot dogs** capable of reconnaissance and booby-trap detection. Russian and Chinese forces, along with the U.S. Marine Corps, have experimented with arming these robots with sniper rifles and rocket launchers.

China's advancements in AI-driven reconnaissance drones further underline the growing sophistication of these systems. **Bird-shaped drones**, reported in 2024, demonstrate their ability to bypass traditional security measures. These tools could support intelligence gathering or **clandestine operations in irregular warfare**, such as a hypothetical conflict involving Taiwan. While mounting weapons on such devices raises ethical concerns, their potential utility in asymmetric conflicts is undeniable.

Near-Peer Competition

China's rapid progress in autonomous technologies highlights a critical aspect of modern warfare – near-peer competition – something China is aggressively moving forward with its comprehensive **UAV modernization program**. China's Academy of Sciences has achieved breakthroughs in autonomous **vehicle perception and navigation**, enhancing both military and civilian applications. These advancements align with China's strategic aim to lead the global race for technological dominance.

This competition is reshaping warfare, with implications far beyond the battlefield. Autonomous vehicles—

airborne, ground-based, and maritime—offer unprecedented speed, precision, and reduced reliance on human operators. Such capabilities challenge traditional defense strategies and necessitate a reevaluation of military doctrines.

Escalating Threats: Drone Swarms

Drone swarms represent one of the most significant challenges in modern warfare. These AI-guided systems can overwhelm defenses, execute coordinated strikes, and disrupt vital infrastructure. Their **potential to operate autonomously** with minimal oversight magnifies their impact. In 2024, the U.S. Army tested **countermeasures against swarms** of up to 40 drones, illustrating the urgency of developing effective defenses.

China's advancements extend this threat. Reports in 2022 revealed a Chinese military contractor deploying a **robot dog armed with a machine gun** via drone. Such innovations foreshadow a future where drones deliver autonomous vehicles across domains—air-to-sea, ground-to-air, or sea-to-land—blurring the lines between science fiction and battlefield reality.

Ethical and Tactical Considerations

The rise of unmanned and autonomous systems presents complex ethical and tactical challenges. While these technologies reduce human risk and enhance operational efficiency, their accessibility **enables non-state actors** to exploit them for devastating effects. The

weaponization of commercial off-the-shelf technology exemplifies how easily accessible tools can be repurposed for military use.

Moreover, integrating AI into these systems raises concerns about accountability and decision-making. Autonomous networks capable of executing missions with minimal human intervention challenge traditional notions of command and control. These developments demand rigorous oversight, international regulation, and ethical guidelines to prevent misuse and escalation.

Conclusion

Unmanned, autonomous technologies are reshaping modern warfare, offering both unparalleled advantages and significant risks. The innovations seen in the Russo-Ukrainian conflict and China's AI-driven advancements illustrate the transformative potential of these systems. However, they also underscore the urgent need for countermeasures, ethical standards, and strategic foresight.

As these tools evolve, they will continue to blur the boundaries between conventional and unconventional warfare, compelling militaries worldwide to adapt rapidly. Failing to address these challenges could usher in a new era of conflict, where the line between human and machine becomes increasingly indistinct. By fostering international collaboration and innovation, we can navigate this perilous landscape and ensure a balance between technological progress and global security.