

# Drone warfare: an evolution in military affairs

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Over the past three decades, remotely piloted aircraft (RPAs) – also known as drones – have acquired increasing importance in modern warfare. Originally designed to perform surveillance missions during the Cold War, drones gained prominence during the post-Cold War era through their ability to gather real-time intelligence over conflict-prone areas, particularly in support of humanitarian interventions. Following the onset of the global war on terror, drones acquired a further, arguably more significant function: armed with precision-guided munitions, they enabled Western armed forces to identify, track, and accurately strike targets from afar, reducing the need for troops on the ground.<sup>1</sup> Simultaneously, drones' allegedly low costs, limited technological sophistication, and ease of employment also enabled their rapid proliferation to dozens of countries around the world.<sup>2</sup> According to some, the major implications are yet to come: drones' unique capabilities promise in fact to revolutionize warfare. Consequently, militaries could eschew complex and expensive force structures to wage war: they would just need drones. As countries face stronger incentives and fewer constraints for using force, the growing availability of drones coupled with their capabilities deserve attention because this trend risks ushering in a new era of global instability and conflict.<sup>3</sup>

## A drone revolution in military affairs?

From the Balkans to Afghanistan, Iraq to Yemen, Pakistan to Ukraine, remotely piloted aircraft have been widely and increasingly employed for combat and non-combat missions. The growing importance of drones is thus unquestionable; that drones have revolutionized warfare, however, remains open to debate.<sup>4</sup> Skepticism is warranted. Warfare is an adversarial contest between adaptive contenders looking to exploit one another's weaknesses, and over the past century, warfare has undergone a series of smaller, adaptive evolutions rather than a set of major revolutions.<sup>5</sup> Revolutions are more the exception than the rule, and thus a drone revolution would be a rare phenomenon. In response, this *Policy Brief* advances a simple analytical framework with two objectives: first, to set clear thresholds that determine what counts as an evolution rather than a revolution, and second, to assess their respective empirical standing. Evidence from the use of drones in recent wars in Libya, Syria and Nagorno-Karabakh suggest that a military revolution has not occurred. While current-generation drones offer new advantages, they remain vulnerable to air defenses and electronic warfare. Additionally, drones proved effective in these

## Keywords

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3 C. Coker, *Warrior geeks: how 21<sup>st</sup> century technology is changing the way we fight and think about war*, Hurst, London, 2013.

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conflicts only when employed by skilled, well-equipped armed forces fighting against significantly weaker adversaries. When enemies deployed advanced air-defense systems, drones' effectiveness shrank. Similarly, drones neither reversed battlefield imbalances nor gave their users a war-winning capability alone, i.e. without troops on the grounds. Based on lessons from these conflicts, radical transformations of existing Western force structures seem unwarranted.

## The hider-finder competition

Air warfare is a competition. It pits attacking aircraft attempting to penetrate an airspace against defenders utilizing air defense systems (primarily ground-based anti-air batteries) to try to deny access. Air warfare first emerged during World War I, but major changes to the nature of air power occurred from the 1960s onwards, when improvements in detection, communi-

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cations, precision and firepower led to an era of "new lethality" that endures to this day. In this era, all platforms are vulnerable to enemy fire, meaning both aircraft and air defense systems must simultaneously hide from enemy sensors (to avoid

being destroyed) while also looking for enemy targets (to destroy). However, there is a tension between hiding and searching: too much hiding and one risks missing the target, too much searching and one is exposed to enemy lethality.<sup>6</sup> As in land combat, both air penetration and air defense missions are extremely difficult as they require proficiency and coordination between multiple types of platforms and capabilities.<sup>7</sup> Given the accuracy and lethality of modern sensors and munitions, even small mistakes expose platforms to enemy firepower, with negative implications for a mission or an entire campaign. For this reason, the hider-finder competition can only be won by mastering a series of tactics, techniques, procedures and technologies which minimize one's own weaknesses while exploiting the enemy's vulnerabilities.<sup>8</sup>

Some suggest that drones are revolutionizing warfare. If this is the case, these systems should be able to cancel out this decade-long hider-finder competition in air warfare. If they do not, then no revolution is occurring. In practical terms, a revolution in air warfare means that drones should easily penetrate enemy air defenses; should enjoy battlefield effectiveness without extensive support from other platforms, technologies, capabilities and skilled operators;<sup>9</sup> and finally, if drones are truly bringing about a transformation of warfare, we should find that close combat is becoming increasingly obsolete, i.e. that actors can achieve their military objectives without fighting on the ground.<sup>10</sup>

The Western Libya military campaign of the second Libyan Civil War (2019-2020), the Syrian civil war (2011-2021), and the Armenian-Azerbaijani conflict over Nagorno-Karabakh (2020) are perfect testbeds to assess these claims. To date, these conflicts have observed the largest and most intensive employment of drones in history. If there is no evidence of a revolution in these cases, skepticism is justified.

To that end, the empirical record hardly suggests that a drone revolution in military affairs is taking place: in these conflicts. Drones proved vulnerable to enemy air defenses. Their battlefield contributions in these campaigns depended on support from traditional force structures. Overall, far from being remotely-waged wars, these conflicts observed extensive ground combat.

## The campaign for Western Libya

In 2019, the Libyan civil war reignited when the Government of National Accord (GNA) and the Libyan National Army (LNA) clashed over control of Western Libya and the capital city of Tripoli. Between April 2019 and November 2019, the conflict observed over 1,040 recorded drone strikes, prompting the UN Special Representative to Libya to talk of "the largest drone war in the world".<sup>11</sup> Despite the intensive employment of RPAs, the empirical record does not corroborate the account of a drone revolution in military affairs: drones did not yield an offensive advantage, they did not level the playing field, and they did not eliminate the need for close combat.

First, in the campaign for Western Libya, drones proved unable to penetrate enemy air defense systems.

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