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## Utilisation of Drones in the Russia-Ukraine War: Shift from Manned Aircraft to Drones

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## **Introduction: War in the Drone Age**

When Russia invaded Ukraine in February 2022, the world anticipated that tanks, fighter planes, and guns would come to characterise the battlefield. Instead, 'Drone', a new actor, moved into the limelight. Within months, the skies of Eastern Europe became a battlefield not for bold pilots, but for quiet, unmanned devices that could observe, attack, and go where manned aircraft could not.

From Ukraine's Bayraktar TB2s obliterating Russian air defences and even sinking the Moskva warship, to Russia launching waves of Shahed-136 "kamikaze" drones to cripple Ukrainian infrastructure, the Unmanned Aerial Vehicles (UAVs) have become much more than support tools; they are now game-changing weapons. They attack deep within enemy lines without putting their pilots at risk, target artillery with precision, and reveal enemy movements in real-time.

This war has demonstrated a profound change; air superiority no longer requires expensive fighter planes or gallant pilots. Rather, cheap, small, and stubborn drones are rewriting the very definition of air power. What was science fiction not so long ago is now a matter-of-fact aspect of war, and the Russia-Ukraine conflict is the most unambiguous indication yet that the era of the drone has officially started.

## **Ukraine's Bayraktar TB2 and Russia's Shahed-136 and Lancet Drones: A Game-Changer**

One of the most recognised drones of the conflict is the Bayraktar TB2, manufactured in Türkiye and used by Ukraine.<sup>1</sup> The Medium Altitude Long Endurance (MALE) drone can fly for up to 27 hours, has a ceiling of approximately 25,000 feet, and can carry laser-guided missile weapons. At the outset of the war, the TB2s were instrumental in the destruction of Russian air defence systems and Russian convoys.<sup>2</sup> They even sank the Russian Black Sea Fleet flagship, the Moskva.<sup>3</sup> The TB2 also provided real-time targeting data for artillery strikes. As the conflict continued and as Russia improved its air defences, the TB2 shifted from conducting attacks to fulfilling the role of Intelligence, Surveillance, and Reconnaissance (ISR).<sup>4</sup>

Russia has employed Iranian-manufactured Shahed-136 drones, which they refer to as Geran-2, a type of "kamikaze drone" designed to fly into a target and explode.<sup>5</sup> The Shahed-136 is relatively cheap and can be launched in swarms. Russia is using them for strikes on everything from power stations to military facilities to cities. Often, Russian forces send them at night to overwhelm air defences. In this way, the Shahed-136 has taken the place of long-range bomber missions by aircraft, which would be much more expensive to use and riskier to send on distant missions.

The Lancet drone by Russians is a precision-guided loitering munition which is utilised to destroy tanks, artillery pieces, and radar stations. Lancet was used in the wake of a Shahed attack to hit targets that survived the first wave. The Lancet has undertaken missions that would have been carried out by Su-25 ground-attack aircraft or an attack helicopter. Although these assets are now often forced to operate from greater distances because of the threat of portable air-defence systems.<sup>6</sup>

### **Commercial UAVs on the Frontline**

Both Russia and Ukraine heavily utilise First-Person View (FPV) drones, which are often adapted from commercial drones.<sup>7</sup> These are small, fast, and manually piloted using a live camera feed, allowing operators to guide them with extreme precision. FPV drones are perfect for trench warfare and urban fighting. They are inexpensive, hard to shoot down, and ideal for missions.

Commercial drones, such as the DJI Mavic series and Matrice series, have also become a standard tool on the battlefield.<sup>8</sup> On the front line, drones are used for artillery spotting, reconnaissance and even light bombing by attaching small explosives. In some cases, these drones have replaced scout helicopters and observation planes. They are inexpensive, readily available, and simple for soldiers to use and operate. A front-line unit can unpack, launch, and fly a drone in just minutes, providing them with instantaneous situational awareness.

### **Shift from Manned Aircraft to Drones**

Why this shift from manned aircraft to drones? Safety is the most obvious factor. If one is shot down, the loss is a machine, not a human life.<sup>9</sup> Price is yet another significant factor. Although a new fighter plane will cost an enormous amount of money, a drone can be constructed and piloted for a fraction of that price.<sup>10</sup> Another benefit is endurance; most drones can remain aloft much longer than manned planes, as pilots get tired and run out of fuel are the only limitations for them.<sup>11</sup> The mere ability of drones to provide real-time video and images means that they can deliver precision strikes or guide artillery fire to the precise location.<sup>12</sup> And since they have no human aboard, they can be launched into deep-defended territory where a manned aircraft would stand little chance of survival.

### **Vulnerabilities of using Drones**

However, drones have certain disadvantages. Even after using fewer munitions, their speed is invariably slower.<sup>13</sup> Many of them are also susceptible to adverse weather conditions.<sup>14</sup> Electronic warfare also poses a significant threat. Signals can be jammed or hacked, or they can crash.<sup>15</sup> There will be obstacles in coordinating airspace for simultaneous use by drones and manned aircraft, as avoiding collisions beyond visual line-of-sight will rely on sensing and control systems with advanced capabilities. And finally, there are ethical questions. Drones can often be deployed with ease and

inexpensive redundancy, which leads to questions of whether this would cause the military and others to lower the threshold to use lethal force.<sup>16</sup> Civilian casualties created by the use of drone strikes are still a hotly contested public debate, as is the potential for autonomous targeting against humans without human intervention. The availability of drones in the open market creates a risk to national security if technologically advanced UAVs are obtained by non-state actors and used in coordinated attacks.<sup>17</sup>

### **Key Lessons for India from the Drone Era**

India must respond to the drone era with strategic and intelligent adaptation rather than mindlessly copying others. Accelerated investment in domestic counter-drone technologies is the first step. For example, the D4 system, developed by the Defence Research and Development Organisation (DRDO) and Bharat Electronics Limited (BEL), neutralises small UAVs by combining hard-kill options, such as lasers or kinetic interceptors, with soft-kill techniques, like jamming.<sup>18</sup> In addition to government initiatives, private companies are also developing innovative projects. For example, Bhargavastra, a micro-missile solution for swarm drones, demonstrates that India can lead the world in specialised counter-UAS technology.<sup>19</sup>

Second, India must implement a layered air defence system, combining drones, electronic warfare, radars, and missile systems at various ranges.<sup>20</sup> Experience from the Ukrainian employment of drones for artillery ranging and precision targeting emphasises the need for training in networked, joint operations where drones are not only used for reconnaissance but also for fire control, intelligence gathering, and logistics support.<sup>21</sup>

Third, the Russian-Ukrainian conflict revealed fundamental supply-chain risks. To prevent similar threats, India needs to minimise import dependence by creating local ecosystems for vital components, such as sensors, chips, payloads, and Artificial Intelligence (AI) software.<sup>22</sup>

Lastly, India should ready itself against the emerging threat of low-cost commercial drones being used atrociously by non-state actors, especially in the border regions, and safeguard civilian infrastructure as well.<sup>23</sup>

Essentially, the most critical takeaway for India is to shift from a reactive to an anticipatory posture: build indigenous counter-UAS capabilities, integrate them into multi-layered defences, reinforce domestic supply chains, and actively confront asymmetric drone threats across all domains.

### **Way Forward: The New Face of Air Power**

Although there are challenges, the war in Ukraine has shown that drones are not merely backup systems anymore; they are now part of military strategy and capable of taking over missions formerly

attended by belligerents with helicopters and fixed-wing aircraft. In Ukraine, drones have been used to identify targets for artillery fire, adjust artillery rounds to targets, engage direct strikes against targets, and induce psychological effects on enemy forces by always ensuring they know they are being monitored.<sup>24</sup> For Russia, drones allow long-range attacks deep into Ukrainian territory without risking pilots or expensive aircraft. This represents a profound shift in how drones are applied in modern warfare.

In the future, the experiences of this war are likely to influence military planning globally. Military forces will allocate more resources to drone manufacturing, pilot training, and anti-drone systems.<sup>25</sup> The ratio between human-crewed and unmanned systems will continue to evolve, with unmanned planes increasingly handling perilous and routine assignments.<sup>26</sup> Though manned aircraft will not become extinct, they do retain an edge in speed, payload, and specific mission types. Their domain will diminish in wars where the airspace is contested, and the threats are real. The ethics, strategy, and technology surrounding this transformation will haunt us for decades to come, but one thing is sure: the age of the drone has arrived.

## Notes:

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