WEEKEND ESSAY

Drones over Ukraine are reinventing war

Putin's invasion is being watched by other nations as a road test for modern conflict. While Moscow clings to long-range bombardment, the swift and smart innovation of Kyiv's weaponry is setting the blueprint, writes Roger Boyes

Roger Boyes | Friday November 25 2022, 5.00pm, The Times

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From HG Wells's War of the Worlds to the *Terminator* film franchise, the future of war has been fertile territory for the sci-fi genre. The technology imagined by writers and popularised by Hollywood has become an inspiration for forward-looking military boffins: a world of laser rays, robots and artificial intelligence. But for science fact rather than science fiction it is enough to study the nine months of combat between Russia and Ukraine. Vladimir Putin's invasion is revolutionising war fighting, pitting drone against drone, weaponising consumer tech, and creating start-up companies that adapt arms and kit for the changing battlefield.

Everyone is watching this very public, very bloody road test underway in eastern Europe. There's China, which hasn't fought a pitched battle since its war against Vietnam in 1979; and there's Taiwan, which is rethinking quickly how to resist the forthcoming Chinese assault on the island. On a recent visit to Taiwan a military engineering lecturer proudly showed me an automatic rifle that had been constructed by 3D printing: part of the future, he said, if China blocks arms shipments from abroad.

There's Iran, which is becoming a major drone producer to feed Russia's dwindling fleet of unmanned aircraft. Tehran's military is now adjusting its approach to fighting Israel and wondering how its proxies could close in on Saudi oil installations. Israel, which has pioneered drone research, has just developed a micro-drone weighing barely 1.5 kilos which enters buildings in urban areas, passes back tactical information to the operator and then releases a lethal charge equivalent to a grenade blast. It has only seven minutes flying time but can return to a mother ship to recharge.

There's Turkey too, which used its Bayraktar drones to help Azerbaijan to victory over Armenia in 2020 and which is now supplying Ukraine. In return, the Motor Sich turbine manufacturer in Zaporizhzhya makes drone engines for Turkey. Russia attacked the factory last week using Iranian drones. The success of the Bayraktars against Russian supply routes in Ukraine meanwhile has sparked interest from buyers in African hotspots including Ethiopia.

Thanks to the conflict in Ukraine it suddenly seems that you can fight a war at relatively low cost, notch up spectacular victories against more powerful opponents and make heroes of your unscathed soldiers. It's smart war and it has been a while coming. In 2001 the US had only a handful of drones. After 9/11 the Pentagon went to arms companies and pushed them to step up production. They proved to be the weapon of choice in the war against terrorism. Now 40 countries have drone forces. The appeal is clear: relatively cheap, simple to construct and use, soldiers pre-trained after an adolescence spent playing video games. Steered from a distance, they shielded the lives of the trigger men and women, while wiping out enemy positions. Providing they were properly guided.

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Soldiers knew, but politicians did not, how quickly an army engaged in intensive kinetic warfare can run through its ammunition and stocks of fighting vehicles. Now, having observed the progress of the Russian-Ukrainian war, they're looking at new cost-effective ways of winning back ground. The Ukrainians want western tanks for the next stage of the war. Wait! say politicians, don't drones demonstrate that tanks have had their day? Didn't Russian tanks get stuck in Ukrainian mud? Shouldn't we hang on to the tanks we have, turn them into super-sophisticated sensors and gradually phase out the rest?

Every request from Kyiv thus tends to prompt deeper questions from supporting governments, not just about the merits of the drone versus the tank but about the way we intend to fight future wars. Major General Bob Scales, in his provocative book *Scales of War*, pooh-poohed war futurology but identified various schools of prediction. One, he said, played out "excuses for going to war with one of the usual suspects with serious military capabilities — China, Iran, North Korea, with Russia as the nostalgic favourite".

Turkey is supplying its Bayraktar drones to Ukraine
BIROL BEBEK/AFP/GETTY IMAGES

Second, there is an emerging techno school of futurologists who sound the alert about new lethal and game-changing devices. A third group advocate creating a vast military toolbox from which governments can select a combination of instruments to tackle unexpected threats. The Australian general Mick Ryan, author of *War Transformed*, probably belongs to that group. "We have to understand how everyone else expects to fight," he says and adds, addressing Australia in particular: "Every significant military force in the Indo-Pacific is modernising its armoured vehicle fleet. They are doing this because they see a capable, lethal and armoured land force as central to future conflict."

You can see Ryan's point. Russia has this year been using hybrid, cyber, massed force, the threat of nuclear weapons, the crippling of energy grids, naval power in the Black Sea, mercenaries and selective atrocities to push the Kyiv government into submission. That demands an extraordinary range of responses and it's difficult to see how under-resourced Kyiv could have found the funding to fight Russia off without the supply of western armaments, training and intelligence.

A senior and well-informed US politician recently suggested to The Times that Ukraine received some skilled western assistance in the sinking of the Russian warship Moskva in April. Ukrainians say it was holed by two Ukrainian-made Neptune anti-ship missiles fired from onshore near Odesa. Both versions could be true. There are similar differing but nuanced versions about the Ukrainian attack on the Kerch bridge from Kyiv and the US. America, it seems, doesn't want to stumble into open conflict with Moscow; by the same token Kyiv, though welcoming new weaponry and almost real-time intelligence transfers from the US, does not want to come across as Joe Biden's puppet.

Most requests for kit from the US have received an initial rejection, but Volodymyr Zelensky seems to be on a pedagogic mission. Every Russian strike is presented to the Biden administration as having been preventable if only western weaponry had arrived on time. Result: hand-held Stinger missiles originally denied an export licence by the US have found their way to Ukraine, as have 155mm guns, high-mobility artillery rocket systems (Himars) and Harm missiles, which, launched from military aircraft, home in on electronic transmissions from surface-to-air radar systems. They should be mounted on F-16 jets but the Ukrainians have found a way of attaching them to their air force's MiGs. That and other pieces of improvisation have impressed the Americans, making Kyiv feel like an ally rather than a passive beneficiary of aid.

From HG Wells to Terminator, war has long been sci-fi fodder
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The GPS-guided Himars have been hitting ammunition depots and Russia's already ragged supply chains. They are a serious deterrent against the Russians and they underline not so much the future of war as a sign of how unexpected weapons systems can tip the balance.

Taiwan defence specialists anticipate that a Chinese invasion would be preceded first by a cyber-attack on energy utilities and government buildings followed by an artillery barrage to secure landing beaches and blockade the island's beaches.

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The war of the near future, in other words, will draw on traditional methods, backed up by new tech. The history of artillery, after all, has shifted from giant catapults (which under the ancient Greeks were mathematically graded according to throw weight) on to gunpowder, the gunners and forward observers of the First World War, the guided missiles of the Cold War.

Today Ukrainian soldiers are using surveillance drones to transmit information about Russian artillery. According to western sources, some observers already use 3-D mapping to pinpoint a target and then transmit it to the shooter. If you're fighting the Russians there is no escape from artillery. The last time Russian soldiers were shown respect by the wider military community was in Syria when Russian bombardment — chiefly from planes that flew in and out of Syrian air space in a morning — smashed insurgent resistance in cities such as Aleppo. One analysis of the Russian withdrawal from Kherson in southern Ukraine is that the soldiers would regroup, be strengthened by recently trained reservists and then move down from Belarus with logistical support from Alexander Lukashenko. The first aim would be to cut off the road and rail links from the West to Kyiv, thus blocking arms deliveries. And the second would be to surround and besiege Kyiv. It would be modelled to some degree on Operation Uranus used by the Red Army to cut into both sides of the German Sixth Army at Stalingrad. The intensive hammering dealt out to the city eventually led to a German surrender. Every officer at Russian military academies has studied the operation as an example of a successful counter-offensive. The fall of Kyiv was Putin's original war aim: a flight into exile of the Zelensky government in the first few days would have been a quick, snatched victory for the Kremlin. Now he may be about to try again.

Soviet soldiers in the destroyed centre of Stalingrad. Putin could be planning something similar for Kyiv
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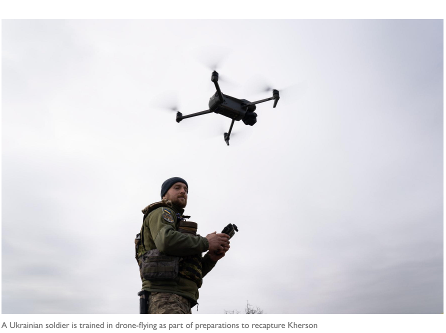
Whether it works out that way won't be clear until the worst of the winter is over. But the mere possibility that Putin may be toying with a Uranus 2.0 suggests Russia is reading old textbooks while Ukraine, day by day, reinvents the rules. The real lesson of its campaign so far is that Ukraine's civilian resilience has not only kept it alive but helped it shape a different kind of army; Russia has been failing because of a poverty of military culture. It has no spine of professional non-commissioned officers to hold units together as they come under attack. The direction of combat is determined rigidly from above. When things don't work out, generals have to get closer to the front lines to analyse, adjust orders and command. That's one reason at least eight Russian generals have been killed in the war so far. They need to be on the spot because the chain of command is too sluggish to keep up with surprises sprung by the Ukrainians.

The starting point for a nimble army is a society willing to learn new tricks. That counts for more than the high-tech revolution in warfare. A soldier has to be mentally alert. The most useful weapons in the early stage of the war were night glasses to allow snipers to feel their way around the woods while Russians stuck to the roads. Western-quality medical kits were essential — many of the Russian wounded died untended. While Russian civilians put fingers in their ears or trusted the mendacious state broadcasters, Ukrainians got on with it. Some organised campaigning groups to ring ordinary families in Russia and explain the true situation. Captured Russian soldiers were given a phone to call their parents. When classrooms were bombed, groups organised alternative schooling. Sandbags were built, historic monuments were wrapped. The Ukrainians call this *hromada*, self-organisation.

Trains have been running throughout the war even if some railway stations were hit by Russian rockets. The railway chiefs communicated with each other to avoid night-time collisions, some of them using Elon Musk's Starlink until Musk appeared to have second thoughts. All this makes for a different kind of army. Ukrainian soldiers that come to Britain to train on new equipment are astonishing instructors by mastering complex weapons systems in a fortnight, determined to go back to the front and try them out.

There is a natural confluence between a decentralised society, a very IT-savvy young generation and the adoption of a highly mobile army that seizes opportunities when the enemy flounders. It is the very opposite of the Soviet model. These new-look digital soldiers are a dab hand at converting cheap commercial drones bought online into lethal grenade carriers. They have been working on naval drones for use against Russian ships in the Black Sea — they float, they bounce and on impact they will cause havoc. "They think for themselves, these kids," one western trainer tells me. "I've not seen anything like this in Europe. Maybe they've got a bit of the esprit of the Israelis."

During a tour of Israeli academies some years ago I met an entrepreneur from Caesarea, a former brigadier in the logistics section, who had worked out that the techniques used to increase ball control in footballers could be adapted for snipers. It was, he explained, a matter of speeding up eye-hand co-ordination and using the brain's full potential.



A Ukrainian soldier is trained in drone-flying as part of preparations to recapture Kherson
ASHLEY CHAN/SOPA IMAGES/ZUMA/EYEVINE

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That kind of interplay between technologies coupled with the confidence to improvise solutions to problems is what makes the up-and-coming Ukrainian army special. The fact they can test their inventions almost immediately on the battlefield incentivises them. The army bureaucracy doesn't get in their way.

It's the future of warfare. Taiwan, accustomed for decades to buying expensive fighters and tanks from the Americans, wonders whether it shouldn't be buying "large numbers of small things" such as the Javelin anti-tank missiles used by the Ukrainians. Even the Pentagon seems to be coming round to the idea that modern war fighting is "software first". As AI becomes more and more important to linking control and command systems, the US defence establishment is looking increasingly towards smaller start-up companies to be innovation leaders. That's the direction the so-called revolution in military affairs is heading. And Ukraine, though struggling for its very existence, is showing the way.

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sarah smith

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SixG
14 HOURS AGO
Roger - that was very good. Thanks.
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Mrs Elaine Ollerhead
1 HOUR AGO
Agreed- very insightful. So many times military thinking and strategy is based on the last experience of conflict, so effectively fighting the last war. I do worry that the British military is the same, reducing boots on the ground whilst spending billions on expensive weapons platforms (the huge new aircraft carriers, hi tech fighters etc)...
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Linda Quilici
13 HOURS AGO
Where there's a will there's a way and the Ukrainians have will in bucket loads, contrary to the invaders.
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Sir Jasper
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Impressive article.
Impressive performance by all Ukrainians.
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Jonathan Newby
12 HOURS AGO
The problem is very simple. There is nothing superior about Russia when up against Ukraine supplied with western arms. The problem is that Ukraine is fighting with one hand tied behind its back.
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Charles
4 HOURS AGO
It has been the same for western countries since WW 2 to fight one handed so as not to offend anyone. We now hold inquiries down under into our troops who we sent to Afghanistan and who shot people before asking them
How they felt about life .
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pdre
1 HOUR AGO
Fascinating analysis. And persuasive too - it makes the point eloquently that Ukraine's nimbleness makes them hard to beat in modern warfare.
That said, I've spent seven months wondering how Russia can actually be beaten while it is assumed that they mustn't be attacked on Russian soil. How do you beat someone when they have a 'safe haven' that spans half the globe?
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Mrs Meldrew
6 HOURS AGO
Untie Ukraine's hands and give it the weapons they need. Then we can see these weapons can really do and end this pointless war quickly.
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Mr K
1 HOUR AGO

Fancy increasing tax payers funding for it as i think most people would say? 🤔 No.

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Left and Right
1 HOUR AGO

Get Ukraine the supplies it needs to defend civilisation. France and Germany should be more than embarrassed by their pathetic efforts

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it'sme
1 HOUR AGO

Ukraine will need generators as much as arms, for the next several months!

Come on Germany!

(Edited)

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John Newbery
2 HOURS AGO

Putin's imperialist army is fighting according to the manual of the Red Army. Thus massed frontal assaults are still being used, and if the first wave fails then send in the next. Tactics like this produce high casualties and low morale.

There are mixed ideas about Belarus. So far they have just acted as a base for the russians. If they start an active role then Ukraine must have the right to attack their bases.

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John Quintonadams
1 HOUR AGO

So the answer is to escalate the war against Russia and its Allies? Does that not make all NATO Countries immediate targets for the Eastern bloc and WW£ inevitable? "Softly softly catchey monkey" seems to be working for the Ukraine and its 'friends' so far however undramatic it may seem to us armchair warriors And the Nuclear warheads remain unused - as yet.

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Wat Tyler II
1 HOUR AGO

Good article. Our MoD can't even develop a rifle let alone something as complex as a modern drone. The young and highly motivated Ukrainians are showing just what can be done.

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