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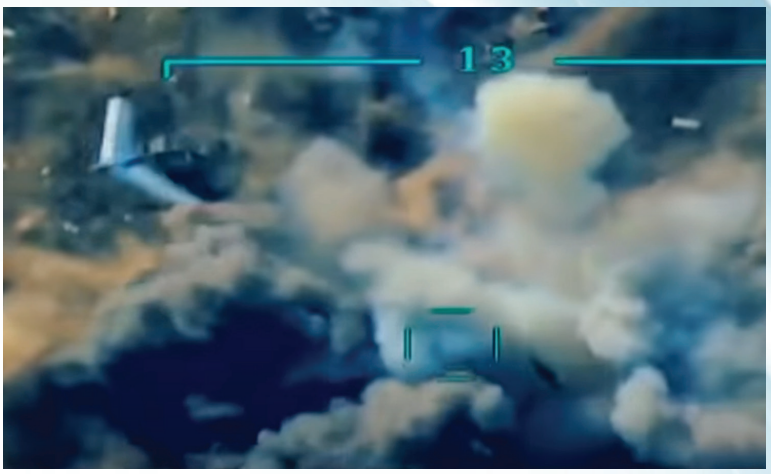
The Second Nagorno-Karabakh War: A Milestone in Military Affairs

Uzi Rubin



Mideast Security and Policy Studies No. 184

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Cover image: Screen grab from video of drone just after it destroyed an Armenian target during the Second Nagorno-Karabakh War, via YouTube

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Executive Summary

The recently concluded six-week-long Second Nagorno-Karabakh War fought by Armenia and Azerbaijan was a milestone in military affairs, as it was the first conflict in which unmanned air vehicles (UAVs) won a war from the air.

Azerbaijan's UAVs obliterated Armenia's formidable array of ground-based air defenses, after which they systematically decimated Armenia's ground force matériel, including tanks, artillery pieces, and supply trucks. This onslaught forced Armenia to accept a humiliating ceasefire imposed by Russia.

It is not entirely clear at this time how this feat of arms was achieved, but it appears that the key to the spectacular victory of Azerbaijan's unmanned air power may have been electronic warfare that blinded Armenian radar, thus facilitating the destruction of its air defense batteries.

The war offered a glimpse of future battlefields on which unmanned weapons and electronic warfare might predominate. Israel should learn the lessons offered by this war and prepare its ground-based air defenses as well as its combat aircraft forces accordingly.

Dr. Uzi Rubin was founding Director of the Israel Missile Defense Organization, which managed the Arrow program. He is now a senior research associate at the Begin-Sadat Center for Strategic Studies.

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While the recent war in the South Caucasus over the fate of the Armenian enclave of Nagorno-Karabakh attracted no more than mild attention in Israel, it was tracked breathlessly by military analysts. The war, fought between Armenia and Azerbaijan, ended in the latter's victory. This in itself was not surprising: Azerbaijan is three times larger, three times more populous, and four times richer than Armenia. Moreover, Azerbaijan is an important oil and gas exporter. Gas from its Shah Deniz oilfields in the Caspian Sea recently started flowing through the Southern Corridor pipeline all the way to Italy, enhancing the EU's energy security vis-à-vis Russia and catapulting Azerbaijan into the status of a global player. Armenia, on the other hand, has scant natural resources. The imbalance in size and wealth between the antagonists was reflected in their relative military power, with Azerbaijan fielding considerably larger and more modernized ground and air forces than Armenia.

The surprise then was not that Azerbaijan won, but how it won. It can be said that this was the first postmodern conflict, in that it was the first in which unmanned aircraft overwhelmed a conventional ground force, grinding it down to the point of impotency and paving the way for the Azeri ground forces to roll in and take possession of a strategic chokepoint. Armenia was forced to accept a humiliating ceasefire that essentially terminated its control of Nagorno-Karabakh—permanently, as it now appears—and turned tens of thousands of its Armenian residents into refugees.

Nagorno-Karabakh is an enclave of Christian Armenians inside the territory of Muslim Azerbaijan. Fighting over control of the region flared up as soon as Armenia and Azerbaijan proclaimed their short-lived independence following the fall of the Tsarist regime in 1918. The fighting was squelched by the Red Army two years later when it

rolled into the Southern Caucasus and incorporated both republics into the new Soviet Empire.

In 1988, with the Soviet Union tottering toward its eventual demise, a civil war erupted between the Armenians and Azeris of the region. This conflict escalated into full-scale war when Armenia and Azerbaijan both declared their renewed independence in 1992 after the Soviet Union had ceased to exist.

The first Nagorno-Karabakh war ended in 1994 in an Armenian victory. The Azerbaijani army retreated from Nagorno-Karabakh and its outlying districts. The Armenians of Nagorno-Karabakh declared an independent state, the Republic of Artsakh, which claimed sovereignty over the entire area vacated by the Azerbaijani army. Artsakh remains unrecognized by the rest of the world—including Armenia itself—to this day.

Renewed military clashes along the ceasefire line have erupted almost every year since 2010, increasing in both frequency and intensity. On September 23, 2020, Azerbaijan launched a full-scale invasion of Artsakh, heralding the commencement of the six-week-long Second Nagorno-Karabakh War.

That another war over control of the district would eventually erupt was long anticipated, and both contenders were gearing up for it. Armenia, the poorer of the two, did not have the resources to modernize its ground forces and air defenses, and the war found it still largely equipped with legacy Soviet-era weapons, some obsolete. The only exception was the Armenian air force, which received four modern Sukhoi 30SM Russian multi-role fighters in the pre-war years.

Azerbaijan, by contrast, used its increased income from oil and gas exports to modernize some of its equipment, but mainly to invest in a growing fleet of Unmanned Air Vehicles (UAVs) and a force of precise tactical ballistic missiles. Until recently, its main supplier was Israel, which sold Azerbaijan a variety of Intelligence, Surveillance and Reconnaissance (ISR) unarmed UAVs as well as the HAROP loitering UAV system, which is designed to destroy targets by diving and exploding on them (hence the term “suicide drones”).

Shortly before the Azerbaijani assault on Artsakh in July 2020, a batch of Bayraktar TB2 armed UAVs was acquired from Turkey, a longstanding ally of Azerbaijan's. (While Israel reputedly fields its own armed UAVs, it seldom exports them as a matter of policy.) The order of battle of the two contending armed forces showed a 50% Azerbaijani superiority in tanks and an equality between the respective air forces in number and degree of obsolescence of their manned aircraft fleets (save the four modern Russian-supplied fighter aircraft possessed by Armenia). However, Azerbaijan had a clear edge in UAVs. While Armenia operated some Russian and locally made ISR UAVs, its unmanned fleet was no match for the variety, quantity, and quality of Azerbaijan's UAV fleet, which was composed of numerous ISR types and at least two types of ground attack UAVs—a Turkish missile-firing aircraft and an Israeli suicide drone, the likes of which Armenia had none.

Armenia is a member of the Russian-led Collective Security Treaty Organization (CSTO), alias "the Russian NATO," which, like its Western equivalent, obliges all members—especially Russia—to extend military support to each other if attacked. For that reason, the Azerbaijanis avoided operations within Armenia's internationally recognized borders, with a few exceptions such as targeting SCUD ballistic missile launchers and S-300 air defense systems inside Armenia proper. (The Russians elected to ignore these incidents.)

The Azerbaijani war plan was dictated by topography. Nagorno-Karabakh proper lies in mountainous terrain, but greater Nagorno-Karabakh— Artsakh—extends down to the lowlands along the Iranian border. It is now clear that Azerbaijan's war plan was to invade through the lowland region of Artsakh and then turn north to close the strategic Lachin Corridor, which is the only road connection between Nagorno-Karabakh and Armenia proper. Closing the corridor would isolate Artsakh and lead to its downfall.

The invasion, which commenced on September 23, 2020, largely followed this plan. The main Azerbaijani offensive was launched into Artsakh's southern lowlands, with diversionary attacks in the north. That Armenian resistance was stiff was evidenced by the slow advance

of the invading forces, which gained no more than about 20 km in the first week of the war. It took the Azerbaijanis almost four weeks to overrun the entire lowland region all the way to Armenia proper and turn north to fight their way to the Lachin Corridor.

By the end of the fifth week, the invaders were closing in on Lachin. In the last week of the war, Azerbaijani special forces fought their way up into the mountains of Nagorno-Karabakh and captured the strategic city of Shusha. The Armenians fought stubbornly from pre-prepared fortified positions, but nowhere could they stop the overwhelming numerical superiority of the Azerbaijani forces. With their armor, artillery, and supplies decimated from the air, the Lachin Corridor within range of Azerbaijani artillery, and Stepanakert, Artsakh's capital city, within mortar range of nearby Shusha, the Armenians had no alternative but to accept a humiliating ceasefire with terms dictated by Russia.

The ceasefire that went into force on November 10, 2020 left the Azerbaijanis in control of all the territory they had overrun and forced Armenia to give up all of Artsakh outside the historic Nagorno-Karabakh enclave (or, rather, of what was left of it).

Yet the key to the Azerbaijani victory was not the ground offensive, which progressed quite slowly, probably due to Armenia's stubborn defense. The distance from the point of invasion to its farthest western reach is about 100 km, and that distance was covered in four weeks. The distance from the point of invasion to its most northern point is about 80 km, and that took the Azerbaijanis six weeks. Simply put, this was not a blitzkrieg but a grindingly slow ground campaign. The key to Azerbaijan's ultimate success was its amazingly sophisticated air campaign.

In the first few days, both antagonists threw in their ground attack manned aircraft and helicopter gunships, but air defenses proved too deadly. After both sides suffered losses of manned ground attack aircraft and helicopters, the sky was cleared for the UAVs to do their deadly work. While the Armenian UAVs could do nothing more than perform surveillance and spot artillery, Azerbaijan's armed and suicide

UAVs were able to launch a deadly campaign of ground attacks against Armenia's military assets.

In the first phase, they went after Armenia's ground-based air defenses. To locate them, the Azeris flew ancient propeller-driven biplanes equipped for remote piloting—in effect, unmanned decoys—above the battle theater. Those of the Armenian air defense batteries that took the bait and locked their radar on the Azeri decoys were located and designated for destruction, either by gliding bombs from the Turkish Bayraktar UAVs or from vertically diving Israeli HAROPs. Azerbaijan's Ministry of Defense released a multitude of action video clips showing Armenian mobile air defense systems of all types being destroyed, including the antiquated SA 8 Osa, the SA 13 Strela 10, and the modern SA 15 Buk, the missile system that shot down Malaysian Airlines Flight 17 over eastern Ukraine in 2014.

The striking feature of the video clips was the utter helplessness of the doomed systems. Some were seen being destroyed with their radar antennas still rotating, searching in vain for targets yet somehow unable to detect the UAVs that were about to wipe them out. Since the Bayraktar is a fairly large aircraft with a 12-meter wingspan—larger, in fact, than that of an F16 fighter—it should have been detected and locked onto for interception well before it could release its glide bombs. The fact that the UAVs managed to remain undetected at close range might hint at electronic warfare that blinded Armenian radar.

No less impressive was the destruction of at least two S-300 air defense batteries inside Armenia proper by Israeli HAROPs. Again, the videos from the diving HAROPs showed the systems' radar antennae still rotating a split-second before being hit, obviously unaware of the UAVs that were diving on them. Here, the question of why the threat remained undetected is easier to answer: the HAROP is such a tiny aircraft that it might fall below the threshold of detectability of the S-300 system's elderly radar.

Once the Armenian air defenses were neutralized, the Azeri UAVs went after the armor, artillery, and logistical trains. Azeri videos show scores of tanks, artillery pieces, and supply trucks being hit by both

Bayraktar-launched glide bombs and suicide HAROPs. Remarkably, some videos show fast-driving tanks and trucks being hit by both types of UAVs—the Turkish Bayraktars and the Israeli HAROPs.

Later videos show the Azeri UAVs assaulting Armenian troop concentrations and fortified positions. With their protective shield of mobile air defense arrays gone, Armenia's well dug in armor and artillery were sitting ducks for air attack. Some Armenian man portable air defense weapons (MANPADs) managed to bring down a few Azeri UAVs, but it seems that they were not distributed to the ground troops in sufficient numbers to make a difference.

While both sides deployed ballistic missiles, they seem to have made only limited use of them. One Israeli LORA precision missile was used to destroy or damage a strategic bridge near the Lachin Corridor, but outside Armenia proper—probably to sever an Armenian supply artery. Toward the end of the fighting, Armenia launched two of its Russian-supplied SS 26 ISKANDER precision missiles against unspecified targets. Armenia is also reported to have used Russian-made SMERCH rocket artillery as well as SCUD ballistic missiles against Azeri towns near Artsakh's northern border, killing scores of civilians. In retaliation, Azerbaijan's UAVs raided Armenia proper and allegedly destroyed at least one SCUD launcher.

Significantly, neither side used ballistic missiles against the other's capital city or national infrastructure, even though their missiles had sufficient range to do so. Clearly they were both anxious to avoid further escalation, which might have brought Russian or other international intervention into the war if not even worse calamities. In this connection, it should be noted that after the final clash before the war, on July 17, 2020, Azerbaijan openly threatened to strike Armenia's nuclear power plant with precision missiles.

This was a true postmodern war in which every action was amply videoed and transmitted by the assaulting UAVs. By meticulously examining each video clip released by both sides, the Dutch analyst Stijn Mitzer, publishing on the ORYX blog, tallied the confirmed losses of Armenia's ground forces at 185 tanks, 89 armored fighting vehicles,

182 artillery pieces, 73 rocket launchers, 451 trucks, 26 air defense systems, and 14 radars. The real number could be higher, but even these losses represent a large chunk of Armenia's ground equipment.

Public sources estimated the entire Armenian tank force at 400. If so, about half of it was lost during the war. The losses were even worse in the case of mobile air defense batteries: out of an estimated 40 systems in Armenia's arsenal before the war, barely one-third survived. This rate of attrition seemed to be crippling.

The Armenian troops, despite their stubborn defense, could not withstand the furious air assault. Shorn of their armor, artillery, and supplies, they had to abandon their fortified positions in the hills of Nagorno-Karabakh. No large-scale decisive set-piece battles between the two armies were reported, and it seems their tanks never got within shooting distance of one another.

Simply put, the Armenian army was bled dry by the Azeri UAV assault and had to retreat from its fortified positions. In so doing, it had to abandon equipment that included tanks and guns, some of which was undamaged.

The published numbers of casualties are yet more indirect testimony of stiff Armenian resistance. The Azeris reported 2,763 troops killed in action. In addition, Syrian human rights organizations reported that 541 Syrian "volunteers" had lost their lives while fighting on Azerbaijan's side. Armenia's losses amounted to 2,718 killed in action. While the losses on the two sides roughly match, it stands to reason that some of the Armenian losses were caused by the attacks from the air, while most if not all of the Azeri casualties occurred in ground fighting since the Armenians deployed no air power to speak of. It can therefore be deduced that the Azeris paid dearly for captured ground.

Judging from the modest number of Armenian prisoners of war—about 40 in all—it seems the Armenian ground forces managed to avoid encirclement and maintain morale throughout the war. The impression is that the Armenian strategy was to prolong the war by fighting a stiff rear guard action, perhaps in the hope that the approaching winter weather would close in and bring the fighting to a standstill.

Unfortunately for them, the winter weather did not close in until the last week of the campaign. By that time, the battle had already been decided in Azerbaijan's favor.

Civilians suffered on both sides. Azerbaijan reported 92 civilians killed by Armenian rocket and ballistic missile attacks on the towns of Ganja and Barda. Armenia reported scores of civilians killed, but did not specify where or how.

How did the Azeris achieve this victory? Obviously, the key was air superiority. This in and of itself is no surprise: ever since the outbreak of WWII, air dominance has been paramount, at least in symmetric wars. He who owns the skies owns the ground. This was proven again and again on the battlefields of Europe, Asia, and the Middle East. The exceptions—the Vietnam War and the Soviets' failed occupation of Afghanistan—were highly asymmetric, where air power was blocked by the nature of the terrain and by the asymmetric tactics of the antagonists.

What came as a surprise in the Second Nagorno-Karabagh War was not that it was won from the air but that it was won by uninhabited air vehicles. This was achieved in the face of an extensive array of Armenian air defense systems that by rights should have shot down the rather large Azerbaijani ISR and armed UAVs in droves. Yet the Turkish-made Bayraktars, with their large wingspans, twin booms, and rotating propellers—all brightly visible to radar—somehow managed to sneak within lethal range of the Armenian air defense batteries and destroy them.

This was not the first time the Turkish armed UAVs had prevailed over Russian-made air defense systems. Earlier in 2020, Turkish armed UAVs succeeded in destroying Russian-made SA 22 Panzirs in northern Syria and Libya, despite the Panzir's superior lethal range. In both cases, suppression of air defenses was quickly followed by intensive destruction of the antagonist's tanks, armored fighting vehicles, artillery, and logistical vehicles. The success of UAVs in the Second Nagorno-Karabakh War followed a pattern that had been established in previous conflicts.

It has been suggested that the apparent invulnerability of the Turkish UAVs to air defense systems can be explained by their composite material structures, which are relatively transparent to radars. However, this is doubtful. Regardless of the composite material airframes of the Turkish UAVs, they include metal in their piston motors, landing gears, electronic systems, and electrical harnesses, rendering them visible to radar. Even assuming the elderly radars of some of the Armenian air defenses found it difficult to detect the Bayraktars, the more advanced radar of the modern Panzir system should have experienced no such difficulty—yet the Bayraktars managed to overcome them.

Various reports in the media argue that the deciding factor was the Turkish KORAL electronic warfare system, which is designed to block radar and wireless communications channels. DefenseWorld.net, an internet publication, argued that Turkey defeated the Syrian air defenses by electronic warfare using a KORAL near Idlib. A KORAL presence was later confirmed in Libya, when the Government of National Accord (Tripoli) acknowledged the destruction of a KORAL system in one of its air bases by the opposing air force of the Haftar (Benghazi) regime. According to Global Defense Corp., another internet publication, "Electronic warfare killed Russian-made weapons in Nagorno-Karabakh."

This could explain the vulnerability of the Armenian short range air defense systems, their radars still rotating in vain at the very moment of their destruction. Azerbaijan has not yet admitted using any form of electronic warfare during the war, but the by now familiar sight of blind air defense systems being systematically obliterated by short-range glide bombs released from big UAVs speaks volumes. Thus, the explanation for Azerbaijan's victory might be that it was an electronic "wizard war."

Without doubt, the UAV campaign in this war was a milestone in military affairs. Still, one should be wary when drawing conclusions. The ascendancy of the UAV over ground-based air defenses as seen here was achieved under favorable conditions that may not prevail in other situations.

First, it seems that the weather was fair through most of the campaign, offering good visibility to the UAVs' optical payloads and laser pointers. The weather reportedly closed in only during the last week of the campaign, shutting down UAV operations during the concluding phase of the war.

Second, the true nemesis of UAVs—manned multi-role fighter aircraft—was absent from the battlefield. There are conflicting reports about whether the Armenian air force operated any older generation fighter aircraft, such as MIG 29s, at the onset of the fighting, but there is no doubt that Armenia received four modern Russian Sukhoi 30SMs in December 2019. It is not clear why these capable fighters were not employed to hunt down the Azeri UAVs. Perhaps they were not yet operational, or perhaps the Armenians were deterred by the formidable array of Azeri air defenses, which included the advanced S300 PMU "Favorite" system. The presence of Turkish F16s deployed to Azerbaijan as soon as the war started might also have been a serious deterrent.

It is not known whether Armenia operates long-range radar to safeguard its airspace against intruders. If such sky surveillance radar does exist, it too may have been blinded and thus rendered unable to vector the Armenian fighters to intercept the hostile UAVs loitering above the battle zone. Finally, the Armenians may have been politically constrained from using their modern fighter aircraft even in a dire military situation.

While Armenia did possess one unit of a Russian-made "Repellent" anti-UAV electronic warfare system, it had no effect during the war. According to Armenian PM Nikol Pashinyan, it simply "did not work"—though the Russian news agency Avia.Pro reported that the system had been destroyed by an Azeri UAV. A more powerful electronic warfare system, the KRASUKHA, was deployed in the Russian base of Gyumri in the northwestern corner of Armenia. According to Stephen Bryan, writing in *Asia Times*, the KRASUKHA in Gyumri downed no fewer than nine Turkish Bayraktar UAVs. (What the Turkish-made aircraft where doing in the neighborhood of Gyumri, about 250 km away from the battlefields of Nagorno-Karabakh, is not clear.)

This claim could be a Russian embellishment to counter the negative impact of the abject failure of its air defense systems as well as the humiliating loss of the Repellent. If the *Asia Times* report is accurate, however, the success of the KRASUKHA punched a big hole in Azerbaijan's UAV array and might have turned the battle if applied earlier in the war. Since all armed UAVs rely on secure data links with their rear-located human operators, they remain vulnerable to disruption by sophisticated electronic interference.

With all these caveats factored in, the Second Nagorno-Karabakh War provided a glimpse of the future battlefield, on which unmanned systems and electronic "wizard wars" are probably destined to predominate. The war reiterated the traditional doctrine that air superiority is a precondition for winning a ground war, but revealed a new, more cost-effective, and more painless way to achieve it.

The most appealing feature of this new way of fighting an air war is the lack of air crew casualties—a sore point for all governments, both financially and psychologically. It can therefore be expected that the recent war in the Southern Caucasus will enhance worldwide demand for armed and unarmed UAVs and at the same time accelerate the development of offensive and defensive electronic warfare systems.

One lesson for Israel from the Second Nagorno-Karabagh War is that its missile and air defenses should be merged into a single aero-ballistic defense array that works hand in hand with its manned fighter force for mutual defense. Another is the need to immunize both ground-based and airborne defenses against electronic warfare.

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