

Observations on the Armenia-Azerbaijan Conflict Sept-Oct 2020

Jon Searle, Associate Lecturer, Derby University

Introduction

*"We might think of... 'sunrise' capabilities, with the corollary being 'sunset' capabilities that could be used for a while in the emerging operating environment but will increasingly become too vulnerable or redundant in the Information Age."*¹

This paper attempts to identify insights and lessons from the initial phases of the conflict between Armenia and Azerbaijan in September and October 2020 over the disputed Nagorno Karabakh (NK) region of Western Azerbaijan. Principally it addresses the questions:

- What would have been the effect on the British Army had it been in the position of the Armenian Forces in September 2020?

and,

- In what ways might the British Army adapt in order to allow itself to compete with adversaries equipped with the novel equipment and doctrine demonstrated by Azerbaijan in NK?

Situation

Between 27 September and 14 October 2020, Armenian Forces and those of the Armenian supported Nagorno Karabakh Republic (NKR), lost more than 80 T72-variant Main Battle Tanks to the Azerbaijanians.² By 21 October, these losses had risen to 141,³ by 25 October to 159,⁴ and to 226 by ceasefire on 10 Nov 20.⁵

¹ Introducing the Integrated Operating Concept, Ministry of Defence, 2020. p16. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/922969/20200930_-_Introducing_the_Integrated_Operating_Concept.pdf accessed 19 Oct 20

² <https://rusi.org/publication/rusi-defence-systems/key-armenia-tank-losses-sensors-not-shooters> accessed 17 Oct 20

³ <https://www.oryxspioenkop.com/2020/09/the-fight-for-nagorno-karabakh.html> accessed 22 Oct 20.

⁴ <https://mobile.twitter.com/oryxspioenkop/status/1320324531249184776> accessed 25 Oct 20.

⁵ <https://www.bbc.co.uk/news/world-europe-54885906> accessed 4 Jan 21.

Armenian losses in other fighting vehicles, Air Defence Systems, and Artillery broadly matched these losses, as did degradation of their Logistic supply chain. The destruction of this equipment, with the deaths of approaching 7,000 personnel,⁶ took place at the hands of an Azeri Army equipped broadly on similar lines to the Armenians, (mostly with classic Soviet/Russian equipment) though with larger overall ground forces. The Armenians benefitted from three decades of opportunity to establish positions in defensible, largely mountainous, terrain and Lines of Communication that effectively lay within their established territorial borders, and a less-Soviet (or more-Western) approach to command, in that far more authority is delegated to NCO and sub-unit command level.

Only in one aspect did the Azeri Order of Battle significantly differ from that of Armenia, and that is in the inclusion of significant numbers of armed Unmanned Combat Aerial Vehicles (UCAVs) and Loitering Munitions tied to an otherwise legacy strike complex. To a large extent these capabilities appear to have been acquired during 2020, between Turkish operations in Idlib during March, and the commencement of hostilities in September, and predominantly after border clashes between Azerbaijan and Armenia in July.⁷ It is clear that state actors with much smaller defence budgets than the UK,⁸ are able to acquire and field such capabilities in less than six months, and probably less than three: a timescale that is significantly shorter than the time currently required even to deploy the UK's fighting Division.

Armenian forces however did boast significantly greater capacity and wider capabilities in Ground Based Air Defence (GBAD) than does the British Army.

Observations

- **Deployed UK Force Elements faced with a UAS/UCAV threat are unable to defend themselves.**
- **Had the entire British Army been holding Nagorno Karabakh against the Azeris, it would have been virtually destroyed as a fighting force in a little over three weeks.**
- **Air Defence doctrine and provision needs to change significantly: greater numbers of systems able to counter UAS (both Armed and Sensor/ISR), at a far lower level in the**

⁶ <https://armenpress.am/eng/news/1032195.html> accessed 25 Oct 20.

⁷ <https://uk.reuters.com/article/us-armenia-azerbaijan-turkey-arms/turkish-arms-sales-to-azerbaijan-surged-before-nagorno-karabakh-fighting-idUSKBN26Z237> accessed 3 Jan 21.

⁸ IISS Military Balance 2018: UK Defence Budget \$US 50.7Bn, Azerbaijan Defence Budget \$US 1.55Bn.

ORBAT will be required if British soldiers are to survive and fight in a sensor rich environment.

- **There is a requirement to reimagine the way in which UK ISR builds and manages the intelligence picture of the battlespace.**
- **Gaps in the British ORBAT suggest significant challenges in maintaining Lines of Communication across Europe were the need to arise to supply the UK component of the NATO Enhanced Forward Presence in the Baltic States in time of kinetic conflict.**
- **Limited AD capacity leaves the command, manoeuvre and support assets of UK formations vulnerable to destruction.**
- **Azerbaijan's use ofUCAV and UAS cued precision fire highlights UK vulnerabilities to enemy observation during the move and assault phases and in defensive positions; to emergent long-range sensor technology.**
- **British Forces are certain to face... information operations... undermining morale, both in the fighting Force Elements, and in the home base, and... lending credence to those voices agitating for a UK cessation of hostilities.**

The rise of Drone Warfare

The spread of unmanned aerial systems from Tier 1 military forces is well documented, though their use prior to 2020 in asymmetric campaigns against those Tier 1 actors reflected predominantly use by insurgencies in which their operation was unconstrained by legal niceties. ISIS developed the use of small UAS armed with grenades and Improvised Explosive Devices, in ways that would and could not have been countenanced by State Actors abiding by the Rules Based International System. The widescale adoption of large, industrially produced, UAS by state actors and their use in conventional conflict is a relatively recent development. However, the actions of Azerbaijan⁹ in NK should not have come as a surprise to either the Armenians, or outside observers. Turkey's use ofUCAVs in Syria against Regime Forces in Idlib Province in March 2020 resulted in destruction of modernised military hardware on a scale strikingly similar to that experienced by Armenia in NK.¹⁰ Parallel

⁹ Azerbaijan's use of C-UAS and UAS in Intelligence, Surveillance and Reconnaissance (ISR) roles is dependent on Turkish (TB2 Bayraktar) and Israeli (IAI HAROP/HARPY2) technology and technical support.

10 *"The Turkish Defense Ministry announced that its forces destroyed 151 tanks, 47 howitzers, three airplanes, eight helicopters, three drones, eight air defense systems and killed over 3,000 troops fighting for the Assad regime."* Kayaoglu, B., *How Turkey's soldiers and spies saved the day in Syria*, Al-Monitor, 8 Mar 20

situations can be discerned in Libya, and to some extent in Russian activity in Ukraine since 2014.

Previous consideration has predominantly focused on drone use in asymmetric conflict because either,

a) conventional military forces have leaned on the use of drones for reasons of expense: it has been cheaper to fly UAS than to maintain a suitably large conventional manned, and increasingly exquisite/massively expensive, air capability; or in terms of political expediency: it has been easier to justify the incursion of an unmanned platform into someone else's sovereign airspace than a conventional airstrike.

Or,

b) UAS were being used by state and non-state actors who could not afford to acquire (and maintain) a conventional manned air force capability).

As has been demonstrated by Azerbaijan with Israeli and Turkish technology, UAS use is a significant amplifier of (effectively a replacement for) conventional, manned, air capability. The absence of manned high-end air assets over NK, did not preclude a highly effective air campaign, in parallel to a devastating artillery and missile operations, throughout Armenia's depth.

(NK air defence was structured to combat low-altitude targets, and based on the Osa-AK and Strela-10 anti-aircraft missile systems, with upper ranges of 5 km and 3.5 km, respectively. Modified Azeri Su-25 attack A/C, were able to bomb from high altitude and flew over 600 sorties. Mi-17 helicopters equipped with Spike-NLOS missiles served as platforms for UAS cued strikes on ground targets out to ranges of 25-30km, and had proven themselves in the Tovuz border conflict in June 2020.)

It is clear from the ground in NK that Ground Based AD systems designed to deny traditional manned Air and Avn, including mutually supporting nested A2AD systems of systems, for example, MANPADs, protecting Osa/GECKO, defending S-300 and theatre AD ISR assets, have all been destroyed—on camera—by the Azeris using a mix of armed and sensor/ISR Class II UAS, and cued PGW.

Conventional manned Air is limited by enemy AD assets: it is not possible to impose air supremacy at a cost that is either politically or financially acceptable. At the same time, NK offers a clear demonstration that nested SHORAD, MRGBAD, and Theatre level AD is susceptible to destruction by supposedly sub-peer state actors operating unmanned systems that cost

a fraction of their manned equivalents. For example, the IAI HAROP loitering munition that destroyed the Armenian S-300 in Shushakend on 17 Oct 20,¹¹ cost in the region of \$US 70,000.¹² In contrast, S-300 systems (for example, those purchased by Iran from Russia in 2015) cost approximately \$US 37.5M per launcher.¹³

Under such conditions, the UK's very limited VSHORAD remain insufficient to deny enemy Air, and are highly likely to be destroyed during the early phases of engagement with an enemy fielding significant numbers of relatively cheap but nevertheless sufficiently capable UAS. For example, the Royal Artillery's Stormer vehicle that provides the Army's Self-Propelled High Velocity Missile Air Defence system mounts 8 ready missiles,¹⁴ the Turkish KARGU-2 UCAV, in contrast, swarms in groups of up to 20.¹⁵

Meanwhile, British reliance on manned Air to provide Air Defence, and establish Air Superiority/Supremacy, is in future highly likely to be significantly constrained by adversary UAS activity. Fast Air and Avn is unable to counter the threat posed by swarming small UAS (sUAS), while at the same time its basing, supporting infrastructure, and airframes remain at significant risk from their activities.

"An adversary can program a number of small mUAVs to take-off, rise to a certain altitude, and stay there until they run out of power. The swarms do not have to be smart, fast, excessively persistent, or carry a weapons payload. The speed at which an aircraft travels combined with the fragility of its jet engine intakes makes it an easy target for

¹¹ https://twitter.com/aldin_ww/status/1317431636129173505?s=20 accessed 24 Oct 20.

¹² <https://nationalinterest.org/blog/buzz/meet-russian-company-building-powerful-suicide-drones-138747> accessed 24 Oct 20.

¹³ Iran acquired 6 Battalions of S-300 from Russia in 2015, at a reported cost of \$US900M. Each Bn is comprised of six TEL units. The calculation above does not take account of the cost of the command and control components of the S-300 complex. <https://freebeacon.com/national-security/iran-to-buy-s-300-missile-systems-from-russia-for-900-million/> accessed 24 Oct 20.

¹⁴ <https://customer.janes.com/Janes/Display/jdw00912-jdw-2001> accessed 26 Oct 20.

¹⁵ Reportedly in use in NK, Turkey has purchased 100 units of the STM-KARGU autonomous quad-rotor loitering attack drone. Hambling, D., *Turkish Military to Receive 500 Swarming Kamikaze Drones*, 17 Jun 20. <https://www.forbes.com/sites/davidhambling/2020/06/17/turkish-military-to-receive-500-swarming-kamikaze-drones/> accessed 20 Oct 20. It has a 30-minute endurance, 6 mile-range, and flies at 90mph. The 15lb unit is armed with a 3lb warhead (AP frag, thermobaric, and an AT shaped charge). It is equipped with LIDAR, optical and IR imaging, and facial recognition. The KARGU-2 swarms in flights of up to 20. See, <https://www.youtube.com/watch?v=9HCDQwRdk20&feature=youtu.be> , <https://www.youtube.com/watch?v=Oqv9yaPLhEk> , <https://www.youtube.com/watch?v=3d28APIfwSI> , <https://www.youtube.com/watch?v=DUJLGzPwMQ4> accessed 23 Oct 20.

*even low-tech, stationary swarms like these. This poses the same threat to air operations as bird strikes, except the swarm is intending to hit the aircraft.”*¹⁶

To some extent the battle-space pervasiveness of small and medium UAS is no more than a reflection of economics: a Squadron of 16 F-35Bs costs approximately £1.3Bn,¹⁷ the equivalent to over 914,000 of the 3D-printed RAZOR sUAVs produced by the University of Virginia in 2014, running on open-source Android mobile phone technology.¹⁸ Consequently, the issues raised in this paper are certain to apply to UK Force Elements throughout the PECF framework,¹⁹ rather than solely in an escalation to kinetic FIGHT against a peer/near-peer adversary.

Air Defence

Traditional ground-based air defence (GBAD) systems rely on a combination of surveillance systems, guns, and missiles. Such suites have been developed to deny access to adversary aircraft, thus allowing friendly aircraft freedom of manoeuvre throughout the battlespace. The development of Anti-Access/Area Denial (A2AD) systems consisting of nested, mutually reinforcing layers of AD systems by for example, Russia and China, was intended to prevent Western, particularly US, access into contested airspace.

The hegemony of Western military aviation capability in the period following the end of the Cold War, and two decades of focus on Counterinsurgency rather than conventional peer-on-peer conflict, has resulted in the British Army reducing its capability to conduct GBAD to a significant degree. Reliance on small arms in the All Arms Air Defence battle, is almost certain fail in destroying/denying significant numbers of s/mUAS.

Such Air Defence capabilities as are available within the UK's ORBAT are intended to provide very short-range denial of airspace around Key Points

¹⁶ Mintz, J.P.F., *Asymmetric Air Warfare: A Paradigm Shift for US Air Superiority*, US Naval War College, 2013. p.6. Available online at <https://apps.dtic.mil/dtic/tr/fulltext/u2/a583530.pdf#:~:text=Asymmetric%20Air%20Warfare%3A%20A%20Paradigm%20Shift%20for%20US,my%20own%20personal%20views%20and%20are%20not%20necessarily> accessed 3 Jan 21.

¹⁷ https://www.f35.com/assets/uploads/documents/F-35_Fast_Facts_-_December_2020.pdf accessed 3 Jan 21.

¹⁸ <https://www.suasnews.com/2014/02/military-drones-shaving-costs/> accessed 24 Oct 20.

¹⁹ PROTECT, ENGAGE, CONSTRAIN, FIGHT. See <https://committees.parliament.uk/oralevidence/1137/html/> accessed 22 Oct 20.

and formation headquarters. They are scaled at a level at which, even were the systems in service intended to be used against the threat of significant numbers of small, often single use, and potentially swarming UAS,²⁰ there are insufficient numbers of systems, or indeed stocks of missiles, to provide air defence over the vast majority of a deployed British force.

This is not a new development, but it is a lesson that the UK has failed to heed. (In 1982 Israeli Firebee UAVs were used to mimic fast-Air and tempt Syrian AD systems to activate their radars and reveal their positions. The UAVs avoided all 43 missiles fired at them, and the Syrian AD systems were then attacked by manned air before they were able to re-load.²¹ Similar operations were carried out in 1973 against Egyptian AD targets during the Yom Kippur War.)

Air Defence in a UAS contested Battlespace

The Armenian Order of Battle (ORBAT) boasts significant Air Defence capability, this can be observed not least in the amount and variety that was destroyed or captured by Azeri Forces.

The NK battlespace has been characterised by an absence of manned aircraft, and this almost certainly reflects on one hand their cost and rarity in the face of the ubiquity of AD systems designed and employed to destroy them, and on the other Azerbaijan's use of UAS in strike and ISR roles. As a result, except for a single Armenian SU-25K,²² and several Azeri AN-2 Soviet-era biplanes that had been converted to UAS and deployed deliberately to activate Armenian Air Defences,²³ the conflict saw no aircraft losses. This has left Armenian AD forces unable to perform the role for which they were expensively acquired, and at the same time vulnerable to an air threat which falls outside of their intended design parameters. [Armenian AD losses as at 22 Oct are detailed at Annex A.]

"We are already seeing a situation where minor states and insurgents are lavishly equipped with drones. [Next

²⁰ Arguably, the UK's in-service Rapier and HVM GBAD systems are incapable of detecting and engaging low-and-slow flying very small targets, leaving unlimited access below and within the AD bubble.

²¹ See Hambling, D., *Swarm Troopers: How small Drones will Conquer the World*, Archangel Ink, 2015. p.23.

²² <https://www.crows.org/news/526082/Armenian-Russian-electronic-warfare-and-air-defense-troops-hold-anti-UAV-drills.htm> accessed 23 Oct 20.

²³ Brahms, J., "Azerbaijan Reportedly Convert Ancient AN-2 Biplanes into Drones", 5 Oct 20. <https://www.overtdefense.com/2020/10/05/azerbaijan-reportedly-convert-ancient-an-2-biplanes-into-drones/> accessed 21 Oct 20.

generation Counter-UAS GBAD] *should be highly effective against small numbers of drones, but it may be facing more targets than it can handle almost as soon as it is deployed.*"²⁴

UAVs are not immune to ground fires, indeed Turkey lost a number²⁵ in Libya in the five months between 10 Nov 19 and 17 Apr 20.²⁶ Though this has not precluded their destruction in return, the trend appears to be that ground based fires from guns at short range, for example by ZSU-23-4 and Pantsir systems²⁷ designed to counter Avn, are more effective than those of more sophisticated—and expensive—missile systems designed to engage Fast Air. Pantsir systems operated by the Syrian Armed Forces were destroyed by Turkish UCAVs in Mar 20,²⁸ and at least one Armenian ZSU-23-4 in NK in October, along with 15 towed AD guns re-mounted on MT-LB chassis as SPAAG. On Friday 23 Oct alone the Azeri MoD released footage of the destruction of 2 separate KS-19, and one S-60 Anti-Aircraft guns.²⁹ By the end of the conflict, Azeri fires had destroyed 10 MT-LB fitted with Zastava M55 AA guns, 3 MT-LB with ZU-23 AA guns, and 2 MT-LB with AZP S-60 AA gun.³⁰

The majority of AD missile systems lost to UAS/Loiter strike were destroyed in the initial 24 hours of the conflict (6 out of 15 x 9K33 Osa [SA-8 GECKO], and 3 of 5 x 9K35 Strela-10 [SA-13 GOPHER]), which suggests that the Azeri intent was to clear the battlespace of as much effective AD as possible. In turn this may suggest that later UAS/Loiter

²⁴ Hambling, D., *How U.S. Army's Billion-Dollar Gamble On Drone Defense Could Go Wrong*, available online at <https://www.forbes.com/sites/davidhambling/2020/10/14/how-us-armys-billion-dollar-gamble-on-drone-defense-could-go-wrong/> accessed 19 Oct 20

²⁵ Reports vary between 7 and 28, but reporting is difficult to verify in the open source, and there are accusations that airframes were moved to be photographed in new positions for messaging purposes.

²⁶ <https://www.almasdarnews.com/article/libya-becomes-graveyard-for-turkish-drones-as-3-more-shot-down/>, <https://smallwarsjournal.com/jrnl/art/drone-losses-impact-turkeys-fighting-libya> and <https://twitter.com/towersight/status/1251568466777292800?s=20> for example, all accessed 24 Oct 20.

²⁷ On 14 Sep 20 Russian and Armenian troops conducted a bilateral air defence exercises in Armenia and Russia's Southern Military District employing ZSU-23-4 Self-Propelled Anti-Aircraft Guns in an anti-UAV role up to 1,500m altitude at 2,400 m range. *Armenian, Russian electronic warfare and air defense troops hold anti-UAV drills*, 15 Sep 20.

<https://www.crows.org/news/526082/Armenian-Russian-electronic-warfare-and-air-defense-troops-hold-anti-UAV-drills.htm> accessed 23 Oct 20.

28 *"Turkish Drone Destroys Syrian Pantsir-S1 Air Defense System"*, dated 4 Mar 20 <https://t-intell.com/2020/03/04/turkish-drones-destroy-syrian-pantsir-s1-air-defense-system/> accessed 23 Oct 20.

²⁹ https://t.me/Azerbaijan_MOD/663 and https://t.me/Azerbaijan_MOD/653 accessed 24 Oct 20

³⁰ <https://www.oryxspioenkop.com/2020/09/the-fight-for-nagorno-karabakh.html> accessed 4 Jan 21.

successes were dependent on a degraded AD environment. (Given the British Army's lack of AD capability in the first place this is salutary.)

The lesson here is that GBAD systems, both gun and missile platforms, designed and intended to deny airspace in an era that predated the saturation of the battlespace with aerial sensors, are incapable of denying access to enemy UAS. Even where missiles have been used to destroy Azeri UAS, the cost of the missile significantly outweighs the financial value of its target, and given the numbers of UAS available to the Azeri Armed Forces, there is a significant danger that the Armenia's stocks of SAMs will be exhausted before the Azeri's UAS fleet. For example, Soviet era AN-2 bi-planes converted to unmanned operation and acting as provocation to Armenian AD systems, numbered over 60 at the start of the conflict.³¹ Given that these are completely obsolete airframes, dating from 1946, their residual capital value is almost certainly negative. In contrast the cost of the missiles being used to destroy them is significant, and (especially given the degradation of Armenia's logistic system) they are difficult to replace in the short term.

The UK's traditional approach of focusing very limited AD capability around high value point targets such as formation Headquarters, is not only unlikely to provide effective protection from UAS to those HQs, but leaves the manoeuvre and support assets of the formation vulnerable to destruction. Air Defence doctrine and provision needs to change significantly: greater numbers of systems able to counter UAS (both Armed and Sensor/ISR), at a far lower level in the ORBAT will be required if British soldiers are to survive and fight in a sensor rich environment. Arguably, AD must become a sub-unit capability: it should not be overlooked that by the third week of the conflict in NK, Azerbaijan was striking targets at a tactical level—in some cases of groupings of no more than four dismounted infantry.

Camouflage, Concealment and Deception

Nothing can move without being seen, and if it can be seen, it can be destroyed.

Multiple sensors linked through a unified command and control system to strike capabilities at range and able to destroy both point and area targets throughout the enemy's depth. We are witnessing the latest evidence of a step change in the use of ISR in the battlespace, albeit one that dates back at least as far as Russian operations in Ukraine in 2014, and arguably further. This implies:

³¹ https://twitter.com/Obs_IL/status/1312760674104283138?s=20 accessed 24 Oct 20.

a) a requirement to reimagine the way in which UK ISR builds and manages the intelligence picture of the battlespace. This will require the acquisition of a variety of sensor and platforms, as well as a framework that allows the integration of data, and the ability to strike throughout the enemy's depth.

b) that since there is no available technology that is able to deny enemy UAS access to the breadth of friendly airspace, there is a need to change the way in which the Army protects its assets throughout its depth. Consideration must be given to:

i) **Vulnerability to enemy observation during the movement phase.** Received wisdom that tactical moves must avoid metalled roads and civilian bridging may need to be reassessed. Methods of deception that allow road moves in depth that are not obviously military, for example,³² since cross county moves imply to a reasonable degree of certainty that vehicle packets are military in nature.

ii) **Camouflage during moves and the assault.** A substantial proportion of Armenian armour lost during the initial phase of the NK conflict was destroyed as it manoeuvred in the assault. No matter how effective camouflage may be whilst under cover, (and it needs to be effective throughout the observable EM spectrum), tracked vehicles are easily identified by track pattern left on entry to a hide location, for example.

iii) **Vulnerability to emergent long-range sensor technology.** Ground Movement Target Indication Radar (GMTI)³³ as fielded by China, offers a ground picture at a range of 150km from an airborne platform that is capable of identifying personnel moving on foot: few non-military individuals are likely to be moving on foot, cross-country, and carrying substantial amounts of metal.³⁴ The implications of this technology are significant: there ceases to be a 'deep'

³² Splitting convoys into individual vehicle packets, for example. Though this obviously has implications for the required Mean Time Between Failure (MTBF) and the amount of Equipment Support available to units on the move, as well as FP against non-UAS threat.

³³ <https://core.ac.uk/download/pdf/193260166.pdf> accessed 25 Oct 20.

³⁴ Moral niceties that constrain UK use of fires in contexts short of general war, such as the avoidance of collateral casualties – in this case, perhaps, agricultural workers carrying farming implements, are highly unlikely to constrain the UK's adversaries. In contrast the UK is in the process of divesting itself of this capability with the RAF's decision to remove Sentinel from its Order of Battle: a decision that presumably reflects a parochial single service mentality of *'this capability is entirely in support of Ground Forces, why therefore ought it to be provided by Air Force funding?'* Wither, one might ask, Defence's much vaunted Jointery?

area in which troops are safe to conduct maintenance and R&R for example. Even biological functions such as visiting the latrine are likely to cue enemy sensors to an otherwise ideally camouflaged and previously concealed location. Turkish built Bayraktar TB2 UCAVs will soon have a satellite control capability, and a potentially global reach.³⁵

iv) **Vulnerability of Force Elements (FEs) in defensive positions.** Defensive positions traditionally involve the use of entrenchment, and the digging of defensive pits that allow artillery pieces and fighting vehicles to fight 'hull-down'. These have served to protect troops and equipment from direct fire, and from the preponderance of area-effect indirect fire (since the bulk of rounds will function in the area of the target but not strike it directly, building berms around vehicles protects them from the majority of the effects of enemy fire.) However, the advent of ubiquitous precision strike, at a unit cost that no longer precludes its use against low-level targets, means that defensive positions—trenches, dug-outs/bunkers, and gun-pits, for example—have instead become obvious ground features and amplifiers of destructive effect where targets can be engaged with precision. MAM-L missiles fired by Turkish TB2 UCAVs are capable of mounting thermobaric warheads specifically designed to be destructive of enclosed spaces.³⁶ Though such weapons have seen widespread use in theatres such as Ukraine since 2014, the British Army currently has no effective defence against them, and their secondary effects are likely to cause casualties that rapidly overwhelm the Army's Medical Services.

It is reasonable to expect that actors previously considered to be sub-peer adversaries will take advantage of the use of UAS-borne sensors to facilitate depth strike in ways that were previously considered the preserve only of states possessing cutting-edge military technology. Russia has developed and fielded long range precision guided weapons in the decades since the demise of the Soviet Union, as has China, and the US and UK deployed precision strike to remarkable effect in 2003 against the Iraqi regime.

³⁵ <https://www.aa.com.tr/tr/turkiye/milli-ihalar-yerli-uydu-terminaline-kavustu/1999636> accessed 19 Oct 20. Arguably this development relies on access to US controlled satellite networks, however, this is unlikely to constrain actors who possess, or have access to non-US operated constellations. China, Russia, and Israel being cases in point.

³⁶ <https://customer.janes.com/Janes/Display/JALWA147-JALW> accessed 25 Oct 20.

Syrian rebel forces used a swarm of 13 IED equipped UAS to attack Russian forces in Jan 2018.³⁷ However, Azerbaijan's ability to prosecute precision strike at considerable scale, both through the use of UCAV, and via traditional fires cued by unarmed UAS, has shown that an actor with a defence budget approximately 3% of that of the UK³⁸ is able to prosecute a precision depth fires capability, against which UK Defence would seem to be defenceless. Iran, as well as Turkey, Israel, Russia and China have shown themselves willing to proliferate technology that has levelled the playing field to a considerable extent, and to the detriment of British military aspirations.

Traditional (and in many cases, aging) artillery systems held by potential adversaries still considered by the British Army as peer, or near-peer actors have been shown capable of delivering significant effect when matched with a sensor saturated environment. Depth fire by Armenian and Azeri forces could reach at least 70km, and in many instances approaching 100km.³⁹ The significant differentiator was the Azeri establishment of a sensor saturated environment integrated with these strike platforms which the better trained Armenian force was unable to counter.

Information Manoeuvre

Either by design, or as a cross-benefit of having systems that record video footage of their strike capabilities, Azerbaijan was able to dominate the media response to the conflict. The clear impression was given that the Armenian and associated NKR forces were being destroyed piecemeal, and that the combat was effortlessly one-sided. This was not the case, and less 'social-media friendly' reporting suggested that Azeri troops are suffered significant degradation once they closed with Armenian forces. However, Azerbaijan were winning the media war.

British Forces are certain to face similar information operations, aimed explicitly at undermining morale, both in the fighting Force Elements, and in the home base, and particularly at lending credence to those voices agitating for a UK cessation of hostilities.

³⁷ <https://nationalinterest.org/blog/buzz/meet-russian-company-building-powerful-suicide-drones-138747> accessed 24 Oct 20.

³⁸ IISS Military Balance 2018: UK Defence Budget \$US 50.7Bn, Azerbaijan Defence Budget \$US 1.55Bn.

³⁹ Both armies are equipped with BM-21 GRAD, with a range of 45,000m, and in service from 1963, and BM-30, able to engage at >90,000m.

ARMENIAN LOSSES FROM 27 SEP 20 VERIFIABLE IN OPEN SOURCE VIDEO AS AT 21 OCT 20
AS A PROPORTION OF BRITISH ARMY EQUIPMENT HOLDINGS

Equipment type	Verifiable Armenian losses as at 21 Oct 20	British holdings	Armenian losses as a proportion of British holdings	
MBT	141	109 (CR2)	100%	
IFV	31(+)	632 (WR Vars)	5%	100% post Integrated Review
AFV	16	1,291 (FV432)	1%	
AT Systems	2	0	100%	
SP Arty	12	89 (AS90)	13%	100% post Integrated Review
Towed Arty	40	114 (L118)	35%	
MLR	54	35 (MLRS)	100%	
Theatre AD	5	0	100%	
Med AD	1	0	100%	
Short AD	1	0	100%	
Point AD	14	42 (STORMER)	34%	

Had the British Army's, 'Armoured Division at Stretch', been holding Nagorno Karabakh against the Azeris, it would have been virtually destroyed as a fighting force in a little over three weeks in terms of all major equipment except infantry and armoured fighting vehicles (Warrior, FV432/Bulldog), and a relatively small number of AS-90 self-propelled guns.⁴⁰ The small numbers of Armenian non-MBT A Vehs destroyed probably reflects the small numbers deployed, rather than an inability of Azeri fires to engage them successfully.

A timely reminder of the importance of logistic functions

Less photogenic, and consequently less visible in the social media footage of the conflict, but perhaps as telling, was the destruction of Armenia's logistic support complex (306 trucks and other vehicles by 21 Oct 20).⁴¹ Armenia may have lost the capability to sustain a fight even within its own borders, let alone in Nagorno Karabakh and the disputed territories. The destruction of bridging leading from Armenia proper into NK by PGW,

⁴⁰ The 2021 Integrated Review has seen the decision to remove Warrior IFV and AS90 from the British Army's ORBAT, albeit with AS90 to be replaced 'within a decade'.

⁴¹ <https://www.oryxspioenkop.com/2020/09/the-fight-for-nagorno-karabakh.html> accessed 22 Oct 20.

and the paucity of roads, most of which lay within range of conventional Azeri artillery, and were observed by Azeri ISR, portended badly for Armenia's chances of maintaining a defence of the areas that remained in their hands over the medium term.

Future developments in sUAS are highly likely to exacerbate the danger to logistic support and Lines of Communication (LoC). While sUAS are unlikely to be able to destroy a bridge, denying it becomes a matter of flooding the area with loitering munitions capable of targeting soft-skinned vehicles. The logical extension to this, is that every location along a LoC becomes a deniable pinch-point – there is no longer a need to strike the bridge, or the cross-roads: simply deny the LoC. A number of Armenian arms and ammunition dumps, as well as significant quantities of artillery pieces and fighting & support vehicles were captured in the latter stages of the conflict when they ran out of fuel and/or ammunition as a result of the interdiction of their LoC, and destruction of the Armenian logistic system.⁴²

From a British perspective, the lack of organic logistic lift in the current order of battle, an almost complete lack of bridging capability, and the dearth of ground based air defence assets (especially those capable of denying s/mUAS), suggest significant challenges in maintaining Lines of Communication across Europe if the need were to arise to supply the UK component of the NATO Enhanced Forward Presence in the Baltic States in time of kinetic conflict, for example.

The Close Battle throughout the Depth

*"...the 'front' no longer lies in some distant theatre of operations, but is within the port, airfield, or barracks."*⁴³

By the third week of October the targets being shown on Azerbaijan's Ministry of Defence Social Media included groups of no more than 4 dismounted infantrymen, sometimes with/by a vehicle, but often in trenches or individual fighting positions.⁴⁴ This probably reflected a wish by the Azeris to project a narrative that 'you are never safe', but may also have been a response to a reduction in the availability of higher-level

⁴² See for example, <https://twitter.com/khalfaguliyev/status/1334055885824544769> , <https://youtu.be/KM5eRNf-JvM?t=127> , <https://twitter.com/Caucasuswar/status/1319988045446320128> , <https://youtu.be/Bsmo79Max5Y> , and <https://youtu.be/kuqPYjaS63Q> accessed 2 Jan 21.

⁴³ Introducing the Integrated Operating Concept, Ministry of Defence, 2020. p6 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/922969/20200930_-_Introducing_the_Integrated_Operating_Concept.pdf accessed 19 Oct 20

⁴⁴ <https://www.youtube.com/watch?v=-HYLEpBbrg> accessed 24 Oct 20.

targets. The alternative, that this was the result of improvements in Armenian TTPs that made it more difficult for the Azeris to locate and identify Armenian targets must be considered unlikely as numerous higher value targets did continue to be destroyed.

This shift to lower value targets was probably then a reflection of an Azeri strategic narrative that reflected the difficulties of taking and holding mountainous terrain in the face of even moderate opposition: if the morale of the Armenian/NKR forces could be broken through successful but increasingly low level attacks, in combination with interdiction of logistic support for their forces in mountainous terrain as winter approached, then there was a hope that resistance would end.

The principle focus of UAS operations shifted during the course of the conflict: in the first weeks of the conflict, the main priority was the destruction of AD and EW systems. Later, they mainly carried out air support, reconnaissance and target designation in support of ground FEs.

- At night, during all phases of the conflict, UAS carried out reconnaissance, target designation and acted as strike platforms.
- Some periods of this war stand apart, in days following the shelling of cities, leading to civilian casualties, (October 12 and 28, 2020), Azeri UAS deliberately sought out long-range artillery and enemy personnel.
- Throughout the conflict (when weather and EW conditions allowed⁴⁵) Azeri UAS flooded areas in the Armenian depth, acting as the sensor components of the Azeri sensor-strike complex.
- Targets in depth were destroyed by rocket and artillery means, Spike-ER NLOS missiles and/or loitering ammunition depending on the range.

Implications for the British Army

Sensor-Strike complexes. The overarching lesson of the conflict in NK is a reminder that forces facing an adversary that is able to soak the environment in a sensor-strike complex will suffer significant and

⁴⁵ From mid-October until the end of the war (November 9, 2020), weather conditions (clouds and fogs) sharply limited the use of drones. At about the end of October and early November, the Krasukha-4 and Pole-21 electronic warfare systems used by Armenia managed to block unmanned aerial vehicles for 3-4 days in the southwestern and central directions of Nagorno-Karabakh. However, the reconfiguration of the control channels led to the loss of the influence of these systems on the UAV. For these reasons, drones were not used in the decisive battle for the city of Shusha, which decided the outcome of the 2nd Karabakh war.

potentially total degradation of their Combat Effectiveness *unless and until they are able to deny sensor access.*

Despite substantial financial investment, such denial systems are not widely available, the US' attempts to produce a workable system have yet to succeed: "*SHORAD-IM should be highly effective against small numbers of drones, but it may be facing more targets than it can handle almost as soon as it is deployed.*"⁴⁶

Mass and Attrition. A focus on the Manoeuvrist Approach to warfare, even allied to an aspiration to disperse mass in the Strike concept, does not obviate the need to absorb casualties either of personnel or equipment. The Armenians have suffered combat losses as significant when manoeuvring as when in defensive positions, and throughout the extent of their depth.

There is a requirement for mass to absorb the effects of attrition. This is not merely a restatement of Stalin's aphorism that, '*Quantity has a quality all of its own*', but rather that, in order to achieve anything other than defeat, some combat losses must be accepted, and made good. The British Army of 2020 simply could not have absorbed the losses taken by Armenia in September 2020 at the hands of Azerbaijan, and have continued to operate, let alone fight.

Force Projection. The British Army's small numerical size, in terms of both troops and equipment, suggests that it is, in some regards perhaps, comparable to that of Armenia and the self-styled Nagorno Karabakh Republic before the start of the conflict in September. However, Armenia was effectively operating within its own borders, and not prosecuting an expeditionary operation at reach from its home base. The requirement to project force, in the way that current British doctrine implies in the ENGAGE, CONSTRAIN and FIGHT contexts, means that escalation dominance is almost certain to lie with the actors against whom the UK is seeking to engage.⁴⁷

Losses in personnel equivalent to Armenia's (some estimates put this as high as 7,000 by 23 Oct 20) would be unacceptable to a UK electorate which balked at the sight of the casualties in single figures from operations in Iraq and Afghanistan, and by extension to those whom they elect. Perhaps more fundamentally, such losses would also be irreplaceable in terms of trained troops.

⁴⁶ Hambling, D., *How U.S. Army's Billion-Dollar Gamble On Drone Defense Could Go Wrong*, available online at <https://www.forbes.com/sites/davidhambling/2020/10/14/how-us-armys-billion-dollar-gamble-on-drone-defense-could-go-wrong/> accessed 19 Oct 20

⁴⁷ <https://warontherocks.com/2020/04/toward-a-new-theory-of-power-projection/> accessed 15 Oct 20.

Equipment reserves. British equipment holdings, the scale of which have been driven by budgetary rather than strategic requirements, have focused on increasingly small numbers of increasingly exquisite kit. In-service upgrades are inevitably and prohibitively expensive, driving in turn further reductions in numbers, and ever more rarefied requirements for the next rotation of the procurement wheel. Consequently, equipment is effectively irreplaceable in terms of economic cost, timeliness, and in many cases absolute availability. This situation is amplified in one direction by Augustine's Law XVI (that there is an exponential rise in the cost per generation of military procurement),⁴⁸ and in the other by a corollary to Moore's Law (increasing costs in technical production are more than negated by growing volume in demand and production – sUAS appear to be following an evolutionary pathway closely linked to the development of smart phone technology).⁴⁹ UK military equipment is becoming prohibitively expensive at the same moment that its adversaries' equipment is becoming disposably cheap.

Armenia lost 76 D-1 and D-20 towed artillery pieces (that can be verified in open source video). These systems are broadly equivalent to the 5.5" guns that were in British service until they were replaced by the L118 Light Gun in 1976. Although Armenia declared them as disposed of under the Vienna Document on CFE some years previously, critically these guns were deployed and engaging the enemy, and must therefore have had trained crews, and available ammunition. A similar situation pertained in terms of fighting vehicles, for example, with numerous T-55s deployed (and lost).

Neither in terms of equipment and materiel, nor personnel does the UK hold a strategic reserve of this type, and certainly could not deploy two brigades' worth of 'current and competently' manned 5.5" guns, or a Regiment of combat ready Chieftain MBTs.

Asymmetric capabilities in conventional conflict. Adversary equipment, purchased at low cost and in bulk, now has the proven capability to destroy the British Army as a fighting force. A single CR2 purchased for £4M in 1999 (£4.84M equivalent in 2020) cost as much as 90 IAI HAROP loitering munitions, for example.

Conclusion

⁴⁸ Smallwood, D., Augustine's Law Revisited, *Sound and Vibration*. Available online at <http://sandv.com/downloads/1203smal.pdf> accessed 24 Oct 20

⁴⁹ Hambling, D., *Swarm Troopers: How small Drones will Conquer the World*, Archangel Ink, 2015. pp.98f.

The prosecution of Sensor-driven warfare by Azerbaijan in September and October 2020, follows the path beaten by Turkey in Syria in March,⁵⁰ Russia in Ukraine since 2014, and arguably Israel since soon after the turn of the Century.

Conventional military orders of battle, such as that of the UK, which do not boast this capability, though very expensive, are unlikely to be able to survive and fight in the face of such methodologies. The speed with which states can acquire them means that every potential adversary must now be considered as having the potential to act as Azerbaijan did in Nagorno-Karabakh in 2020.

Various courses of action suggest themselves, including:

- the comprehensive use of deception and deployment of Counter-Sensor/Counter-Platform Capabilities to mitigate the threat of constant enemy sensor-saturation of the battlespace;
- new tactics and doctrine to better obscure friendly FEs from enemy observation;
- developments in Counter-Rocket and Mortar, and Defensive Aids Suite type technologies;
- and, in the meantime, investment in a Sensor-Strike complex that—through target acquisition and enhanced range in fires—will at least allow a return to symmetry from asymmetry.

ANNEX A: DESTROYED & CAPTURED ARMENIAN AIR DEFENCE ASSETS THAT CAN BE VERIFIED IN OPEN SOURCE VIDEO

Equipment Role	Number Destroyed	Equipment	Remarks
SPAAG	1	ZSU-23-4 'Shilka'	
	35	MT-LB mounted SPAAG (Various)	
Surface-to-air missile systems	5	9K35 Strela-10 (SA-13 GOPHER)	
	15	9K33 Osa (SA-8 GECKO)	2 destroyed by Loitering Munition
	3	2K12 Kub (SA-6 GAINFUL)	
	4	S-300PS (SA-20 GARGOYLE)	3 destroyed by Loitering Munition

⁵⁰ <https://www.oryxspioenkop.com/2020/02/the-idlib-turkey-shoot-destruction-and.html> accessed 3 Jan 21.

	1	S-300 (SA-10 GRUMBLE) command component	
Radars	1	P-15 "FLAT FACE A"	
	2	P-18 "SPOON REST D"	
	1	P-19 "FLAT FACE b"	
	4	ST86U/36D6 "TIN SHIELD" for S-300 (SA-10 GRUMBLE)	1 destroyed by Loitering Munition
	1	SNR-125 "LOW BLOW" (for S-125)	
	2	5N63S "Flap Lid" for S-300 (SA-10 GRUMBLE)	1 destroyed by Loitering Munition
	1	19J6 for S-300 (SA-10 GRUMBLE)	
	1	1S32 "PAT HAND" for 2K11 Krug (SA-4 GANEF)	
	2	1S91 SURN for 2K12 Kub (SA-6 GAINFUL)	

ANNEX B: ARMENIAN LOSSES TO 21 OCT 20 WITH A UK HELD-STRENGTH COMPARISON

Equipment type	Azeri held-strength	Equipment	Armenian held-strength	NKR held-strength	Losses as at 21 Oct 20	Proportion Armenia held-strength lost (21 Oct 20)	Losses as at Ceasefire	Proportion Armenia held-strength lost	UK held-strength	Armenian losses as a proportion of UK held-strength 21 Oct 20 / 10 Nov 20
MBT	439		c. 560		141	c. 26%	226	c. 40%	109 (CR2)	>100%
	100	T-90S	1							
	244	T-72 (Variants)	c.550		141	c. 26%	226	c. 40%		
	95	T-55	5							
		T-54	3							
RECCE	15		75+				9	<12%		
	15	BRM-1K					5			
		BRDM-2	75	X	0		4	5%		
IFV	181		62+		31(+)	50% (+)	72	>100%	632 (WR Variants)	5% / 11%
	43	BMP-1	6	X	16(+)	21% (?)	34			
	0	BMP-1K	6		0					
	33	BMP-2	50	X	15(+)	30% (+)	32			
	88	BMP-3								
	7	BTR-80A								
	10(+)	BTR82-A								
APC	568		237+		16	7%	45	19%	1,291 (FV432)	1% / 3%
	336	MT-LB	52	X	15	29%	44	85%		
	10	BTR-60	62		0		0			
	132	BTR-70	11		1	9%	1	9%		
	0	BTR-80	112		0		0			
	20	BMD-1								
AT	10		36+		2	6%	10	27%	0	>100%
		AT-5	9	X	1	11%	5	56%		
		AT-6	27	X	1	4%	5	19%		

	10	AT-15								
ARTY SP	87		38+		12	32%	24	64%	89 (AS90)	13% / 27%
	46	2S1	10	X	8	80%	20	100% (+)		
	24	2S3	28	X	4	14%	4	14%		
	18	2A19								
	5	ATMOS200 0								
	12	2S7								
ARTY towed	207		131+		40	31%	168	>100%	114 (L118)	35% / >100%
	129	D-30	69	X	21	31%	81	100% (+)		
	18	2A36	26	X	2	8%	11	42%		
	36	M-46								
	0	D-1	2		6	100% (+)	15	100% (+)		
	24	D-20	34	X	11	32%	61	100% (+)		
	18	2S9								
	18	2S31								
MRL	133(+)		62-68+		54	80-87%	71	>100%	35 (MLRS)	>100%
	43	BM-21	47	X	50	100% (+)	68	>100%		
		WM-80	4	X	2	50%	2	50%		
	9(+)	IMI Lynx								
	12	RAK-12								
	18	TOS-1A	5		1	20%	1	20%		
	30	BM-30	6-12		1	17%	4	>33%		
	21	T-300								
AD										
Theatre									0	>100%
	X	S-200								
		S-300	50		5	10%	5	10%		
	2 x Bn	S-300PM								

Med									0	>100%
	X	SA-4	115	X	0		0			
	X	SA-2	79	X	1	1%	1	1%		
Short									0	>100%
		SA-6	X	X	1		3			
		SA-3	X	X	0		0			
		ZSU-23-4	X	X	1		7			
		MT-LB SPAAG	X	X	0		35			
Very Short									42	45% / 60%
	X	SA-7	X	X	3		3			
	X	SA-8	X	X	11		15			
	X	SA-11								
	X	Buk-MB								
	X	SA-13			5		5			
	X	SA-14								
	X	SA-16	X	X	0		2			
		SA-18	X	X	0					
	X	SA-24	X		0					
	X	SA-26								

GLOSSARY

A Veh	Armoured fighting vehicle
A2AD	Anti-Access/Area Denial
AA	Anti-Aircraft
AD	Air Defence
AN-2	Soviet/1940s era, propeller driven biplane transport aircraft.
AS-90	Artillery System of the 90s. The British Army's Self-Propelled Howitzer
Avn	(rotary-winged) Aviation
CFE	The Treaty on Conventional Forces in Europe (The Vienna Document)
CR2	Challenger 2 – the British Army's Main Battle Tank
EM	Electro-Magnetic (Spectrum)
FE	Force Element
Firebee	US super-sonic jet-powered target drone
FV432/Bulldog	The British Army's Armoured Personnel Carrier, dating from 1962. BULLDOG is the Mk3 variant up-armoured for service in Iraq & Afghanistan
GBAD	Ground-based Air Defence
GMTI	Ground Moving Target Indicator
HQ	Headquarters
IED	Improvised Explosive Device
IAI HAROP	Loitering munition developed by the MBT division of Israel Aerospace Industries
ISIS	Islamic State in Iraq and Syria (also <i>Da'esh</i>)
ISR	Intelligence, Surveillance and Reconnaissance
KARGU-2	Turkish small UAV
KS-19	Soviet towed 100mm Heavy Anti-Aircraft Gun

LoC	Line(s) of Communication
MAM-L	Turkish made <i>Mini Akıllı Mühimmat</i> (Smart Micro Munition), 160mm thermobaric-capable UAS launched lightweight laser-seeking missile.
MANPADS	Man-portable Air Defence System
MBT	Main Battle Tank
MoD	Ministry of Defence
MRGBAD	Medium Range, Ground Based, Air Defence
MT-LB	Soviet multi-purpose fully amphibious auxiliary armoured tracked vehicle
NATO	North Atlantic Treaty Organisation
NCO	Non-Commissioned Officer
NK	Nagorno-Karabakh
NKR	Self-styled Nagorno-Karabakh Republic
ORBAT	Order of Battle
Osa/GECKO	low-altitude, short-range tactical surface-to-air missile system
Pantsir	Family of self-propelled, medium-range, surface-to-air missile and anti-aircraft artillery systems
PECF	The UK's PROTECT, ENGAGE, CONSTRAIN, FIGHT framework for operations
PGW	Precision Guided Weapon
R&R	Rest and Recuperation
sUAS	Small UAS
mUAS	Medium UAS
S-300	Series of initially Soviet and later Russian long-range surface-to-air missile systems
S-60	Towed, road-transportable, short- to medium-range, single-barrel anti-aircraft gun
SAM	Surface to Air Missile

SHORAD	Short-range Air Defence
<i>SHORAD-IM</i>	Short Range Air-Defence – Initial Manoeuvre. US Army Air Defence Artillery capability which moves and manoeuvres in direct support of Brigade Combat Teams
SPAAG	Self-Propelled Anti-Aircraft Gun
SU-25K	Single-seat, twin-engine jet aircraft developed in the Soviet Union to provide close air support
T72-variant	Variants of the Soviet T-72 Main Battle Tank. Recent B3 & B3M upgrades are considered to be 3 rd Generation MBTs
TB2	Turkish Bayraktar UCAV
TTP	Tactics, Techniques, and Procedures
UAS	Unmanned Aerial System
UCAV	Unmanned Combat Aerial Vehicle
VSHORAD	Very Short-range Air Defence
Warrior	British Army tracked, armoured, Infantry Fighting Vehicle
ZSU-23-4	Lightly armoured tracked, radar guided anti-aircraft weapon system mounting 4 coaxial 23mm cannons
ZU-23-2	Towed 23mm twin-barrelled anti-aircraft autocannon