Drones over Nagorno-Karabakh: A glimpse at the future of war?

Joël Postma

Between September 27 and November 10, 2020, Armenia and Azerbaijan clashed over the disputed territory of Nagorno-Karabakh, as they had before between 1988 and 1994. This sequel, a classic battle for territory through a clash of military force, culminated in an Azeri capture of the strategically important town of Shusha, after which a Russian-brokered peace deal ended 44 days of fighting. While there was no formal surrender by Armenia, the results on the battlefield were clear: Azerbaijan had delivered a stunning military blow to the Armenian forces which left Yerevan with no choice but to accept the terms of the ceasefire agreement and pull back from most of the disputed region.

International coverage of the military operations gave much of the credit for this Azeri victory to the effective use of Unmanned (Combat) Aerial Vehicles (U(C)AV) and loitering munitions. A loitering munition is a weapon system category in which the munition loiters around the target area for some time, searches for targets based on a predetermined set of parameters, such as a specific radar signal, and attacks once a target is located. During the conflict, Azerbaijan frequently published videos of Azeri UAVs targeting Armenian armored vehicles and air defense systems. This played into the hype surrounding 'drone warfare' on the battlefield. The perceived ease with which Armenian tanks were destroyed by drones prompted some observers to claim the end of the era of the tank and make other sweeping assertions on the future of warfare.[1]

Does this conflict provide us with a scenario that has predictive value for the battlefield of the future, and does this future indeed belong to the drone? This article aims to moderate some of the hype surrounding this conflict. This 44-day conflict between two smaller powers in a geographically limited arena was not the paradigm-changing event that some have made it out to be. Drone warfare, while important, was not the single decisive factor in the war. Other factors besides the Azeri military technological edge contributed significantly to the eventual outcome. This article will place the use of drones and loitering munitions in the wider context of the conflict while still highlighting some valuable battlefield lessons that may inform future strategy, operations and tactics.

DRONE WARFARE

Both Armenia and Azerbaijan deployed drones during the course of the conflict. In the case of Armenia, these were mostly indigenously developed systems such as the Krunk and X-55 light reconnaissance drones and HRESH loitering munitions which did not seem to have a significant impact on Armenian effectiveness. Azerbaijan's unmanned arsenal, on the other hand, took center stage in the reporting of the conflict, especially as a continuous flow of strike imagery against Armenian armor and other units was being distributed by Baku.

According to the Stockholm International Peace Research Institute, Azerbaijan entered the conflict with an extensive inventory of unmanned aerial systems, consisting of loitering munitions (Harop, Orbiter 1K, Orbiter-3 and SkyStriker), reconnaissance UAVS (Hermes 450, Hermes 900, Heron, Aerostar and Searcher), and the Bayraktar TB2, a Turkish armed drone capable of carrying MAM laser-guided munitions. From this array of systems, the

Harop and TB2 stand out as being most effectively used against the Armenian prepared defensive lines and mobile targets.

The Israeli-made Harop (or IAI Harpy 2) is a loitering munition with a 50lb warhead and an endurance of approximately 6 hours, specifically developed for the Suppression/Destruction of Enemy Air Defenses (SEAD/DEAD) mission set. It is an anti-radiation weapon that autonomously homes in on radar emitters. It also has a man-in-the-loop mode which allows it to be manually targeted through an electro-optical sensor. During the conflict, Harops were effectively targeted against Armenian air defense systems and other (mobile) military targets. According to Oryx blog, an amateur research blog that collects battlefield statistics from open-source data, during the 44 days of fighting at least 3 Tin Shield and 2 Flap Lid radars, normally associated with S-300 batteries were destroyed by loitering munitions, as well as other targets including a bus that was carrying reinforcements.[2]

From open-source reporting, it seems likely that Azerbaijan devised an innovative tactic to trick Armenia into turning on its air defense systems in order to produce a radar signal for the HAROP to target.[3] Azerbaijan reportedly converted a number of old Soviet Antonov-2 biplanes into remotely piloted vehicles and flew them into the range of Armenia's air defenses. As the air defense systems, such as SA-8 Gecko, SA-13 Gopher and SA-10 Grumble, tracked and engaged the AN-2s, the HAROP picked up the radar signal and self-destroyed into the target.

The perceived ease with which Armenian tanks were destroyed by drones prompted some observers to claim the end of the era of the tank

The Bayraktar TB2 was perhaps the most surprising new asset on the battlefield. This Turkish UCAV had seen action in Turkish service in Libya and Syria, where it had proven its effectiveness against a range of Russian-made systems such as T-72 tanks, BMP-1 IFVs, ZSU-23 and Pantsir-S1 short-range air defense systems.[4] Purchased by Azerbaijan only in the summer of 2020, TB-2s were extensively deployed against Armenian defensive positions, lines of communication and assembly areas, using 50lb MAM-L laser guided munitions. The results were impressive. According to open-source research, TB2s destroyed 89 T-72 tanks, 29 armored vehicles, 131 artillery pieces, 61 rocket launchers, 543 trucks, 9 radar systems and 15 Surface-to-Air-Missile (SAM) systems.[5]
The TB2 does have a few drawbacks compared to high-end drones such as the MQ-9 Reaper. First, it is not (yet) able to be controlled via satellites which limits its range to Line-of-Sight operations, typically up to 150km. Attrition numbers for the TB2 are quite high. Dronewars.net estimates that in the first half of 2020, Turkey lost 16 UCAVs in Libya.[6] The Oryx blog reports two likely TB2 losses (one crash/one destroyed by enemy action) during the six-week conflict in Nagorno Karabakh.[7] At a price of about 1.6 million Euros including ground stations and associated infrastructure, however, the cost-benefit analysis still swings in the right direction for small-to-medium powers looking for an unmanned capability.[8]

THE IMPORTANCE OF TACTICS

While the abundance of YouTube videos of TB2s destroying Armenian T-72s in the open and Harops targeting air defense systems may suggest otherwise, Azerbaijan did not win this war by unmanned airpower alone. Besides its technological edge, Azerbaijan displayed a tactical proficiency which allowed it to outmaneuver its Armenian adversaries who, on their part, were not as tactically astute.

The Azeri campaign demonstrated solid combined arms operations with infantry following up preparatory fires by artillery as well as armed drones, mirroring current NATO doctrines. In the early phases of the conflict, UCAVS and loitering munitions were effective in targeted strikes creating chaos in the Armenian defensive positions and cutting lines of communication to the front. These operations cleared the way for Azeri mechanized and infantry units to move in and take control of the area.

Perhaps the most telling episode that underscores the assertion that it was not just drone warfare that dominated the conflict is the November 6-8 Azeri push for the town of Shusha. During this final battle of the war drones played only a limited role. Due to inclement weather –fog severely degraded ground visibility in early November – overhead surveillance and target acquisition was nearly impossible. The occupation of Shusha was executed by teams of SOF, climbing the rugged cliffs surrounding the town and clearing city blocks until Armenian forces retreated. While drones may have shaped the battlefield and supported the Azeri advance, in the end it was an old-fashioned infantry operation that dealt the final blow.

Azeri tactical success was compounded by Armenian tactical failure. From the available combat footage, it seems that Armenian armor formations disregarded the most basic tactical operating procedures. Drone combat footage that captured the final moments of Armenian units suggest a lack of dispersion of tank formations and no attempts to camouflage or conceal static firing positions. Also, research of open sources does not reveal any effec-

Even though the Nagorno-Karabakh conflict was far from a paradigm changing event, we would be amiss to disregard some of the lessons on the role of UAVs and loitering munitions that can be learned from this relatively short and limited conflict between two peer state powers. Depicted is a UAV on a truck in the Azerbaijani army victory parade in Baku (2020) (photo: Nurlan Mammadzada / Shutterstock.com)

tive use of active air defense systems within the tactical operating units.[9] With no significant air defense coverage, caused partly by Azeri strikes on systems such as the S-300 and ZSU-23s, and a lack of tactical proficiency, Armenia provided Azerbaijan with a turkey shoot in the open fields of Nagorno-Karabakh.

This lopsided battle was further exacerbated by a disbalance in equipment. While Azerbaijan had invested heavily in a modern force, including high-end drones and Israeli LORA tactical ballistic missiles, Armenia's order of battle still had a distinct Soviet-style character to it. As Robert Bateman asserted in *Foreign Policy* the Armenian problem was not the failure of the tank, but rather that they fielded "incompetently trained and equipped military forces that left themselves clumsily open."[10]

WHAT LESSONS SHOULD WE LEARN?

Even though the Nagorno-Karabakh conflict was far from a paradigm-changing event, we would be amiss to disregard some of the lessons on the role of UAVs and loitering munitions that can be learned from this relatively short and limited conflict between two peer state powers. These lessons, however, are not new, nor are they unique to this conflict. They can be added to similar observations on the use of drones by ISIL in Iraq and Syria, Turkey in Libya and Syria, and the strikes on Saudi Arabian airports and oil facilities by Iran-backed Houthi rebels.

Airpower to the People

The first overarching observation is that that drone warfare is no longer the prerogative of large states and armed forces with deep pockets. The effective use of UAS by Azerbaijan and the important role TB2s and Harops played in the Azeri victory over Armenia reinforces this notion. Airpower, the ability to deliver effects from the air, is becoming more available and at lower price points. Smaller actors, state and non-state alike, are ex-

ploiting this opportunity and jumping on the unmanned bandwagon.

This "democratization of airpower" has been visible in other theaters of war in recent years.[11] Pablo Chovil, an US infantry officer who served in Iraq in 2017 summarizes the effect even small consumer drones can have on the battlefield: "despite its clear military and technological superiority, the coalition to defeat ISIL in Iraq faltered in the face of devices that a 20-year-old with no formal military experience could easily obtain on Amazon. These cheap and easy-to-use devices, previously little more than toys, herald a democratization of technology on the battlefield that will change the way nations contend with adversaries."[12]

The increasing proliferation of these types of weapons poses a definite threat to future military operations. Be it against peer competitors or irregular and hybrid actors, Western military professionals and strategists need to think through the implications of an increased adversary drone presence on the battlefield and come up with possible mitigations. I offer two interrelated lessons at different levels of warfare that should inform this discussion.

In the next military confrontation Western military forces will not automatically have total control of the air

Tactical Air Defense

On the tactical level, in the realm of ground formations, the main lesson is the renewed importance of tactical defense against air threats. Both passive and active measures need to be diligently reviewed to determine whether current systems and operating procedures are still adequate against an evolving threat. The apparent ease with which TB2s and Harops destroyed Armenian targets reiterates one of the universal rules of battle: if you can be seen, you can be shot. This highlights the importance of Concealment, Camouflage and Deception (CCD).

Even though the outdated Armenian order of battle and their questionable tactical proficiency exacerbated the outcome on the battlefield, this lesson does not fall on deaf ears in military organizations around the world. In their podcast, the US Army Mad Scientist Laboratory takes this lesson on passive defensive measures to its logical extreme: "Camouflage is no longer enough. We must define, study, and promote the concept of masking as a key element of war—possibly elevating it as a separate principle of war. Our mantra must be 'Mask or Die'."[13]

A similar urgency is discernible in the discussion on active defensive measures. Besides efforts to conceal and camouflage against acquisition from the air, tactical units should have an organic capability to actively defend themselves against threats that may have slipped through the wider air defense network. Traditional tactical air defense systems, such as Stinger missiles may still be effective against larger UAS. The challenge becomes more difficult, however, as the size of the UAS decreases and even more complex as adversaries deploy drone swarms, possibly saturating air defense systems. This makes the active defense against drones a wicked problem. As a recent JAPCC report on countering UAS warned: "the field of counter-UAS needs to be on the cutting edge of current developments as well, otherwise, NATO will have a clear and decisive disadvantage in upcoming missions."[14]

Air Superiority

As an operational or even strategic corollary to the first lesson, the conflict in Nagorno-Karabakh should be another trigger for Western armed forces to rethink their conceptions of airpower and, specifically, control of the air. At the tactical level, the objective is not to be seen from the air, or—in case passive defense fails—to be able to defend against incoming air threats. Life at the tactical level can be made much easier if adversary systems cannot even get in range to acquire a target—the essence of air superiority.

For decades, Western ground forces have been able to operate safely under an air umbrella. This has led to a worrying degree of complacency. Many joint tabletop-exercises assumed control of the air and did not give much thought to plans to gain and maintain air control against a capable adversary. The proliferation of cheap, yet very capable, unmanned systems such as the TB-2 and Harop challenges this complacency and puts the onus on Western armed forces to take a good look at our own doctrine.

In many Western forces, and despite much conceptual work on multi-domain operations or the latest American-led push towards Joint All Domain Operations (JADO) and Combined Joint All Domain Command and Control (CJADC2), there is still a noticeable divide between the domain-oriented components and services. The answer to the question of who is responsible for control of the air in what part of the airspace (laterally or vertically) is just not always clear. Especially at the lower altitudes this divide creates maneuver space for systems such as loitering munitions and UCAVs. Azeri operations demonstrated just how effective these systems can be against an adversary who does not control the air above its ground forces.

A Russian-brokered peace deal ended 44 days of fighting after the Azeri capture of Shusha. Depicted are recent burials (November 22, 2020) in the Yerablur Military Memorial Cemetery in Yerevan, Armenia (photo: Gevorg Ghazaryan / Shutterstock.com)

Traditionally, the aim of air superiority is to gain and maintain control of the airspace over a geographically defined area for a certain amount of time while denying any form of control to your adversary. This concept is currently biased towards air and missile threats at the higher flight levels. The main protagonists in this game are high-end sensors and shooters such as Patriot air defense systems, manned fighter Combat Air Patrols (CAPS) and intricate command-and-control networks consisting of a central node and an integrated web of sensors (land-based or airborne).

Drones and loitering munitions that operate at lower altitudes, in the seams between ground and air forces, and which can be challenging to detect, target and engage before they become a threat, are not being sufficiently countered in our traditional approaches to control of the air. This challenge is being addressed in the discussions on JADO and related concepts, as well as in the NATO Integrated Air and Missile Defense Program. Nevertheless, Western forces should ensure this discussion receives the attention and resources it requires or face the consequences on the battlefield in future operations.

CONCLUSION

The analysis of 44 days of fighting in Nagorno-Karabakh and the influence of drones and loitering munitions on the course of the war does not justify making grand sweeping statements about the viability (or lack thereof) of armor on the battlefield, let alone the character of future warfare. It does, however, provide a few interesting observations that reinforce the need to have profound discussions on how we prepare for the battlefield of the future.

Drones and loitering munitions have undeniably claimed their place in military arsenals. It is more than likely that in the next military confrontation Western military forces will not automatically have total control of the air at all times and will have to face threats from a variety of adversary UAS. Preparation for this scenario starts with a deep look inside our own doctrine and procedures. Are

While there was no formal surrender by Armenia, the results on the battlefield were clear: Azerbaijan had delivered a stunning military blow to the Armenian forces which left Yerevan with no other choice but to accept the terms of the ceasefire agreement and pull back from most of the disputed region. Depicted is a victory parade by Azerbaijani soldiers in Baku (2020) (photo: Nurlan Mammadzada / Shutterstock.com)

our concepts of airpower, air defense and air superiority still in tune with current technological and operational developments? Or should we go back to the drawing board and come up with something new that goes beyond highly abstract conceptual pondering and provides our forces with tangible doctrine and procedures that are more tailored to the evolving realities of drone warfare?

Lieutenant Colonel Joël Postma (RNLAF) is an Assistant Professor of Airpower Studies at the Netherlands Defense Academy. He holds a MA in American Studies from the University of Groningen, a Master in Strategic Studies from USAF Air War College, and an M.Phil in Strategic Studies from the USAF School of Advanced Air and Space Studies. His interests include strategy, all things airpower, and space.

Would you like to react?
Mail the editor: redactie@atlcom.nl.

1. See, for instance: *Washington Post*, 'Azerbaijan's drones owned the battlefield in Nagorno-Karabakh – and showed future of warfare', November 11, 2020, https://www.washingtonpost.com/world/europe/nagorno-karabkah-drones-azerbaijan-aremenia/2020/11/11/441bcbd2-193d-11eb-8bda-814ca56e138b_story.html, and *The National Interest*, 'Does the Nagorno-Karabakh conflict prove the tank is toast?', October 5, 2020, https://nationalinterest.org/blog/buzz/does-nagorno-karabakh-conflict-prove-tank-toast-170155
2. Oryx Blog, 'The fight for Nagorno-Karabakh: Documenting losses on the sides of Armenia and Azerbaijan', Accessed on April 2, 2021, https://www.oryxspioenkop.com/2020/09/the-fight-for-nagorno-karabakh.html
3. Overt Defense, 'Azerbaijan reportedly converted Ancient AN-2 biplanes into drones', October 5, 2020, https://www.overtdefense.com/2020/10/05/azerbaijan-reportedly-convert-ancient-an-2-biplanes-into-drones, and *The Bulletin of Atomic Scientists*, 'The next frontier in drone warfare? A Soviet-era crop duster', February 21, 2021, https://thebulletin.org/2021/02/the-next-frontier-in-drone-warfare-a-soviet-era-crop-duster/
4. *Forbes Magazine*, 'Turkish drones and artillery are devastating Assad's forces in Idlib province – here's why', March 2, 2020, https://www.forbes.com/sites/sebastienroblin/2020/03/02/idlib-onslaught-turkish-drones-artillery-and-f-16s-just-destroyed-over-100-armored-vehicles-in-syria-and-downed-two-jets/?sh=4d31349c6cd3
5. Oryx Blog, 'The fight for Nagorno-Karabakh'
6. Drone Wars, 'Libyan war sees record number of drones brought down to earth', July 1, 2020, https://dronewars.net/2020/07/01/libyan-war-sees-record-number-of-drones-brought-down-to-earth/
7. Oryx Blog, 'The fight for Nagorno-Karabakh'
8. Compared to a per unit cost of approximately $20 million Euro for a General Atomics MQ-9 Reaper. *The Guardian*, 'UK wants new drones in wake of Azerbaijan military success', December 29, 2020, https://www.theguardian.com/world/2020/dec/29/uk-defence-secretary-hails-azerbaijans-use-of-drones-in-conflict.
9. The Jamestown Foundation, 'Tactical reasons behind military breakthrough in Karabakh conflict', November 3, 2020, https://jamestown.org/program/tactical-reasons-behind-military-breakthrough-in-karabakh-conflict/
10. *Foreign Policy*, 'No, drones haven't made tanks obsolete', October 15, 2020, https://foreignpolicy.com/2020/10/15/drones-tanks-obsolete-nagorno-karabakh-azerbaijan-armenia/
11. T.X. Hammes, 'The democratization of airpower: the insurgent and the drone', *War on the Rocks*, October 18, 2016, https://warontherocks.com/2016/10/the-democratization-of-airpower-the-insurgent-and-the-drone/
12. Pablo Chovil, 'Air Superiority Under 2000 Feet: Lessons from Waging Drone Warfare Against ISIL', *War on the Rocks*, May 14, 2018, https://warontherocks.com/2018/05/air-superiority-under-2000-feet-lessons-from-waging-drone-warfare-against-isil/.
13. The Convergence: an Army mad scientist podcast, 'Top attack: lessons learned from the second Nagorno-Karabakh war', April 1, 2021, https://madsciblog.tradoc.army.mil/317-top-attack-lessons-learned-from-the-second-nagorno-karabakh-war
14. NATO Joint Air Power Competence Center, 'A comprehensive approach to countering unmanned aircraft systems', 2020, https://www.japcc.org/c-uas-defensive-counter-air-operations/