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Some Reflections on Air and Air Defence War: Five Months and Counting



Lieutenant General (Dr.) VK Saxena, PVSM, AVSM, VSM (Retd), is a Visiting Fellow at CLAWS. General Saxena was the Former Director General of the Corps of Army Air Defence. He is also a Distinguished Fellow at VIF. He has authored 5 books and publishes regularly across defence media. He is also a familiar face on TV, speaking on multiple issues in his core competency domain.

Setting the perspective

A few days back, on 24 July 2022, the Russo-Ukrainian war entered its sixth month, treading a bloody path of catastrophic destruction and sending much of the world economy into an 'unpredictable' turmoil and a looming recession.

As regards the air and air defence war, the five months gone by have thrown up all the nuances of a full spectrum 'cause and effect duel' between the parties to the conflict "with bystanders outside the ring actively fuelling this 'global war' in a local scenario".

This article is a reflection on the course of 'air and air defence war', highlighting certain takeaways.

Key Points

- A few days back, the Russo-Ukrainian war entered its sixth month, treading a bloody path of catastrophic destruction.
- All along its course of five months, the Ukrainian skies have remained contested, with both sides facing casualties in the air and air defence duel.
- The five months gone by have thrown up all the nuances of a full spectrum of the 'cause and effect duel' between the parties to the conflict.
- This article is a reflection on the takeaways from the air and air defence war.



If the Pre-Emptive Strike Does Not Deliver – What Happens?

It was the night of 23/24 February 2022 when the mighty Russian war machine, standing aside the Eastern and South Eastern border of Ukraine, had put together a ‘mighty punch’. Here is a brief capture of what constituted this punch:¹

- An array of strike fighters (MiG 29, SU 25SM, Su 27, Su 30 and SU35) and attack helicopters (AHs) [Mi 24, Mi 35, Ka 52, Mi 24P, Mi 8, Mi 28N].
- Long range Surface-to-Surface Missiles (SSMs) — OTR- 21 Tochka Tactical ballistic missile (range 120 km), 9k720 Iskander SSM (range 400-500km), Kalibr ballistic missile (range 1500-2500 km) Kinzhal aero-ballistic hypersonic missile (joined later; range more than 2000 km) and many more.²
- A variety of Multi Barrel Rocket Launchers (MBRLs) or Multi-Launcher Rocket Systems (MLRS) like BM 21 GRAD P (range 20 km), BM-30 Smerch (range 70-90 km), 9A 52-4 Tornado MRLS (range 90 km).³
- A variety of guns and howitzers— Giatsint towed and Self-Propelled (SP) howitzer (range 30-40km), Koalitsiya SP Howitzer (range 40 km), 2S19 Msta SP Howitzer (range 30-40 km), 2S7M Malka heavy (203mm) SP Howitzer (range 37.5 km range), and Mortars (82 mm, 122mm).⁴

A large quantum of the above arsenal was used to carry out a solid pre-emptive strike across chosen targets in Ukraine during the night 23/24 February. The strikes, however, continued in the following days. The aim was as under:

- To destroy maximum quantum of Ukrainian air assets (aircrafts, helicopters, air traffic control assets, infrastructure) while still on ground (referred to as Counter Air Operations or CAO).
- To carry out an operation called ‘Suppression of Enemy Air Defence’ (SEAD). The aim of SEAD is to make the enemy’s air defences incapable to counter the attacker’s air threat. It involves destroying the enemy’s early warning and fire control radars (which provides warning about impending air attack and control the fire of guns and missiles) and destroy enemy’s Air Defence Control and Reporting System (ADCRS), that controls the air defence battle of detecting, intercepting and destroying the air threat.

Figure 1: Pre-emptive Strike by Russia on 24 February 2022



Source: <https://www.google.co.in/search?q=Russian+air+strikes+Ukraine+24+Feb+2022&tbn>

Unfortunately for Russia, the initial pre-emptive strike, as well as, the following subsequent attacks fell short of the above aim— neither could they kill much of the Ukrainian air assets in CAO operations nor fully disable their ADCRS in the SEAD operations. Why? Some of the causes, as interpreted from open source, are put together:

- Way back in 2014-2015 when rebel operations in the Donbas region were in full swing and Ukraine was suffering from heavy air and ground losses, it learnt the lesson of ‘hardening’ its air defence nodes and control centres (ADCRS) by locating them undercover or in underground shelters. This saved them to a large extent in 2022.
- Also, since much of Ukraine’s air assets were under cover, therefore, they did not present ‘sitting duck’ targets to Russian air and ground strikes during the CAO operations.
- Russia faced and continues to face the result of this undoing till date. Ukrainian air and air defences are still alive five months into the war and counting, causing casualties to Russian aircrafts and AHs.
- A mighty air, and air defence power like Russia is unable to achieve a Favourable Air Situation (FAS) in Ukraine, leave aside air supremacy.



Therefore, if the pre-emptive falls short and defender's ADCRS continues to remain alive, battle skies will remain ever contested, no matter how strong is the attacker's air and ground power.

The Menace called MANPADS

While the typical teeth of air defence arsenal constitutes a complete continuum of Long Range, Medium range and Short Range SAMs (LRSAMs, MRSAMs and SRSAMs) complimented by the towed and SP guns for terminal engagement of air threat, there is yet another class of weapon, which if not countered holistically, can cause heavy casualties on the attacker. This weapon is known as the man-portable air defense system (MANPAD).

- Also, going by the generic name of Very Short Range Air Defence Systems (VSHORADS) (wherein it includes all variety of terminal air defence weapons), MANPADS are basically shoulder/pedestal fired short range missiles (typical range 5-8 kms and altitude ceiling 1000-3500m). MANPADs being small and highly flexible need not conform to a rigid and conventional air defence deployment. There are many ways by which these can be deployed :
 - Deployment in conjunction with air defence guns, thus converting a typical gun based defence into gun missile defence providing a higher range and reach envelop.
 - Standalone deployment in 'air ambush' role wherein MANPADS deployed at unconventional and unexpected places (eg. along defiles/passes/bottlenecks/built-up-areas/rooftops/countryside etc.) awaits their prey.
 - Standalone deployment in areas, inaccessible to conventional weapons, along the likely approach routes of enemy air.
- Ukraine has proliferated the tactical battle field with hundreds of MANPADS—either from its own inventory or supplied in thousands by the western countries (Igla, Igla 1S, Strela 2M in its own inventory Stinger SAMs from USA, Star Streak SAMs from UK and similar weapons from Germany, Denmark, Lithuania and Netherlands⁵).

The above MANPADs have scored multiple kills on Russian air assets. Why?

Figure 2: Russian KA 52 Attack Helicopter Hit by a MANPAD



Source: <https://www.google.co.in/search?q=MANPADS+HITTING+RUSSIAN+ATTACK+HELICOPTERS+IN+UKRAINE&tbm>

- Being unconventionally deployed and in an unobtrusive manner, makes them difficult to be identified by the attacking aircrafts/AHs.
- Being ‘fire and forget’ type of weapons, which locks on the target just prior to launch, these do not paint a strong ‘threat picture’ on the ‘Radar Warning Receivers’ on board the attackers’ platform.
- Most of the MANPADS follow one of the three guidance methods:
 - **Command to Line Of Sight (CLOS).** A remote controller maintains a line of sight to target and the missile is guided on to that.
 - **Laser.** Missile rides the laser beam illuminating the target.
 - **Infra-red or IR.** Missile locks on to the heat source on the target.
- Since MANPAD engagement is mostly in the visual domain, the time of flight is too short for the target to adopt any effective evasive measures. In addition, most of the engagements are sudden and surprise attacks on their unsuspecting victims.

Few Takeaways

One of the most effective way to deal with a much stronger air power is to ‘proliferate’ the battlefield with large number of MANPADS.

- MANPADS are a big menace to the attackers— difficult to detect in time and difficult to adopt evasive measures in time.

The Game of the Little Monsters

Turning the tide for Azerbaijan against Armenia in the battlefields of Nagorno-Karabakh in September 2020 by claiming huge kills of tanks, air defence guns, artillery pieces and more⁶; earlier showing their might in Western Syria (attack on Khmeimim Air Base and Tartus Naval Base January 2018)⁷ and in Saudi Arabia in September 2019⁸ (attack on two oil facilities), the small drones as ‘little monsters’ are taking their toll in the Russo- Ukraine war. Some salient points are covered.

Figure 3: Bayraktar TB2 Drone in Action



Source: <https://www.google.co.in/search?q=bayraktar+tb2drone+killing+russian+tanks+in+Ukraine+war&tbm>



- Ukraine has deployed variety of drones in the battlefield. These basically include Turkish TB-2 Bayraktar drone or the USs witchblade Kamikaze drones.⁹
- Bayraktar TB-2 is a fully loaded and capable machine—its ‘typical’ payload includes the guided weaponry (L-UMTAS anti-tank guided missile (ATGM), MAM-C and MAM-L laser guided HE, thermo-baric ammunition and Cirit laser-guided munitions).¹⁰
- Enjoying all the virtues of ‘low-detectability’ to conventional air defence radars and imposing skewed costs on defenders if killed by conventional missiles (as was seen to be done a few times), the drones are seen taking kills as under:
 - Claiming ‘tank kills’— often bringing long and unwinding convoys to a grinding halt.
 - Taking kills on Ground Based Air Defence Weapons (GBADWS) when these were caught huddling in convoys instead of deployed and firing in a ‘leap frog sequence’ (one foot on the ground).

Few Takeaways

- Small drones (including drone swarms) are re-defining the way in which the air threat will be prosecuted in the tactical battle area (TBA) in times to come.
- Killing these little monsters calls for a whole new range of anti-drone systems featuring multiple kill means (hard kill/ laser kill/ RF kill/ EW kill).
- Trying to counter small drones with conventional GBADWS is like killing a fly with a sledge hammer—it will inflict unacceptable costs to the defender in the long run.

Some Final Reflections

Air war is an eternal ‘cause-effect duel’. In that, as the attacker keeps revamping the air threat, both quantitatively (numbers of air threat platforms pressed in) and qualitatively (accuracy and lethality of weapons and munitions), the defender is always reacting by trying to field such weapons with the moot aim of countering the threat platform.

While this ‘see-saw’ is doing its deathly dance in Ukraine, both sides continue to take casualties in aerial platforms, as well as, air defence means. Some final reflections however stare in the eye as abiding truths. These are reiterated very briefly:

- A strong and effective pre-emptive air strike is an essential precursor to opening an air/air defence duel.



- Since 'surprise' is the DNA of pre-emptive strike, the defender's intelligence must play up to deny this advantage to the attacker. Ukraine, despite adequate signals (developments in Donbas, gradual massing up of Russian Forces on the Eastern and SE border of Ukraine), did allow the 'surprise' factor to the attacker.
- If for any reason whatsoever, either the initial pre-emptive strike or the actions by the attacker thereafter, are unable to either destroy maximum of the air assets of the defender on ground in the CAO or disable the ADCRS and in SEAD operations, the battle skies will ever remain contested no matter how big and mighty is the air power of the attacker. This was 'loud and clear' in this conflict.
- Accordingly, for the defender, the important means, to preserve and sustain the capability to prosecute the air and air defence war, are not only the air assets, but also, the air defence command and control nodes and the BMC2 infrastructure on which rides the ADCRS— the lifeline of air defence battle.
- Thanks to the experience gained by Ukraine in the early days of the rebellious war in Donbas in 2014, actions were taken to secure the air defence nodes and the ADCRS, so that it was not destroyed during the pre-emptive strike. This allowed them to still fly the Ukrainian colours in the battle skies five months into the war and counting.
- One of the effective ways to deal with a much stronger air power is to proliferate the tactical battle area with hundreds of MANPADS. These small tubes can strike unobtrusively in the nook and corner of the battlefield and can cause many surprises, thus taking a high toll on the attacker.
- It is in this context that the author has been voicing his strong concerns for making up the MANPADS voids in our scenario and for acquiring the capability of indigenous production of MANPADS under Make-in-India, programme.¹¹
- Drone and drone swarms are redefining the future of aerial combat in the TBA. Inspired by the amazing intelligence of a swarm and driven by the enabling tools of Artificial intelligence, these little monsters are giving a totally new signature to air attack - autonomous, precise and devastating.
- Drones (as the ongoing conflict has shown), demands a complete new arsenal of drone specific weaponry both in the hard kill, as well as, the soft kill domain. Any



attempt to kill the ‘flies with sledge hammer’ will inflict unacceptable costs to the defender in the long term.

That is the scene out there in the battlefield as the ‘global war in the local scenario’ is now in its sixth month and counting.

End Notes

¹ VK Saxena, “Why the Ukrainian Skies are Still Contested”, *VIF*, 24 March 2022. Available at <https://www.vifindia.org/article/2022/march/24/why-the-ukrainian-skies-are-still-contested-an-assessment>. Accessed on 21 July 2022.

² VK Saxena, “The Power of the ‘God of War’: Assessing the Russian Advantage in Artillery in the Russo-Ukrainian War”, *VIF*, 27 July 2022. Available at <https://www.vifindia.org/article/2022/july/27/the-power-of-the-god-of-war>. Accessed on 22 July 2022.

³ Ibid.

⁴ N.1.

⁵ Diksha Munjal, “What are MANPADS that the West is Sending to Ukraine?”, *The Hindu*, 17 March 2022. Available at <https://www.thehindu.com/news/international/what-are-manpads-that-the-west-is-sending-ukraine/article65218537.ece>. Accessed on 25 July 2022.

⁶ VK Saxena, “Why Drones Turned the Tide for Azerbaijan? An Analysis”, *VIF*, 04 December 2020. Available at <https://www.vifindia.org/article/2020/december/04/why-drones-turned-the-tide-for-azerbaijan-an-analysis>. Accessed on 26 July 2022.

⁷ VK Saxena, “Commentary: First Ever Swarm Attack has Happened”, *VIF*, 19 January 2018. Available at <https://www.vifindia.org/article/2018/january/19/commentary-first-ever-swarm-attack-has-happened>. Accessed on 26 July 2022.

⁸ Ben Hubbard, Palko Karasz and Stanley Reed, “Two Major Saudi Oil Installations Hit by Drone Strike, and US Blames Iran”, *The New York Times*, 15 September 2019. Available at <https://www.nytimes.com/2019/09/14/world/middleeast/saudi-arabia-refineries-drone-attack.html>. Accessed on 26 July 2022.

⁹ “What Weapons have Other Countries Supplied to Ukraine?”, *The Guardian*. Available at www.theguardian.com. Accessed on 27 July 2022.

¹⁰ Ibid.

¹¹ VK Saxena, “Critical Requirement of VSHORADS: A User’s Perspective”, *VIF*, 23 May 2017. Available at <https://www.vifindia.org/article/2017/may/23/critical-requirement-of-vshorads-a-user-s-perspective>. Accessed on 28 July 2022.

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CENTRE FOR LAND WARFARE STUDIES (CLAWS)

RPSO Complex, Parade Road, Delhi Cantt, New Delhi 110010

Tel.: +91-11-25691308, Fax: +91-11-25692347, CLAWS Army No. 33098; Email: landwarfare@gmail.com

Website: www.claws.in