

Exploitation of Air Power in Russia-Ukraine Conflict and Lessons for IAF

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INTRODUCTION

The Russia–Ukraine war has drawn attention from across the world to learn tactical and strategic lessons for their own ongoing regional conflicts. Although the West is actively supplying combat hardware to Ukraine, the aggressor in this war has a major asymmetrical advantage in terms of military resources. The end result of this war would have massive implications for future warfare. India, as an emerging Superpower, must closely monitor the effects that modern-day Air Forces can bring on altering the dynamics of the war.

Some key observations and takeaways for Indian Air Force (IAF) in terms of usage of new technology, application of air power and synergy among Ground forces and Air Force are discussed in this article.

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DRONES

Autonomous and unmanned systems can be considered the future of warfare. The Russia-Ukraine war has featured usage of more drone technology than any previous war. The defender in the ongoing conflict has utilised drones very effectively to neutralise Russian aircraft and combat tanks on the battlefield. The real-time intelligence gathered by Ukrainian drones led to the decimation of the premier warship (*Moskva*) of the Russian Black Sea fleet. Their innovative employment of drones in urban-semi-urban areas has proven to be very cost-effective.

According to open source intelligence, 60 Russian assets have been destroyed till date by drones since the war has begun.¹ They have played a major role in the recent counter-offensive success of the Ukrainian armed forces.

The Medium-Altitude Long-Endurance (MALE) drone, Turkish Bayraktar TB2 has played a substantial role in Ukrainian operational success. It is armed with laser-guided bombs and targets vehicles, troops and military stations. The US-made Switchblade and Russian Lantset, also known as “Kamikaze drone”, have also been extensively used.² Lantset is man-portable and has the ability to loiter and search before finally engaging a target.

Though the drones mentioned above are highly effective, the UAVs used by Ukrainian soldiers are simple, commercially off-the-shelf available drones with inbuilt high-resolution cameras that can be paired with a smartphone. Ukrainian soldiers exploited

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1. Aleksandre Tsereteli, “Use of Technologies in the Russia-Ukraine War”, at <https://www.freiheit.org/ukraine-and-belarus/use-technologies-russia-ukraine-war>. Accessed on August 2, 2022.
 2. Joe Sabela, “Turkish Bayraktar Drone Fires Laser-Guided Missile During Trial”, *The Defense Post*, July 4, 2022, at <https://www.thedefensepost.com/04/07/2022/turkey-bayraktar-drone-missile/>. Accessed on August 2, 2022.

them for intelligence gathering, surveillance and reconnaissance giving them the much required edge over the enemy.

LESSONS

We should draw our own lessons on how these drones, ranging from weighing a few kilograms to sophisticated UCAVs can be used by Pak-backed insurgents by sub-conventional warfare in Kashmir. The recent sabotage attack by a drone near an Air Force station in Jammu, and the use of drones in border areas of Punjab and LOC has highlighted the changing nature of threat we face in future as drone technology further matures.

We have to develop innovative ways to seek and neutralise such aerial targets while still maintaining operational efficiency of our surveillance resources for combat warfare. We also need to look at the scope for exploitation of high-altitude long-endurance and medium-altitude long-endurance remotely piloted aircraft to fill the surveillance voids.

MAN-PORTABLE AIR DEFENCE SYSTEMS (MANPADS)

The Russian Air Force (RAF) carried out missions at the start of the war to neutralise Ukrainian Air Defence resources including ground radars, combat aircraft on ground successfully. Some passive weapon systems including MANPADS like Stingers and Starstreak supplied by NATO proved to be very effective in preventing Russians from gaining complete control of the air.³

The RAF has used precision bombs and missiles in a restricted manner to cater for the NATO contingency. It has forced usage of traditional munitions at lower altitude in specific time and space, to gain advantage in Tactical Battle Area (TBA), which has brought the use of MANPADS to the forefront. Data from open sources

3. Denys Davydenko, "Why advanced weapons can help Ukraine defeat Russia", April 20, 2022, at <https://ecfr.eu/article/why-advanced-weapons-can-help-ukraine-defeat-russia/>

suggest that the Russians have so far lost 18-20 fighter aircraft and 15-30 attack helicopters to these manpads.⁴

LESSONS

During the Kargil conflict, Indian Air Force lost helicopters and fighter aircraft to MANPADS used by the enemy during active operations. In view of the prevailing threat scenario in Kashmir valley, the utilisation of MANPADS against our vital strategic air assets and force multipliers is a reasonable possibility.

Close coordination amongst various intelligence agencies about accurate locations of these threats in specific areas of TBA can help the mission planners to avert these threats for own advantage towards targeting vital enemy assets.

Our intelligence agencies and counter-infiltration grid must pre-empt enemy's attempts to position MANPADS on Indian land.

INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (ISR)

Military strategist, Sun Tzu said, "Know your enemy, know yourself, in one hundred battles, you will never be in peril." Weapons are only credible when they can perform offensive, defensive or dual roles at the right time, right place and on the right target. This is only possible when ISR capability allows the weapon system to gather credible information about the mission and perform task efficiently.

Ukrainian armed forces are armed with Intelligence gathered by West-backed powerful intelligence services of the world. Precision strikes on Russian tactical targets by small drones, UCAVs, Long-Range Surface-to-Surface Missiles (LRSSMs),

4. "Russia invades Ukraine", at <https://suspilne.media/211514-russia-invades-ukraine-live-updates-suspilne/26-august2022>

namely, HIMARS, can be attributed to the knowledge sharing between Ministry of Defence of Ukraine and Western allies.

LESSONS

Development of advanced ISR capabilities is crucial for India's employment of conventional and nuclear weapons. It is very important that national ISR assets complement weapon systems. IAF has made good progress on this front so far by operating HERON, NETRA, AEW&C and other space-based assets like INSAT and integrating them with weapon systems. RUSTOM-2, being developed by HAL for the development of UAVs with ranges in excess of 250 km, is an appreciable initiative in this direction. The focus on indigenous manufacturing of UAV and UCAV systems as well as accelerated R&D projects by HAL is a masterstroke towards self-reliance by the government.

ARTIFICIAL INTELLIGENCE (AI)

AI operates at speeds that would otherwise require hundreds of analysts to process the same amount of data. Ukrainians appear to have successfully applied advanced AI tools to publicly available imagery for producing critical information. Ukrainians are exploiting Russian soldiers' massive usage of unencrypted communications.

AI focused Tech Company, Primer, modified its commercial AI-enabled voice transcription and translation services to process intercepted Russian communications. It automatically highlights information relevant to the Ukrainian armed forces in a searchable text database.⁵

LESSONS

India is the global hub of talent from IT space and various AI-based emerging start-ups. Initiatives like joint workshops during

5. Aleksandre Tsereteli, n. 1.

peacetime among our Cyber Cells, Ops crew and these AI tech start-ups may lead to improvement in our Intelligence network's efficiency, emergence of new ideas and yield better results operationally.

SPACE

Commercial space company, SpaceX delivered aid of Starlink Internet to Ukraine⁶ after Russian ground forces took control over access to Internet to masses in some regions. Ukrainian drones are using Starlink Internet services to attack Russian forward positions.

Other commercial space companies have responded as well. These companies are predominately focused on remote sensing and satellite communications. The support they have provided has been critical in delivering timely intelligence on Russian troop movements and keeping Ukrainian military communications networks operational.

LESSONS

The responsibility of protecting Indian interests in outer space lies with Defence Space Agency. It is tasked with operating the Space warfare and Satellite Intelligence.

The successful demonstration of Anti-Sat weapon technology handed our political leadership a great leverage with capability to neutralise enemy's military and Communication satellites at will.

Antrix Corporation, the newly-formed commercial subsidiary of ISRO, can be utilised to find similar space-based solutions during conflicts. There is further research required in the field

6. Michael Sheetz, "Musk's SpaceX sent thousands of Starlink satellite internet dishes to Ukraine, company's president says", at <https://www.cnbc.com/2022/03/22/elon-musk-spacex-thousands-of-starlink-satellite-dishes-sent-to-kraine.html#:~:text=Investing%20in%20Space-,Elon%20Musk's%20SpaceX%20sent%20tho>. Accessed on March 3, 2022.

of persistent multi-spectral, all-weather surveillance from space-based assets.

OFFENSIVE AIR DEFENCE

The Russians used the S-400 system effectively by deploying them in the captured border areas of Eastern Ukraine. The system is a proven asset in the second successive geopolitical conflict after Syria. It has effectively deterred all the NATO countries from providing combat air support much needed by Ukraine. The system also provided operational flexibility in offensive mode at higher ranges in Ukraine's territory to shoot down UCAVs.

LESSONS

India has recently purchased S-400 Air Defence System. The western adversary can be tackled by Offensive Air Defence role of S-400 in operationally crucial sectors where our ground forces are at a geographical disadvantage.

Employing such long-range AD systems can provide us Air Superiority or Favourable Air Situation (FAS) in a given Tactical Battlefield Area (TBA) to achieve operational objectives and deny enemy's use of air power.

SYNERGY

The Russian Defence forces brought reformation and reorganisation changes in employment philosophy after the 2008 Georgia conflict.⁷ However, the Command and Control (C2) structure of Russian Aerospace Force still favours extreme centralisation and an intimate control and attachment by a Ground Forces Commander. Ineffective coordination among the ground and air elements has

7. Ariel Cohen and Robert E. Hamilton, "The Russian Military and the Georgia War: Lessons and Implications", June 1, 2011, at https://www.jstor.org/stable/resrep11808#metadata_info_tab_contents

led to underutilisation and ineffective use of air power, occasionally resulting in loss of crucial air assets and manpower.

LESSONS

There will be an increased need for close coordination between all aerial elements and ground forces to ensure aerospace safety as well as effective Air Defence. Periodic review of SOPs and operational flexibility in a dense AD environment exercises would be fruitful post creation of an Air Defence Command.

Air defence ops are inextricably linked to counter air operations and offensive ops. The success or failure of one dictates the demands of the other during active operations. The air defence and offensive missions are interdependent and if executed in isolation, both are likely to be ineffective in execution of the joint strategy.

Involving ground forces in various Air exercises at tactical level (on a smaller scale) will provide valuable feedbacks from both components. The lessons that emerge from these exercises can be covered in pan Air Force and Army formations for adherence during active operations.

'AATAMNIRBHARTA'

The Russia-Ukraine conflict clearly highlighted the importance of self-reliance in defence technology. After the initial setbacks by the West-provided drones, the Russians reached out for emergency purchase of Turkish drones⁸ for a counter-reply on similar lines.

8. Selcan Hacaoglu, "Russia Meets Deadly Turkish Drones Once More in Ukraine Invasion", March 1, 2022, at <https://www.bloomberg.com/news/articles/2022-03-01/russia-meets-deadly-turkish-drones-once-more-in-ukraine-invasion?leadSource=uverify%20wall>

Ukraine has been critically dependent on the West-provided long-range missiles, artillery, UCAVs, ATGMs, from the very start of the Russian campaign, to sustain its defensive operations.

LESSONS

The recent initiatives of 'Make in India' and increasing the Foreign Direct Investment (FDI) in the defence sector are welcome steps to boost the in-house defence manufacturing in India.

New programmes like AMCA need to be critically monitored for in-time completion of the projects. The goals decided for the state-run HAL should be periodically reviewed to keep in sync with the evolving aviation technology in the world.

INVESTMENT IN NEW AGE TECHNOLOGY

In March, Russia used the Kinzhal Hypersonic missiles in the war to destroy a large weapon depot. This was the first confirmed use of hypersonic weapons in modern warfare.⁹ These missiles are almost impossible to detect by conventional surveillance systems.

LESSONS

We need to invest in technology such as Directed Energy Weapons (DEWs), Laser dazzlers, weapon systems to take on Multiple Independent Re-entry Vehicles and Hypersonic missiles. It is important to note that our Northern adversary has already developed Hypersonic missiles. We should invest in R&D of our own Hypersonic weapons.

INFORMATION AND PSY OPS

The West has used its leverage in terms of setting the agenda of negative perception building of Russia among other countries of the world. International media houses, effective social media tools like Twitter and Facebook have been used to spread misinformation campaigns against Russia.

9. Paul Kirby, "Russia claims first use of hypersonic Kinzhal missile in Ukraine", March 9, 2022, at <https://www.bbc.com/news/world-europe-608061511>

These platforms are also being used as a means to degrade the morale of the enemy troops by releasing estimates of exaggerated losses of combat troops and air-ground assets.

LESSONS

A tri-Service command of the Indian Armed Forces has been tasked to work in tandem with National Cyber Coordination Centre (NCCC) and devise strategies for future conflicts.

Post Balakot operations, Pakistan also carried out information campaigns and psychological (psy) ops to set the narrative of the warfare. We must pre-empt such scenarios playing out in all future conventional and sub-conventional warfare.

CONCLUSION

The 21st century has brought significant developments in military warfare. Technological development, both intuitively and intentionally, has upgraded military operations and tactics. The Russian invasion of Ukraine is an evident demonstration of how new technology has transmogrified the way wars are fought. New lessons are evolving with every move of both nations engaged in this conflict. The lessons emerging out of the current engagement for defence leaders and planners the world over would be worth the lives of countless soldiers. It is also important to understand that it is the technological advancement amalgamated with tactics and innovation which would give our forces much needed edge over adversary military capabilities.