The fog of war continues to hangover Ukraine even after eighty days, especially with facts difficult to discern amongst the information war running in parallel, biased reportage, and contradictory narratives based on the wide swath of international political agendas. In this war of shifting objectives and seemingly endless attrition, showcased in destruction, death and human misery, it is extremely difficult to discern cogent military lessons with a significant degree of certainty. As much analysis continues on the larger Russian strategic goals, miscalculations, shifting military aims, and the conduct of warfare, this follow-up piece retains its focus on the air operations. It hopes to address some of the larger structural and doctrinal aspects of the Russian Aerospace Force (VKS) which have affected the war aims and put to question the efficacy of the Russian military strategy. The focus here is to fit some of the larger visible pieces, amongst the many missing ones on the broad mosaic of air power employment, as they slowly emerge. The less than expected demonstrated performance of the Russian Army, the unclear operational employment concepts of the Air Force and the evident dissonance in integration between the two, have led some analysts to lay the blame on the VKS for its inability to 'support' ground operations, and even question the very need of an independent Air Force. This is a deeply concerning trend of thought which underscores the absence of a deeper understanding of air power in some quarters.

The VKS is not 'missing in action' as many thought after the sudden decline in tempo from the initial surge operations

early in the war. It has actually been active throughout, albeit with varying degrees of roles and intensity of employment, with tactical adjustments in their concepts of operations in keeping with shifting war aims and losses. It is currently playing a major offensive role in the new front of Eastern Ukraine region, carrying out extensive air strikes in the battle spaces of cities and towns. It is attacking the Ukrainian military, command and control centres, fuel and weapon storages, power plants, waterworks, and a variety of targets in the combat zone. Importantly, the extensive and ever-expanding Allied support in the form of military materiel logistics supply chains via road and rail networks, which are sustaining the Ukrainian forces, has been added to the target list. But there is no denying the fact that the VKS has underperformed, and –*'Analysts have ascribed a variety of reasons which range from inadequacy of precision guided munitions' inventory, inability to manage the contested airspace between Russian Air Force and the SAM (Surface to Air Missile) systems of the Russian Army, low training standards of the Russian pilots due to inadequate flying hours, their inability to undertake large scale offensive missions, poor Army-Air Force coordination, to the reluctance on part of the VKS leadership to engage in operations which would lay bare their capability gaps.'*[1]While these reasons in part or combined have played a part in the underperformance, despite its losses it has continued to carry out extensive operations, causing considerable damage to the Ukrainian forces, both in air and on surface. Though it is premature to draw definitive

conclusions on its operational performance, there are some deeper issues in the mighty Russian military machine which have impacted the prosecution of military operations, and their war aims.

The fundamental orientation and posturing of the Russian military over the years, still remains centred on defending its heartland and vital industries and cities, using layered and integrated air defence. Inclusion of offensive air power amongst its multi-layered conventional theatre strike capability showed indications of an offensive shift over the last decade. This was demonstrated in Georgia (2008), Crimea (2014) and especially Syria (2015), but in the absence of any viable air opposition, the offensive use of air power was limited in scale. While Russia has observed air power employment in Western interventions closely over the last two decades, it is the structural and doctrinal aspects of the VKS and its place in the Russian military that remains Army centric. In the Soviet days, the PVO Strany was the dominant military air element which owned all AD forces including its own aircraft. It was the favoured force as it was central to winning ground campaigns, in comparison to the Russian Air Force (VVS) whose role was limited to providing tactical fire power from the air. [2] In 1988 the air assets of the PVO Strany were merged with the VVS and its AD missile element formed the Russian Air Defence Force (VKO). In 2011, the VKO became the Russian Aerospace Defence Force (VVKO) to merge air and space defence. In 2015, Russia merged the VVS and the VVKO to form what is now known as the Russian Aerospace Force.

The Russian Defence Minister Army General Sergey Shoigu had then said that the VKS was created because "*their formation is dictated by the shift in the centre of gravity of armed struggle into the aerospace sphere.*" [3]

The VKS is organised, equipped and trained to repel enemy threats, and essentially operates the high-altitude and long-distance AD systems – the S-300s and S-400s.This enables a very strong access denial into Russian airspace. The Russian Army on the other hand owns the battlefield AD systems which are limited to defending against air attacks at the low and medium altitudes. In a 2019 speech at the Russian Academy of Military Sciences, the Russian chief of General Staff, Valery Gerasimov, described Russia's military strategy as one of 'active defence.' [4] This leads to the structural challenge for its military, essentially oriented to defend the nation against a massive multi-domain threat to its heartland, in carrying out large scale orchestrated offensive operations with overwhelming force, which involves extensive participation of the VKS. All of Russia's recent military operations have been on a much smaller scale, with relatively very little involvement of its aerospace force. The lessons learnt in the Georgian campaign in 2008, initiated its military reform and modernisation efforts which are still underway.

Its strategic exercises - Zapad, Vostok, Tsentsr and Kavkaz were introduced as capstone events of its annual training cycle.[5] These large-scale exercises meant to showcase its

operational art, military strategy and capability in two front operations, nuclear might, etc., and serves as strategic communication. Zapad 2021 exercised its 'active defence' strategy to counter a massed NATO aerospace attack. The VKS and surface missile units conducted counter-strikes with long range precision guided weapons against the enemy force, command and control, and key supporting infrastructure, to support large air assault operations employing helicopters in transport and attack roles, concentrating artillery and rocket fire against enemy forces to cause attrition. Russian units then switch to a counteroffensive, with large combined arms assault.[6] Typically, the VKS only supported the surface operations rather than first create conditions offensively to counter the enemy air, as they have in the Ukraine invasion.

The next issue is that, very much like the erstwhile Soviet days even today in Russia, aircraft are extensions of the ground force. Combat aircraft are essentially considered airborne artillery: inflexible vehicles for the delivery of massive firepower. Therefore, the Russian military doctrine doesn't require the VKS to control large swathes of airspace in order to pursue its operations towards surface campaign goals. Aside from long-range high-altitude AD, the VKS owns the long-range bombers for nuclear and conventional strikes (long range aviation), and the military transport fleet. It also has the VVS (frontline aviation or tactical aviation), which till only recently was limited to air operations over the tactical battle areas. The VVS with its modern four plus generation and fifth generation fighters, with a weapon mix of large

number of older generation and some advanced ones, has a defensive AD role against aerial threats and an offensive strick role restricted to the surface campaign. Long range air launched precision and stand-off strikes have only recently been included in its offensive capability. These enable it to engage targets deeper inside enemy territory, which its bombers cannot take on in a dense AD environment. Helicopters are an important constituent of the military and are considered as ground weapons (or 'tanks in the air') by the Russian General Staff in their operational planning. Since the reform, these formations are known as 'army aviation brigades',[7] and despite their high vulnerability to SAMs, remain 'major force multipliers during Russian joint operations'.[8] It is commanded by Army General Sergei Surovikin, who unlike his predecessor is from the ground forces.

The Russian military strategy, unlike the American and most modern militaries, does not allow its Air Force the freedom to pursue its own air campaign. Hence its doctrine does not require the VVS to offensively achieve control over the adversarial airspace. Consequently, it is not geared to carry out large scale offensive air operations, where all elements of offensive counter air fighters, suppression of enemy AD (SEAD) aircraft, strike aircraft, ISR and EW elements, AD escorts fighters, combine with AWACS and aerial refuellers come together to offensively seize control of the air and facilitate the surface campaign. The initial Russian air and missile strikes that targeted over a dozen airfields, the

Ukrainian Air Force (PSU) and its AD systems were extensive. It severely impacted the PSU's operational capability and its long and medium range AD cover.[9] However, after the initial success, Russia failed to follow to put the PSU and its AD out of action. Total destruction is hard to achieve, unless the massive and sustained air offensives of the likes of Gulf War are carried out, and where there was practically no air opposition. Against an adversary with a much smaller Air Force (AF), the possibility of achieving air supremacy (no interference from enemy air) or air superiority (minimal interference from enemy air) is high. Provided, there is concerted effort by the side on the offensive to do so, and its AF is given a free hand to execute its air operations against the adversarial AF. Thus, in their effort to carry out swift offensive operations, employing precepts of mass and manoeuvre, without having achieved a viable degree of control of airspace, has led to greater Russian Army and AF losses. According to David Deptula –"*Russia has never fully appreciated the use of airpower beyond support to ground forces. As a result, Russia, in all its wars, has never conceived of or run a strategic air campaign.*"[10]

There have been numerous assessments of the operational performance of AD and AF on both sides, and almost all have tended to look at them either independently or at best as the combat outcomes and effects of being pitted against each other. This approach, while it serves to suit the narrative of some and the vested interests of the weapon industries, may lead to incorrect and incomplete military

lessons. Since even media anchors have become 'military experts' eager to pronounce 'breaking news' analyses, there is a real danger of looking at the serious and complex business of offensive air and AD operations simplistically. Offensive employment of air power is the raison d'être of air forces, and air defence is inherently integral to it. They are the con-joined twins of air power as they are not only inter-dependent; they cannot do without each other. The challenge arises when AD operations are looked at only from a defensive perspective against the adversary's offensive air operations, without considering the necessity to counter the adversary's AD to prosecute one's own offensive air operations. Offensive air power remains a vital element of a nation's military power, not just towords effectively 'supporting' the surface campaign, but equally importantly, to take the war deep into the adversarial spaces, towards achieving the larger war aim. And therefore, for offensive air power to succeed in both the roles, it has to defeat the adversarial AF. Simply put, AD is a vital element in both offensive and defensive employment of air power, and cannot be seen in isolation.

The large numbers of Russian helicopter and fighter losses at low levels have been due to the dated and rigid doctrinal approach of air power employment, which is a subset of the surface dominant military strategy. Having lost 333 helicopters to the Stinger shoulder fired SAM and Anti-Aircraft guns in Afghanistan one would have thought there would have been a doctrinal revisit.[11] Interestingly, in the air operations in 2015 where the Russian AF supported Syria

against the ISIS, it lost only one fighter to Man Portable AD System (MANPADS) out its total of 19 aircraft losses, in 34,000 sorties over almost two and half years.[12] This was because the VVS, which was deployed independently and was not a part of a combined Russian military campaign, conducted its operations from medium altitudes outside the MANPADs threat envelope.[13] However, this experience does not appear to have translated to any doctrinal changes as was evident in its early air operations in Ukraine, where it followed the scripted operational concepts of the Russian military. The VVS evidently does not have the freedom to evolve and pursue its own air doctrine and concept of operations, when it is employed as a part of a larger military whole. Notwithstanding doctrinal rigidities, substantial aircraft losses which includes high end and legacy assets, has forced the VVS to shift its fighter operations to the medium altitudes very quickly over Ukraine. Helicopter offensive operations over contested airspaces by day have significantly reduced, and shifted into the night where they cannot be targeted by electro-optical/infrared MANPADS.

Arguably, the shortcomings of the Russian AF employment were inevitable because of two reasons. First, the VVS still essentially remains a 'ground support' force, where its focus was essentially centred on providing the surface campaign with aerial fire power, and not ensuring that the PSU could not interfere with their surface operations. There have been attempts at change from the erstwhile Soviet AF concepts towards those of modern Air Forces, where

the military understanding of air power and independence of the air force to prosecute air operations is much more sophisticated, and produces greater integrated military outcomes. But it in the absence of any participation in international air exercises with modern air forces, it appears that the transformation has been limited to organisational restructuring and superficial changes. There have been no independent doctrinal changes in its overarching VKS of which VVS is a part of, as the Russian Army dominant military continues to adhere to its legacy approach to air power of the Soviet era. The second reason is the discernible disconnect in the AD structuring and its employment. The VKS AD centred on defending the heartland is an Integrated Air Defence System (IADS), which enables what the West calls Anti-Access Area-Denial (A2AD). Bronk explains – '*For Russia, the IADS is a fundamentally static construct composed of mobile elements. It is designed to defend Russian airspace and to give the Kremlin an ability to threaten aircraft with long-range missiles some distance inside neighbouring countries' airspace and in the Baltic from behind a multi-layered and sophisticated network of medium- and short-range SAMs. It is also a critical part of the Russian Ground Forces' plans to be ready to fight or coerce NATO forces in Eastern Europe, by forcing NATO's air forces to spend the first critical weeks of any conflict engaged in a protracted, costly and politically high-risk SEAD/DEAD campaign rather than attacking ground forces and strategic objectives inside Russia.'*[14]Given the Ukrainian Air Force's incapability to operate over the Russian

airspace, the VVS has failed to exploite its own IADS cover, which extends well into the Ukrainian airspace offensivly.

Against an adversary with a small AF which could interfere with its surface campaign, control of the skies should have been a priority for the Russian military. Its initial stand-off strikes against airfields and AD systems in Ukraine, gave the impression that it was part of an orchestrated counter air and SEAD campaign. While it caused serious attrition to Ukraine's AD radars and SAM systems initially, it did not follow through by going after its AF. The PSU fighters which were flying blind without ground control radars guiding it and without the protective cover of its long-range SAMs, were vulnerable to high end Russian fighters armed with Beyond Visual Range (BVR) air-air missiles, whose ranges were more than Ukrainian BVRs. Not having offensively destroyed the PSU's air assets, enabled it to survive and fight on. Russian IADS, whose lethal ranges extend well inside Ukrainian territory, inhibits the PSU from carrying out air operations at high and medium altitudes freely over the battle-spaces. Combined with the Russian Army which owns a variety of AD systems to protect the airspace over the battle zones from medium to low altitude threats, also denied the PSU the opportunity to interdict the advancing Russian forces. This was evident when the long Russian armour columns and logistic convoys which were forced to use roads due to the 'Rasputitsa season',[15] were not engaged by the PSU. So why did the VVS fighters fail to leverage this to their advantage as well? For the VVS to provide close support inside its Army AD's lethal missile

engagement zone, it would need excellent airspace management which de-conflicts friend from foe to prevent fratricide. While it is not clear what kind of interface and integration exits between the VKS and the Russian Army for airspace management, it is evident that there have been serious gaps here as AD operations have remained independent from offensive air operations. Despite losing most of its high and medium level AD assets, Ukraine with extensive ISR and tactical assistance from its Allies, has been effective in employing its surviving mobile AD systems and large supplies of Western MANPADs. Tactical inflexibility of commander's intent and campaign aims, forces the VVS to fly singly or in pairs into and out of hostile airspaces without any tactical routing, decoying or deception to enhance mission survival against the enemy AD.

The depth of the military objective directly affects the time-space-volume of air operations. Deeper the surface campaign objective, means greater is the application of air power that will be necessary. With Kiev as the initial objective, where the surface forces would have taken greater time to reach, compounded by the mobility challenges of the season, also meant more space on ground and larger volume of airspace would have to be covered. Clearly the Russian military strategy, which did not have a counter air campaign coordinated with SEAD and integrated AD in its play book, was unable to achieve the swift outcomes it expected. The disconnect between the long range and stand-off missile attacks, the initial air operations and the ground campaign

appears to indicate challenges in the organisational structure, evident in the lack of coordination amongst branches, indicating issues with command and control, both at the tactical and the operational levels. Russian commanders seem to have been unprepared for many aspects of the invasion, including coordination between branches and between units. [16] Absence of joint planning, training and execution have been evident through the campaign, and even necessitated a leadership change midway, with General Alexander Dvornikov taking charge. What could be the problem?

Way back in 2010, Russian Military Districts (MD) were reorganised into Operational Strategic Commands (OSKs), where its frontal and army aviation were transferred from the Air Forces to be directly subordinate to Russia's four new OSKs. According to the then Air Force CINC, General-Colonel Aleksandr Zelin – "*The Air Forces will remain a service of the Armed Forces, its Main Command (Glavkomat) will continue functioning, the transfer of four Air Forces and Air Defense commands to the commanders of the new military districts - Western, Southern, Central and Eastern." This was –"just to optimize command and control and concentrate the main forces and means in the troops (OSK)."* The new system of command and control was ostensibly created due to 'the realities of the current time and changing international situation, so the state can independently confront possible threats to its security and the security of its allies, and achieve strategic goals'.[17] Defense commentator Igor Korotchenko said the move to four MDs / OSKs has diminished the service CINC's

influence: “The role and place of the main commands of the services of the Armed Forces has been reduced accordingly. Practically all aviation, except strategic, will be subordinate to the OSK commander.”[18] It seems clear that the Russian military does not understand airpower, let alone leverage it to its advantage. Western experts echo this view. ‘*Instead of working to control the skies, Russia’s air force has mostly provided air support to ground troops or bombed Ukrainian cities. In this it has followed the traditional tactics of a continental power that privileges land forces. Focusing on ground troops can work if you have almost endless numbers of soldiers and are prepared to lose them. But so wedded is Russia to its history of successes on the ground that it fails to understand the importance of airpower.*’[19]

Though the focus has been on the larger pieces of the underperformance of the Russian air power, two aspects which have rightfully earned their place in contemporary warfare – MANPADS and drones, need a mention here. Without taking away anything from the demonstrated lethality of these two weapon systems, the hype of their role being a ‘game changer’ in warfare, where the future manned combat aircraft are being written off, is certainly overstated. In the brutal business of warfare, the ‘game’ of war remains the same, nothing ‘changes.’ The ways to ‘kill’ proliferate. There are many aspects of the air operations conducted by both sides from which serious lessons can be drawn. But those are deeper operational, tactical and technical aspects and including use of drones and MANPADS amongst many

other vital aspects like EW, secure and encrypted communications, advanced weaponry, etc. But for now, one cannot overlook from wider standpoint that despite the losses and inefficient use of air power, the VKS has contributed much to the war despite the shifting war aims. From an Indian context the two larger issues which need greater deliberations are the fact that the Russian Military evidently does not seem to understand air power fully, and that subordinating it in their reorganised OSK twelve years ago, has had serious consequences in the national war objectives. The other is, AD operations and offensive operations are the inseparable twins of modern air warfare, and their close synergy will remain a prerequisite for combat operations of the future, and therefore must form an integral part of a nation’s military strategy.