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THE RUSSIAN WAY OF WARFARE IN THE AERIAL DOMAIN

Viktoriya Fedorchak

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Introduction

The paper aims to address the Russian way of warfare, focusing on its approach to the employment of mass in air warfare. In this regard, attention is paid to Russia's employment of mass in terms of the structure of its air force, its capabilities and its employment of air power in mass attacks during Russian wars.

The modern concept of mass is explained by referencing the existing academic and military debates on the subject, including some recent works by Heather Venable,[1] David Deptula and Heather Penney,[2] and Viktoriya Fedorchak.[3] In this regard, the focus is on the shift from balancing numerical superiority and cutting-edge technologies to establishing a critical mass – meaning sufficient numbers to achieve the posed objectives. The recent use of air power by Russia in Ukraine is assessed in terms of its strengths and limitations, and the paper addresses the effectiveness of the Ukrainian countermeasures in degrading the Russian numerical superiority. The discussion section provides key takeaways for strengthening national defences against numerically superior opponents. Unlike previous works on the subject, attention is also paid to the historical traces of the Russian way of employing air power. Hence, the features of the Russian way of warfare are traced in the post-Cold War development and employment of air power and the conceptualisation of air power.

Mass, artificial mass and critical mass

After the end of the Cold War, armed forces across the world had to be reformed and to adjust to the new reality of the hopes for peaceful trends in international relations and the consequent opportunities for cutting military budgets. The phenomenon of the peace dividend had varied effects on the national armed forces of Western countries.[4] One of the consequences of the military reforms was the establishment of a

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[1] David Alman and Heather Venable: 'Bending The Principle Of Mass: Why That Approach No Longer Works For Airpower,' War on the Rocks (accessed 3 March 2023). Available online: https://waron-therocks.com/2020/09/bending-the-principle-of-mass-why-that-approach-no-longer-works-for-airpower/

[2] David Deptula and Heather Penney: Building An Agile Force: The Imperative for Speed and Adaptation in the U.S. Aerospace Industrial Base (Arlington: The Mitchell Institute for Aerospace Studies, 2021). https://mitchellaerospacepower.org/wpcontent/up loads/2021/05/a2dd91_776e3514d41f4e0aa1c 0954050eaa194.pdf

[3] Viktoriya Fedorchak: 'The Mass Approach in the Air War Over Ukraine: Towards Identifying a Critical Mass,' *Handlingar Och Tidskrift*, no. 1 (2023):110−126.

[4] Viktoriya Fedorchak: *The Russia-Ukraine War: Towards Resilient Fighting Power* (London: Routledge, 2024), p. 210.

certain dichotomy when structuring and reforming national military forces: the mass (numerical) and the cutting-edge (smaller in number but more qualitative) approaches. The mass approach to structuring armed forces was a continuation of the massive armed forces of the Cold War and the tradition that numbers were equivalent to greater capabilities and stronger effects. By contrast, sophistication and the multi-faceted effects of cutting-edge technologies meant reductions in the number of actual pieces of equipment and personnel, and the consequent shrinking of military services across the Allied nations.[5]

A country's choice to follow one way or the other was often dependent on considerations of costs, the level of sophistication that already existed in the available equipment, access to cutting-edge Western technologies, and the condition of the available equipment and quality of the trained personnel. Accordingly, Western countries followed the cutting-edge approach to structuring their armed forces. By contrast, Russia and China followed the numerical or mass approach. In this regard, it should be emphasised that the adoption of the numerical approach did not merely mean preserving the numbers in the existing Cold War arsenals. The reforms of both the Chinese and the Russian military capabilities followed a rather holistic approach to mass and numbers. Neither country could fully keep up with the Western cutting-edge technologies (due to limitations in accessing certain technologies) at the same pace and with the corresponding numbers. Also, both countries had to revamp the old Cold War capabilities of their military arsenals in order to free up space and funds for the more advanced areas of their capabilities. Since they could not have full technological superiority over the Western countries, the solution was to combine greater numbers of the functional capabilities of the previous generation with the gradual increase and development of more advanced technologies to match the Western competition.[6]

From the conceptual perspective, this dichotomy in the structuring of the military can be summarised in the discussion of what mass actually represents and how it can be achieved. The traditional understanding of mass as a numerical advantage gradually shifted to what became known as artificial mass – meaning the advantages provided by cutting-edge technologies to give more effective situational awareness, command and control (C2) and lethality in different operating environments.[7] In this regard, greater focus was placed on the multi-functionality of various platforms, and a greater extent of integration of systems to achieve massed effects. This entailed higher costs for cutting-edge technologies, and had an impact on the timeframe for their development, production and procurement.[8]

While the supremacy of artificial mass proved to be significant in various post-Cold War conflicts of varied complexity, tempo and length, the revival of peer and near-peer conflicts illustrated further the need to reconsider the approach to cutting-edge technologies, numerical superiority and timeliness in available capabilities. In their 2021 report, Deptula and Penney outlined the need for balancing artificial and traditional numbers in the US national offset strategies to gain an advantage in peer and

[5] Viktoriya Fedorchak: Understanding Contemporary Air Power (London: Routledge, 2020), pp. 147-165.
[6] Ibid.
[7] Alman and Venable: 'Bending the Principle of Mass.'
[8] N. Augustine: 'Augustine's Laws and Major System Development Programs', Defence Acquisition Research Journal, 22, no. 1 (2015), 2.

near-peer conflicts.[9] The numbers and diversity of capabilities have to be strengthened in order to effectively cover the required range and geography of the battlespace, to undermine the enemy's targeting and operational performance and to '*withstand[…] attrition in contested environments to remain operationally resilient and effective*.'[10]

The war in Ukraine has illustrated the need for a balanced approach to structuring and sustaining capabilities so that they are flexible enough to adjust to the constantly changing fighting environment. The term 'critical mass' refers to the balanced approach to structuring one's military and can be defined as '*the ability to rapidly produce and/ or have sufficient numbers of military capabilities to deploy, modify, sustain and integrate into the force structure of a given operating environment according to the operational requirements*'.[11] Accordingly, a simplified understanding of the entire critical mass approach might mean balancing more complex and cutting-edge technologies against less sophisticated but more numerous ones which can provide the needed edge and concentration of effects at a given time.[12] On the other hand, if approached as a full cycle from development to employment, critical mass would focus on the set of decisions and actions required to provide sufficient capabilities at the required tempo of the fighting environment. Hence, questions of production capacity become paramount in building up and sustaining critical mass in inter-state warfare.

Russian numerical approach

The legacy of the Soviet Union's numerical approach on Russia's reforms of its armed forces was affected by various considerations. First of all, the mass of equipment remaining from the Cold War had to be readjusted for the new realities, which meant reducing numbers because of the lack of funding, of production capacity and of the means to sustain older platforms in full functionality during the 1990s. However, with the start of Putin's rule, there was a shift towards reforms of the military. New trends for reconceptualising and modernising platforms and strengthening the cutting-edge nature of equipment were emphasised to match the Western developments. While various claims were made about Russian stealth aircraft and the hypersonic status of some ballistic missiles, many Western experts doubted these. The more hyped platforms did not come to fruition in Russia, but its aerial fleet still added more advanced aircraft (MiG-35 fighters, Tu-22M3M bombers, and Su34 fighter bombers) with wider functionality and application across various aerial tasks. In 2021, the Russian Aerospace Forces (VKS) had the third largest combat air fleet in the world after the USA and China, with 1,531 combat aircraft, but for tanker aircraft it was in fourth place, with only 19 such aircraft.[13] Traditionally, Russian air-to-air refuelling capabilities were reserved for their strategic bomber fleet.

Not having the full spectrum of aerial assets to compete with the Western cutting-edge technologies, Russians focused on long-range, surface-to-air missile systems (S-400), the establishment of Anti-Access/Area Denial (A2/AD) environments, and ballistic and cruise missile systems like the Iskander and Kalibr (long-range precision-

[9] Deptula and Penney: 'Building An Agile Force'.
[10] Ibid., p. 19.
[11] Fedorchak: The Russia-Ukraine War, p. 18.
[12] Fedorchak: 'The Mass Approach', pp. 110−126.
[13] Flight International, 'World Air Forces 2021', https://www.flightglobal.com/download?ac=75345.

strike). While the fighter and bomber fleet were most certainly stronger in numbers, the traditional secondary/supportive role platforms (AWACS (Airborne Warning and Control System), strategic transport and air-to-air refuelling) were underrepresented in the Russian fleet, and they also did not have full multi-functionality drones.

A few distinctive features characterised the employment of Russian aerial assets in the post-Cold War conflicts. First, they used aviation forces as an extension of the army or as artillery from the air, which meant that the air force was not fully independent and was not trained to plan effective activities on the operational and strategic levels, while on the tactical level the focus was more on air interdiction and close air support. Second, despite various claims about successful and effective cross-service integration or joint operations, Russia showed significant shortfalls in that area.[14] During the Chechen Wars, the air and land components were characterised by poor communication and a very rudimentary cooperation setup. While the Russian use of aerial assets in Syria demonstrated significant air–land integration, and Russia could be considered to have learned the lesson and to some extent adopted it in the Russian air war in Ukraine, their air–land integration in Syria was on the much smaller scale of integrating aerial assets with the Special Operations Forces (SOF) groups; the need for multifaceted integration with the army and diverse units was much greater in Ukraine in 2022.[15]

Another distinctive feature of the Russian employment of air power is that they focus less on precision-guided munitions (PGMs), giving preference to dumb bombs used en masse against various targets. This feature is the result of certain considerations. The remains of the Soviet arsenals provided sufficient numerical advantages to carry out indiscriminate mass attacks, allowing Russia to reach various targets. The downside of this approach was the limited effectiveness of these attacks against distinctive and more niche targets. On the other hand, this lack of discrimination between civilian and military targets corresponded to another feature of the Russian strategic culture – the limited respect for human lives on both their own and their adversary's side.[16] Russia also continued to use indiscriminate bombing against civilian populations as a means of undermining their opponent's will to fight and in an attempt to put pressure on the political leadership of the countries they targeted.[17] In this regard, mass bombing campaigns became something of a signature feature of Russian air power – Grozny, Aleppo, Mariupol and numerous Ukrainian cities confirm this enduring trend in the use of Russian aerial assets.

Following on from the previous feature, Russian military campaigns and, by extension, their air components went through certain phases of intimidation and intensification of firepower and consequent mass strikes. In this regard, shifts in targeting from military and strategic objects to infrastructure and then to larger civilian targets can be traced in their campaigns from Chechnya to Ukraine. Accordingly, there is

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[14] Justin Bronk: 'Is the Russian Air Force Actually Incapable of Complex Air Operations?', Defence Systems, 2022-03-04, https://rusi.org/ explore-our-research/publications/rusi-defence-systems/russian-air-force-actually-incapable-complex-air-operations.

[15] Fedorchak: The Russia-Ukraine War, pp. 100−120.

[16] Anton Lavrov: 'The Russian Air Campaign in Syria: A Preliminary Analysis', CNA, 2018. Available online: https://www.cna.org/reports/2018/06/russian-air-campaign-in-syria.

[17] Slavoj Žižek: 'Death or Glory in Russia,' Project Syndicate, 1 February 2023. Available online: https://www.project-syndicate.org/commentary/russian-orthodox-christianity-and-the-roots-of-ideological-madness-by-slavoj-zizek-2023-02.

often a punitive element in Russian military campaigns, and this is often directed at the civilian population and highly populated areas. In the case of Ukraine in the last two years, the change in targets from military to infrastructure to civilian can be directly traced to the lack of significant military achievements by the Russian long-range ballistic missile campaigns during the period from spring to autumn 2022.[18] The intensification of the Russian bombardment could often be linked to their failures on the ground. After any significant regaining of territory by Ukraine, Russia would often retaliate by targeting Ukrainian civilians. The best example was the appointment of General Sergey Surovikin to command Russian operations in Ukraine after the successes of the Ukrainian counter-offensives in Kharkiv and Kherson in summer and autumn 2022.[19]

Russian mass approach in Ukraine and its limitations

From the first days of the full-scale invasion, Russia used its aviation forces in support of the destruction of various military targets, employing its numerical advantage through the number of sorties per day. According to different calculations, they flew between 140 and 200 sorties daily. The initial push, with numerous assets, was undermined because the Ukrainian Air Force survived the first contact with enemy and dispersed into other areas of the country. While some air defences were jammed during the first few days, Ukrainian pilots bought time in the air battles over Kyiv. Despite having significant numbers of aircraft, Russian attacks across the last two years of the full-scale invasion illustrate the limited use of many aircraft in a single mission.[20] There are several reasons for this observation. First, Ukrainian skies were far more dangerous to Russian aircraft, due to the combination of the effects and firepower of both aircraft and the ground-based air defences, especially when the numbers of these increased as a result of the assistance of the allied nations. Second, while the materiel segment of the Russian air power remained numerically higher, the losses of personnel and pilots had a knock-on effect on Russia's effective use of air power in Ukraine. Third, despite having the numerical advantage in the structure of their air force, the hybrid nature of the construction of mass illustrated significant shortfalls. In this regard, having more of the older Soviet fleet with a smaller number of more modern aircraft in the high-intensity inter-state war led to higher demand for the cutting-edge segment of the fleet, with a greater preference for using Su-30s and Su-34s. Their better precision and multi-role nature allowed them to achieve more within the same sortie and to switch between different roles, which corresponds to the usual expectations of multi-role platforms. However, this reliance on the more advanced and less numerous aircraft also meant greater pressure on these machines and their pilots, resulting in both of them wearing out much faster.[21]

Another distinctive but predictable limitation of the Russian mass approach in Ukraine was the scarcity of pilots. Teaching and training new pilots takes time, and

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[18] Fedorchak:'The Mass Approach'.
[19] Andrew Roth: 'Russia appoints notorious general to lead Ukraine offensive,' The Guardian, 8 October 2022, available online: https://www.theguardian.com/world/2022/oct/08/russia-appoints-notorious-general-sergei-surovikin-ukraine.
[20] Justin Bronk, Nick Reynolds and Jack Watling: *The Russian Air War and Ukrainian Requirements for Air Defence* (London: RUSI, 2022), p. 8.
[21] Justin Bronk, Nick Reynolds and Jack Watling: *The Russian Air War and Ukrainian Requirements for Air Defence* (London: RUSI, 2022), p. 8.

experienced pilots remain scarce in modern warfare. The situation significantly deteriorated in the decade of reforms prior to the full-scale invasion. The primary issue with reforms, which is often seen, is that if a certain service is not prioritised or does not have a significant degree of relevance, its various structures and activities can be reduced to a bare minimum. In the case of the military education of the Russian air force, the new wave of reforms introduced in 2008 gradually resulted in the closing down of various regional subsidiaries (in Yeysk, Saint Petersburg and Chelyabinsk) of the Zhukovsky-Gagarin Academy in Moscow, and its merger with the Military Aviation Engineering University in Voronezh. These reforms in essence meant that a significant number of experts and teaching personnel were laid off, with no systematic or quality-oriented reorganisation of the preparation programme for Russian aviation experts. In the light of these reforms, the reduced number of flight training hours of the Russian pilots does not come as a surprise.[22]

The long-range mass attack campaign against the entire territory of Ukraine started at the very beginning of the full-scale invasion and continues until the current time. While the overwhelming mass attacks were aimed at showing the strength of the Russian military and hitting more targets, the transformation of the campaign over the last two years illustrated significant shortfalls in the approach itself and limitations in the Russian stockpiles and ability to sustain these efforts within this mass campaign. The initial stage of this campaign was characterised by consistent attacks using primarily ballistic and cruise missiles against most of the territory of Ukraine. The primary problem at this stage was that more cutting-edge and expensive technologies were used in an indiscriminate manner without achieving significant military effects. The second stage can be attributed to the successes of the Ukrainian armed forces in counteroffensives in Kherson and Kharkiv: with the appointment of General Sergei Surovikin as the individual responsible for the Russian campaign in Ukraine, a new stage of punitive attacks on civilian targets and infrastructure across the entire country began in October 2022. From the perspective of the numerical advantage, the shift from one stage of targeting to another illustrated the inherent issue with a numerical advantage – the challenge of sustaining it in the long term. In order to reduce costs and diversify its assets in the mass attacks, Russia introduced Iranian Shahed drones in combination with ballistic and cruise missiles in their attacks. While the punitive measures were aimed both at undermining the morale of the Ukrainian people and overwhelming the air defences with a multitude of targets, the increased presence of Western advanced air defences and the solutions that were found to destroy Shahed drones allowed the effects of the mass attacks to be reduced.

In this context, the Russian ballistic missile long-range mass attacks during the second year shifted to more sporadic and less intense attacks during the summer and autumn of 2023, with more intense attacks introduced to focus on distinct cities in attempts to identify and overwhelm air defences. Hence, the previous claims that Kyiv had become a safe haven were quickly refuted by the more intense attacks on the city. Accordingly, the following aspects of air defences remain valid: '*It's not just that you*

[22] Rafael Franco: 'Russian Air Force's Performance in Ukraine: Air Operations: The Fall of a Myth,' *JAPCC Journal*, 35 (2023), p. 50.

must have the right system, you have to have enough ammunition to maintain defence. It is not inexhaustible – the question is, is there enough, will there be more supplies?'[23]

In order to sustain its mass attack campaign, Russia's numerous stockpiles proved to be insufficient, especially since the end of the war did not seem to be on the horizon. Accordingly, Russia switched on its mass military production industry in order to sustain its demand for the use of conventional mass in its attacks. In this regard, the focus was placed both on the cutting-edge segment of ballistic missiles and on the modernisation of the cheaper segment of the air attacks – Iranian Shahed drones, with the aim of installing '*new navigation systems, materials and more stealthy designs for the propeller to improve its survivability*'.[24]

Adaptations during the second year of the full-scale invasion

During the two years of full-scale invasion there were various changes in Russian tactics and in their employment of their numerical approach to air power. As was illustrated on various occasions, stockpiles with significant quantities of ammunition are still exhaustible. Ballistic missile long-range mass attack campaigns, indiscriminate bombing, and poor battle damage assessment (BDA) significantly undermine the effectiveness of firepower in achieving military effects. Despite having a significant numerical advantage over the Ukrainian military capabilities, Russia began to focus more on gathering its strength and assets for more intensive but less prolonged attacks.

The cost of war and the mass approach has begun to be felt in the Russian military, with higher demand for ammunition for the existing platforms and a greater presence of cheaper equipment. Hence, the Russian military industry began to work at its full capacity in order to satisfy the demand for more, faster and cheaper weapons. Accordingly, learning from the way Ukraine took advantage of asymmetry by producing and utilising different types of drones, Russia began to focus on the diversification and mass production of drones. Its defence budget for 2024 increased to 6% of GDP.[25] On the other hand, Ukraine and its Western partners have also been strengthening the numerical and unmanned segments in the fighting, with the aim of providing Ukraine with approximately one million drones in total, as was announced in the last few days.[26]

In this context, in the discussion of more complex platforms and weapons, and cheaper weapons like drones, the core utility does not come from the substitution of more advanced technologies by cheaper and less sophisticated tools and weapons, but more from getting the necessary weapons within the shortest time, since the demands of high-intensity warfare do not conform to the rules of peacetime and contractual

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[23] Henrik Samuelsson: 'Starkt luftvärn ger Kiev-borna trygghet' Göteborgs Posten, 25 November 2023, available online: https://www.gp.se/nyheter/varlden/starkt-luftvarn-ger-kiev-borna-trygghet.e7ac6d0b-97be-5bf9-9493-230da269154a.

[24] Sam Cranny-Evans: 'Russia's defence industry gears up for a long war' European Defence Review, 9 January 2024, available online https://www.edrmagazine.eu/russias-defence-industry-gears-up-for-a-long-war.

[25] Russia Plans Huge Defense Spending Hike in 2024 as War Drags, *Bloomberg news*, 22 September 2023, https://www.bloomberg.com/news/articles/2023-09-22/russia-plans-huge-defense-spending-hike-in-2024-as-war-drags-on.

[26] Ukraine Business News, 'One million drones and increased supply of shells: the results of the 19th Ramstein.' 16 February 2024, available online: https://ubn.news/one-million-drones-and-increased-supply-of-shells-the-results-of-the-19th-ramstein/.

arrangements. On the other hand, in times of peace, it is a matter of having a balanced approach to structuring and equipping one's armed forces, ideally having greater focus on self-sufficiency in producing the required weapons.[27]

From the perspective of the physical component of air power, Russia began to use its fixed-wing aircraft more carefully and sparingly. Even on their air-bases, various types of deception and camouflaging were observed. The issue of personnel remains a significant problem – pilot training requires time, and even after graduation pilots are far from being prepared for the contested environment of the Ukrainian airspace. Similarly, pilots who have been redirected from civil aviation and retrained for military purposes are far from having the operational experience of fighter pilots.

Conclusion

Overall, it can be concluded that the Russian way of fighting in the aerial domain remains very much the same, with the Soviet numerical approach being preserved and combined with some modernisation of materiel during the wave of reforming the Russian armed forces. Land-centric thinking and conceptualisation of air power as a firepower extension of the army – long-range artillery and rocket assets, remained prevalent in Russian thinking and employment of air power. The war in Ukraine illustrated Paradoxically poor air–land integration of the actual military services, which greatly contrasted with the integration of SOF with air capabilities in Syria. Another enduring trend remained greater focus on fire superiority instead of gaining air superiority. Not being able to catch up with peers in air-to-air combat, Russians focused on long-range, surface-to-air missile systems (S-400), A2/AD environments, and ballistic and cruise missile systems (Iskander and Kalibr) (long-range precision-strike). The reforms of the last two decades in Russia illustrated some focus on equipment to improve its cutting-edge nature, but economising on the basics (logistics, manpower, skills and training). While numerical superiority might provide instant results, the primary question remains what happens in the long term?

The experience in Ukraine illustrated various problems with the numerical approach and the requirement to build critical mass based on cheaper equipment like drones of different kinds. Various Ukrainian developments and innovations in integrating drones into fighting were learned and mimicked by Russia in recent months.

[27] Fedorchak: 'The Mass Approach', pp. 119–120.