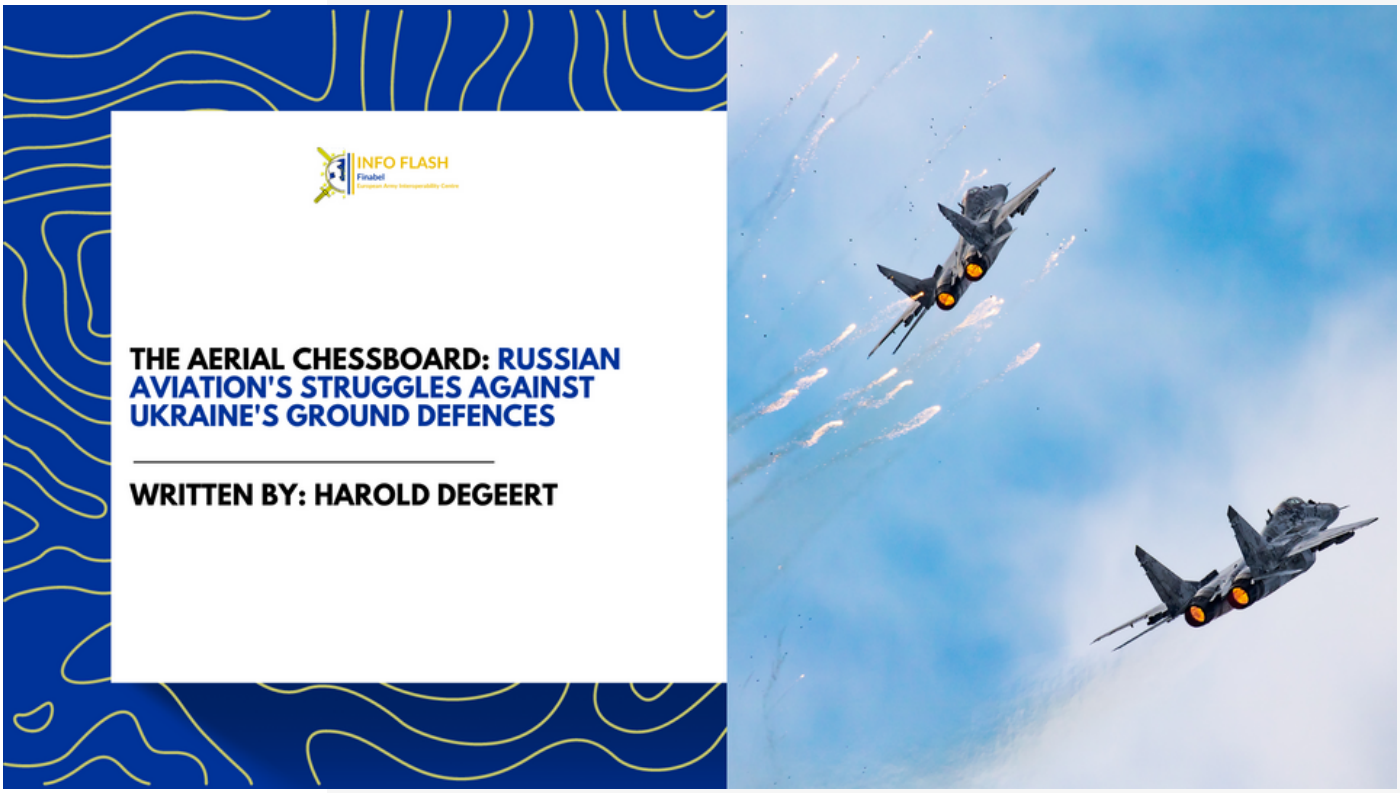
INFO FLASH
Finabel
European Army Interoperability Centre

FINABEL - THE EUROPEAN ARMY INTEROPERABILITY CENTRE

OCTOBER 2023



WRITTEN BY
HAROLD DEGEERT

EDITED BY
CHIARA NASONTE

SUPERVISED BY
GINEVRA BERTAMINI

After one year and a half of war, none of the belligerents achieved to take the upper hand in the air. Air superiority in the Ukrainian sky is still denied to Russia. Why is the Russian Aerospace Force (VKS), theoretically superior by number and by equipment, having difficulties against the outnumbered Ukraine Air Force? What conclusions should Europeans armies draw from this modern interstate war?

The Current State of the Ukrainian Sky

Prior to the start of the invasion by Russia, the Ukrainian Air Force was already in bad shape, it was under the process of cannibalisation for maintenance due to the non-renewal of its fleet, and it also suffered some casualties during the eight years of the Donbas war (Airheadsfly, 2014). In February 2022, its fighter air force was mainly composed of 51 Mig-29 and 32 Su-27 (Flight Global, 2023), which are less advanced versions of the modernised Russian ones with inferior radar range capabilities. Ukraine has had high casualties since 2022; up to this day it lost 22 Mig-29 and 12 Su-27, which is roughly half of their fighter fleet (Oryx, 2022).

Before the invasion, the Russian side was composed by around 900 aircrafts (Flight Global, 2023) and, up to this day, 92 confirmed losses have been reported (Oryx, 2022). This number can be raised up to 130 according to some estimation. Additionally, the VKS also suffered attrition from the overuse of their fighter jets, which can lead from 27 to 57 additional imputed losses (Bohnert, 2023), this attrition effect may certainly be observed in the Ukrainian fleet as well. Furthermore, Russia does not assign each of its aircrafts to the Ukrainian front. Its large fleet is split around the wide Russian airspace and it is divided into different Russian foreign operations worldwide. The Wagner group has been provided by some Russian aeroplanes in different African states, where the mercenary group operates (Thompson et al., 2022). Moreover the Russian Air Force's is still present in Syria (Nicholls, 2021) and Libya (Newdick & Trevithick, 2020; Bermudez & Katz, 2020). Therefore, the Russian Air Force might not be as efficient and powerful as the total number of aircraft might suggest.

The aircrafts losses are a problem for both parties, but they may affect Ukraine the most. As the Ukrainian fleet is smaller and Ukraine is unable to produce any of these aircrafts, the country must deal with the limited number of planes and spare parts stock. On the other hand, Russia can produce newer aircrafts and to thin out other fronts, where Russian aircrafts are deployed. Ukraine is unable to protect its sky by dogfighting the Russian air fleet, so the denial of air supremacy is achieved by ground origin.

Ukraine's Ground Base Anti-Air

Prior to the Russian invasion of Ukraine, the Ukrainian air defence was composed of modernised Soviet surface-to-air systems (SAM), S-300, Tor, Kub, Buk, and S-125. Early in the war, old Soviet stock of those weapons was gifted to Ukraine by former Warsaw Pact members.

Foreign aid has already sent multiple surface-to-air defence systems, man-portable air defence systems (MANPADS), anti-air guns, anti-air batteries, and anti-air mobile missiles. With this foreign aid, Ukrainians are able to deploy high efficiency anti-air architecture, from high to very low altitude protection. Due to the high number of anti-air missile batteries, the VKS is forced to fly at low altitude and to enter the action field of MANPADS. This means that air denial can be easily achieved with less expensive anti-air defence, with MANPADS or MANPADS mounted on pickup trucks, and few sometimes outdated anti-air equipment (Axe, 2023).

However, this architecture has its limits and requires a high number of ammunitions. There might be a stock shortage problem, as Western anti-air units in storage are limited due to the diminishing need for air defence after 1991. Therefore, now the West has less equipment to provide to Ukraine (Cancian & Karako, 2022).

Moreover, the leaked Pentagon files of April 2023 reported an ammunition shortage by May 2023 (Cooper et al., 2023). Europe and the United States provided enough equipment to Ukraine to sustain an air defence. However, they might not be able to afford this great effort in the future, as other fronts may open. In fact, the US has already offered anti-air missiles to Israel in reaction to the Hamas attack of October 2023 (Cappaccio, 2023).

The high appetite for this missiles' architecture is causing tensions on Ukrainian stocks and Western supplied aid. This explains the Russian strategy of saturating Ukrainian air defence with cheap Iranian Shahed-136 by targeting residential areas or agricultural facilities (Williams, 2022). The purpose is to disperse Ukraine anti-air batteries away from the front line and to force the use of precious missiles, so the thinning of defences opens windows for Russian airstrikes. This is a long-term Russian plan to empty the Western missile stocks.

The problem with drones is not to shoot them down, but it is to shoot them down economically. Finding the balance between targeting the cheap drones without using expensive anti-air missiles is why anti-air guns are regaining relevance against cheap loitering munitions resistant to jamming.

UThe State of the Russian Anti-Air Defence

As for the Russian air defence, it is not as good as expected before the war. The biggest issue for Russia is the extent of its territory. Russia may have a large number of SAMs, but they might not be enough to protect all of its air space. Nonetheless, even in the well-protected areas, there are some flaws. As of 23 August 2023, Ukraine managed to target the Crimean peninsula. While hitting a S-400 anti-air system with an air-to-air missile, Ukraine Air Force was filming the scene with a drone (Cenciotti, 2023).

However, the Russian side does not lack anti-air ammunition, as it is using modified S-300 missiles to strike ground targets (Mazurenko, 2023). The Russian equipment is not the most efficient. It has been reported that a successful Israeli airstrike conducted by F-16 struck the Syrian territory, while being protected by old Russian S-300 (Global Defense Corp., 2022). Therefore, it is possible to pass Russian defence, but with high risk of losing precious aircrafts and well-formed pilots. This is the reason why Ukraine relies heavily on cheap drones.

Can Western Aircrafts be a Game Changer?

Slovakia promised Ukraine 13 Mig-29, while Poland will give 14 Mig-29. This will not be a game changer in the present situation, but it may ease the currently under heavy pressure Ukrainian fleet by providing a better turnover. It is easy for Ukraine to receive and use those Soviet aircrafts, but it is hoping for real new operability opportunities offered by Western aircrafts (Tirpak, 2023).

As for the promised F-16, Denmark offered 19 aircrafts, the Netherlands 42 and Norway less than 10. Regarding Belgium, it will be from 2 to 4 F-16, but not before 2025. Sweden also offered Gripen in exchange for NATO membership (Youssif et al., 2022). These planes can add some changes to the battlefront because they offer longer range capabilities and can carry NATO ammunition natively. So, they can take full advantage of the NATO ecosystem, since it was restricted when mounted on soviet planes, and shoot modern Western missiles with active radar, longer range, better precision, and anti-radiation capabilities, offering more efficient air-to-air and air-to-ground strike possibilities.

With the diminishment of anti-air missile stock, Western aircraft can be used as a new way to deny air dominance and ease the ground defence. The plan is to offer Ukraine more anti-air capabilities to strike further with minimal exposure to Russian anti-air defence .

The West trained Ukrainians with NATO tactics, which require strong air support for ground assault. Training Ukrainians with those tactics without air superiority renders the counter-offensive less efficient. Without air dominance, Ukraine is unable to launch coordinated attacks leading to a less successful counteroffensive, and the conflicts may remain bogged down in trench warfare.

Conclusion

While Russia is able to deny air superiority to Ukraine with its abundant fleet, the Ukrainians achieve the same with ground base anti-air defence. This state of mutual denial will certainly remain this way, which leads to a stick in the mud war and a duel of artillery.

It is essential to monitor the evolution of how aerial warfare is conducted (Grieco, 2022). The NATO doctrine relies heavily on air dominance in its operations. In the case of denied air dominance, Western tactics are irrelevant. It is now appear that the air supremacy of the West could be denied. In future conflicts, in which European forces may be involved, an outnumbered but smartly equipped enemy could deny such dominance to a European coalition as Ukraine did with Russia.

Western armies have chosen quality over the quantity (Bremer & Grieco, 2022), but Europe might reconsider this approach due to the conclusions of the Ukrainian war. As a consequence, it might reshape its anti-air and aircraft equipment, with a possible switch from an ultra-efficient smaller fleet to a larger number of cheap unmanned aerial vehicles, which require less maintenance and less training. Buying less expensive aircrafts will allow the military budget to afford more ammunition for air defence and air strikes.

The needs of the Ukrainian army highlight the need for future warfare involving Europe. In conventional warfare, the demand for ammunition is colossal. Europe needs larger stocks of anti-air missile ammunition, long-range missiles and loitering munitions. Similarly, it is important to monitor the needs of a nation under attack, to which Europe is most likely to provide aid in the future. As for the tangible Chinese assault on Taiwan, China will need strong air dominance to cross the Taiwan Strait. Chinese are producing a large number of aircrafts and have the facilities to easily produce large quantities of cheap drones to barrage the Taiwanese air defence system. Certainly, China is learning from the Ukrainian conflict how to hinder air defence with swarm drones, an up-to-date anti-air defence is crucial for Taiwan and for its potential upholder nations.

References

Airheadsfly. (2014, March 1). Overview: the Air Forces of Ukraine. Airheadsfly. Retrieved from: https://web.archive.org/web/20170527015330/http:/airheadsfly.com/2014/03/01/overview-air-forces-ukraine/

Axe, D. (2023, July 15). A hundred ex-Taiwanese missile launchers could transform Ukraine's air defenses. Forbes. Retrieved from: https://www.forbes.com/sites/davidaxe/2023/07/15/a-hundred-ex-taiwanese-missile-launchers-could-transform-ukraines-air-defenses/

Bohnert, M. (2023, August, 14). The Uncounted Losses to Russia's Air Force. The Rand blog. Retrieved from: https://www.rand.org/blog/2023/08/the-uncounted-losses-to-russias-air-force.html

Bremer, M.K. & Grieco, K. A. (2022, June 15). IN DENIAL ABOUT DENIAL: WHY UKRAINE'S AIR SUCCESS SHOULD WORRY THE WEST. War on the rocks. Retrieved from: https://warontherocks.com/2022/06/in-denial-about-denial-why-ukraines-air-success-should-worry-the-west/

Cancian, M.F. & Karako, T. (2022, December 16). Patriot to Ukraine: What does it mean?. CSIS. Retrieved from: https://www.csis.org/analysis/patriot-ukraine-what-does-it-mean#new_tab

Cappaccio, A. (2023, Octobre, 12). US gives first Iron dome interceptors to Israel. Bloomberg. Retrieved from: https://www.bloomberg.com/news/articles/2023-10-12/pentagon-owned-stocks-in-israel-transfered-to-defense-forces

Cenciotti, D. (2023, August 23). Ukrainian attack destroys Russian S-400 missilesystem in Crimea. The Aviationist. Retrieved from: https://theaviationist.com/2023/08/23/ukrainians-destroy-s400/

Cooper, C., Schwirtz, M. & Gibbons-Neff, T. (2023, April 9). Leaked Documents Suggest Ukrainian Air Defense Is in Peril if Not Reinforced. The New York Times. Retrieved from: https://www.nytimes.com/2023/04/09/us/politics/leaked-documents-ukrainian-air-defense.html

Flight Global. (2023). World Air Forces report 2023. Flight Global. Retrieved from: https://www.flightglobal.com/reports/2023-world-air-forces-directory/151088.article

Global Defense Corp. (2022, January 24). Why did Russia's S-300 fail in Syria?. Global Defense Corp. Retrieved from: https://www.globaldefensecorp.com/2022/01/24/why-did-russias-s-300-fail-in-syria/

Grieco, K.A. & Siegel, J. (2022). Airpower after Ukraine: the future of air warfare. Atlantic council. Retrieved from: https://www.atlanticcouncil.org/programs/scowcroft-center-for-strategy-and-security/forward-defense/airpower-after-ukraine/

Bermudez, J. S. Jr. & Katz, B. (2020, June 17). Moscow's Next Front: Russia's Expanding Military Footprint in Libya. CSIS. Retrieved from: https://www.csis.org/analysis/moscows-next-front-russias-expanding-military-footprint-libya

References

Mazurenko, A. (2023, January 16). Russians lack ballistic missiles, they will use S-300 and S-400 more frequently. Ukrainska Pravda. Retrieved from: https://www.pravda.com.ua/eng/news/2023/01/16/7385095/

Newdick, T. & Trevithick, J. (2020, September 11). Two Russian MiG-29s Have Crashed In Libya According To Top American Intel Official. The War Zone. Retrieved from: https://www.thedrive.com/the-war-zone/36365/two-russian-mig-29s-have-crashed-in-libya-according-to-top-american-intel-official

Nicholls, D. (2021, April 7). Exclusive: Satellite images reveal how shadowy Wagner Group has become Vladimir Putin's 'private army'. The Telegraph. Retrieved from: https://www.telegraph.co.uk/news/2021/04/07/exclusive-uk-prepared-confront-putins-private-army-says-defence/

Oryx. (2022, March 20). List of aircraft losses during the Russian invasion of Ukraine. Oryx. https://www.oryxspioenkop.com/2022/03/list-of-aircraft-losses-during-2022.html

Thompson, J., Doxsee, C. & Bermudez, J.S. Jr. (2022, February 2). Tracking the arrival of Russia's Wagner Group in Mali. CSIS. Retrieved from: https://www.csis.org/analysis/tracking-arrival-russias-wagner-group-mali

Tirpak, J. (2023, August, 18). USAFE Boss: Ukraine won't get the F-16 until 2024 - and proficiency will take years. Air & Space Forces Magazines. Retrieved from: https://www.airandspaceforces.com/usafe-boss-ukraine-f-16-2024-proficiency/

Williams, I. (2022, October 13). Russia doubles down on its failed air campaign. CSIS. Retrieved from: https://www.csis.org/analysis/russia-doubles-down-its-failed-air-campaign

Yousif, E., Cohen, J., Abramson, J., Hartung, W., Overton, I., Jaramillo, C. & Gallagher, K. (2022). Arms transfers to Ukraine. Forum on the Arms Trade. Retrieved from: https://www.forumarmstrade.org/ukrainearms.html