

Comparison of Russian and Ukraine Air Force and Observation of Russian Air Combat Capabilities

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As the war in Ukraine continues to this day, the Russian military is still deadlocked, and its Air Force does not seem to play a key role in the war. The Russian Air Force is far superior to the Ukrainian Air Force in terms of performance and number of fighters, and the Ukrainian Air Force and air defense forces were already suppressed at the beginning of the war; however, the Russian Air Force did not fully exploit its power to support ground operations in the follow-on campaigns, which is incomprehensible to Western experts.

1. Ukraine's air power ar inferior to Russia's

After the collapse of the Soviet Union and the restoration of its independence in 1991, Ukraine inherited the military equipment of the former Soviet Union and had the world's fourth-largest armed forces, retaining nearly 400 missiles and nuclear weapons, including 130 SS19 ballistic missiles, 160 SS24 ballistic missiles, and 46 SS-24 missiles.¹ As for combat aircraft, Ukraine possessed 43 strategic bombers (Tu-160 and Tu-95), 241 tactical bombers (Tu-16, Tu-22, and Tu-22M), 20 Il-78 aerial refueling aircraft, 245 Su-24 fighter-bombers, 80 MiG-25 fighters, 260 MiG-29 and Su-27, in addition to a large number of naval and ground forces.²

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1. "Ukraine Destroys Last SS-19 N-missile," *Deseret News*, February 28, 1999, <https://reurl.cc/NpvGN6>.
 2. "Ukraine's Fall From Grace: How a World Leading Military Industrial Power Devolved Into a Dependant on Western Aid," *Military Watch Magazine*, November 6, 2020, <https://reurl.cc/xO51W1>.

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After the Cold War, the US promoted a policy of preventive defense and worked with the former Soviet republics, including Russia, to destroy their strategic weapons to prevent them from spiraling out of control and threatening international security, and to prevent the sale of these advanced weapons to China. With the assistance of the US, Ukraine destroyed its strategic weapons, including Tu-160, and retained only the original Russian-made Su-27, MiG-29, Su-24, and Su-25 fighters, of which less than 100 remained until the war. Due to economic and other factors, almost no further improvements or enhancements have been made in the past 30 years except for some minimal upgrades. The Ukrainian fighters lack new electronic scanning radar, active radar-guided missiles, and electronic self-defense systems, lagging significantly behind the Russian 4.5-generation fighters such as Su-30SM and Su-35 that were continuously improved after the collapse of the Soviet Union. In addition, under Western pressure, Ukraine scrapped Tu-22M, Tu-160, and tactical missiles as well,

so that it also does not have the ability to launch retaliatory strikes against Russia.

Before the recent conflict, the Ukrainian Air Force had a few 4th-generation fighters such as 35 MiG-29s and 35 Su-27s, far less than the previous 260. Although the Su-27 is an excellent fighter, the Ukrainian fleet of such aircraft lacks advanced air-to-air weapons like the active radar-guided R-77 missiles. Overall, the Ukrainian Air Force is at least 25 years behind the Russians in terms of radar, avionics, and electronic warfare technology. In addition, the smaller fleet and planes grounded due to the low availability not only prevent them from flying combat missions but also increase the chances of being suppressed by Russian precision weapons.³

Due to the lack of modern fighter aircraft, Ukraine relies heavily on ground-based air defense systems; however, the Soviet-era systems are outdated, and the Russians are very familiar with their performance and specifications as well as the vulnerabilities that can be blinded by electronic warfare. For instance, Ukraine

3. "Air Superiority Over Kiev: Can Russian Strike Fighters Eliminate Ukraine's Air Defences Within 24 Hours?," *Military Watch Magazine*, December 26, 2021, <https://reurl.cc/AKVy9Y>. December-26th-2021.

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is still using the former-Soviet S200 long-range missiles, and even the S125 system, which lacks maneuverability, has been redeployed in 2020.⁴ The Ukrainians use S300 and BuK-M1 from the 1980s for their medium- and short-range air defense. Since it's not designed for wide-area defense, the S300 lacks multi-layer defense capability, situational awareness, proper mobility, and up-to-date electronic countermeasures, making it vulnerable to Russian air suppression from the anti-radiation missiles equipped by Su-34, or attack helicopters such as Ka-52 and Mi-28, for example.⁵

Some of the Ukrainian air defense systems were sold to the US for testing, while the BuK short-range missiles were sold to Georgia, making the scale of its air defense system even smaller. Since NATO countries rely on aircraft rather than missiles to strengthen their air defenses, it limits the ability of Western countries to help Ukraine improve its air defense

capability.⁶

After the outbreak of the war, the Ukrainian Air Force was quickly overwhelmed; some of its fighters were destroyed at the airport or shot down by Russian fighters and ground-to-air missiles. The Ukrainian Air Force lost four Su-27s on March 5, which may have been shot down by Russian fighters or S-400 missiles deployed in Belarus, or by the Su-35s, the most advanced Russian fighter. The Ukrainian Air Force has a very small number of fighters evacuated to the west part of the country; however, a Su-24 was still shot down on March 13. It is currently unknown how much resource remains in the Ukrainian Air Force and how long it can last.⁷

The Ukrainian Air Force has long been using Russian-made equipment and lacks experience in operating Western fighters; moreover, the fighters not only require pilots and ground crews, but also air-to-air and air-to-surface weapons,

4. "Russia Just Destroyed Ukraine's Air Defences in a Couple of Hours: Why Was it So Easy?," *Military Watch Magazine*, February 24, 2022, <https://reurl.cc/NpvGO6>.

5. "Air Superiority Over Kiev: Can Russian Strike Fighters Eliminate Ukraine's Air Defences Within 24 Hours?"

6. "Russia Just Destroyed Ukraine's Air Defences in a Couple of Hours: Why Was it So Easy?"

7. "Ukrainian Su-24 Strike Fighter and 11 Drones Shot Down as Air Assets Diminish," *Military Watch Magazine*, March 13, 2022, <https://reurl.cc/yQdm0M>.

fuel, spare parts, and available airfields to operate. Although Poland can provide 28 MiG-29s to Ukraine, they are not expected to significantly enhance Ukraine's air combat capability; other former Warsaw Pact countries may have some MiG-29s as well, but most of them are too old and have a poor availability rate. As for American or European fighters such as F-16 or A-10, Ukraine is yet to have the ability to use them effectively. Ukrainian President Zelensky has appealed to Western countries, including Canada, to provide fighter jets, but Canadian Prime Minister Justin Trudeau said the Canadian Air Force could not provide available aircraft. The US believes that providing fighter aircraft will not help. If the Russian Air Force already has air superiority, anti-aircraft missiles may be the only viable option.

2. Russia unable to fully utilize its air superiority

After the Cold War, the Russian Air Force has continued to enhance its combat capabilities by eliminating most of its

former Soviet-era fighters and undergoing an impressive modernization since 2010. The newly acquired 350 modern combat aircraft, including the advanced Su-35S and Su-30SM that are mostly based in the southern and western theaters. Ukraine is in their operational range and some units have likely been transferred in from other regions before the war.⁸ According to *Flight Global* magazine, the Russian Air Force owns 240 MiG-29s and MiG-35s (improved MiG-29s), 131 MiG-31s, 273 Su-24s, 192 Su-25s, 350 Su-27s, Su-30s and Su-35s, and 125 Su-34s in 2022. These are all 4th-generation fighters. The Su-57, the first Russian 5th-generation fighter, has 75 units on order and should have yet to become operational before the war.⁹ The most notable Su-35S is a new fighter with the 5th-generation technology as its core that adopts Irbis-E passive phase-array radar, new-generation AL-41F engine, distributed active/passive radar and electro-optical warning system, common datalink, and a new self-defense system. Its avionics system, engine thrust, and weapon-carrying capability are all

8. "Is the Russian Air Force Actually Incapable of Complex Air Operations?," *RUSI*, March 4, 2022, <https://reurl.cc/3jg3W1>.

9. "2022 World Air Forces," *Flight International*, March 24, 2022, <https://reurl.cc/2D18OO>.

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greatly improved over its predecessor.¹⁰

Russia launched airstrikes against Ukrainian military facilities, air defense systems, and airports on February 24, destroying Ukraine's major land-based air defense radar with cruise missiles and ballistic missiles to "blind" its air force and block its activities at major bases; and some Ukrainian S-300 air defense missiles were destroyed as well in Russian tactics similar to which employed by Western countries before mounting attacks. After suppressing Ukraine's air defense capability, the Russian Air Force should then launch a massive strike to destroy Ukraine's combat power.¹¹

A 2021 report predicted that if Russia and Ukraine were going to war, the Russian Air Force should quickly seize air superiority and strike Ukrainian air defense positions, airports, command facilities, and other high-value targets within hours to pave the way for ground forces to push forward.¹² However, the

war is stagnant, and the Russian army is unable to achieve important strategic results. Western experts are puzzled by the fact that although the Russian Air Force has an absolute advantage over Ukraine, it has not been able to grasp complete air control and has not fully utilized its air resources to support ground operations. Western defense officials also found that the Russian Air Force had committed only about 75 fighters at the beginning of the war when it was expected to commit at least a few hundred. It is obvious that Russia has been very cautious in the use of its air force, which has allowed Ukraine to effectively counterattack even after more than 20 days of fighting with its functioning air defense system to threaten Russian pilots trying to provide air support for their ground troops. The Western experts pointed out that there is no explanation for the apparent risk-averse behavior of the Russian Air Force.

10. Yang Zhengwei, *The Two Ultimate Killers: Russia's Fifth-generation Fighter* (Taipei: Jingdian Co., Ltd., September 2012), pp. 46-96.

11. "The Mysterious Case of the Missing Russian Air Force," *RUSI*, February 28, 2022, <https://reurl.cc/nEaZbD>.

12. "Air Superiority Over Kiev: Can Russian Strike Fighters Eliminate Ukraine's Air Defences Within 24 Hours?," *Military Watch Magazine*, December 26, 2021, <https://reurl.cc/AKVy9Y>.

3. Why Russian Air Force under performing

Western experts also found that the actions of the Russian Air Force and ground forces lack coordination; many Russian ground units were sent to combat in theaters outside air defense cover, which exposed the units to Ukrainian drone and anti-tank weapon attacks. David Deptula, a retired US Air Force General, believes the Russian military finds it difficult to coordinate multi-domain operations.¹³

The Russian Army has only limited combat experience in Syria, and the lack of air support for ground forces may also be related to its lack of precision-guided munitions (PGM). In Syria, the Russian Air Force used only a small number of precision weapons while most fighters were still using unguided bombs or rockets. In addition, the Russian Air Force's aerial reconnaissance capabilities are also insufficient. For example,

although Russians raided the Ozerne base in western Kyiv, satellite images show that they did not successfully hit the main runway, nor did the bombing prevent the Ukrainian Air Force from continuing to use the base. Since the Russian planes have to avoid short-range anti-aircraft weapons by staying at high altitudes, their use of non-precision weapons also increases the chance of hitting civilian targets by mistake.¹⁴

Experts at the Royal United Services Institute (RUSI), a British think tank, believe that the Syrian war could have depleted the Russian inventory of precision weapons, and the Russian military also lacks equipment such as target identification and designation pods. However Russian multi-role fighters should be versatile enough to perform low-altitude “defensive counter-air” (DCA) or “offensive counter-air” (OCA) missions.¹⁵

The RUSI report also noted that

13. “Why hasn’t Russia Mobilised its vast air power against Ukraine?,” *Al Jazeera*, March 2, 2022, <https://reurl.cc/e6RW4L>.

14. “Why has Russia’s Superior Air Force Failed to Conquer Ukraine’s Skies?,” *Week*, March 2, 2022, <https://reurl.cc/Y9gdrx>.

15. “The Mysterious Case of the Missing Russian Air Force,” *RUSI*, February 28, 2022, <https://reurl.cc/nEaZb.D>.

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Russian fighters flew only limited missions in Ukrainian airspace, mostly at low altitudes after dark, to minimize losses to Ukrainian man-portable air defense systems (MANPADS) and ground fire. The experts say this shows that the Russian Air Force lacks the ability to organize and plan large-scale air operations with dozens or even hundreds of airplanes for joint air-ground combat.¹⁶

The RUSI experts also believe that the Russian Air Force may not be able to effectively prevent friendly fires, and it also lacks the ability to coordinate the activities of air and ground forces and to provide air cover for maneuvering units. In addition, the average number of training hours for Russian pilots is 100-120 per year, lower than the Western standard of 180-240 hours plus simulator training. The Russian Air Force also lacks an exercise structure comparable to that of NATO, such as the complex, extensive annual exercises like Red Flag or NATO Tiger Meet. This makes it difficult for

Russian pilots to organize large-scale air operations to effectively perform in high-threat airspace as well as to support military operations and protect ground forces.¹⁷

At present, the Russian Air Force is flying about 200 sorties a day. Due to Putin's request to bomb cities and infrastructure, it seems to have increased to 300 sorties daily by March 21. However they were unable to establish full air superiority, and their flight missions in Ukraine have also increased.¹⁸ US experts believe the reasons for the limited combat performance of the Russian Air Force may be that this is still a limited operation, based on the Russian view; therefore the Kremlin is reluctant to conduct large-scale air force operations and wants to convey a message that its ground units can fight without air support. If the war escalates, the Russian Air Force still has the ability to scramble and stop NATO air forces. But US experts stress that there is no evidence to support these inferences.¹⁹

16. "Is the Russian Air Force Actually Incapable of Complex Air Operations?"

17. "Is the Russian Air Force Actually Incapable of Complex Air Operations?"

18. "Russia Speeds Up Air War Over Ukraine, As Some Munitions Run Low or Malfunction," *Defense One*, March 21, 2022, <https://reurl.cc/DdzXr.O>.

19. "U.S. Intelligence Perplexed as Russia Refuses to Hit Hard with Air Force in Ukraine – Reports," *Military Watch Magazine*, March 2, 2022, <https://reurl.cc/Y9gdzO>.

5. Conclusion

Although the Russian Air Force fighters are more advanced, they lack precision ammunition and have to rely on long-range weapons and even hypersonic missiles, which limits their ability to perform attacks on Ukrainian ground units and support the Russian offensive. In addition, the Russian Air Force may also lack the ability to conduct large-scale operations, and the Ukrainian air defense system can still pose a deadly threat to the Russian aircraft. If the West succeeds in providing additional ground-to-air missiles, then there is no need to take the risk of escalating the war with a direct confrontation between Russia and NATO. NATO countries are also concerned about whether the Russian Air Force is retaining

the advanced fighters to counter NATO or conduct the next operation in Eastern Europe, so they will also deploy advanced fighters and air defense systems to Eastern Europe to enhance air defense capabilities on the eastern side and deter possible Russian threats to NATO borders.²⁰

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(The contents and advice in the assessments are the personal opinions of the authors, and do not represent the position of the Institute for National Defense and Security Research.)

20. “Send Missiles Not Planes,” *CSIS*, March 9, 2022, <https://www.csis.org/analysis/send-missiles-not-planes>.