Air Denial: What We Know? vs What Should We Know?

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The extent to which theory fails to foresee actual battle situations may mean the difference between success and failure. The undeniable claim that military organisations responsible for maintaining national security will work to produce relevant doctrine and the conviction that an impending conflict will include some unforeseen events despite the best efforts of planners, especially if a country enters an unforeseen conflict, stands true.

Because a thorough grasp of the conditions of future combat is beyond any strategist's vision, those who will handle the future war situation and execute doctrine will find it insufficient. It is remarkable how doctrine can be completely wrong for even a foreseen, anticipated conflict. Obviously, no organisation desires to create a defective doctrine, but some doctrines, notwithstanding the best of intentions, lead to disaster for the armed forces that deploy them. The major powers went to war in 1914 expecting it to be brief and conclusive, with their military preaching the virtues of offensive warfare. However, nothing went as planned.

"War is a harsh teacher," warned Thucydides in ancient times. His dictum has been proven time and again, and the war in Ukraine

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is no different. The prolonged war should act as a "wake-up call" to the international community; despite Russia's numerical and firepower advantages, Kyiv proved to be a formidable rival by mixing old and new tactics and technology, signalling a turning point in air power history. Ukraine has effectively implemented an air denial mechanism. As a result, Kyiv has been able to restrict Russian fighter aircraft freedom of operation over the majority of Ukraine while flying its own, primarily unmanned assets in the air littoral.[1] The occurrence of air warfare in this contested battle between Russia and Ukraine has certain lessons to be learnt from respective Air forces; and this article is specifically tasked to scrutinise the overzealous appeal of security experts that "Air denial is the future of Air Warfare."

As the discussion over the Ukraine-Russia conflict is going on, it is important to remember that all conflicts are contextual. Warfare is all about who is fighting whom, for what goals, with what resources, and under what limits. Correct interpretation of events is achievable when political objectives, military tactics, and restrictions—military, political, and economic—are clear.[2] Only then can one understand the realities of the battlefield.

UNDERSTANDING AIR DENIAL BY UKRAINE SUCCESSES?

After Russia's full-scale invasion of Ukraine began with pre-dawn bombings, the airspace over Ukraine remained contested.[3]

1. The airspace between ground forces and high-end fighters and bombers. Maximillian K. Bremer and Kelly A. Grieco, "Air denial: The dangerous illusion of decisive air superiority", Atlantic Council, August 30, 2022, at https://www.atlanticcouncil.org/content-series/airpower-after-ukraine/air-denial-the-dangerous-illusion-of-decisive-air-superiority/
2. PK Mulay, "Air Superiority or Air Denial: The Truth about the Air War in Ukraine", *Indian Defense Review,* February 21, 2023, at http://www.indiandefencereview.com/news/air-superiority-or-air-denial-the-truth-about-the-air-war-in-ukraine/
3. Maximilian K. Bremer and Kelly A. Grieco, "In Denial About Denial: Why Ukraine's Air Success Should Worry the West", War on the Rocks, June 15,

Ukraine's ability to deny air superiority to a bigger and more technologically advanced Russian Air Force continues to perplex military analysts. Ukraine, by employing Air Denial strategy, has ensured mutual denial of aerospace.[4] Air denial relies on a defence-in-depth strategy that combines multilayered and overlapping systems and combines their impact across the domain, from the blue skies to the air littoral.[5]

Ukrainian defence outer layer is made up of mobile surface-to-air missiles (SAM) from the days of the Cold War that cover threats from the sky. Ukrainian ground forces utilised long-range S-300 family and medium-range Buk-M1 SAM to keep Russian planes at a distance and under threat in the airspace. The 'shoot and scoot'[6] strategy has been particularly helpful in compounding the difficulty of the superior Russian air force. Ukrainian air defence units launch missiles, shut off their radars, and escape, thereby rendering it harder for the Russians to locate and eliminate them. It has been claimed that Russian aircraft are "not only hunter but also the hunted,"[7] therefore Russian aircraft are wary of entering Ukrainian airspace and refrain from conducting close-in-strikes.

Russian warplanes have turned to operating at low altitudes in order to avoid these threats. Although this strategy allows these

2022, at https://warontherocks.com/2022/06/in-denial-about-denial-why-ukraines-air-success-should-worry-the-west/

4. Greg Hadley, "Mutual Denial of Air Superiority Could Benefit US in Future Conflict, Top USAF Planner Says", *Air & Space Forces Magazine*, September 6, 2022, at https://www.airandspaceforces.com/mutual-denial-of-air-superiority-could-benefit-us-in-future-conflict-top-usaf-planner-says/
5. Justin Bronk, "An Unstoppable Force meets an Immovable Object: Air Superiority vs Airspace Denial Strategies", *Stratagem*, September 27, 2021, at https://www.stratagem.no/an-unstoppable-force-meets-an-immovable-object-air-superiority-vs-airspace-denial-strategies/
6. Emma Helfrich, "Ukraine Is Turning Fiat Trucks into Mobile Surface-To-Air Missile Systems", *The War Zone*, May 5, 2022, at https://www.thedrive.com/the-war-zone/ukraine-turned-fiat-trucks-into-mobile-surface-to-air-missile-systems
7. Maximillian K. Bremer and Kelly A. Grieco, n. 1.

aircraft to avoid being identified by radar of high-end surface-to-air missiles, it takes them directly into the heart of Ukraine's air defences—the air littoral. Russian fixed-wing aircraft and helicopters hovering at low altitudes were convenient targets for anti-aircraft artillery and thousands of shoulder-fired air defence systems, including 1,400 American-supplied Stinger missiles.

Ukraine is said to have employed anti-tank missiles to take down Russian attack helicopters approaching low in the sky.[8] The Ukraine instance foreshadows future wars in which the advantage will move towards inexpensive mass rather than a small number of pricey manned planes. In short, the Russian Air Force failed to gain control of Ukrainian airspace, which is often seen as the principal duty of a formidable air force. Because of their failure to control airspace over the battlefield, Russian aircraft had to fly at low altitudes, which exposed them to devastating MANPADS such as the SA-8, Stinger, Javelin, and others. Losses reduced exposure, resulting in fewer air attacks and help for ground forces. Attack helicopter operations were also harmed due to their fragility, resulting in severe losses. Furthermore, Russia was unprepared to resist Ukraine's use of drones or Unmanned Aerial Systems (UAS). As a result, the Russian Air Force did not manage to pull its act in tandem.

WHAT THE WORLD NEEDS TO LEARN FROM AIR DENIAL?

Having the capacity to properly resist enemy air threats has been an essential component of Ukraine's effective air denial policy. Fixed-wing aircraft have always performed the key function of air defence. However, given Russia's strength in the air, Ukraine's strategy has been to use the movement and dispersal of its anti-air systems. This, coupled with the Russian air force's failure to carry out SEAD/DEAD operations effectively,[9] has enabled them

8. Ibid.
9. David Axe, "Russian Pilots Have No Choice but to Fly Straight Through Ukraine's Man-Portable Missiles", *Forbes*, March 16, 2022, at https://www.

to withstand the initial attempt at a neutralising strike and later successfully drive the Russian air force out of the sky, employing "shoot-and-scoot" tactics of firing and rapidly running away. The effective performance of Ukraine in air denial has significant ramifications for future military battles. It indicates that even for a military force with massive air power capabilities, air dominance may no longer be an inevitable outcome. Simultaneously, smaller, and less well-equipped forces can use novel and effective air defence strategies to deny adversary air superiority.

While Ukraine has effectively utilised an air denial tactic against both fighters and bombers, the ongoing battle has underlined the significance of a new operating region in warfare: the air littoral. This low-level habitat between the ground and the blue sky has grown critical for combat operations.[10] It offers a low-cost accurate striking capability that can be used by commercial and military drones alike. Ukraine was the first to recognise the strategic value of this realm and was able to gain control of it using drones and loitering missiles like the infamous Bayraktar TB2.[11] The fight for air littoral control has underlined the significance of redesigning layered air defences in order to effectively stop enemies from deploying in this zone.[12] With the two sides experiencing a substantial presence in this new battlespace, and given the likelihood of reduced expenses and precision capabilities supplied

forbes.com/sites/davidaxe/2022/03/16/russian-pilots-have-no-choice-but-to-fly-straight-through-ukraines-man-portable-missiles/?sh=4c0aab5f3319

10. Andrew Salerno-Garthwaite, "Air denial over supremacy: lessons from Ukraine", *Airforce Technology*, September 8, 2022, at https://www.airforce-technology.com/features/air-enial-over-supremacy-lessons-from-ukraine/
11. T. Wetzel, "Ukraine Air War examined: A Glimpse at the Future of Air Warfare", Atlantic Council, August 30, 2022, at https://www.atlanticcouncil.org/content-series/airpower-after-ukraine/ukraine-air-war-examined-a-glimpse-at-the-future-of-air-warfare/
12. Maximillian K. Bremer and Kelly A. Grieco, "US Air Force needs to Embrace Air Denial as a Core Mission", September 8, 2022, at https://www.defensenews.com/opinion/commentary/2022/09/08/us-air-force-needs-to-embrace-air-denial-as-a-core-mission/

by the air littoral, it is probable that this space will keep playing an increasingly significant part in modern warfare, making its defence an important issue for militaries and politicians worldwide.

The use of democratic air power in Ukraine has produced tangible effects. Previously the domain of highly developed militaries, unmanned aerial vehicles (UAVs) and autonomous drones have made air power accessible to a larger variety of nations. UAV commanders have posed serious issues regarding their airspace for just a portion of the expense and in a lot less time than conventional air power, which spent hundreds of millions of dollars and years training troops capable of maintaining and piloting aircraft.

Taiwan is a prime instance of a country that would profit greatly from such an approach. Unlike in Ukraine, where Russia gained territory despite Ukrainian air denial measures, Taiwan's position as an island nation implies that "China would be unable to execute almost any military plan against Taiwan without air control."[13] Despite this competitive edge, Taiwan's armed forces are now focused on air denial and are developing under the presumption of potential air superiority.[14] Taiwan's high command continues to regard its fighter squadron as the major deterrent to a future Chinese attack.[15] As a result, it has been spending substantially on upkeep and expansion of its fleet of 321 aircraft, paying billions

13. CPT Matthew Revels, "Denying Command of the Air: The Future of Taiwan's Air Defense Strategy", *Journal of Indo-Pacific Affairs*, Air University Press, April 24, 2023, at https://www.airuniversity.af.edu/JIPA/Display/Article/3371516/denying-command-of-the-air-the-future-of-taiwans-air-defense-strategy/
14. Jaroslav Maxa, "Air War over Ukraine: Lessons for Taiwan", *Security Outlines*, June 16, 2023, at https://www.securityoutlines.cz/air-war-over-ukraine-lessons-for-taiwan/
15. M. J. Lostumbo, et al., "Air Defense Options for Taiwan: An Assessment of Relative Costs and Operational Benefits", RAND Corporation, 2016, at https://www.rand.org/pubs/research_reports/RR1051.html

of dollars to refurbish existing F-16s[16] and acquire 66 additional jets.[17]

Taiwan's geographical position, on the other hand, is considerably different. In the unlikely event of a conflict, Taiwan's air force may be unlikely to take off when faced with the threat of an assault of Chinese missiles. By overcoming Russian attempts to stop opponent air defence missions, the Ukrainian tactic of mobility and dispersion was vital for accomplishing air denial. According to readily available information, Taiwan's high command uses air defence systems principally for safeguarding fixed assets such as air bases, command and control installations, and critical infrastructure.[18]

The above strategy has been criticised for several years, putting those systems at a higher risk of being overwhelmed and annihilated when it comes to a Chinese missile attack. Based on most recent lessons, Taiwan ought to shift to concentrate on the air denial approach to dispersion and concealment to improve its chances of effectively deterring potential Chinese military action.

The USA and other Western air forces must begin preparing for this scenario currently. When attempting to maintain the status quo on NATO's eastern flank or across the Taiwan Strait, an air denial strategy may be the more prudent and cost-effective option. The United States and its partner nations would raise the costs and uncertainties of Chinese or Russian efforts to quickly capture territory and present their conquest as a fait accompli by utilising a

16. M. Yeo, "Taiwan commissions first upgraded F-16 fighter wing", *Defense News*, November 19, 2021, at https://www.defensenews.com/global/asia-pacific/2021/11/19/taiwan-brings-upgraded-f-16s-into-service/
17. The International Institute for Strategic Studies, "The Military Balance 2023", Routledge, 2023, at https://www.taylorfrancis.com/books/mono/10.4324/9781003400226/military-balance-2023-international-institute-strategic-studies-iiss
18. D. A. Shlapak, et al., "A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute", RAND Corporation, 2009, at https://www.rand.org/pubs/monographs/MG888.html

sufficiently large number of smaller, cheaper, unmanned systems in a scattered manner.

AIR DENIAL VS AIR SUPERIORITY?

Does the preceding support the notion that the idea of air superiority has passed so the attention must now shift to air denial? There are two arguments why this assumption is improbable. To begin with, the conclusion is indistinguishable from the facts of the Ukraine-Russia war. The Russian Air Force never truly carried air superiority to its natural goal of establishing supremacy over contested airspace with enthusiasm.[19] It aborted this mission early on, allowing Ukrainian Air Defense infantry to regroup and reorganise. Following that, with Western assistance, Ukrainian Ground Based Air Defense systems posed a severe danger to Russian Air Force operations. Its capacity for assisting on-the-ground combat was also weakened as a result of the original setback. The Russian experience does not suggest that obtaining air superiority is no longer a doctrinal requirement. On the contrary, the war demonstrates that a lack of air control or dominance over airspace has a negative influence on all other air operations.

The second point is the incorrect conclusion that air denial is an appropriate replacement for air superiority. In this regard, one is unable to ignore that, by definition, air power is most effective when used offensively.[20] To elaborate, air denial prevents own air power from maximising its offensive capabilities. Air denial may prevent hostile air power from operating within one's area, but it cannot guarantee safe air operations of one's own aircraft above the conflict or inside the adversary's territory.

Air denial is a nebulous idea because airspace cannot be shut and an intrepid assailant will always find a way across. As a

19. PK Mulay, n. 2.
20. Justin Bronk, n. 5.

result, air denial is fundamentally a defensive tactic best suited to the inferior side. It prevents the full potential of air power from being exploited. The Ukraine-Russia war is not, in any way, a paradigm-shifting event announcing a transition from the concept of air supremacy to air denial.

CONCLUSION

Without hesitation, air operations during the Ukraine-Russia war do not foretell the need to relinquish the doctrinal requirement of air superiority. Instead, the war emphasises the importance of the notion in order to maximise the offensive potential of one's air power. The potential to target the enemy's centre of gravity is possible only if air power can take advantage of these characteristics. The need and significance of air dominance remains high in air power theory. A weaker force may consider the concept of air denial, but only if air supremacy or beneficial air control is not within reach.

Russian fighters are unable to engage with advanced electronic warfare or engage in combat beyond visual range, which forces them to approach the Ukrainian air defence systems' bubble, according to officials within the Indian defence community.

Finally, the air battle over Ukraine teaches Taiwan important lessons about its defence capability. The efficacy of Ukraine's air denial tactic against a larger enemy calls into question standard ideas of air supremacy. The war in Ukraine is more likely to become the norm instead of the exception. It provides a frightening peek into the probable future of air warfare, in which medium-sized nations, as well as other major powers, will progressively control and deny sections of airspace to US and other Western air forces.