



## AIRPOWER AT ANY SCALE

GENERAL JAMES C. SLIFE  
US AIR FORCE

The scaled-down forms of airpower—small uncrewed vehicles in particular—can no longer be seen as a nuisance or a tax but should instead be seen as an ecosystem with both defensive requirements and offensive potential. The possibilities of these new capabilities drive us toward another key question: How can airpower work together with our sister services to achieve victory together?

On January 28, 2024, the United States Air Force lost its 70-year claim that no American has been subject to air attack, when an Iranian-backed uncrewed aerial system (UAS) killed three American service members.<sup>1</sup> One hundred thirty days later, Ukraine claimed the world's first kill of a fifth-generation fighter using another UAS deep in Russian territory.<sup>23</sup> This strike reprised another Ukrainian success two years prior, when a Bayraktar UAS reportedly played a key role in the sinking of the Russian cruiser *Moskva*.<sup>4</sup> One event might be a fluke, but two is a pattern, and three demands action. These scaled-down forms of airpower can no longer be seen as a nuisance or a tax but should instead be seen as an ecosystem with both defensive requirements and offensive potential.

Changes in technology upend our comfortable ways of doing business, and combat advantages those who can capitalize on these changes. Prior to World War II, Germany harnessed wireless communication to integrate tanks and airpower in the Blitzkrieg and harnessed the Spanish Civil War as a proxy war to perfect these concepts

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*General James Slife is the Vice Chief of Staff of the US Air Force.*

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1. C. Todd Lopez, “3 U.S. Service Members Killed, Others Injured in Jordan following Drone Attack,” January 29, 2024, US Department of Defense (DoD), <https://www.defense.gov/>.

2. Brad Lendon, “Ukraine Says Deep Drone Strike Destroys Rare Russian Su-57 Stealth Fighter,” CNN, June 10, 2024, <https://www.cnn.com/>.

3. Justin Bronk, Royal United Services Institute (RUSI), “Damaged Su-57 Emphasises the Vulnerability of Russian Airbases near Ukraine,” June 28, 2024, <https://www.rusi.org/>.

4. David Hambling, “Ukraine’s Bayraktar Drone Helped Sink Russian Flagship Moskva,” *Forbes*, April 14, 2022, <https://www.forbes.com/>.

and technologies.<sup>5</sup> As a rising revanchist power, Germany was able to navigate institutional change; on the backdrop of success, organizational change is slower and more difficult, as demonstrated in the US Navy's adoption of airpower.

At first glance, the attack on Pearl Harbor seems an indictment of the Navy of the time, but this reading is simplistic and incomplete. The Navy had long been studying the role of aviation in maritime war, conducting war games and making investments in order to field naval airpower alongside the battleship.<sup>6</sup> Therefore, the force was prepared when the Pearl Harbor attack shifted the Navy to a carrier-centric force literally overnight. Without the pioneering work done by Admirals William A. Moffett and Harry E. Yarnell in the interwar period, it is difficult to imagine how that force could have achieved the successes at the Coral Sea and Midway.

We Airmen must ask ourselves, "Is this our battleship moment?" Just as the pioneers of naval aviation were able to imagine complementary forms of seapower and adopt them into their force, we must do the intellectual and organizational work required to weave these disruptive technologies into our understanding of airpower. Are we pursuing sixth-generation air superiority capabilities, or only a sixth-generation aircraft? Our force cannot responsibly bet that we will have the time and space to recover from getting this one wrong, especially when there is so much evidence available. Conversely, if our force pioneers disruptive change, our strategic competitors will find themselves at risk of operational surprise and thereby be deterred.

There are good reasons to fear such a surprise. Small uncrewed vehicles played an outsized role in offsetting Russia's massive overmatch in Ukraine, turning a three-day operation into a two-and-a-half-year stalemate. Over the course of one week in Avdiivka, the Ukrainian "Army of Drones" claimed 428 Russian military vehicles, obliterating a motor-rifle brigade's worth of equipment and accounting for 53 percent of all destruction for the entire force during that time period.<sup>7</sup> In order to cross the Dnepr River during the Kherson Offensive, the Ukrainians first hunted the pilots of adversary small-UAS (sUAS) and destroyed enemy jammers, then interdicted Russian supply depots and reinforcements, and lastly provided fire support to Ukrainian marines. Longer-range UAS provide Ukraine a means for strategic attack against long-range bomber airfields and oil refineries, offsetting Russian volleys of Shahed UAS used as terror weapons.<sup>8</sup>

These are airpower missions: suppression of enemy air defenses, interdiction, close air support, strategic attack, and even offensive counter-air. The effects simply arrive in a smaller, often distributed, format. In the difficult opening phases of World War II, the British Special Air Service conducted offensive counter-air from jeeps, burning

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5. Andrei A. Kokoshin, *The German Blitzkrieg against the USSR, 1941* (Cambridge, MA: Harvard Kennedy School, Belfer Center for Science and International Affairs, 2016), <https://www.belfercenter.org/>.

6. *American Heritage*, s.v., "Early Warning," by Thomas Fleming, accessed July 1, 2024, <https://www.americanheritage.com/>.

7. Iryna Voichuk, "Army of Drones' Project's UAVs Hit 428 Pieces of Russian Equipment in One Week," *Euromaidan Press*, October 16, 2023, <https://euromaidanpress.com/>.

8. David Axe, "Ukrainian Drones May Have Flown a Record 1,100 Miles to Target Russian Bombers at Their Northern Base," *Forbes*, July 27, 2024, <https://www.forbes.com/>.

Stukas on the ground.<sup>9</sup> This small-scale airpower is our generation's Lewes bombs, an asymmetric means to use otherwise-denied airspace and offset our adversary's growing strength in the air. We must not allow ourselves to be "affixed by our prefix," only seeing the future fight through the lens of our past platforms. If it operates in the air domain, it is airpower.

While the character of war changes with technology, its nature remains the same. Even as the forms of airpower change, airpower functions remain evergreen. Judging by those functions, these denizens of the so-called air littoral undeniably qualify as airpower and fit well under the basic principles set forth by a few great captains a century ago.<sup>10</sup> Small-format airpower does not replace the stalwart technologies of traditional aircraft but serves as a necessary complement and an incompatible problem for an adversary.

Ukraine demonstrates the value of an air war inside an air war, and while not all technologies and tactics translate between theaters, some surely do. The Russians have quickly adopted these technologies—with no shortage of help from the Iranians—and our competitors in the Pacific are quickly adapting to these technologies on both offense and defense. We do not have a choice whether or not to observe these lessons, but we do have a choice whether or not to learn. Our adversaries have already made their choice, and it behooves us to pay attention.

In this challenge there is great opportunity. In World War II, the US Army Air Forces produced more than 35,000 heavy bombers—seven times our entire current fleet in bombers alone. There are few better expressions of mass in warfare than the wings of the Eighth Air Force thundering in combat box formation.<sup>11</sup> Exponential growth in the cost of aircraft compelled the Air Force to turn away from mass in the Cold War, and our force lost the art of commanding truly large numbers of forces. Now, with capabilities that traverse the trade space between platforms and munitions, affordable large-scale production runs are within our reach. Mass is back. Let us imagine what we might do with it as Airmen.

Culture and strategy go hand-in-hand, and the cultural implications of these technologies are profound. During World War II, aircraft were relatively simple, comparatively low cost, and accessible to most Airmen. Since the Cold War, the complexity of aircraft increased exponentially, driving higher costs and smaller fleets. As a result, the physical expressions of airpower have become more distant from an Airman's day-to-day life. Small-UAS technology reverses this trend by democratizing aviation, providing an opportunity for every Airman to gain a practical understanding of airpower principles.

Perhaps, just as every Marine is a rifleman, every Airman might learn to employ small-format airpower in the course of their professional training. Beyond building a culture of

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9. Ben Macintyre, *Rogue Heroes: The History of the SAS, Britain's Secret Special Forces Unit That Sabotaged the Nazis and Changed the Nature of War*, 1st ed. (New York: Crown, 2016).

10. Dewitt S. Copp, *A Few Great Captains: The Men and Events That Shaped the Development of U.S. Air Power* (McLean, VA: Epm Pubns Inc, 1989).

11. "'Combat Box': Bomber Formations," National Museum of the United States Air Force, accessed July 1, 2024, <https://www.nationalmuseum.af.mil/>.

“air mindedness,” there is direct combat utility here: organic surveillance and strike capabilities would provide clear value in an agile combat employment environment.

The strategic implications of these technologies are equally expansive. Prior to the arrival of these technologies, authoritarian regimes boasted a comparative advantage in using mass, since large volumes of low-cost mass resulted in high loss rates. They were far less sensitive to casualties, so they could deploy and lose large volumes of lower quality hardware, so long as there was more grist for the mill. With large numbers of affordable, automated platforms, free nations can now respond in kind. Moreover, in World War II the US Army Air Forces’ response to Axis terror weapons was to convert “war-weary” B-17s into UAS cruise missiles designed to target the V-1 and V-2 launch sites.<sup>12</sup> Today’s automation might similarly provide a means to conjure new capabilities with the kit we already have in the cupboard.

From a defense industrial base perspective, these technologies rekindle the forges of the “arsenal of democracy” by unleashing the military potential of the civilian production base. Due to the highly specialized nature of advanced aircraft, traditional aerospace companies cannot affordably retain surge capacity or easily repurpose civilian production lines. There will always be a need for these exquisite forms of airpower, but the Collaborative Combat Aircraft and Enterprise Test Vehicle are meant to open up a broader allied defense industrial base through dual-use technologies and commercial production processes.<sup>13</sup> Ukraine was able to rapidly repurpose large swaths of its industrial sector toward producing this small-format airpower. The rapidly growing commercial market for sUAS provides a formidable strategic industrial reserve—that is, if we are able to harness and employ these technologies effectively in the air fight.

Mass is not the only hand that can be played with these capabilities. The air littoral provides a space for skirmishing strategies, where relatively inferior capabilities can create disproportionate effects against superior forces through diversions and harassment. Despite losing every single aircraft, the Doolittle Raid was an operational success because it forced a long-term and low-value commitment of Japanese fighter forces to the homeland.

Similarly, Colonel Phil Cochran’s and Colonel John Alison’s Air Commandos tied down larger adversary formations through a long-term skirmishing strategy. In classic battles of antiquity, weaker forces have vexed and even defeated larger forces through the clever choice of terrain and timing—in particular, the Battle of Leuctra (371 BCE), where Theban peltast skirmishers prevented the main body of the Spartan force from engaging. This allowed the Theban phalanx to concentrate on a flank of the Spartan line and ultimately the collapse of the entire Spartan line. The Battle of Lechaem (391 BCE) is another example of the power of ambushes and harassment against a stronger force.<sup>14</sup>

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12. Jack Olsen and John Gresham, *Aphrodite: Desperate Mission* (New York: ibooks, 2004).

13. “Four Companies Selected for USAF, DIU Enterprise Test Vehicle Project,” Defense Innovation Unit, accessed July 28, 2024, <https://www.diu.mil/>.

14. Xenophon, *Hellenica*, vol. 1, trans. Carleton L. Brownson (Cambridge, MA: Harvard University Press, 1918).

Even better, the combination of a weaker skirmishing force and a stronger decisive force creates multiple dilemmas for an adversary. Airmen must learn to play both the strong and weak hands, and small-format airpower provides them the means to relearn the latter.

Finally, these capabilities provide an avenue to improve our integration with the Joint Force. The Cold War division of roles and missions between the Army and the Air Force, commonly known as the Key West Agreements, centered on who owned what type of aircraft. The Army had become reliant on organic liaison aircraft during World War II—in part a product of the birth of the independent Air Force. The Army was hesitant to give up these aircraft, and the Air Force was reluctant to receive them.

This mission space gave way to rotary-wing aviation, which largely became the purview of the Army. Unfortunately, technology did not always so neatly abide by these distinctions, contributing to the costly experience of the cancelled AH-56 Cheyenne.<sup>15</sup> This problem will become acute with small-format airpower. One prototype offers the option to swap between propeller, jet, and electric propulsion; almost all feature vertical or short take-off and landing capabilities using a mix of rotary and fixed-wing techniques.

If these aircraft are neither fish nor fowl, then perhaps new thinking is in order. We might consider a world where an Airman drops a cluster bomb full of sUAS to an Army commander as a “single serving Air Force” or a world where an Army commander launches a swarm of sUAS forward to conduct interdiction using Air Force long-range datalinks. The possibilities of these new capabilities drive us toward another key question: How can airpower work together with our sister services to achieve victory together?

This *Æther* issue devoted to the air littoral is sorely and urgently needed to address these pressing questions. Airmen will rise to the challenge, as they always do, and will master these new expressions of airpower. We, as an institution, must support them in doing so. This is not simply a question of technology and tactics. Our Air Force must consider what forms of doctrine, organization, training, leadership, people, logistics, and policies are required for these new capabilities. We must consider this problem from many angles, but we must do so quickly and move out decisively. Toward that end, I enthusiastically recommend the work of the authors of this volume and the tireless efforts of the editors. Thank you for joining me in opening this new chapter of our shared airpower story. Æ

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15. Ian Horwood, *Interservice Rivalry and Airpower in the Vietnam War* (Fort Leavenworth, KS: Combat Studies Institute Press, 2006).

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