No. 62
July 2026

The Mitchell Forum

Winning at Sea by Controlling the Air: The Strategic Centrality of Airbase Defense

by Lt Col Jonathan F. Vogel, USAF, Air War College, Air University

Winner of an AFA Research & Writing Award

The Air & Space Forces Association (AFA) recognizes and sponsors Research and Writing Awards annually to graduates at Professional Military Schools. The Mitchell Institute for Aerospace Studies facilitates the publishing of these papers in recognition of their achievement.

The opinions, conclusions, and recommendations expressed or implied in this article are those of the author and do not necessarily reflect the official policy or position of the U.S. Government, Department of War, the Air Force or Space Force, the AFA, or the Mitchell Institute for Aerospace Studies.

AFA Aerospace Education Programs

Abstract

The lessons learned by the Chinese at the 1894 Battle of the Yalu River underpin their modern anti-access strategy in the maritime domain; more robust U.S. airbase defenses can help the Air Force generate the combat force needed to overcome this approach. China's contemporary naval expansion relies fundamentally on the People's Liberation Army Rocket Force (PLARF) to neutralize American airpower—the decisive arbiter of maritime control. Current U.S. Air Force responses, including Agile Combat Employment and long-range bomber operations, without addressing U.S. airbase defenses, prove insufficient against saturation missile attacks threatening forward airbases.

The solution lies in developing organic, layered missile defense capabilities, particularly directed energy weapons, to defend critical air installations. By enabling sustained airpower generation from forward bases, robust active defense undercuts China's anti-access strategy, restores American air dominance, and denies the People's Republic of China (PRC) its maritime ambitions. The proposed approach transforms airbase defense from a passive measure into an offensive enabler, ensuring the United States can project the decisive airpower necessary to control the global commons and counter Chinese expansionism.

Why the Chinese Prioritize Maritime Dominance

On the afternoon of September 17, 1894, the Beiyang Fleet of the Chinese Qing Dynasty and the forces of the Imperial Japanese Navy faced each other at the mouth of the Yalu River.[1] The battle between the two Asian giants lasted only hours, but its aftermath would determine the trajectories of China and Japan for the next 50 years. The Battle of the Yalu River represented the last gasp of a dying empire and the first breaths of a rising behemoth. For the Chinese, its lessons were clear: Establishing naval dominance maintains a nation's favorable position in the global world order; those without the ability to establish naval dominance are relegated as second- or third-rate military powers. Carrying this principle into the present, the People's Republic of China, especially under the leadership of Xi Jinping, has set about to ensure that its access to and dominance of the seas will not be jeopardized.[2]

Its method of execution, however, is unique. The PRC's contemporary expansionist ambitions are not enabled primarily by the size of its naval fleet, but by the People's Liberation Army Rocket Force's long-range ballistic and hypersonic strike systems. The PLARF protects Chinese naval maneuver and permits sustained naval operations within and potentially beyond the Western Pacific by denying U.S. forces the ability to mass and utilize their primary defeat and control mechanism: airpower.

Indeed, the decisive contest between the PRC and the United States to control the global commons will be decided not by hull counts or naval presence, but by air dominance. Accordingly, the PRC has developed its long-range strike capabilities specifically to target American airbases and aircraft carriers.[3] Regarding airbases in particular, the threat requires U.S. Air Force commanders to make a decision: either operate at extreme ranges beyond the operational or politically acceptable reach of Chinese missile systems, or attempt to generate airpower within the area of responsibility (AOR) via flexible, dispersed operations while under fire. Neither of these approaches permits Airmen to generate the mass of airpower needed to catalyze air superiority or to coalesce the balance of weapons and platforms necessary to decisively defeat Chinese maritime maneuver forces. The answer to this conundrum lies in developing and deploying organically generated, layered missile defense capabilities that specifically defend against PLARF systems and capabilities. Robust active, organic airbase missile defense is a critical enabler for winning control of the air, dominating Chinese naval power, and securing the global commons against Communist Chinese schemes. The U.S. military must secure the bases needed to generate airpower that can breach PLA anti-access defenses and ultimately deny Chinese maritime dominance.

Battle of the Yalu River as Historic Trauma

The Chinese appreciate that maritime dominance is the organizing architecture of global wealth, trade, and influence.[4] Historically, nations that ruled the seas prospered, amalgamated vast amounts of wealth, and peddled significant global influence. The historical record contains innumerable examples of great maritime powers: The Carthaginians, Athenians, Spanish, Dutch, and British, to name a few, all showed how even nations with modest geographies could punch well above their weight and dictate terms of global engagement.[5] The corollary follows that if global power and influence flow from maritime dominance, then exclusion from these global commons is synonymous with strategic subordination. This foundation is fundamental to understanding the historical military trauma that continues to drive PLA strategy.

The destruction of the Qing Dynasty's Beiyang fleet in 1894 transformed China into a strategically inert continental power and subjected it to exploitation at the hands of foreigners.[6] While the Imperial Japanese Navy (IJN) won victory through superior command and control, initiative, and maneuver, the strategic effect of the loss was more consequential in the long term than the tactics used. Once the IJN eliminated the Qing naval threat, the Chinese had little power to contest subsequent Japanese amphibious and land operations. The Japanese went on to take the Korean peninsula and eventually forced the Qing to accept a ruinous peace. The Treaty of Shimonoseki, which the Chinese begrudgingly signed, gave huge geographic concessions to the victors, opened China to further exploitation at the hands of Western powers, and forced China to pay a huge indemnity to Japan. The lesson Chinese leadership takes from this history could not be clearer: Defeat at sea—or "the commons," in a contemporary sense—is a sure path to destruction. The PRC today does not just fear naval defeat but a return to conditions where others control China's access to and protection from the outside world.

We are witnessing a strategic pivot in Chinese thinking from a purely defensive posture to one that leverages maritime power as a vehicle for both national rejuvenation and global ambition. Xi has wasted no time in articulating that a strong maritime country is prerequisite for great power status. Thus, he and elements of the PLA shifted significantly from coastal and regional defense to power projection and sustained distant ocean presence.[7] Great Britain and the United States have been their muses, providing excellent examples of how power and influence can spread under the umbrella of naval might.

Unlike in the Battle of the Yalu River, ships themselves are no longer the primary determinant of global power projection. It is the airpower wielded by, in conjunction with, or against fleets that is the new arbiter of victory. Modern history is replete with examples of airpower's decisive effect on maritime control. As in cases like the Battle of Midway, the Battle of the Bismarck Sea, the Battle of the Philippine Sea, and Operation Praying Mantis, the side that brought effective airpower to bear against its enemies reigned victorious.[8] On the other hand, nations that failed to achieve air dominance often suffered ignominious defeat—Germany's failure to eliminate the Royal Air Force (RAF), and thereby its failure to enable seaborne operations to subjugate Great Britain, began the Axis power's long slide to total collapse. Argentina's inability to defend its forward airfield in the Falklands permitted an inferior-sized UK naval task force to successfully execute ship-to-shore operations and retake the territory. Recently, Russia's failure to subdue Ukrainian air operations imperiled the entirety of its Black Sea Fleet, culminating with the sinking of the Moskva by UAV and missile attack.[9] The lesson for the Chinese remains clear: Control of the seas is crucial to national survival, but the seas can only be controlled if the air above it is free of enemies.[10] While the PRC's massive naval shipbuilding and modernization effort dwarfs the United States' capacity in these areas, those ships and their ability to advance Chinese interests across the seas are wholly dependent on blunting the lethality of American airpower.[11]

The PLARF Threatens U.S. Air Dominance, & Therefore Sea Dominance

The PLARF acts as the centerpiece of China's strategy for suppressing the American air threat, thereby enabling PLA Navy (PLAN) maritime maneuver and operations. Through the development and deployment of large numbers of variably ranged ballistic and hypersonic missiles, PLA strategists aim to remove American and allied airpower

from the Western Pacific. Missiles invert the traditional offensive/defensive balance endemic to modern warfare by directly threatening the bases from which the United States generates its airpower. Indeed, the first mission of the PLARF in any kinetic engagement with the United States will likely be the suppression of airfields. As airpower expert Giulio Douhet said, the easiest way to kill an air force is while it is on the ground, and the Chinese aspire to do just that.[12] In a 2024 Stimson Center assessment of Chinese counter-air strategy in the Pacific, the authors noted that "from the PLA's perspective, the critical weak point in the American air combat system is the airbase—particularly the runways—required for takeoffs and landings."[13] The bevy of weapons it has built to execute this strategy is large and growing fast—an estimated 1,000 short-range ballistic missiles, 1,000 medium-range ballistic missiles, 500 intermediate-range ballistic missiles, and 300 ground-launched cruise missiles are already deployed, with a significant number of additional missiles (including hypersonics) coming online. These forces can saturate airbases within the first island chain like Kadena and Misawa, and very soon they will be able to saturate those in the second, to include Andersen and the revitalized Tinian North Airfield.[14]

Air Defenses are Critical to Achieve Air & Sea Dominance

The current United States Air Force (USAF) response to this challenge, while a worthwhile effort, is on its own insufficient. The first line of effort is Agile Combat Employment (ACE), which aspires to disperse forces among airfields to preserve them for offensive operations. While nominally effective against a limited attack, this scheme does not solve the saturation of a finite number of airfields with an increasing number of warheads. In recent modeling of airfield denial scenarios, a single hit on an airfield could cause extensive damage and delay operations for an extended period of time, even if ample reconstruction materiel and manpower are available.[15] In response to this challenge, the USAF has attempted to reinvigorate its runway and concrete repair enterprise, aiming to rapidly fix damage that the enemy inflicts on its airbases within an ACE environment. Although undoubtedly necessary, runways and taxiways can only be repaired so long as the personnel and fragile equipment repairing them survive and maintain the ability to operate. Notably, while the USAF has pioneered innovative Rapid Airfield Damage Repair (RADR) processes in the last few years, which significantly reduce repair timelines, it has "not included the construction of hardened facilities for storing RADR repair equipment and materials," at any of its Pacific airbases.[16]

A second current line of effort is concealment and passive protection to prevent damage to fragile aircraft and sustainment systems operating within missile range. Hardened shelters, concealment, and deception have become a staple of airfield defense in the war between Ukraine and Russia, mostly in response to the threat of Unmanned Air Systems (UAS).[17] While hardened aircraft shelters (HAS) are effective against these small aircraft and their light payloads, such structures would not be impervious to large, unitary warheads carried by ballistic or cruise missiles. Concealment and deception can be effective when the enemy must judiciously select targets to conserve limited warhead supplies, but their utility is limited in scenarios involving adversaries with large stockpiles of weapons that they can afford to liberally expend on anything even suspected to be a target. Moreover, none of these efforts defend the runways themselves. A third effort focuses on anchoring operations

in locations outside of missile ranges and using long-range, long-endurance bombers for the majority of weapons delivery. All of these measures can be useful, but they are best regarded as fragments of a much-needed more cohesive solution.

The issues with this last line of effort—operating solely from standoff locations—truly highlight the pickle in which the USAF finds itself vis-à-vis the PLA. First, the USAF lacks sufficient numbers of bombers or the long-range escort platforms needed to generate significant, sustained airpower over distance. Hence, the conversation at the operational level has moved away from continuous air presence within the battlespace toward temporary "pulsed" air operations.[18] In the Pacific, the idea is that the United States could still bring desired effects against maritime targets during defined windows of air superiority. Like the bomber raids of WWII, the United States would generate just enough forces to fly to the target, enter (or at least get near to) contested airspace, and launch weapons. However, if the bombers, and their support elements like fighters and tankers, must operate from geographically remote or dispersed locations, it will be difficult if not impossible to amass the required air packages at a high operational rate. This means fewer sorties into the battlespace with fewer weapons on target. Moreover, the United States only has 130 bombers with intercontinental range and sufficient weapons capacity, making these platforms exceptionally high demand and low-density in this fight. The PLA knows this and has made interdicting bombers or denying their operation a priority.[19]

To operate in this arena, the bombers need support from fighters tasked against enemy air platforms and the suppression of air defenses. But those cannot be generated in sufficient quantities if they cannot operate reliably from bases closer to the fight. Hence, bombers are expected to employ only low-density, costly standoff weapons against targets to avoid losses.[20] Additionally, all of these plans require massive, sustained air refueling support that hazards fragile aerial tankers just to get strikers to locations from where they can launch their standoff munitions.[21] Finally, and most discouragingly, putting additional distance between the PLARF missile threat and American airbases does nothing to defend against future threats. Inevitably, as American airpower retreats from the forward edge of battle, Chinese missile technology will rapidly adapt to target it at these more distant ranges.[22] The USAF has thus been forced into an operational conundrum. The PLARF precludes generating airpower within ranges where sorties can be maximized and short-range tactical aircraft enjoy relevant combat radii. Bombers critical to interdicting maritime targets are subsequently forced to operate at vast distances from the battlespace, supported by massive aerial refueling fleets, and only to employ exquisite, expensive, low-density standoff munitions with limited magazines.

The critical question then becomes: How might the United States restore the relevance of its airpower by regaining control of the skies from the missile threat, and thereby bring the benefits of air superiority to bear in a fight to dominate the global commons? Fielding sufficient numbers of new long-range platforms optimized for operations in the Pacific is not feasible. While the B-21 and F-47 promise to partially solve the range and airborne survivability issues faced by the current USAF fleet, they cannot be produced or replaced rapidly and remain reliant upon the tanker fleet for extended operations.[23] Most importantly, they are still totally reliant on an airfield with the appropriate maintenance support and runways for sortie generation.[24] Vertical Takeoff/Landing aircraft like Sikorsky's Nomad and rocket-launched UAS like the XQ-58 Valkyrie do not require the same level of airbase infrastructure,

but the limited power generation, processing power, range, and payloads carried by these aircraft reduce their utility.[25] Fielding them in numbers sufficient to be impactful would require both huge acquisitions expenditures and a complete overhaul of the USAF's training, sustainment, and operations.

Given all variables in play, active air defenses are critical to restoring U.S. air dominance in the face of the growing PLARF threat. The calculus here is the same as it has been since the days of Billy Mitchell: defend the base, fix airplanes, load munitions, get airborne, and bring effects to bear upon the enemy through the air domain. The Battle of Britain in 1940 provides an excellent example of how these tasks are imperative to successful air control operations. Initial Luftwaffe air attacks targeted poorly defended airfields and nearly crippled the RAF. It was only after the Germans changed their targeting priority to major urban areas that the British were able to reconstitute and muster airpower in sufficient numbers to viably contest the Luftwaffe for mastery of the air.[26] Developing and deploying capability, structuring defensive networks, and commanding and controlling forces to intercept inbound threats is foundational to the production of airpower. The PLARF poses a credible, existential threat to the generation of airpower for joint force operations. If U.S. forces can reliably defeat enough missiles to defend critical airbase assets, the USAF can operate within the adversary's growing engagement zone, sustain aircraft generation, and bring decisive mass to bear.

Air Defense Capabilities

The USAF must invest in both fixed and forward-deployable missile defense capabilities. The U.S. Army currently owns primary responsibility for missile defense capability development thanks to the 1948 Key West Agreement. This construct has left missile defense at USAF installations at the mercy of internal Army doctrinal, financial, and bureaucratic decisions.[27] This paper does not advocate for the Army relinquishing its authority in this area but recommends that the Air Force should recognize and address the risk created by the neglect of the mission as well as the need for specialized capabilities to maintain its combat relevance through the protection of its assets. To deconflict developmental and deployment efforts with the Army, the Air Force should prioritize the development of its own emerging capabilities. Directed energy (DE) solutions, in particular, show serious potential to change the character of air defense operations, especially in response to the missile threats posed by the PLARF.

The potential for DE weapons to change the battlespace over USAF airfields is enormous. High energy lasers (HEL) and high power microwave weapons (HPM), among others, are effective at relatively long ranges and are limited in shots only by power available. To demonstrate the efficiency of a notional HEL against a missile target, consider the difference between engaging an inbound missile with the existing Terminal High Altitude Area Defense (THAAD) systems and engaging with a HEL. A single THAAD interceptor operated by the Army costs roughly $15M. Per standard unclassified shot doctrine, the THAAD operator will take two to three shots at an inbound target to achieve an acceptable probability of kill (pK) for a total cost of around $30M–$45M in munitions. While the defense of high-value assets is certainly worth the cost in many scenarios, there is no denying that the construct is economically unsustainable when considering a single DF-21 warhead is about $12M and a CJ-20 cruise missile costs roughly $1M.[28]

This scenario promises to worsen in light of the advances in Chinese missile tech that specifically seek to field very low-cost warheads like the YKJ-1000 at $99K

per unit. In comparison, a shot from a HEL like Israel's Iron Beam is estimated to cost at most $10 worth of energy. More importantly, systems like the U.S. Navy's shipboard solid-state HELs have an unlimited duty cycle so long as power is available.[29] Accordingly, these weapons can engage targets continuously without any reloading or cooldowns required, permitting an exponential increase in the number of targets engaged by the defensive network and taking multiple shots to disable shielded or more evasive vehicles. As Dr. Alex Alaniz of the Air Force Research Laboratory pointed out, modeling and simulation of scenarios focused on airbase defense, which compared traditional interceptors and directed energy in "high intensity scenarios [of] 500 missiles per day" showed that even when factoring total procurement, manpower, and energy costs, DE becomes "more cost-effective" after only two days of hostilities.[30]

Critics may offer that DE is an emerging technology and opine that it will stay that way for myriad reasons ranging from power requirements to system fragility to the difficulty of targeting objects moving at hypersonic speeds. But recent engineering has solved several of these issues, and this capability falls well within the realm of possibility. For example, advances in small modular nuclear reactors like the one being installed at Eielson AFB offer sustainable solutions for DE weapons at fixed installations.[31] The Japanese Self-Defense Forces recently debuted a 100kW shipboard laser that successfully packaged all elements of the weapon system—capacitors, mirrors, turret, cooling, and other subsystems—into two 40-foot containers. As theorized, the Japanese system effectively has an unlimited magazine depth and can continue to operate indefinitely so long as it has a power source.[32] Similarly, Israel rolled out its Iron Beam air defense system. Comprising an air defense radar, C2 unit, and two HEL systems, Iron Beam can engage targets to an altitude and distance of 6 miles.[33] Meanwhile, the United States has developed and successfully tested a range of DE weapons, from the USAF's Tactical High-power Operational Responder (THOR) counter-UAS system to the Army's Directed Energy Maneuver Short-Range Air Defense (DE M-SHORAD).[34]

Importantly, there are physics limitations for DE weapons employment that impede their operational effectiveness against some targets. For example, atmospheric dispersion and absorption of HEL and HPM beams limit the range at which sufficient power can be imparted on a target to kill it. Thermal heating of air vehicles traveling at hypersonic speeds also reduces the effectiveness of DE weapons due to the propagation of plasma shielding around the vehicle, especially at high aspect angles (i.e., nose-on).[35] While these issues may limit the ability of DE weapons to kinetically interdict ballistic and hypersonic missiles in terminal phases of flight, they do not negate non-kinetic kill mechanisms that degrade on-board flight control systems or deny supporting elements of the missile kill chain. Moreover, issues specific to ballistic and hypersonic weapons do not apply to lower-speed threat systems like the ground-launched cruise missiles (GLCMs) deployed by the PLARF and air-launched cruise missiles (ALCMs) maintained by the PLA Air Force (PLAAF).

Evolving the Air Defense Construct

Any new missile defense capability will be worthless unless it can be coordinated with other systems and organizations. Getting this piece right is critical because it can help to solve some of the biggest sustainment issues with HELs and HPMs. Tying DE anti-missile systems to airbases is an appropriate means of ensuring that there is enough space, power, and cooling available for the systems. Much like a ship, the airbase needs to be thought of as a tooth-to-tail warfighting ecosystem for

which the commander is responsible. Herein there are two solutions. The first, and simplest, is to tie DE systems into existing permanent infrastructure at well-established airbases. For example, at Andersen AFB, DE systems can be deployed and sustained as part of the permanent base infrastructure. With a steady power supply and dedicated support, these weapons can cover large swaths of airspace in and around the island of Guam.

The second solution is to integrate DE systems, operators, and sustainers into deployable combat wings. These units would focus on bringing capability to bear in temporary environments, whether leveraging permanent facilities provided by host nations or operating at austere forward airbases. In this construct, DE becomes an integral part of a wing's mission, offering commanders a resilient anti-access/area-denial node that can also generate offensive airpower. An approach fielding capability at established bases and permanent facilities in the Western Pacific to immediately enhance their resilience should be tackled first. The second deployable construct can be pursued thereafter to bolster the active defense of austere or non-military airfields used in contingencies, thereby benefiting from lessons learned during fixed-base operation of DE systems.

DE capabilities at USAF installations and combat wings should be integrated into comprehensive, layered air and missile defense for joint force operations. The current doctrinally blessed system takes all air defense capabilities over a geographic area and incorporates them into a single C2 network for the coordination of fires. Integrated Air and Missile Defenses (IAMD) amalgamate the organic missile defense capabilities deployed by the various services into a single structure under the authority of a Theater Air Defense Commander (TADC). Thanks to the 1948 Key West Agreement, the preponderance of land-based missile defense capabilities is deployed by the U.S. Army, consisting primarily of the THAAD and Patriot surface-to-air missile (SAM) systems. Relevant naval systems like Aegis-armed destroyers are incorporated into the IAMD scheme of maneuver for an AOR, but they still bear significant competing responsibilities for the service's own equities, such as carrier defense. Operational control of these capabilities is ceded to an Area Air Defense Commander (AADC), designated by the Joint Force Air Component Commander (JFACC) and TADC.[36] With DE weapons at their disposal, the AADC would gain significantly greater flexibility in engaging missile threats across the theater. Not only would more shots be available overall, but the ability for DE to handle lower, slower engagements against UAS, drones, and cruise missiles would grant TADCs the option to conserve their more exquisite interceptors for high-end or complex targets.

In a scenario where saturation air attacks are a concern, the AADC could authorize the free use of ground-based DE weapons against drones, cruise missiles, and UAS. This would massively reduce the number of interceptor aircraft needed to execute this same mission set and conserve the valuable air-to-air munitions their pilots utilize. In 2024, Iran launched a strike against Israel with more than 300 surface-to-surface weapons. Of this total, 170 were one-way attack drones and another 30 were traditional cruise missiles. U.S. and Israeli air defense forces intercepted all but about nine of these threats with a combination of ground-based interceptors and airborne fighters. While overwhelmingly successful, the cost in terms of air-to-air munitions was extraordinary. The fighter crews responsible for downing the Shahed drones exhausted their loads of AIM-120 and AIM-9 missiles and were left, in some cases, with no further options but to engage targets, unsuccessfully, with onboard guns. Here the cost difference makes these successful interceptions pyrrhic:

These two air-to-air missiles cost around $1M and $500K per unit, respectively. That is a princely sum for downing a $20K–$50K Shahed attack drone.[37]

While the USAF is fielding lower-cost air-to-air munitions like the AGR-20 ($25K–$40K per unit) to fix the problematic cost dynamic against drones, it is important to note that each sortie flown to defend against cruise missile or drone attacks is a lost opportunity to project power forward.[38] If ground-based DE weapons can down drones and cruise missiles targeting friendly centers of gravity, more aircraft can be tasked to offensive operations. This translates into more capability at the forward edge of the battlespace that can gain control of the air and engage adversary surface units—perhaps even PLARF launchers themselves. The importance of this aspect cannot be overstated: In a maritime-focused battle against the PRC, the USAF will need the preponderance of its fighter assets to gain and maintain air superiority over the area of naval maneuver. Suppressing surface-to-air missile threats, destroying PLAAF air assets, and defending U.S. strikers tasked with destruction of naval forces will be critical to defeating the adversary's scheme of maneuver. Every aircraft sortie lost to local defensive counter-air missions is one less sortie that can be flown in the enemy's backyard. Weapons and fuel expended in air defense mission sets will become more problematic as finite stockpiles and fuel reserves run low, especially in a Pacific scenario where logistics support will be heavily contested.

DE weapons at the airbase should be folded into theater IAMD, allowing C2 elements to coordinate defense across a wide area of concern. However, installation or wing commanders should retain the ability to use them as required for point defense. Thanks to the low cost per shot of these systems, conservation of interceptors is not a driving factor for centralized command and expenditure of assets. With sensor-to-shooter connectivity provided through data sharing and fire control platforms like the Joint Fires Network (JFN), geographically proximate bases could provide independent and overlapping fires against inbound threats, vastly increasing the chances of successfully defending critical assets. This is especially important within the context of ACE operations, where commanders are responsible for several airfields within a regional cluster. In essence, this construct comes closer to mirroring the U.S. Navy's concept for employment of carrier strike group (CSG) missile defense: Organic capabilities deployed on vessels within the group are coordinated to provide mutual support to vital centers of gravity within the formation.[39]

More importantly, USAF base commanders who are doctrinally responsible for point defense of their installations would now have the means to do so even if cut off from the appointed Air Defense Commander. This latter point cannot be emphasized enough. Assuming that the future battlespace will be a fast-paced, complex, adaptive system environment, it is imperative that commanders can operate at the forward edge without centralized decision-making or fires support.[40] Airbases must be defended against missile attacks, especially when regional or theater-wide C2 networks become inoperable or unreliable. Although current air defense systems maintain independent engagement capabilities, a loss of connectivity underpinning control and deconfliction mechanisms across a wide geographic expanse may jeopardize the interdependent interceptor network. If centralized control within the IAMD network is lost, commanders need to be ready and able to engage threats independently and continuously. DE weapons paired with relatively inexpensive organic sensor structures like Anduril's Cruise Missile Defense Sentry Towers can provide USAF installations with that ability.[41]

Organic airbase defense DE weapon incorporation therefore has the potential to restore air superiority capability along a lengthy continuum. It can increase the number of shots defenders can take at incoming missiles; invert pyrrhic operational and financial cost curves by preserving both surface-to-air and air-to-air interceptors; free valuable air platforms from defensive mission sets so that they can be deployed forward in the battlespace to pursue offensive objectives; and provide commanders with independent defense capacity to ensure continuation of operations in complex, contested, and degraded environments.

Competence & Authorities

The efficient employment of layered air defenses to support wider air control requires investment in the personnel who will operate systems and direct their use. Tactical task training for those deploying, sustaining, and firing various weapon systems is necessary for successful implementation. Within a missile defense context, the U.S. Army should continue in this space—the service has already aligned a large segment of its air defense community to organize, train, and equip its personnel primarily for operations in and around American-controlled airbases.[42] However, organic USAF capabilities will require the service to develop and train its own personnel capable of operating new weapons and integrating them into the wider IAMD network.

The current USAF base defense model relies upon Security Forces personnel for base defense. This includes a wide range of responsibilities, from securing base perimeters against ground penetration to the counter-UAS mission.[43] These Airmen are overtasked with mission sets that live at vastly disparate locations along the defensive operations spectrum. This overextension and trend toward generalization is dangerous. Consider that short of cataclysmic emergencies, no responsible USAF leader would expect intelligence analysts to also act as air traffic controllers. The job specialization is exceptional, and the risks to each mission set are simply too high for them to be conflated. Similarly, dedicated air defenders are needed to fully develop the operational potential of improved weaponry and systems, especially when fielding advanced capabilities like DE.

Developing talent within the airbase defense enterprise extends well beyond the tactical training of operators: The USAF should deliberately deepen its battle management career field to take on command and control responsibilities for both installation and regional air defense. Emerging capabilities and tactics have outpaced the service's focus on traditional tactical air control. The rapidly proliferating threats against airbase operations, especially in the Pacific, deserve steady concentration on the problem and dedicated resources. If the USAF is going to gain and maintain air superiority over a battlespace full of Chinese systems designed to target airpower at its weakest point—on the ground—then the service should deliberately develop personnel who understand the threat, have experience with relevant kinetic and non-kinetic solutions across joint capabilities, and know how to integrate those capabilities into existing and emerging command and control networks. Talent is employed by air commanders ad hoc, and most often the Sector Air Defense Commanders (SADC) operating on behalf of the JFACC/TADC are Air Force officers who have spent their career concentrating on the tactical control of aerial warfare from inside a C2 aircraft like the E-3 or a ground-based Control and Reporting Center (CRC). A role so pivotal as effective air defense of critical airbases against the rapidly growing PLARF threat demands that USAF battle managers have a deep, holistic understanding of IAMD developed through deliberate education and realistic experiential training.

Authorities for operational execution of installation to regional and theater-wide air defense will flow naturally from the development of officers dedicated to the enterprise. As mentioned previously, centralized control of all theater assets by a single or even regional air defense commanders is unlikely to survive concentrated efforts by a capable adversary to degrade and disable C2 networks. Thus, it is imperative that installation commanders be prepared to execute disaggregated, independent operations to defend airbases. In contemporary practice, this translates into dedicated Base Defense Sectors. These are wholly defined by the maximum range and effective altitude of resident defensive weaponry within the commander's purview, which is usually limited to the short-range counter-drone or counter-UAS fires controlled by Security Forces personnel. If airbases are going to survive against combined PLARF and PLAAF saturation attacks, local commanders need to be given specific authority to defend critical assets, such as runways, control centers, fuel depots, ammo storage, and parked aircraft, and to break their dependence upon external agencies for protection.

Reimagining Air Dominance

The Battle of the Yalu River's lessons underscored for China that national power, regional dominance, and global influence are derived from unchallenged access to the sea. Xi Jinping has publicly asserted that reunification with Taiwan and dominance of the near seas is not the end of China's ambitions. The PRC plans to maintain a minimum 430-ship navy to make good on Xi's strategy to compete with and displace American naval primacy in the Pacific, Arctic, and Indian oceans.[44] To manifest this agenda, the PRC has made extreme investments in its shipbuilding capacity, capitalizing on government-directed civil-military fusion to birth a domestic ship industry that outproduces the U.S. industry by a factor of 232 to 1.[45] Shockingly, the Jiangnan Shipyard alone has the capacity to outproduce the entirety of U.S. shipyards combined.[46] Obviously ocean-going assets are foundational to the PRC's current aspirations for national rejuvenation through reunification with Taiwan, attainment of primacy within the Pacific, control of global choke points like the Strait of Malacca, and the expansion of Chinese interests into the Arctic and Indian oceans. To contain the PRC's quest for regional dominance and global power projection, the United States must deny its true military center of gravity and primary enabling mechanism—the PLARF.

PLA military thinkers correctly identified airpower as the U.S. center of gravity that presents an existential, asymmetric threat to their maritime ambitions. From World War II's Pacific campaigns to contemporary operations, massed American airpower has provided the flexibility, reach, and lethality that dominated contested spaces, to include the maritime domain. The PLARF's long-range ballistic, cruise, and hypersonic strike systems represent a deliberate counter to this advantage, targeting airbases to deny operations, suppress sortie generation, and prevent the concentration of air assets necessary to gain air superiority and interdict Chinese maritime forces. Responding to this threat with the adoption of operational models that cannot generate sufficient airpower to bring decisive results to the AOR signals a retreat of USAF airpower from the battlespace.

However, comprehensive active airbase defense against PLARF threats can restore the capacity for massed airpower, enable sortie generation at scales sufficient to overwhelm Chinese anti-access/area-denial (A2/AD) networks, and eliminate the maritime vessels central to the PRC's ambitions. Developing and adopting DE systems within theater and regional air and missile defense networks introduces defensive firepower at a favorable

cost exchange that conserves expensive interceptor missiles for difficult targets and frees aircraft from purely defensive mission sets that sap combat power from offensive operations. Deploying these systems organically within Air Force installations and authority structures provides commanders with independent options for the interdiction of threats in complex, contested, and degraded environments. Most importantly, these weapons provide an improvement to missile defense that can preclude U.S. airbases from absorbing critical losses to their infrastructure, fragile aircraft, and essential personnel.

This is a pathway to restoring USAF combat effectiveness. Airfields that can operate closer to the battlespace can generate more sorties, achieve higher operational tempos, reduce logistical and air refueling support, and preserve high-demand, low-density assets during vulnerable stages of operation. More combat power projected into the fight at a higher rate and with greater consistency is the foundational ingredient in the recipe for establishing air superiority. In this sense, effective defense is not merely protective; it is inherently offensive in intent, as it preserves the "archer's" ability to loose arrows—U.S. fighters, bombers, and support aircraft that create an asymmetric advantage and hold enemy centers of gravity at risk.

Strategically, neutralizing long-range strikes through robust airbase defenses undermines the PRC's navy-centric ambitions for regional and global power by nullifying the PLARF's protective umbrella. Building American airbases into fortified, high-octane factories of airpower production undercuts the PRC's massive investments in both ships and missiles, rendering them irrelevant in the face of a resilient U.S. air presence. This is the blueprint for air dominance in the Western Pacific and beyond: Leverage American airpower to deter the PRC from acting on its revisionist schemes and, if necessary, wield it decisively to defeat its territorial aggression. ✪

Endnotes

1 Tommy Jamison, "The Importance of the Battle of the Yalu," *War On The Rocks*, September 12, 2025.
2 Andrew Scobell et al., *China's Grand Strategy: Trends, Trajectories, and Long-Term Competition* (Santa Monica, CA: RAND Corporation, 2020), pp. 10, 42.
3 Office of the Secretary of Defense (OSD), *Military and Security Developments Involving the People's Republic of China 2025*, Annual Report to Congress (Washington, DC: DOD, 2025), p. 40.
4 Scobell et al., *China's Grand Strategy*, p. 96.
5 Iskander Rehman, *India, China, and Differing Conceptions of the Maritime Order* (Washington, DC: Brookings Institution, June 2017), p. 4.
6 Jamison, "The Importance of the Battle of the Yalu."
7 Aaron Marchant, "China's Global Maritime Ambitions 10,000 Miles Beyond Taiwan," *Proceedings* 150, no. 12, December 2024.
8 S. Richards, "The Decisive Role of Air Power in the Pacific Campaign of WWII," *Air and Space Power Review* 6, no. 4, Summer 2003; David L. Richards, "Air Power Visionaries and the Battle of the Bismarck Sea," *Air and Space Power History*, Spring Issue, 2022; and Bud Langston and Don Bringle, "The Air View: Operation Praying Mantis," *Proceedings* 115, no. 5, May 1989.
9 David Hambling, "Ukraine's Bayraktar Drone Helped Sink Russian Flagship Moskva," *Forbes*, April 2022.
10 Rehman, *India, China, and Differing Conceptions of the Maritime Order*, p. 17.
11 Liza Tobin et al., "System by Design: The Evolution of China's Military-Civil Fusion Strategy," in, Benjamin Frohman and Jeremy Rausch, eds., *The PLA's Long March toward a World-Class Military: Progress, Obstacles, and Ambitions* (Seattle, WA: The National Bureau of Asian Research, 2025), p. 132.
12 Giulio Douhet, *The Command of the Air*, 2019 Air University Press ed. (New York: Coward-McCann, 1942, translation by Dino Ferrari), p. 31.
13 Kelly A Grieco, Hunter Slingbaum, and Jonathan Walker, *Cratering Effects: Chinese Missile Threats to U.S. Air Bases in the Indo-Pacific* (Washington, DC: Stimson Center, December 2024), p. 10.
14 Grieco, Slingbaum, and Walker, *Cratering Effects*, p. 11.
15 Jonathan Walker, *Cratering Effects: Analyzing China's Ability to Deny Airfield Use with Missile Strikes* (Maxwell AFB, AL: Air University Press, 2024), p. 15.
16 Grieco, Slingbaum, and Walker, *Cratering Effects*, p. 17.
17 Sofiia Syngaivska, "UK Defense Intelligence Reveals Why New Domed Aircraft Shelters are Under Construction at Key Russian Airbases," *Defense Express*, July 30, 2025.

18 Thomas A. Walsh and Alexandra L Huber, "A Symphony of Capabilities: How the Joint Warfighting Concept Guides Service Force Design and Development," *Joint Forces Quarterly* 111, 4th Quarter, October 2023, p. 12.
19 Richard Haddick, *Fire On The Water* (Annapolis, MD: Naval Institute Press, August 2022), p. 179.
20 Haddick, *Fire On The Water*, p. 182.
21 John A. Tirpak, "Paparo: Airlift and Tanker Fleets Below What We Need in Pacific," *Air & Space Forces Magazine*, April 14, 2025.
22 Stephen Redmond and Ryan Enlow, "A Revived Commitment to Control of the Air," *Æther: A Journal of Strategic Airpower & Spacepower* 4, no. 1, Summer 2025, p. 92.
23 Jennifer DiMascio, *U.S. Air Force Next-Generation Air Dominance (NGAD) Fighter*, In Focus (Washington, DC: Congressional Research Service [CRS], updated July 22, 2025).
24 Sean M Zeigler et al., *Assessing Progress on Air Base Defense: Past Investments and Future Options* (Santa Monica, CA: RAND Corporation, June 3, 2025), pp. 1–3, 45–48.
25 John A. Tirpak, "New 'Nomad' VTOL Drone Family Could Boost Air Force's Plans for Agile Ops," *Air & Space Forces Magazine*, October 6, 2025; and "XQ-58A Valkyrie Fact Sheet," Kratos Defense & Security Solutions, July 2025.
26 Joseph Sheffield, *Interpreting Airpower: American Observation of the Battle of Britain* (Maxwell AFB, AL: School of Advanced Air and Space Studies, 2010), pp. 18–20.
27 R.D. Hooker, "It's Time for a New Key West Agreement," *Defense One*, January 24, 2025.
28 "Missile Interceptors by Cost," Missile Defense Advocacy Alliance, as of February 2024.
29 Ronald O'Rourke, *Navy Shipboard Lasers: Background and Issues for Congress* (Washington, DC: CRS, 2026), p. 5.
30 Alex Alaniz, "Directed Energy in Air Base Defense Can Save the Arsenal," *National Defense Magazine*, August 11, 2025.
31 Matthew Cox, "Air Force Still Planning a Nuclear Microreactor in Alaska – and More After That," *Air & Space Forces Magazine*, August 23, 2025.
32 Daisuke Sato, "Japan Tests 100kW Ship-Based Laser Weapon," *The Defence Blog*, December 3, 2025.
33 Seth J. Frantzman, "Israel's New Laser System Goes Active," *Breaking Defense*, December 29, 2025.
34 Kelley M. Sayler et al., *Department of Defense Directed Energy Weapons: Background and Issues for Congress* (Washington, DC: CRS, July 11, 2024), pp. 5–10.
35 Sayler et al., *Department of Defense Directed Energy Weapons*, pp. 3–4.
36 U.S. Joint Chiefs of Staff, Joint Air Operations, Joint Publication 3-30 (Washington, DC: Joint Chiefs of Staff, July 25, 2019), pp. II-17, III-10–III-12.
37 Sam Lair, "Shallow Ramparts: Air and Missile Defenses in the June 2025 Israel-Iran War," *Foreign Policy Research Institute*, October 17, 2025.
38 Joseph Trevithick, "Laser Guided Rockets Shown Shooting Down Houthi Drones For First Time," *The War Zone*, updated March 19, 2025.
39 Kenneth R. Dorner, William B. Hartman, and Jason M. Teague, "Back to the Future: Integrated Air and Missile Defense in the Pacific," *Air & Space Power Journal* 29, no. 1, January–February 2015, p. 73.
40 Benjamin Selzer, "Taking Cues From Complexity: How Complex Adaptive Systems Prepare for All-Domain Operations," *Joint Force Quarterly* 113, 2nd Quarter, 2024, p. 12.
41 Jen Judson, "Anduril Adapts Tech to Detect Cruise Missiles in US Air Force Demo," *Defense News*, October 2020.
42 J. Michael Dahm, *Fighting the Air Base: Ensuring Decisive Combat Sortie Generation Under Enemy Fire* (Arlington, VA: The Mitchell Institute for Aerospace Studies, 2023), p. 22.
43 Phil Ferris, *Air Force Under Fire: Time to Own Base Defense* (Arlington, VA: The Mitchell Institute for Aerospace Studies, August 2025), p. 5.
44 Christopher H. Sharman and Andrew S. Erickson, "China's Future World-Class Navy: Ends, Ways, Means," in, *The PLA's Long March toward a World-Class Military*, p. 202.
45 Tobin et al., "System by Design," in, *The PLA's Long March toward a World-Class Military*, p. 132.
46 George R. Shatzer and Joshua M. Arostegui, eds., *Decisive Decade: PRC Global Strategy and the PLA as a Pacing Challenge*, 2023 PLA Conference, Updated and Expanded (Carlisle, PA: U.S. Army War College Press, 2024), p. 9.

About The Mitchell Institute

The Mitchell Institute educates the general public about aerospace power's contribution to America's global interests, informs policy and budget deliberations, and cultivates the next generation of thought leaders to exploit the advantages of operating in air, space, and cyberspace.

About the Forum

The Forum presents innovative concepts and thought-provoking insight from air and space experts here in the United States and across the globe. In order to afford publishing opportunities for thoughtful perspectives, Mitchell Institute's Forum provides high visibility to writing efforts on issues spanning technology and operational concepts, defense policy and strategy, and unique interpretations of changing geopolitical relationships.

Forum Submissions & Downloads

For more information about submitting papers or ideas to the Forum, or for media inquiries, email our publications team at forum.mitchellaerospacepower@afa.org

Copies of Forum papers can be downloaded under the publications tab on the Mitchell Institute website at https://www.mitchellaerospacepower.org

About the Author

Lt Col Jonathan F. Vogel is an Air University Fellow and student at the Air War College, Maxwell AFB, AL. Lt Col Vogel is Command Pilot with more than 3,000 hours in the B-1B, T-38C, and T-6A, to include 900 combat hours. He has completed staff tours at Headquarters Air Force as the Chief of Combat Air Force O-6 Assignments, and as the Branch Chief for Battlespace Awareness and C2 at Air Force Tactical Exploitation of National Capabilities (AFTENCAP). He has deployed in support of operations ENDURING FREEDOM, INHERENT RESOLVE, and FREEDOM'S SENTINEL. Prior to this assignment, Lieutenant Colonel Vogel served as the 36th Operations Support Squadron Commander, Andersen AFB, Guam where he was responsible for flight operations at INDOPACOM's largest fighter, bomber, tanker, and airlift base supporting 16,000 sorties per year. Additionally, he led the Wing's JADC2 modernization efforts, oversaw Agile Combat Employment and Operations Plan readiness, and managed the Wing's intelligence enterprise. He holds a Bachelor of Science from Carnegie Mellon University, a Master of Arts from American Military University, a Master of Technology and Strategy Integration from Air University, and a certificate in Artificial Intelligence Product Design from the Massachusetts Institute of Technology.