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CHINESE PERCEPTIONS OF STEALTH: SHAPING DEFENSES AGAINST U.S. CAPABILITIES AND INDIGENOUS DEVELOPMENTS

Major Derek Ecklebe, USAF

June 2026

Printed in the United States of America
by the China Aerospace Studies Institute

To request additional copies, please direct inquiries to
Director, China Aerospace Studies Institute,
Air University, 55 Lemay Plaza, Montgomery, AL 36112

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INTRODUCTION

Stealth technology has transformed modern air warfare, providing the United States with a sustained operational advantage for over four decades. From its Cold War beginnings to its development in platforms like the F-117, B-2, F-22, and F-35, stealth has evolved into a system-of-systems capability that combines advanced engineering, mission planning, and operational expertise. As the U.S. improved both the technology and its deployment, other countries, particularly China, closely watched its progress and combat application, aiming to understand, counter, and replicate its advantages.[1] These observations have not happened in isolation; they have been influenced by unique institutional viewpoints, technological limitations, and strategic goals that continue to shape China's approach to stealth and counter-stealth systems.

Open-source PLA military writings and observations suggest Chinese views of U.S. stealth have been shaped by a mix of empirical observation, cognitive biases, and technological ambitions. This has led to a dual strategy focused on both countering U.S. low-observability capabilities and developing indigenous stealth platforms. However, these perceptions are often incomplete or skewed, leading to an overreliance on hardware solutions, an underestimation of U.S. operational adaptability, and a framing of stealth as a technical rather than an operational problem. Analyzing how these perceptions affect China's integrated air defense systems, radar technology, and next-generation aircraft programs reveals both the strengths and vulnerabilities in the PLA's approach, providing insights into the shifting balance of airpower in the Indo-Pacific. Open-source PLA analyses and commentary give limited attention to the intangibles of conflict, areas in which the United States has accumulated decades of operational experience.

BRIEF HISTORY OF STEALTH

The end of the 20th Century brought revolutionary change to air warfare, particularly for the United States. The U.S. pursued new ways to improve aircraft survivability after losses in Korea and Vietnam. During the height of the Cold War, U.S. and Soviet counter-air technology advanced rapidly. This drove a race to improve both aircraft and defensive systems. China, preoccupied with internal challenges arising from the Cultural Revolution, struggled to keep pace. As a result, a technological gap emerged. However, China watched these developments with keen interest. They recognized that emerging U.S. technologies could significantly influence future military dynamics, even if China was not yet a direct rival.

The engineers and scientists who developed and built the F-117A Nighthawk, followed by the B-2A Spirit, forever changed the scope of modern warfare. F-117s led bombing campaigns during Operation DESERT STORM, skillfully evading enemy air defenses that had once been formidable. Behind closed doors in California, another milestone was emerging—a large, tailless bomber that defied conventional design. The B-2 stealth bomber, produced in Palmdale, California, was poised to usher in a new era in air warfare.

In the 1990s, the Chinese government renewed efforts to integrate into the global economic and international trade systems. During this period, they worked to repair relationships damaged by earlier missteps while simultaneously modernizing their military with new alliances and imports. Meanwhile, the United States unveiled the world's first stealth bomber by delivering the B-2 to Whiteman Air Force Base in Missouri. When paired with the F-117, these developments impressed governments worldwide that stealth technology represented the future of warfare.

Global tensions persisted, and the world watched intently as the F-117 operated over Serbia. Ten years after its first combat flight, only three days after the B-2's debut, an F-117 was shot down by a Russian SA-3. The global perception of stealth shifted.[2] Images of the wreckage spread widely, and China saw an opportunity to learn and quickly sent scientists to Serbia to examine parts of the downed aircraft.[3] They hoped to gain insight into stealth technology. This reinforced China's prioritization of understanding stealth as both a threat and an opportunity.

In the years that followed, China maintained a dual interest in stealth technology: developing countermeasures to U.S. capabilities and advancing its own capabilities. The United States moved forward with the F-22A Raptor and F-35 Lightning II stealth fighters. The B-2 proved effective in Middle East operations throughout the early 2000s.[4] Despite tensions not being as high as they are today, there was still an aura of strategic competition between the two nations, punctuated by occasional crises like the 2001 collision between a U.S. EP-3 spy plane and a Chinese J-8 fighter.[5] The incident was not directly related to stealth but highlighted ongoing military tensions. Resolution of this and other crises also reinforced the cautious optimism that characterized relations during this era.

Over the next decade, China viewed the development of defenses against stealth as critical to any future conflict with the United States. Its focus was on extending detection ranges and fielding advanced air defense systems, despite limited knowledge of stealth operations.[6] The HQ-9 system, produced domestically and based on Russian designs, was representative of China's determination to bridge technological gaps.[7] The emphasis was primarily defensive. China aimed to counter stealth threats while laying long-term plans for its own stealth aircraft. After years of closely observing the United States, the Chinese eventually began the long, arduous process of developing a stealth fighter organically. This process led to the emergence of the Chengdu J-20 Mighty Dragon in 2017. China focused on identifying vulnerabilities in stealth and reducing dependence on foreign technology as it developed indigenous capabilities.[8]

Today, nine years after the J-20 Mighty Dragon's operational debut, significant advancements have emerged. China has introduced a range of new capabilities, including the J-31, J-35, and J-36, as well as other projects.[9] These will be examined later. Only recently has China publicly unveiled a tailless stealth platform.[10] Much of China's focus remains on challenging the dominance of U.S. fighters such as the F-22, F-35, and the recently unveiled F-47. In 2016, the PLA Air Force (PLAAF) Commander, General Ma Xiaotian, announced the PLA's plans to develop the H-20 stealth bomber.[11] Nearly a decade later, setbacks in this program have kept the international community waiting for updates on its production and operational status. At the beginning of 2026, Chinese-owned CCTV released a short video titled "We look forward to the official unveiling of the H-20 and the J-36" (期待轰-20和歼-36正式亮相), in which Du Wenlong, a prominent military commentator, states that the PLA will officially unveil both the H-20 and the J-36 in 2026.[12]

The United States has long been the leading power in stealth technology and its combat use. From China's perspective, catching up remains a serious challenge. Chinese perceptions of stealth are shaped by U.S. modernization, both in doctrine and capability development. PLA writings characterize stealth as a dominant but not unbeatable U.S. advantage; meanwhile, Chinese analyses emphasize effective countermeasures focused on innovation, radar improvements, and careful study of U.S. tactics.[13] However, China faces persistent misperceptions. For example, open-source PLA analyses emphasize reliance on radar-based counters while giving comparatively little attention to U.S. adaptability. These views shape China's investments and frame stealth as both a threat and a feasible objective. This paper will analyze how such perceptions influence defensive development and guide indigenous stealth programs.

CASE STUDY: THE 1999 F-117 SHOOTDOWN AND ITS LASTING INFLUENCE ON PLA THINKING

The single most influential event in shaping Chinese views of stealth remains the downing of the F-117. PLA writings repeatedly reference this incident, presenting it as proof that stealth is not invincible and highly vulnerable to low-frequency radar.[14] Reports that Chinese officials arrived in Belgrade immediately to examine the wreckage, regardless of how limited the recovered material was, are often cited as the turning point that accelerated domestic Chinese stealth and counter-stealth development.

U.S. investigations, however, determined that the loss stemmed from operational complacency, repeated use of the same ingress and egress routes, and insufficient suppression of known threats, rather than any fundamental flaw in the aircraft itself. The aircraft operated as expected; however, insufficient mission planning and the operator's inexperience contributed to the shootdown. Subsequent missions quickly incorporated those lessons, and no operational stealth aircraft have been lost to enemy fire since. The major takeaways from the Chinese perspective were that the U.S. was overconfident in its stealth technology, underestimated the combat effectiveness of Soviet SAM systems with indigenous upgrades, and lacked adequate suppression of EW radar systems.[15] The PLA has used its lessons learned to guide the development and acquisition of what it deems "counter-stealth" radars, in hopes of replicating the Serbian success in shooting down a stealth aircraft.

These interpretations shaped subsequent Chinese analyses, which increasingly emphasized technical detection solutions while giving less attention to operational and adaptive factors. They drive impressive engineering efforts and large budgets, yet leave gaps that a more holistic opponent can exploit. The following section examines how these beliefs have translated into the defensive systems China has fielded and where the resulting architecture remains vulnerable.

WHAT IS STEALTH?

To compare U.S. and Chinese stealth strategies, it is necessary to first define "stealth," a term that remains imprecise and inconsistently applied. The U.S. Air Force does not formally define stealth despite its central role in doctrine, while standard definitions vary: the Cambridge English Dictionary describes it as technology that cannot be detected by radar, whereas Merriam-Webster emphasizes specific design features intended to minimize radar return.[16] These differences highlight a lack of consensus on both meaning and application. In practice, "stealth," commonly referred to as low observable (LO), does not render an aircraft invisible but instead encompasses a set of technologies and design principles that reduce radar cross-section (RCS) and, consequently, detection range. Given significant variation in aircraft design, materials, and maintenance, as well as external factors such as radar frequency, signal polarization, and relative geometry, stealth effectiveness is highly context dependent. Accordingly, this paper defines stealth as the ability to reduce RCS across varying frequencies and polarizations, emphasizing that not all stealth is equivalent and that its operational value depends on the sensing system's characteristics. Figure 1 shows the calculated RCS of a J-20 at 10 GHz, with a reduced signature off the nose of the aircraft and significant returns still off the sides and tail sections.

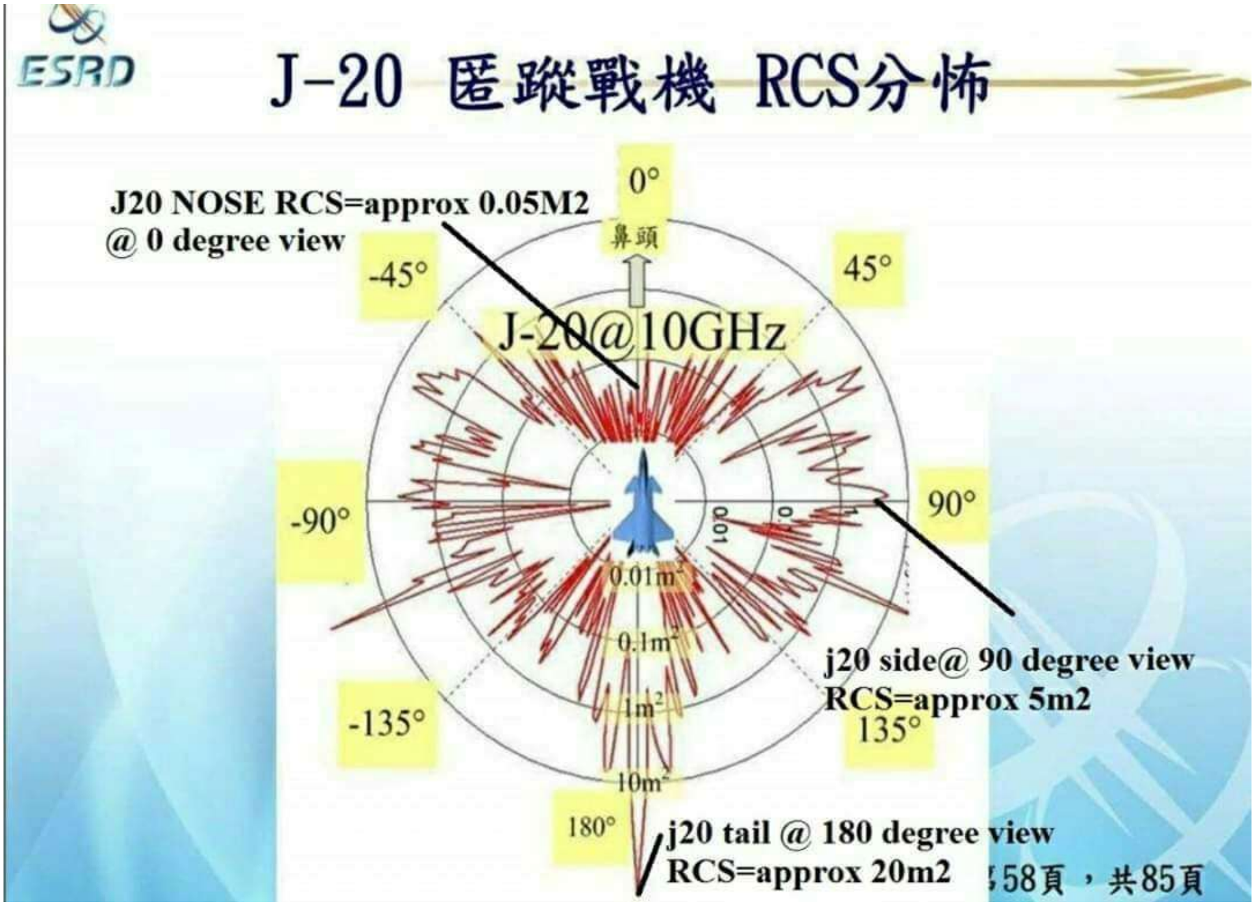

Figure 1: Notional calculated RCS of the J-20 circulated by the Taiwanese Electromagnetic Compatibility Laboratory.

A common misconception is that stealth makes detection binary. In reality, detection is probabilistic. A radar may detect an aircraft at a certain distance, but this is not guaranteed. When all factors are considered, radars have the *potential to detect*, not the certainty. Radar designers use the signal-to-noise ratio (SNR) to assess when they believe that a specific radar has the potential to detect an aircraft with a certain RCS at a specified range.[17]

$$\mathbf{SNR} = \frac{P_s\, G^2\, \lambda^2\, \sigma\, M}{(4\pi)^3\, R^4\, k\, T_s\, B_n\, L}$$

Where:

- P_s: Signal power
- G: Antenna gain
- λ: Wavelength
- σ: Radar cross-section
- M: Pulse compression
- 4π: Mathematical constant
- R: Range or distance to the target
- k: Boltzmann constant
- T_s: System noise temperature
- B_n: Noise bandwidth
- L: System losses

The focus here is on wavelength and RCS. Wavelength is the distance between successive signal peaks and is measured in meters, centimeters, or millimeters. Lower-frequency radars in the HF, VHF, and UHF bands are usually Electronic Warfare (EW) radars and have much longer wavelengths. Higher-frequency radars operating at C-band (4-8 GHz) and X-band (8-12 GHz) are typically Fire Control Radars or Target-Tracking Radars and have much shorter wavelengths. Wavelength appears in the numerator of the SNR equation, and thus longer wavelengths yield higher SNR, but many other factors, such as power and gain, also matter in radar development. This leads to a misconception: simply moving to a lower frequency automatically makes it “anti-stealth.”

RCS is the amount of energy returned by an aircraft to a radar, normally measured in decibels (dB) or square meters (m2). The RCS of an aircraft is affected by numerous factors, including shape, materials, the presence of a tail, engine inlets, pylons, lights, or anything else that protrudes from the surface of the aircraft.[18] This helps explain the substantial RCS differences among stealth aircraft, particularly between stealth fighters, which typically have vertical tails, and stealth bombers, which typically lack tails. In the context of the equation above, factors such as entering a high bank turn or a flight control deflection contribute to the equation and must be accounted for. Many RCS factors are determined on the ground and cannot be adjusted in flight, but the aircrew can still make real-time adjustments to increase or decrease RCS.

Stealth extends beyond minimizing a radio frequency (RF) system's ability to detect aircraft; it also includes minimizing a networked system's ability to detect aircraft across multiple domains and the full electromagnetic spectrum. The six primary components of stealth are: 1) RF, 2) electro-optical / infrared (EO/IR), 3) passive, 4) visual, 5) acoustic, and 6) operational security (OPSEC). These technologies are widely deployed worldwide, but none can single-handedly offset the benefits of modern stealth technology. As the race for future technologies continues, the goal will be to optimize an aircraft's performance across these tenets. U.S. tactics, techniques, and procedures (TTPs) have evolved over decades to address each of these tenets. Aircrew, maintainers, logisticians, mission planners, and many others have gained invaluable experience through hundreds of exercises, thousands of events, and the benefit of time. While many of these concepts are new to foreign players and those not directly involved in tactics development, the best of the U.S. military has been preparing for these technological advancements for years.

Literature Review and Theoretical Framework

The literature on stealth and counter-stealth includes technical analyses, military doctrine, intelligence assessments, and state-backed narratives. It is extensive but fragmented. Different communities vary in methods, information access, and incentives. This literature fits four categories: (1) U.S. doctrinal and operational analyses, (2) Western academic and think-tank assessments, (3) Chinese military and state-affiliated writings, and (4) technical research on radar and the electromagnetic spectrum (EMS). Each offers valuable insight. However, their credibility, rigor, and biases vary. These differences explain why Chinese assessments of U.S. stealth often diverge from technical reality and operational practice.

U.S. Doctrinal and Operational Literature

U.S. doctrinal publications are the most authoritative sources for how stealth is conceptualized and used. Core documents such as Air Force Doctrine Publications (AFDP) 3-0 and 3-02 do not treat stealth merely as a technological feature. Instead, they describe it as part of a broader system that blends low observability, electronic warfare, intelligence, and adaptive planning. This approach draws on decades of operational experience. It shows that survivability depends on integrating multiple capabilities rather than relying on a single technological edge.

These sources are strong because they are grounded in institutions and have operational relevance. However, they are normative and limited by classification. They often emphasize intended concepts more than observable weaknesses. As a result, they credibly define stealth as integrated and adaptive. Yet, they give little insight into how outsiders perceive that adaptability. This matters because Chinese analyses often reduce stealth to physical traits rather than operational use. This divergence supports the misperceptions discussed in this study.

Western Academic and Think-Tank Analysis

Western academic and policy analyses provide some of the most rigorous open-source assessments of U.S. and Chinese military capabilities. Institutions such as RAND Corporation, CASI, IISS, and the U.S. Department of War integrate technical expertise, intelligence insights, and comparative analysis. They use these tools to evaluate modernization trends and strategic intent. Collectively, these works reinforce the U.S. doctrinal view of stealth as a system-level capability. They also highlight the growing sophistication of Chinese air defense and detection systems. CASI is especially valuable for its use of Chinese-language sources, offering insight into PLA priorities and internal discourse. Meanwhile, RAND and IISS provide scenario-based and comparative perspectives that assess both the strengths and limitations of China’s modernization efforts. These analyses rely heavily on open-source intelligence, which introduces uncertainty when evaluating classified capabilities or real-world performance. They may also reflect implicit biases, such as assumptions of U.S. superiority or Western analytical framing. Despite these limitations, these analyses remain critical for identifying gaps between Chinese claims, technical realities, and operational outcomes. This is particularly true where differing conceptions of stealth employment shape such discrepancies.

CHINESE MILITARY AND STATE-AFFILIATED LITERATURE

Chinese military and state-affiliated sources offer key insight into how the PLA thinks about stealth and counter-stealth. They include doctrinal texts, materials from the Academy of Military Sciences, and reports from *China Military Online* and *Global Times*. Together, they show the conceptual framework guiding Chinese acquisitions and operational planning.

These materials vary in credibility. Official doctrinal and academic works best reveal internal thinking, but they are shaped by institutional and political limits. State media and defense industry reports often serve signaling or propaganda goals. They highlight technological breakthroughs but downplay uncertainty and operational weaknesses.

These sources treat stealth as a technical problem to solve with new detection tools. They present low-frequency radars, passive sensors, and terahertz sensors as potential solutions that could soon counter U.S. advantages. These claims show real research goals but lack independent verification in open sources. They often pay little attention to technical constraints, such as limited resolution, atmospheric attenuation, and vulnerability to countermeasures. Such patterns suggest both optimism and a mindset that values technological gains over adaptability and integration. These habits support hardware-focused views, which the PLA holds in high esteem.

TECHNICAL AND ENGINEERING LITERATURE

Technical literature on radar and electromagnetic theory provides the most objective way to assess stealth and detection. Work from institutions like MIT Lincoln Laboratory and engineering journals emphasizes the probabilistic nature of detection. It discusses trade-offs between frequency and resolution. It also explores complex interactions between radar and low-observable features.

This research is based on physical laws and experiments, so it is mostly free from institutional or political bias. It shows that detection is not a yes-or-no issue. No single frequency solves stealth. System performance depends strongly on context. However, this technical literature is so abstract that it cannot show how military organizations interpret these limits. It defines technical boundaries without addressing how they are used or understood in practice.

SYNTHESIS AND ANALYTICAL FRAMEWORK

Together, these sources show a key gap between technical reality, operational doctrine, and perceived capability. U.S. and Western sources see stealth as dynamic and integrated. Context, adaptation, and experience shape it. Technical literature supports this by showing detection is probabilistic—no system can always defeat low observability.

Chinese sources often view stealth as a technical problem and focus on detection to counter U.S. advantages. This gap stems from differences in access, experience, and the impact of cognitive and institutional bias. Chinese assessments place too much faith in low-frequency radar. They ignore U.S. operational adaptability and prioritize hardware over doctrine or organization.

Though there is much research on stealth and Chinese modernization, few studies tie perception gaps to specific acquisitions or operations. This paper fills that gap using a cognitive bias framework. It explores how Chinese perceptions of U.S. stealth influence defense decisions and indigenous design. Confirmation bias, mirror-imaging, and optimism bias reveal a consistent emphasis on technical countermeasures, providing the foundation for the analytical framework developed in subsequent sections. These false ideas affect force development and create vulnerabilities. This happens even as China narrows the technology gap with the United States.

GLOBAL STEALTH DEVELOPMENTS AND PERCEPTIONS

Because stealth technology is mature and has been in operational use for decades, there is a substantial body of academic and military literature on it. Additionally, because the United States has long held a significant technological advantage in stealth operations, much of the global literature highlights perceptual gaps in assessments of stealth capability. The majority of the writing is from non-U.S. states, such as China and Russia. Stealth technology is framed not solely as an engineering marvel but also as a strategic capability gap that China aims to mitigate through rapid, robust innovation, while simultaneously casting doubt on the robustness and efficacy of the long-held U.S. advantage and its modern-day adaptability.

U.S. STEALTH DOCTRINE AND DEVELOPMENT

The evolution of U.S. stealth doctrine marks a paradigm shift in both air warfare and stealth implementation, moving from early stealth thinking, focused on radar-evading designs in the late 20th century, to fully integrated, multi-domain capabilities across modern platforms. The journey began with the Lockheed F-117 Nighthawk, the world's first operational stealth aircraft, developed under the secretive "Have Blue" program in the 1970s.[19] Introduced in 1983, the F-117 featured angular tiles to deflect radar waves, achieving an RCS reduction that rendered it nearly undetectable to contemporary radars. Its 1989 combat debut in Operation JUST CAUSE and subsequent roles in Operation DESERT STORM demonstrated stealth's operational value, enabling precision strikes with minimal detection risk. The F-117's limitations, such as subsonic speeds and a lack of air-to-air capabilities, underscored that stealth was a complementary rather than a standalone capability during this era.

Acknowledging the F-117's limitations, the United States determined that it needed to further advance strategic stealth capabilities while continuing to modernize the aircraft's capabilities. Advancements in fifth-generation aircraft, such as the F-22 Raptor and F-35 Lightning II, integrated stealth with supercruise,[i] sensor fusion, and network-centric warfare. The F-22, operational since 2005, combines low-observable shaping with advanced avionics, lethal weaponry, and air-to-air capabilities that the F-117 never possessed. The F-35 expands these modernization efforts by emphasizing proliferation, production, and interoperability,

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[i] Supercruise is the ability to maintain supersonic flight without the use of afterburners. This allows for better fuel efficiency, as well as enhanced stealth due to maintaining a lower thermal signature.

incorporating stealth coatings and internal weapons bays to maintain LO profiles during missions. In a relatively short time, the United States fielded a dominant air-to-air stealth fighter and a multi-role stealth fighter, helping resolve one of the main issues with the F-117. Coupled with the deployment of the B-2 stealth bomber, which provided unprecedented range, payload, and survivability, the United States now fields an entire air force's worth of stealth assets that no other nation can match. Sixth-generation concepts, under programs such as Next Generation Air Dominance (NGAD), now known as the F-47, envision tailless fighter designs, integration of hypersonic weapons, and AI-driven autonomy, with the aim of enhancing survivability in highly contested environments.

The United States has also learned intangible lessons after decades of strategic, operational, and tactical iteration. Modern U.S. mission planning leverages numerous tools, including the Joint Mission Planning System, which incorporates threat libraries and dynamic routing to maximize stealth. Automating stealth mission planning is complex, requiring optimization of RCS files, the Electronic Order of Battle (EOB), and the Threat Information File (TIF). The EOB, which shows the adversary radars' locations, and the TIF, which shows the aircraft's RCS to the adversary, are highly dynamic and can change frequently. Despite these complexities, U.S. doctrine emphasizes adaptability, shifting from standalone stealth to integrated systems-of-systems approaches, as evidenced by the modern focus on collaborative combat aircraft, multi-role aircraft, and fully integrated systems across multiple platforms.[20] This progression underscores stealth as a multifaceted capability that integrates technology with operational tactics to maintain air superiority. Stealth technology, while expensive, complex, and important, is only part of the equation. If mission planning is insufficient or incomplete, the technology will be used suboptimally, increasing the risk to the aircrew and the airframe.

FOREIGN PERCEPTIONS OF STEALTH

Globally, stealth is perceived as a U.S.-dominated advantage, prompting widespread development and proliferation of "counter-stealth" technologies, heavily influenced by Soviet-era legacies, particularly in air defense systems. Russian, formerly Soviet, technologies and capabilities have profoundly shaped Chinese domestically produced defenses. For example, the Russian S-300PMU SAM system served as a foundational model for the Chinese domestically produced HQ-9.[21] Developed in the late 1970s by the Soviet Union, the S-300PMU featured relatively long-range interception and semi-active radar homing, which China reverse-engineered in the 1990s to create the HQ-9, blending Russian S-300PMU elements with capabilities similar to those of the U.S.-produced Patriot.[22] This hybrid approach reflects a broader trend in recent years, in which former Soviet states and allies have reverse-engineered numerous legacy systems to counter Western stealth advantages, emphasizing the development and implementation of a multi-layered defense rather than a singular "silver bullet" innovation.

Current development trends in Russian and Chinese air defenses highlight a focus on anti-access/area denial (A2/AD)[ii] capabilities intended to directly threaten the United States' ability to operate freely in the Indo-Pacific region.[23] This approach stands in stark contrast to the narrative

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[ii] A2/AD is a U.S. term. The Chinese concept is "counter-intervention", which is similar but distinct.

of the last several years, which focused on defensive posturing.[24] Russia continues to export more modern S-400 variants, which integrate with legacy S-300 networks to provide the advertised enhanced tracking of low-RCS targets, but they still have inherent limitations in detecting certain LO aircraft.[25] China, meanwhile, has continued to ramp up HQ-9 and other domestically produced radar production, deploying an increasing number of batteries by 2026, often integrated with metric-wave radars for "anti-stealth roles."[26] These systems aim to exploit vulnerabilities in stealth fighters, particularly the fact that these aircraft exhibit numerous non-optimal RCS signatures in their design and shaping, which challenge U.S. stealth fighters such as the F-35 and F-22.[27]

Global delays in developing manned, tailless aircraft underscore widespread skepticism about China's ability to mirror U.S. stealth doctrine in part or in full.[28] China's iterations on tailless designs, with various prototypes revealed in the last few years, indicate gradual progress, but potential challenges with aerodynamics and technological barriers to engine modernization.[29] Russia faces similar hurdles with the Su-57, with heavy criticism focused on its stealth technology and engines.[30] The program has been plagued by numerous delays and international sales issues, including India's withdrawal of its purchase, initially citing a lack of stealth as a primary factor.[31] These delays reinforce the Chinese narrative that stealth is resource-intensive, thereby favoring asymmetric countermeasures, such as advanced SAMs, over direct emulation. Yet despite that narrative, the PLA continues to ramp up production of numerous stealth assets.

CHINESE SOURCES ON STEALTH

Chinese literature and scholarship generally portray stealth as a relatively easy U.S. advantage to overcome, informing both defensive innovations and indigenous aircraft development. The J-35A, unveiled at Airshow China 2024, is described as a "medium-sized multi-role stealth fighter" optimized for air and sea superiority.[32] Emphasis is placed on its blended-wing design and internal weapons bays, which are widely recognized as critical enablers of low-observable operations in contested maritime domains. This reflects PLA views of stealth as integral to multi-domain warfare, with the J-35A family extending to carrier-based variants, similar to the United States' F-35. Many of the J-35's design, considerations, and developments are directly comparable to those of the U.S.-made F-35, particularly given the breach of classified data linked to the PLA.[33]

The PLA has invested significant time and resources to establish dominance and proficiency across the electromagnetic spectrum (EMS). This has generally meant operations from HF (3-30 MHz) to Ka Band (26-40 GHz). Most modern warfare and technological development occur within these bands, but recent evidence indicates that China is pursuing technology in previously neglected regions. Terahertz (THz) technology is "unquestionably a key technology to dominate the EMS and gain an edge in military competition," according to PLA analyses.[34] Globally, there has been less emphasis on THz operations given technological limitations, whether for military or civilian use, which has been a key driver of the PLA's research into this new technology. Since 2005, the PLA has invested heavily in THz capabilities, specifically for communications and radar systems, viewing them as a key means of countering U.S. stealth and weapons by exploiting previously underexplored frequencies.[35] PRC documents indicate an emphasis on state-led research and development infrastructure beginning around 2005, integrating civilian and military efforts to counter adversary networks and establish a PLA advantage.[36]

Chinese radars are labeled "anti-stealth" or "counter-stealth," such as the YLC-8E and JY-27A, underscoring Chinese optimism about developing a conventional counter to U.S. stealth assets.[37] Higher-frequency systems, more commonly used for target engagement, employ high-energy arrays to overcome traditional frequency limitations. Beyond the standard hardware production cycle, Chinese researchers are developing RCS algorithms that incorporate geometric features to model stealth scattering, aiming to advance understanding of U.S. aircraft RCS and the PLA's ability to develop its own advanced stealth aircraft.[38]

Figure 2: JY-27A, like the one ineffectively utilized in Venezuela, next to a YLC-8B and SLC-7, all touted by PLA advocates as "anti-stealth" on display at the Zhuhai Airshow.

Theoretical Lens: Perceptions in Aerospace Strategy

Cognitive bias theories provide an ideal analytical framework for dissecting Chinese views of U.S. stealth capabilities. PLA writings consistently present patterns consistent with confirmation bias, such as the 2020 *Science of Military Strategy*, which selectively amplifies the efficacy of low-frequency radar against stealth aircraft. For example, state-sponsored CETC trials advertise the YLC-8B ability to detect aircraft and ballistic missiles at ranges from 500-700km, while failing to publicly acknowledge known probabilistic limitations, including inherent resolution errors and constant false alarm rates (CFAR) in heavily cluttered environments.[39]

Mirror-imaging may further contribute to these distortions, as PLA planners project domestic constraints, such as WS-10 and AL-31F engine reliability and modernization issues that limit J-10 and J-20 sortie rates, onto U.S. systems.[40] Historical precedents underscore this point. Chinese underestimation of U.S. intervention timelines and capabilities in the 1999 Kosovo campaigns stemmed from an underlying tendency for the PLA to focus on lessons learned that support its narrative or paint the U.S. in a disadvantageous light.[41] Modern examples include the

Chinese J-35 program, which replicates features of the U.S. F-35 platform but prioritizes hardware metrics over U.S.-style software-defined adaptability coupled with TTP modernization. This is not to say that the PLA is not utilizing software adaptability in its modernization. Given that the U.S. has held a 40-year-plus stealth hardware advantage over the PLA, the U.S. can modernize its software in conjunction with hardware much more effectively and efficiently than the PLA, which is still trying to optimize its hardware.

Elements consistent with optimism bias are evident in PLA assessments of emerging technologies. PLA cognitive warfare research published by the Academy of Military Sciences emphasizes exploiting adversary biases within integrated electromagnetic operations, while state defense industry materials reflect confidence in sub-terahertz sensing concepts.[42] However, publicly available CETC materials provide no evidence that the claimed 0.34-THz detection range against ultra-low-RCS targets accounts for well-documented atmospheric attenuation effects, particularly in humid environments.[43] This approach may contribute to misaligned strategies and priorities. Open-source estimates and Western defense analyses indicate that China has prioritized investment in advanced radar, sensing, and integrated air defense systems designed to counter low-observable platforms.[44] This hardware-centric emphasis is most clearly manifested in sustained investment in low-frequency radar arrays, passive detection systems, and multi- and bistatic architectures, which are prioritized to exploit known vulnerabilities in U.S. stealth designs. While precise allocations remain shrouded in secrecy, aggregate military expenditure figures from the Stockholm International Peace Research Institute (SIPRI) provide useful context: China's total military spending reached approximately $314 billion in 2024, a 7.0 percent increase year over year, with consistent annual growth reflecting long-term prioritization of air defense modernization and counter-intervention capabilities.[45] For example, China saw a rise from $2.1 billion in 2013 to $6 billion in 2022 in its domestic radar market for military radar systems.[46]

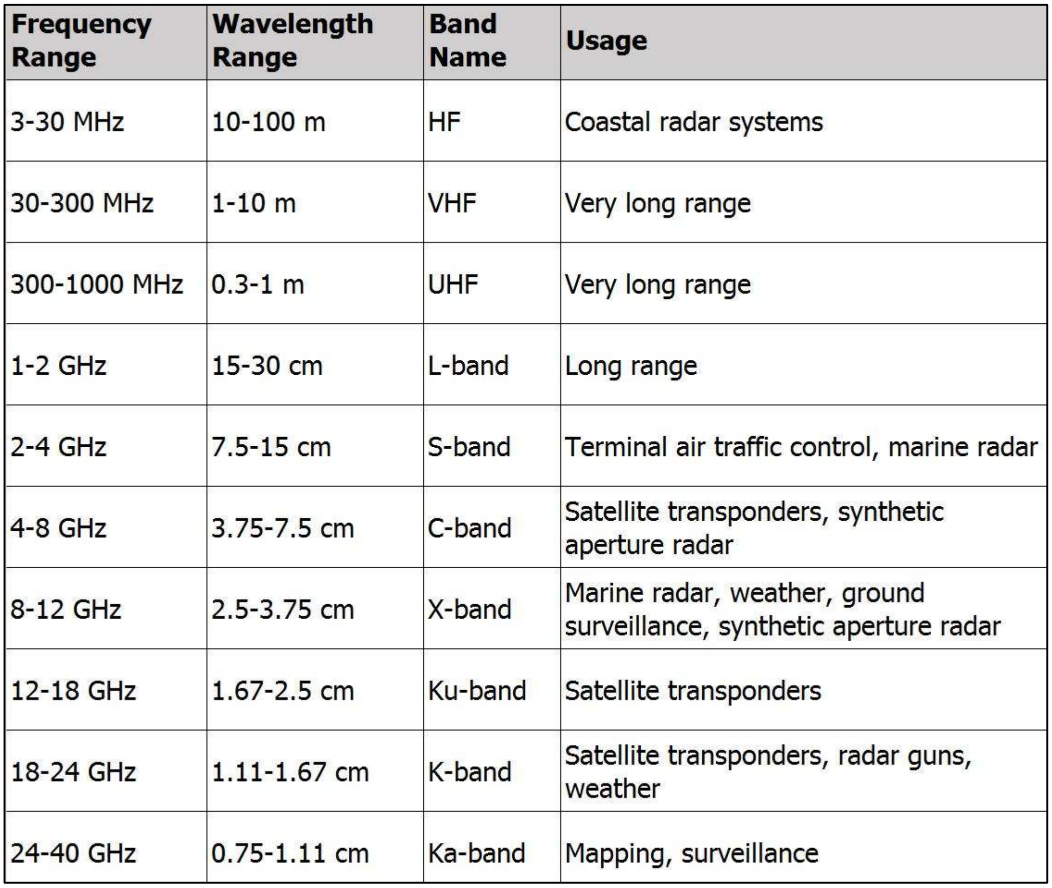
This hardware-heavy focus appears to contrast with the growing U.S. emphasis on software-driven adaptability and mission-system integration in developmental programs, where advanced AI, dynamic routing, and real-time environmental adaptation are intended to mitigate the very predictability and rigidity that Chinese planners may assume constrain U.S. stealth operations in contested environments. Contrasting U.S. and PLA viewpoints frame stealth as a dynamic, probabilistic contest rather than a binary technological race. U.S. doctrine emphasizes survivability as the integration of stealth, command and control, and adaptive planning; PLA texts prioritize material solutions and technological prowess, setting the stage for divergent defensive and developmental trajectories that will be further analyzed in the following sections.[47]

Chinese Perceptions of Stealth Technology

The PLA, and the PLAAF in particular, views U.S. stealth technology as a major asymmetric advantage that has long given the United States Air Force a decisive edge. Yet Chinese assessments of this threat are shaped by recurring biases that consistently downplay its full complexity. As noted in the introduction, these misperceptions fall into three broad categories: 1) overconfidence in and overreliance on low-frequency radars as reliable counters, 2) treating stealth as a fixed, hardware-only characteristic while underestimating U.S. operational flexibility, and 3) a strong preference for technological fixes at the expense of training, doctrine, and combined-arms integration. The goal of this section is to highlight how these perceptions influence strategic acquisition decisions and create exploitable gaps that could help sustain U.S. advantages, even as China narrows the raw technological advantage.

Overconfidence in Low-Frequency Radars as "Anti-Stealth" Solutions

A cornerstone of Chinese "anti-stealth" writings and discussions is the belief that radars operating at very low frequencies, typically in the VHF (30–300 MHz) and UHF (300–1,000 MHz) bands, can reliably and consistently detect and track all stealth aircraft.



Frequency Range	Wavelength Range	Band Name	Usage
3-30 MHz	10-100 m	HF	Coastal radar systems
30-300 MHz	1-10 m	VHF	Very long range
300-1000 MHz	0.3-1 m	UHF	Very long range
1-2 GHz	15-30 cm	L-band	Long range
2-4 GHz	7.5-15 cm	S-band	Terminal air traffic control, marine radar
4-8 GHz	3.75-7.5 cm	C-band	Satellite transponders, synthetic aperture radar
8-12 GHz	2.5-3.75 cm	X-band	Marine radar, weather, ground surveillance, synthetic aperture radar
12-18 GHz	1.67-2.5 cm	Ku-band	Satellite transponders
18-24 GHz	1.11-1.67 cm	K-band	Satellite transponders, radar guns, weather
24-40 GHz	0.75-1.11 cm	Ka-band	Mapping, surveillance

Figure 3: Table depicting the RF spectrum, focused on the most common frequencies for radars. This table shows the frequency, wavelength, nomenclature, and most common uses for each frequency range.

Chinese manufacturers and PLA spokespeople routinely highlight the longer wavelengths of these systems, arguing that they interact differently with aircraft shapes and materials than higher-frequency radars used for more precise tracking and targeting.[48] Official production brochures and state-media features on systems like the CETC YLC-8B (UHF band) and YLC-2E (VHF band) claim impressive detection ranges, often several hundred kilometers, against U.S. stealth fighters, and the Chinese media and commentators label these radars as "anti-stealth" or "counter-stealth" assets.[49]

In practice, these systems face significant physical and operational constraints. Although noted in academic writing, these limitations are often ignored or portrayed as irrelevant[iii], even though they are physics-based.[50] Their long wavelengths make it difficult to achieve the precise angular resolution required to guide a missile to a target. A UHF or VHF radar might provide early notice that something is in the sky but handing that track over to a higher-frequency fire-control radar for an engagement is far from automatic. Real-world trials and open-source analysis (including Western assessments of similar Russian systems) consistently show that these radars struggle with clutter in complex environments, such as the open seas near the Spratly Islands and the mountainous terrain of Taiwan and are vulnerable to electronic countermeasures that were not prominent in the older scenarios Chinese planners often reference.[51]

Deployment locations of these Chinese systems nonetheless reflect this confidence. Commercial satellite imagery from 2024–2025 shows numerous low-frequency arrays on islands in the Spratlys, integrated with HQ-9 and other surface-to-air missile batteries to create overlapping early-warning zones.[52] Official PLA coverage of these installations almost always asserts that U.S. stealth aircraft would now be visible from further and further away with each new system; these reports rarely address how the necessary follow-on steps, accurate tracking, and missile guidance would be achieved against a determined opponent employing modern suppression tactics and decoys.[53]

Additionally, in the South China Sea, China is developing and deploying unique radar systems that many other nations have abandoned, including the Chinese-dubbed Synthetic Impulse Aperture Radar (SIAR).[54] This system is highly touted by the Chinese media as a “stealth-killer,” while many Western engineers have discredited it as nothing more than a “tripwire” effect.[55] Wu Jianqi, the chief designer of many of China’s most prolific low-frequency weapons systems, including the SIAR, fails to heed many of his own cautionary points when discussing this capability, such as inaccurate height finding, poor site adaptability, and discontinuous coverage, among numerous others.[56]

While much of the PLA’s defensive development focuses on ground-based radars, there has also been a significant push to develop “counter-stealth” airborne assets. These include the KJ-500, KJ-500 Mod, KJ-600, and the recently announced KJ-3000. Like its ground-based assets, the PLA has emphasized low-frequency radars aboard these airborne early warning and control (AEW&C) aircraft.[57] The KJ-500 and KJ-500 Mod are land-based AEW&C aircraft, while the KJ-600, heavily influenced by the U.S.-made E-2D Hawkeye, is carrier-based. The newest AEW&C aircraft, still in development and testing, is the KJ-3000, which had its first flight in late 2024.[58] As with low-frequency, ground-based EW systems, these airborne systems will likely be effective at detecting certain assets, including 5th-generation fighters, but, for the same reasons discussed previously, will still have greater difficulty against tailless stealth assets, such as the B-2, B-21, and F-47.

[iii] China continues to prioritize the development and proliferation of low-frequency radars, including the JY-27, SLC-7, YLC-8, and others, indicating a reliance on low-frequency for its perceived “counter-stealth” capabilities.

Figure 4: An unofficial Chinese-language brochure on the projected sensors and characteristics of the next variant of the KJ-series aircraft.

The PLA has invested heavily in various unmanned ISR drones, many of which it claims are "counter-stealth" because they use low-frequency radars.[59] Aircraft such as the WZ-9 Divine Eagle, WZ-7 Soaring Dragon, and the stealth GJ-11 Sharp Sword are all touted as "counter-stealth," with capabilities including high-altitude, long endurance, and sensor fusion.[60] The PRC continues to rapidly develop and reveal numerous drone variants, which will likely include radars, command-and-control systems, advanced sensors, and other modern capabilities. These alone, however, do not make the systems "counter-stealth", despite the brochure's claims.

UNDERVALUING U.S. OPERATIONAL ADAPTABILITY AND THE BROADER STEALTH ECOSYSTEM

A second misperception treats stealth solely as a property of the aircraft rather than as part of a larger, adaptive, and holistic operational system. U.S. doctrine emphasizes that low-observable characteristics are only one element of survivability. Equally important are mission planning, real-time rerouting, electronic warfare support, force packaging, and the critical experience gained by operators and support personnel. Open-source, publicly available PLA analyses, by contrast, tend to characterize U.S. stealth platforms primarily in technical terms, emphasizing shaping, materials, and radar cross-section reduction, while devoting comparatively less attention to their operational employment and integration.[61]

The 1999 shootdown of the F-117 over Serbia is frequently cited in Chinese military literature as evidence that stealth can be defeated.[62] While the Chinese and many others learned lessons from that event, so did the United States. Subsequent operations incorporated updated dynamic routing, force packaging, and more exhaustive mission planning. These changes ensured no further losses in that campaign and none in subsequent major operations. In Iraq, Afghanistan, Syria, Yemen, and, most recently, Iran, the B-2, F-22, and F-35 operated in a wide range of air defense environments without loss, thanks in large part to historically informed mission planning, highly experienced aircrew, and flexible support packages, rather than relying solely on stealth.[iv]

Chinese simulations and exercises tend to use more rigid, scripted scenarios. Reports from major drills, such as the JOINT SWORD series, indicate that PLA forces are practicing intercepts of stealth targets, but the assumed U.S. profiles often appear "over-scripted and unrealistic", while lacking the dynamic adjustments observed in actual American operations or exercises.[63] Training hours for PLAAF pilots remain generally equal to those of their U.S. counterparts, however, the emphasis remains heavily on hardware familiarity and basic TTP implementation, while U.S. aircrew have been consistently gaining real-world combat experience.[64] Consequently, PLA writings suggest planners underestimate how quickly U.S. forces can change tactics when a particular approach is compromised or no longer relevant.

In contrast, official Chinese reporting on U.S. exercises, including RED FLAG, VALIANT SHIELD, KEEN SWORD, and others, highlights that these events are a direct threat to regional stability and notes that the PLA has developed a defensive system that is already postured to mitigate these efforts.[65] These comments further reinforce the Chinese narrative that current U.S. stealth assets are already outmatched by their Chinese counterparts and that these training events are little more than saber-rattling.

A HARDWARE-CENTRIC APPROACH AT THE EXPENSE OF DOCTRINAL AND ORGANIZATIONAL DEPTH

The third misperception is a pronounced preference for technological solutions over broader organizational or doctrinal approaches. Numerous unverified claims, often from defense analysts and news outlets, make hyperbolic claims about technological advances that invalidate current U.S. capabilities. Some claims are based on "off-the-cuff" comments by engineers or scientists and make great clickbait, such as "Chinese Breakthrough: Radar Technology Boosts Detection of U.S. F-22 Stealth Jets by 60,000 Times!", but they fail to meet the threshold for valid reporting.[66] In a similar vein, the PRC and its affiliated news agencies, defense contractors, and research institutions issue numerous statements and studies that advance similar narratives. New sensors, terahertz prototypes, handheld emission detectors, passive location systems, and other "silver bullet" technologies are regularly unveiled with great fanfare and described as paradigm-shifting.

[iv] As of this publication, there has been no official confirmation from USCENTCOM regarding the damage to a U.S. F-35 during OPERATION EPIC FURY. It is unconfirmed at this time if the aircraft was struck with a RF system, MANPADS, anti-aircraft, or a different system. Despite being damaged, the aircraft survived and landed safely.

For example, a 2025 report from the China Aerospace Science and Industry Corporation, one of China's largest defense developers, highlighted a breakthrough in textile engineering and materials.[67] The breakthrough uses ancient silk-weaving techniques dating back 3,000 years, which the researcher claims outperform conventional coatings used on the U.S. F-22 and F-35 aircraft. Some Chinese reporting also claims that previously uncharted technologies, such as terahertz sensors, will provide expert terminal guidance, or that portable low-probability-of-intercept handheld devices will allow PLA infantry units to cue systems against stealth aircraft. These claims remain unverified and face significant technical barriers to operationalization.[68] A group of researchers from the Air and Missile Defense College of the PLAAF's Air Force Engineering University claims to have developed a technological breakthrough that can amplify the F-22's RCS by 60,000 times, reducing personnel workload and training time.[69] These systems represent potentially impressive engineering and may prove viable in future iterations, but their present battlefield utility is limited by environmental factors, technological constraints, operator proficiency, and the fact that they are almost always tested in scripted, static environments or simulated scenarios.

By comparison, U.S. operations place heavy emphasis on the hardware and software capabilities of each individual asset, then integrate those capabilities into the greater force package. Mission-planning tools and training focus on intelligence-informed, near-real-time route optimization, electronic warfare capabilities that blind, deceive, or delay enemy sensors, and a training culture that rewards initiative and rapid adaptation. Chinese investment, while massive, remains skewed toward radar and missile hardware and still fails to adequately address—at least publicly in open-source reporting—equally critical areas of doctrine, training, and multi-domain coordination.

DEFENSIVE COUNTERMEASURES: CHINESE DEVELOPMENTS AGAINST U.S. STEALTH

China's defenses against U.S. stealth aircraft consist of a dense, constantly evolving network of radars, surface-to-air missiles, and command-and-control structures designed to detect, track, and engage low-observable aircraft. This integrated air defense system (IADS) is heavily informed by the previously discussed views of U.S. stealth capabilities and by the PLA's organic assessments. Grounded in the PLA's "active defense" strategy and its broader counter-intervention approach, these countermeasures aim to create layers of protection that make it difficult for U.S. aircraft to penetrate airspace near China undetected, including the First Island Chain. This section explores the historical development of these systems, their key components, their interconnections, and their real-world strengths and limitations. While impressive in scale and ambition, the IADS still faces challenges from environmental factors, U.S. capabilities, and the need for seamless coordination, gaps that could prove critical in a conflict.

EVOLUTION OF CHINESE RADARS: BUILDING FROM RUSSIAN ROOTS TO HOMEGROWN SYSTEMS

China's modern air defense systems owe much of their prominence to early imports of former Soviet and Russian technology, particularly the S-300PMU SAM systems acquired in the late 1990s. These imports laid the foundation for the HQ-9 family of systems, which first appeared publicly in 2001.[70] The initial Chinese HQ-9 used a Russian-style engagement radar with a typical detection range of roughly 150–200 kilometers, but it struggled against LO targets. Over the next two decades, indigenous upgrades transformed the HQ-9 into a much more capable system. The HQ-9A, the second-generation system that debuted in 2006, added improved signal processing, while the HQ-9B, unveiled in 2019, extended range and introduced Chinese-advertised "anti-stealth" features. By 2021, the HQ-9C incorporated advanced materials, such as gallium nitride modules, for its modernized radar, which advertised 360-degree coverage through four fixed arrays and a reported detection range of up to 250 kilometers against "small" targets under ideal conditions.[71]

Figure 5: HQ-9 TELS with associated target engagement radar.

These SAM systems are supported by a range of mobile early-warning radars manufactured by CETC that serve as the outer shield. The YLC-8 series, introduced in 2008, has become a flagship for long-range surveillance. The YLC-8B operates in the UHF band, with manufacturer claims of detecting large targets at 500 kilometers and stealth targets at 350 kilometers. A newer variant, the YLC-8E, showcased at the 15th China International Aviation and Aerospace Exhibition, builds on this with a fully digital phased-array design for faster scanning and greater jamming resistance.[72] Similarly, the YLC-2E in the VHF band is marketed as a dedicated "anti-stealth" tool, relying on its long wavelengths to detect signature returns from aircraft features such as engine inlets that higher-frequency radars might miss.[73]

These radars are not just stationed on mainland bases; they are strategically deployed to extend China's defensive reach. Satellite imagery from 2024–2025 confirms YLC-8E installations at outposts such as Fiery Cross, Subi, and Mischief Reefs in the South China Sea, forming a coverage bubble[74] that stretches an advertised distance of 400 kilometers seaward.[75] The PLA is attempting to link these ground stations with naval versions of the HQ-9 on Type 052D destroyers, aiming to enable over-the-horizon handoffs in which a distant radar detects a threat and passes it to a ship-based system for engagement.[76] While these setups show clear progress relative to China's early reliance on foreign technology, they still reflect a bias toward low-frequency detection: the systems improve early alerts but still rely heavily on higher-frequency systems for accurate guidance and targeting, which potentially creates exploitable delays for U.S. operators.

EMERGING TECHNOLOGIES FOR DETECTION: FROM PASSIVE SYSTEMS TO CUTTING-EDGE SENSORS

China has moved beyond traditional active radars to include passive and experimental technologies that aim to detect stealth aircraft without emitting signals that could reveal their own positions. Passive coherent location systems, such as the DWL-002 introduced in 2018, use existing broadcasts, such as FM radio or TV signals, as impromptu illuminators to detect aircraft reflections.[77] Upgraded in 2024 with low-noise amplifiers, it reportedly localized emissions from an F-22's communications at distances up to 450 kilometers, according to PLA trial reports in defense journals.[78] Multi-static setups, in which transmitters and receivers are separated by tens of kilometers (as in the KR-1000), add a layer of complexity by making it harder for U.S. systems to pinpoint and jam the source.

Looking ahead, China is investing heavily in more exotic options to gain an edge in the electromagnetic spectrum. THz sensors operate at frequencies around 0.34 THz to achieve fine resolution, down to 15 centimeters, for close-in detection of tiny targets at 5–10 kilometers.[79] These sensors could guide missiles in the final stages of an intercept or spot drones in cluttered airspace. However, their signals degrade quickly in humid or rainy conditions, limiting their use to short range or clear weather, and pairing them with small UAVs remains experimental.[80]

Quantum radar represents an even bolder push, generating signals that are supposedly hard to jam and effective against stealth coatings.[81] While little data is available in the public domain, the Chinese Institute of Electronics has discussed recent advances, including a focus on filtering and noise-reduction techniques, but recognizes that there are still substantial limitations given its heavy reliance on signal processing.[82] Handheld low-probability-of-intercept detectors, unveiled in May 2025, bring this capability down to the unit level: portable units that detect faint emissions from 10–20 kilometers away to guide artillery or drones.[83] In addition, the Yaogan-41 satellite, launched in December 2023, provides persistent infrared and optical monitoring over the western Pacific, feeding data back to ground radars for a more complete picture.[84]

INTEGRATION INTO IADS: LINKING SENSORS THROUGH NETWORKS AND AI

What makes China's defenses formidable is not any single radar or missile, but rather their integration into a unified IADS. The PLA has prioritized multi-domain integrated operations, pulling data from low-frequency early-warning systems, passive detectors, and even satellites into shared command centers at the corps level.[85] High-speed links, such as the JN-300 satellite relay, ensure that a VHF radar's distant alert can quickly cue an HQ-9 battery or a naval ship.[86] Artificial intelligence plays a growing role here: neural-network-based algorithms sift through incoming tracks, prioritizing high-confidence threats, and automating handoffs to SAM launchers like the HQ-9C or the longer-range HQ-19.

CETC, one of the PLA's most prolific defense developers, plays a central role in the PRC's modernization efforts. Its 14th Research Institute in Nanjing produces most phased-array components, while the 38th Research Institute in Hefei handles signal processing for nearly all major systems.[87] This concentration has enabled rapid scaling but also creates bottlenecks if key facilities are targeted. Recent exercises demonstrate the system's potential: the "STRAIT THUNDER-2025A" drills in April 2025, which focused on the central and southern Taiwan Strait, tested joint blockade and precision strikes.[88] "JOINT SWORD-2024B," conducted in late 2024, similarly practiced rapid responses around Taiwan. These drills show improvements in coordination across the army, navy, air force, and rocket units, but they also reveal reliance on fixed patterns that could be disrupted by cyberattacks or strikes on communication nodes, all of which are frequently practiced by U.S. operators.

EFFECTIVENESS ASSESSMENT: STRENGTHS ON PAPER, CHALLENGES IN PRACTICE

On balance, China’s IADS presents a credible and increasingly sophisticated threat, particularly to non-stealth and legacy platforms. Its effectiveness against modern U.S. low-observable operations, however, is less certain and likely depends on factors such as integration fidelity, operator proficiency, and the ability to maintain system performance under contested conditions. Early-warning radars provide broad coverage, and networked fusion enables faster action on detections than ever before. Yet the system's effectiveness hinges on smooth handoffs and resilience under pressure, areas where perceptual biases from Section 3 come into play. Low-frequency alerts are valuable for warning, but their coarse accuracy often requires corroborating data from higher-frequency radars, leaving critical windows for U.S. forces to maneuver, jam, or otherwise mitigate the threat.

Environmental realities pose hurdles: THz signals fade quickly in rain or fog, common in the East and South China Seas, while quantum prototypes require specialized cooling, limiting their use in mobile setups. Doctrinally, the PLA's emphasis on scripted drills invites exploitation; U.S. suppression of enemy air defenses (SEAD) with a combination of stand-in, standoff, and hypersonic missiles could strike emitters before they fully activate the kill chain.

Consider a hypothetical Taiwan scenario in the late 2020s or early 2030s: U.S. B-2 and B-21 bombers, along with F-47, F-22, and F-35 fighters, evade YLC-system cueing, while drone swarms overload the network and complicate the targeting picture. RAND wargames from 2024 suggest that degradation of key nodes could reduce the effectiveness of networked fusion, potentially creating localized vulnerabilities.[89] China's defenses are denser and more capable than a decade ago, but they remain geared toward known threats rather than the unpredictable adaptations of a peer adversary. This gap, driven by overconfidence in technology, reinforces the U.S. edge in contested airspace. The next section examines how these same perceptions guide China's own stealth aircraft programs.

INDIGENOUS STEALTH AIRCRAFT DEVELOPMENT: INFORMED BY PERCEPTIONS

China's homegrown stealth aircraft programs reflect how the PLA interprets U.S. stealth technology as a powerful but ultimately replicable advantage that can be matched through focused engineering and production. Shaped by the biases explored earlier, these initiatives have evolved from early 2000s prototypes into a growing fleet of operational fighters and experimental designs. While China has made remarkable strides, fielding hundreds of advanced jets and testing next-generation concepts, these efforts still face challenges in engine reliability, sensor integration, and the need for more adaptive training. Against U.S. benchmarks, these gaps highlight how a technology-first mindset, while driving rapid progress, leaves Chinese stealth vulnerable in real-world scenarios, preserving an American advantage in contested skies.

EARLY EFFORTS AND J-20 MIGHTY DRAGON: FROM PROTOTYPE TO OPERATIONAL MATURITY

The Chengdu J-20, nicknamed "Mighty Dragon," marks China's entry into the world of operational stealth fighters, born of a late-1990s program code-named "Project 718" spurred by revelations about the U.S. F-22.[90] The aircraft's first flight took place on January 11, 2011, and it achieved initial operational capability (IOC) in March 2017 with the PLAAF's 9th Brigade at Wuhu Air Base.[91] Early J-20A models used Russian AL-31FN engines, which provided solid thrust but limited the jet to subsonic speeds without afterburners and made its exhaust plumes more visible to infrared sensors.[92] Initial estimates place its frontal RCS roughly at the level of U.S. systems in X-band, but with a significantly greater signature in various aspects due to design choices.[93] Upgrades have steadily addressed these issues, making the J-20 a more capable platform. The J-20B variant, which began low-rate production in 2021, switched to the domestically developed Shenyang WS-15 engine, increasing thrust and enabling sustained supercruise, while reducing heat signatures through serrated nozzles and heat-resistant materials.[94]

In service, the J-20 focuses on controlling airspace near China's coast, within what planners call the "first island chain."[95] It carries various weapons and missiles, including the long-range PL-15, in its bays to maintain its stealth signature. Exercises such as "RED SWORD-2024" have shown that J-20s have linked up with KJ-500 early-warning aircraft for coordinated strikes.[96] By September 2025, state media had confirmed the single-seat J-20A and twin-seat J-20S as core PLAAF assets, with over 300 airframes produced and annual output projected to reach 800 by 2030, according to serial analysis and PLA announcements.[97] Quantity is a quality of its own, as evidenced by China's recent focus on scale and production over quality.[98]

Yet vulnerabilities persist. While the United States has spent the better part of three decades modernizing and improving its stealth fighter fleet, the PLA remains relatively new to that endeavor. Like the F-22 and F-35, jets that use afterburners have inherent limitations in infrared detection, as well as other issues in the mid-wave and long-wave regions of the spectrum. Additionally, the J-20 failed to address the low-frequency detection issues associated with jets with vertical tails. This underscores a perceptual tilt toward physical stealth over all-aspect optimization, as PLA production trends continue to emphasize technology, hardware, and coatings over modernized TTP development and integrated operations.

NEXT-GENERATION FIGHTERS: THE J-35 FAMILY AND EMERGING SIXTH-GENERATION CONCEPTS

To complement the heavier J-20, Shenyang Aircraft Corporation has developed the J-35 program, previously known as the FC-31 during its prototype phase, to provide a lighter, more flexible stealth fighter for both land-based and carrier-based operations. The program reflects China's effort to build a tiered fifth-generation force structure in which a heavy air-superiority platform is paired with a medium-weight, multi-role stealth aircraft.

Public displays at the 2024 Zhuhai Airshow marked the formal debut of the carrier-adapted J-35A, designed to operate from the Type 003 *Fujian* aircraft carrier.[99] This navalized variant incorporates structural reinforcements, folding wings, and updated steel coatings, including radar-absorbent material.[100] The land-based J-35 is intended primarily for the PLAAF, while a naval version supports the growing requirements of China's carrier aviation arm. In concept, this family of aircraft occupies a role broadly analogous to the division between the U.S. Air Force and Navy variants of the F-35. Chinese industry materials describe the J-35 concept as a "family" of related aircraft: a baseline air-combat variant, a carrier-based version optimized for naval aviation, and potential specialized derivatives for missions such as electronic warfare or reconnaissance.[101] In addition to domestic service, the J-35 is also positioned as a future export product, offering a lower-cost alternative to the heavier J-20.

Beyond the J-35, Chinese aerospace development appears to be moving toward a new generation of combat aircraft that extends beyond traditional fighter roles. One such project, often referred to in open-source reporting as the J-36, is a heavier, longer-range stealth platform that blends fighter and strike aircraft characteristics. Early prototypes observed in late 2024 and 2025 suggest a large, tailless configuration optimized for long-range penetration and multi-role operations. This aircraft is widely interpreted as part of China's exploration of "sixth generation" concepts, emphasizing extended range, networked operations, and integration with other platforms such as stealth fighters, drones, and space-based sensors.[102] Alongside the J-36, analysts also discuss more conceptual programs, often labeled in Western literature as projects such as "J-XDS", that represent experimental or developmental efforts focused on future air combat. These new systems, which feature intriguing design choices such as triple-engine and double-delta-wing configurations, are tailless and much larger than previous fighters.[103] Taken together, the J-35 family and the emerging J-36 and J-XDS concepts illustrate the evolution of China's stealth enterprise.

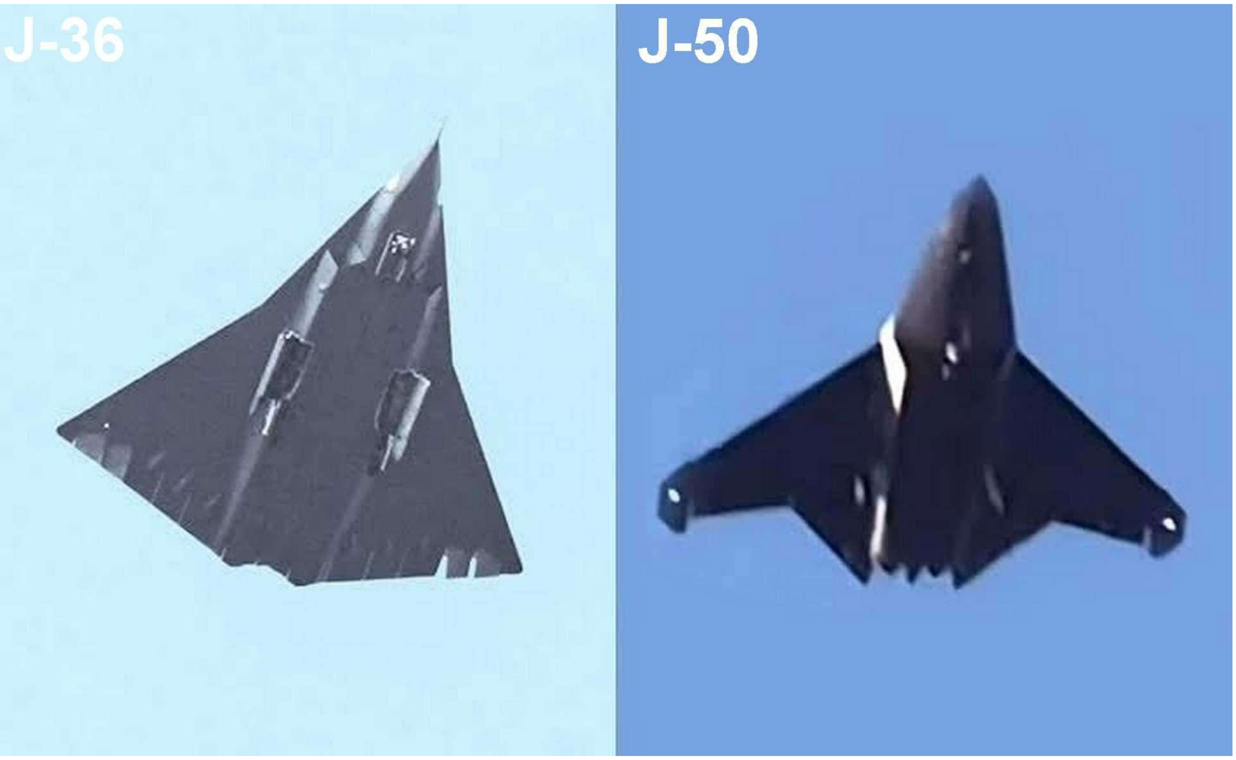


Figure 6: Screenshots of the recently revealed potential J-36 and J-50, or J-XDS.

Bombers and Advanced Programs: H-20 Strategic Reach

The Xi'an H-20 stealth bomber, launched under "Project 20" in 2008, aims to fill a major gap in the PLA’s long-range strike capability. Early silhouettes from 2016 and taxi tests in 2023 suggest a flying-wing design strikingly similar to the U.S. B-2 and B-21, with a 45-meter wingspan and a blended body.[104] Unlike the H-6 series bomber, the H-20 is likely to have internal weapons bays to maintain its stealth profile during operations. Despite these aspirations, the program has been plagued by numerous delays and is likely to incur costly overruns. Initial operational capability, once eyed for 2025, has likely slipped to at least 2030 according to the Department of Defense’s 2024 China military power report.[105]

The H-20’s artistic renderings depict an aircraft roughly the size of the U.S. B-2 Spirit, with similar features, including buried engines, a reduced engine inlet, planform-aligned surfaces, and a blended body shape. Stealth design relies on curved surfaces, hidden inlets, and buried exhausts to achieve optimal RCS across different frequencies and polarizations. These features alone, however, are insufficient to optimize the employment of a tailless, stealth bomber. The support infrastructure, including logistics and maintenance, is robust but has a steep learning curve.

The PLA has released little information on the H-20's specific design elements, but what has been released so far highlights inexperience and questionable design choices. In each of the semi-official artist renderings, which vary slightly, non-planform-aligned edges are depicted, a significant concern for the aircraft's signature, but these are still unofficial and likely to change when officially revealed.[106] While technology can address some deficiencies in mission planning and tactics, it cannot compensate for these design decisions. The mission planners for the H-20 will face an increased workload to address these issues, necessitating greater learning and software development.

Since the early days of speculation, the H-20 has faced numerous design issues and production delays. Since PLA General Ma Xiaotian first publicly acknowledged the existence of a "new-generation long-range strike bomber," little has been disclosed about the H-20. In 2021, a video teased a "follow-up to the H-6," and over the following two years, there was a concerted recruitment push to increase the number of pilot candidates.[107] In 2024, PLAAF Deputy Commander Wang Wei stated that there were "no technical bottlenecks" but provided no concrete timeline or status update on the new stealth bomber.[108] As previously noted, Du Wenlong's 2026 comments about the imminent reveal and entry into service constitute the most recent update on the program.

CHALLENGES AND GAPS: PERSISTENT HURDLES IN ENGINES AND TRAINING

Despite the momentum, China's stealth lineup faces hurdles that a hardware-heavy approach has not and will not fully overcome. Persistent engine issues, prevalent in legacy Chinese-produced engines such as the WS-10 in the original production J-20 model, are improving.[109] However, even the new WS-15 engine in later variants of the J-20 still exhibits significant wear at high temperatures, lasting approximately 1,500 hours between overhauls, compared with the Pratt and Whitney F135 engine's 4,000-hour capability.[110] These engines, while offering a significant increase in capability, still lag U.S.-made systems in many respects, affecting not only fuel efficiency and supercruise performance but also other attributes, particularly for stealth assets. Additionally, the requirement to sustain and maintain multiple engine types, as well as to train aircrew on the varying capabilities of each, will prove cumbersome for the PLA.

The term "training" is commonly used primarily to discuss pilot proficiency and capability, particularly the gap between U.S. and Chinese pilots. This "gap" is rapidly closing as Chinese pilots accrue more training hours each year, but not all training is equivalent. Chinese pilots' training focuses on rehearsed long-range fights, with pilots logging nearly equivalent hours annually under recent training reforms and with less emphasis on dogfights or dynamic operations.[111] By contrast, many U.S. pilots have deployed numerous times, dropped weapons in combat, and participated in dozens of advanced exercises, far beyond what a typical PLAAF aviator does. The distinction between training types, though difficult to quantify, is critical to understanding the training gap.

For tailless assets such as the GJ-11 and H-20, the learning curve will be steep for operators and support crews. For operators, flying a tailless bomber is very different from flying a traditional H-6 bomber or a J-20 fighter. Mission planning is significantly more involved; understanding RCS and LO has become critical, and understanding adversary systems is essential. This cannot and does not happen quickly. The U.S. has had decades to learn these lessons, only recently reaching IOC with its advanced, iterative mission-planning system. It has taken years of trial and error, exercises, successes and failures, and input from a diverse group of thinkers to achieve these milestones. The Chinese may not be starting from zero, but there is significant ground to cover to effectively adopt these new technologies.

STRATEGIC IMPLICATIONS AND RECOMMENDATIONS

Previous sections have outlined the core elements of China's approach to stealth technology: its misperceptions of U.S. capabilities, the defensive systems developed to counter them, and the indigenous aircraft programs informed by those perceptions. Together, they reveal a striking tension in U.S.-China aerospace competition. These efforts are constrained by persistent biases, such as overconfidence in early-warning radars, underestimation of how U.S. forces adapt in real time, and a heavy reliance on hardware over training and flexible planning. This section brings these threads together to examine the broader implications for military balance, regional tensions, and global stability.

VULNERABILITIES IN THE CHINESE APPROACH: OPERATIONAL WEAK SPOTS, RIGID PLANNING, AND RISKS OF MISCALCULATION

China's air defenses and stealth aircraft appear robust in structure, but closer examination reveals cracks that its optimistic self-assessments often overlook. Early-warning radars such as the YLC-8E and JY-27 can theoretically detect distant threats, and systems such as the HQ-9 family provide relatively solid missile coverage but integrating them into a seamless response chain remains difficult. In jammed or cluttered skies, such as heavy rain over the Taiwan Strait or electronic interference from U.S. assets, distinguishing friend from foe and refining the targeting required to engage can be extremely difficult. Recent wargames, such as CSIS's 26 iterations of a 2025 Taiwan blockade, highlight this: even when China starts strong, U.S. stealth raids on key radar sites or command posts can disrupt the network within hours, creating exploitable operations gaps.[112]

The U.S. raid in Venezuela, OPERATION ABSOLUTE RESOLVE, offers a limited but illustrative case, suggesting potential discrepancies in Chinese systems advertised capabilities versus operational performance.[113] Venezuelan military forces reportedly fielded 12 JY-27 "anti-stealth" systems, several of which were operational at the time of the raid. U.S. stealth assets, supported by numerous multi-domain capabilities, entered Venezuelan airspace and were able to successfully achieve their military objectives. Despite the PRC's claims of 240 nautical mile detection capabilities against stealth aircraft and increased resistance to electronic warfare, initial assessments are that U.S. military aircraft operated effectively in this environment.[114] When deployed in a real conflict rather than in a scripted exercise or simulation, initial analysis indicates these systems faced practical constraints that limited their effectiveness relative to the advertised capabilities, although open-source information is still too limited to make firm conclusions.

On the aircraft side, fighter aircraft such as the J-20B are impressive, but issues arise from inconsistent engine performance and the use of different engines across variants. With multiple engine types, including AL-31FN, WS-10, and WS-15, all implemented across the fleet, each aircraft will have variations in performance.[115] This lack of consistency imposes additional workload on planners and operators, who must be aware of each aircraft's performance capabilities and limitations based on its tail number. Even if the PLA accounts for these differences in jet availability and capabilities, the requirements for training and exercises remain unchanged.

PLA exercises, including large-scale joint operations, have historically relied on relatively scripted scenarios and limited free-play opposition, which can constrain the realistic representation of low observable threats and result in training environments that underemphasize the dynamic, adaptive employment characteristic of U.S. stealth operations.[116] This is especially prevalent given their limited understanding of U.S. stealth bomber TTPs, outside what they may have gleaned from a distance at exercises such as RED FLAG. This approach to exercises ignores critical U.S. capabilities and TTPs, including real-time routing optimization using various tools and expertise. U.S. aircrew and mission planners continually rehearse real-time inputs and changes to fighter and bomber routing to minimize the risk of detection by an adversary system. Undoubtedly, the PLA is increasing its testing, modernization, and the realism of its training scenarios and exercises, but it still lags behind the U.S., given the years of additional experience and expertise that U.S. personnel have.[117]

These operational weaknesses and misperceptions create greater risks: the risk that tensions escalate out of control. Overconfidence in its defenses could embolden China to test the boundaries, for example, by imposing a blockade on Taiwan in the 2027-2030 timeframe. But if a U.S. B-21-led force package, accompanied by B-2, F-22, F-35, and F-47s, penetrates to hit naval bases and air defenses in Fujian province, the response might shift from a blockade to a more offensive posture, or even to nuclear posturing with H-6N patrols. Gray-zone incidents, such as J-20 or J-35A fighters buzzing U.S. spy planes, could escalate into kinetic conflict if pilots misjudge their stealth advantage or true capabilities. The DoD's 2025 report warns of this, noting that China's nuclear arsenal now tops 600 warheads (up from 500 in 2023) and that future stealth bombers could add a new element to their triad, but perceptual gaps make deterrence fragile, as leaders might overestimate how well their systems perform.[118]

U.S. OPPORTUNITIES: TURNING CHINESE BLIND SPOTS INTO PRACTICAL EDGES

The interplay between Chinese perceptions of U.S. stealth technology and the defensive-offensive duality extends far beyond bilateral military competition. This dynamic influences regional stability, alliance development and sustainment, and global economic interdependencies. As the PRC interprets U.S. stealth as a hegemonic tool to be countered through A2/AD enhancements and indigenous developments, these efforts ripple across the Indo-Pacific, often heightening tensions at key flashpoints such as Taiwan and the South China Sea. At the same time, the spread of related technologies to other nations, such as Japan, adds layers of complexity, while deep economic ties serve as both a stabilizing force and a source of vulnerability. This section explores these wider implications, focusing on how Chinese views of stealth as a surmountable challenge drive an escalation cycle, reshape deterrence, and prompt broader coalitions as of early 2026.

TAIWAN AS THE CENTRAL FLASHPOINT

Taiwan, unsurprisingly, stands at the heart of these dynamics. Chinese A2/AD systems, extending roughly 500–600 kilometers from the mainland, employ advanced surface-to-air missiles, such as the HQ-19, and long-range radars, such as the YLC-8E and JY-27V series, to deter external intervention. Recent Chinese exhibitions, including the 2025 World Radar Expo, highlighted VHF and UHF radars designed to counter low-observable aircraft, reflecting a belief that stealth advantages can be offset through multi-band sensing and “intelligent processing."[119]Chinese strategists appear to view stealth not as an insurmountable barrier but as a factor that can be managed through overwhelming volume and integrated networks, leading to a deterrence posture that emphasizes rapid, decisive action to limit U.S. involvement. Yet U.S. assessments and simulations suggest that stealth strikes could significantly disrupt Chinese amphibious operations. While specific 2025 wargame outcomes vary, analyses indicate that precision attacks

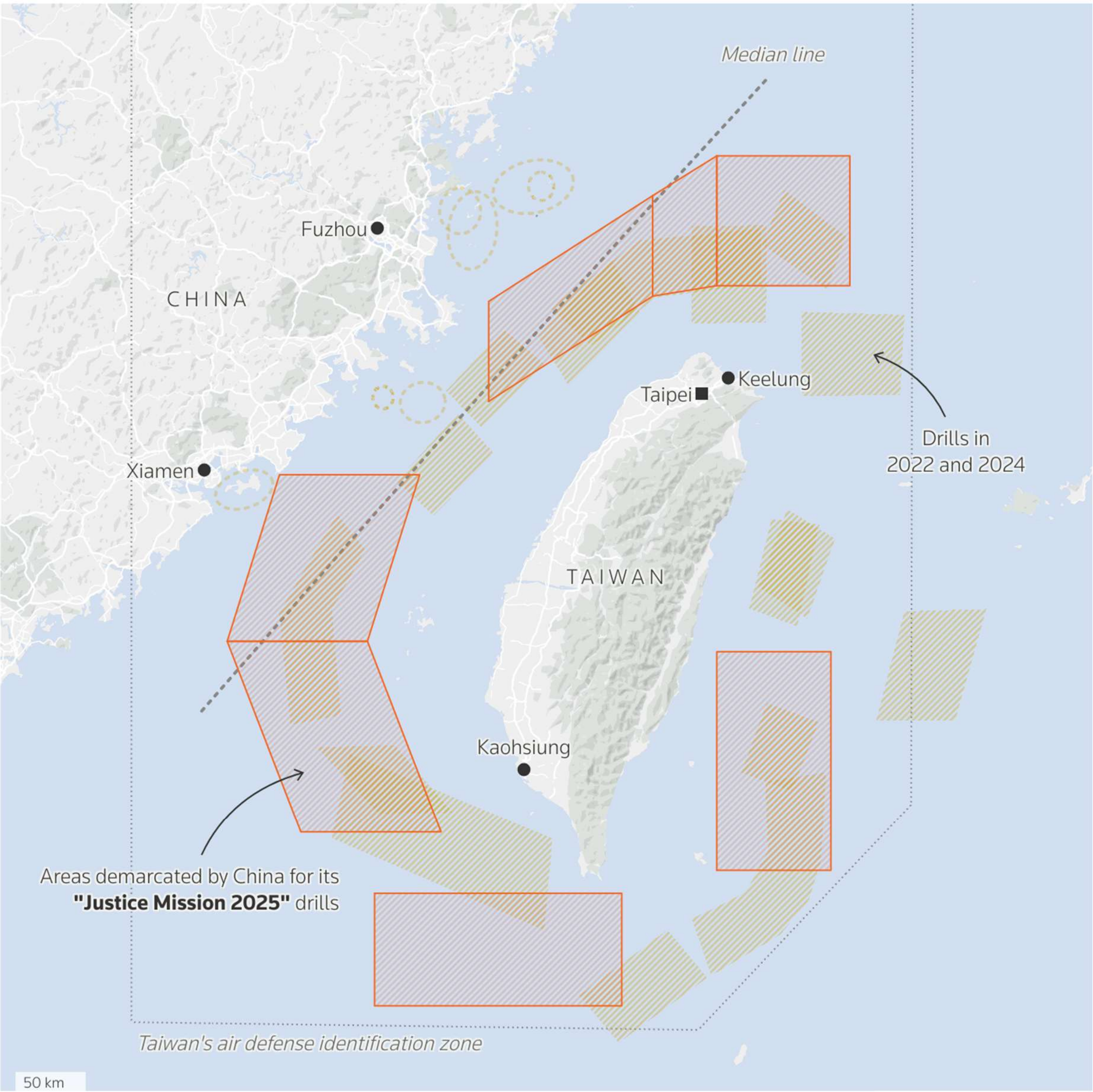


Figure 7: Chinese operating zones around Taiwan in 2025 overlayed with previous exercises.

from both stealth and non-stealth assets may target key elements of an invasion fleet early on, inflicting significant losses before forces reach Taiwan's shores.[120] This could prompt escalatory Chinese responses, such as intensive missile barrages against U.S. forward bases in Guam, the Philippines, or Okinawa, underscoring the risks of miscalculation.

In practice, this creates a delicate balance: a perceived U.S. edge in stealth penetration might encourage caution in Beijing, while Chinese confidence in counter-stealth radars could embolden more assertive behavior. The result is heightened crisis instability, in which even routine military activities, such as U.S. reconnaissance flights near the strait, risk unintended escalation if pilots or operators misjudge capabilities or threats.

TENSIONS IN THE SOUTH CHINA SEA

Further south, militarized artificial islands such as Fiery Cross and Subi Reefs host numerous sophisticated radar systems that bolster Chinese claims and extend surveillance coverage.[121] These facilities heighten the perceived threat during U.S. freedom-of-navigation operations, where encounters between Chinese fighters or naval vessels and U.S. assets could escalate quickly. Chinese pilots, operating under a doctrine that emphasizes anti-stealth detection, might feel greater confidence in challenging U.S. forces, thereby increasing the risk of close calls or incidents that could erode regional norms under the United Nations Convention on the Law of the Sea. Such gray-zone activities test alliances, particularly among ASEAN members like the Philippines and Vietnam, many of whom seek stronger U.S. security partnerships to counterbalance Chinese assertiveness.

PROLIFERATION AND REGIONAL BALANCES

The spread of stealth-related technologies further complicates matters. Pakistan's pursuit of the FC-31 (an export-oriented variant of China's J-31) has been publicly discussed since early 2024.[122] This acquisition would introduce fifth-generation capabilities to South Asia, potentially shifting airpower dynamics in the Indian Ocean region and straining U.S.-India relations, given the lack of tangible progress on the sale of the F-35 to India. Similarly, reports of other nations exploring Chinese stealth platforms underscore broader proliferation risks, as these systems could influence conflicts beyond the Indo-Pacific. Additionally, India has explored acquiring Russian-made Su-57 aircraft, adding another dimension to the region's power dynamics.[123]

China's H-20 strategic stealth bomber program, still in development and not expected to enter service until later this decade or beyond, according to U.S. intelligence assessments, remains a longer-term concern.[124] Intended to complete China's nuclear triad with long-range, LO strike options, the H-20 could enable deep strikes against U.S. allies and partner interests. In response, the U.S. B-21 Raider, already progressing toward operational status, offers networked capabilities for preemptive or retaliatory operations, raising the stakes of an emerging arms race and underscoring the need for renewed strategic dialogue.

RECOMMENDATIONS FOR ENHANCING U.S. STEALTH CAPABILITIES IN RESPONSE TO CHINESE PERCEPTIONS AND DEVELOPMENTS

To counter Chinese interpretations of stealth technology as a vulnerability that can be addressed through advanced detection systems and indigenous aircraft programs, the United States should prioritize a multifaceted approach that emphasizes human capital, doctrinal refinement, operational persistence, and alliance-building. These recommendations build on U.S. strengths in integration and adaptability and address potential gaps in preparedness and collaboration. By investing in these areas, the United States can reinforce deterrence in the Indo-Pacific, ensuring that stealth remains a reliable pillar of airpower superiority.

1. Establishing Formal Academic Frameworks for Low Observable Operations and Tactics Development

To institutionalize knowledge of LO operations, the U.S. should create dedicated academic programs focused on stealth principles, radar fundamentals, and the evolution of TTPs. A foundational understanding of how adversary threat systems interact with the U.S. military's stealth capabilities is critical to increasing, or at least maintaining, the U.S. military's edge over China. Currently, this knowledge resides at the unit level, which is unsustainable and results in a lack of cohesive education across the force. The Air Force should lead the development of a course on stealth education and radar fundamentals, taught by recognized experts already within the enterprise. Every operator, intelligence analyst, mission planner, and staff officer who oversees a stealth asset should complete a one-time training course to deepen their understanding of adversary capabilities against U.S. stealth assets.

2. Expanding Training Programs for Stealth Operators

A core recommendation is to significantly increase specialized training for operators of stealth platforms, including the B-2, B-21, F-35, F-22, and the emerging F-47. Current training regimens, while robust, could be expanded to better simulate Chinese multi-domain environments. Joint, coalition, and integrated training should expand to better replicate contested Chinese multi-domain environments. Beyond major events such as RED FLAG and WSINT, units must continue to develop and advance training and integration grounded in accurate, up-to-date intelligence assessments. Small-scale training and exercises can be highly beneficial and should not be overlooked in favor of larger events.

While these integration opportunities are vitally important to the tactical experts, they also hold great value for operational and strategic leaders. The entire Department of War must increase its fundamental understanding of stealth operations, including general officers and senior civilian leadership. As operators conduct small-scale training integrations, in-depth outbriefs should be provided to senior officials, with the eventual goal of incorporating senior leaders into the exercises themselves to raise the level of knowledge about stealth operations across the joint force.

3. Sustaining and Enhancing INDOPACOM Bomber Task Force Deployments

A continued emphasis on INDOPACOM Bomber Task Force (BTF) deployments is essential to demonstrate resolve and refine stealth operations in the theater. These missions, primarily involving the B-2 and eventually the B-21, should be sustained at a steady pace, with increased integration of coalition stealth assets in the region.

Deployments should incorporate joint and coalition exercises with regional partners, constantly pushing the envelope and modernizing TTPs across the joint and coalition force. For example, routing BTF flights near the Taiwan Strait or the South China Sea, integrating with Japanese or Australian F-35s and EA-18Gs, and supporting U.S. Navy F-35C operations would signal deterrence and provide insights into PLAAF reaction times. This approach not only bolsters operational readiness but also counters Chinese narratives of stealth vulnerability by demonstrating a persistent presence, ultimately contributing to regional stability through a visible and consistent commitment.

CONCLUSION

The United States must continue to examine the intricate ways in which Chinese perceptions of stealth technology, particularly those shaped by the PLA, inform both defensive countermeasures against U.S. capabilities and the development of indigenous stealth platforms. These perceptions, evident in open-source commentary, shape resource allocation, doctrine, and escalation risk.

Chinese views of stealth as an asymmetric yet counterable U.S. advantage have driven a bifurcated strategy: robust investments in layered air defenses and a rapid program to field domestically developed LO aircraft. The foundational perceptions, showing how PLA literature and CETC marketing overstate the detection capabilities of VHF/UHF radars such as the YLC-8E and JY-27, claiming ranges of 300–500 kilometers against stealthy targets while glossing over practical hurdles and real-world limitations. This overvaluation fosters a false sense of security, as evidenced by deployments on the South China Sea artificial islands and in the Eastern Theater Command near the Taiwan Strait.

These biases ripple into the defensive architecture. China's IADS, evolved from S-300PMU imports to indigenous systems such as the HQ-9C and passive detectors such as the DWL-002, forms a dense network of coverage extending hundreds of kilometers from baselines. Yet, as exercises like "STRAIT THUNDER-2025A" demonstrate, coordination remains scripted and brittle. These systems are a positive step forward for Chinese engineering, but significant gaps in capability and reliability still create opportunities for U.S. operators.

The PLA appears to be unveiling new stealth systems nearly monthly, fueling suspicion and concern within the international community. Many of these systems are unlikely to see combat, as they are prototypes or technology demonstrators rather than refined products. Integrating these new capabilities is time-consuming and complex, but the Chinese are making progress toward these goals. The engineering and design choices made by Chinese developers, such as engine specifications and capabilities, as well as stealth design and material decisions, are not infallible and will likely require extensive work by operators and support assets to overcome.

FUTURE RESEARCH DIRECTIONS & FINAL THOUGHTS

Looking ahead, the PLA's integration of AI and quantum technologies into stealth applications warrants deeper scrutiny, as these technologies could reshape asymmetries in electromagnetic spectrum operations. These systems will not, by themselves, negate the benefits of U.S. stealth technology, but they will increase the complexity of mission planning and capability development. U.S. acquisition and program development must continue to mature and iterate at a pace at least as rapid as China's to maintain its current edge.

The U.S.-China aerospace rivalry hangs in a delicate balance: China's stealth advances, including the unveiling of numerous stealth fighters, bombers, and UAVs, as well as its modern radar production, challenge American primacy. Despite these advances, the United States still maintains a significant advantage in personnel, training, and experience. While technology is critical to sustaining U.S. dominance in multidomain operations, the most effective investment remains in personnel and training. The U.S. needs experts in both stealth and China. Ideally, it will also develop experts in China and stealth. These are the people the Department of War needs to develop requirements for future programs and to guide decision-making in high-level wargames. Relying on a small contingent of experts is dangerous and insufficient for the future fight. Training and integration opportunities must continue to expand, with a focus on validated, intelligence-informed analysis rather than the uncritical repetition of Chinese-source claims.

China and the PLA maintain a formidable military that is modernizing at an unprecedented pace. That does not mean they are infallible or an insurmountable adversary. Their capabilities are advanced, but so are those of the United States. Sustaining U.S. advantage requires rigorous, intelligence-informed analysis of Chinese capabilities and perceptions, grounded in operational reality rather than declaratory claims, while better understanding the Chinese perspective. The decisions that drive China are often based on different justifications than those the U.S. would make, which can induce fear and uncertainty. Analysis of Chinese motivators, from symbolism to historical drivers to misperceptions, is crucial to gaining a holistic understanding of the true threat posed by the PLA.

Figure 8: U.S. Air Force B-2 stealth bombers conduct an elephant walk at Whiteman Air Force Base, Missouri. Source: https://www.dvidshub.net/image/7531736/spirit-vigilance

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