

**Ferdinand Wegener**

## Stealthily stabbing the Red Dragon

Can the new US stealth  
planes stop China's rise? -  
Details on the F-47 and B-21



### About the Article

China air power is on the rise, with more and more of its aircraft lifting into the pacific skies each day. This puts big pressure on the next generation of US fighter and bomber aircraft. Can the F-47 and B-21 stealth planes stop the crimson tide?

### About the Author

Ferdinand Wegener is the Co-Founder of EPIS and the current Head of Delegations. He studied law at the University of Cologne with a focus on European & International Law. He has led EPIS delegations to the Black Sea Security Forum in Odesa, the Paris Defence & Strategy Forum and the Munich Security Conference. His main topics of research are security policy and defense technology, with a specific interest in military aviation.

# The

picture that could be painted about the balance of power in the Pacific theatre for the US Armed Forces is a grim one. In 1991, during Operation Desert Storm, the US Air Force alone, not counting the Navy or Marine aviation, had about 4000 tactical aircraft (i.e. fighters, fighter-bombers and attack aircraft) available, of which 650 deployed to the Middle East for air raids against Iraqi targets. By 2025, only 1940 tactical aircraft remain in the USAF active inventory. The US Department of Defense (DoD) plans for the fiscal year 2025 calls for acquiring 91 tactical aircraft for the USAF, enough to equip a mid-sized nation with an entirely new air force. The same plans do however also entail retiring a grand total of 250 planes, further reducing the numbers. Between 2024 and 2028, 800 fighters are set to retire, while only 345 new ones join the fleet (Aldeghi, 2025a). And the year 2028 is awfully close to 2027, the earliest time experts predict a Chinese attack against Taiwan (Cancian, Cancian & Heginbotham, 2023). Other areas of a potential air war with China are not looking that good either, with the planes responsible for the information space over any aerial battlefield looking like museum pieces on the US side. The Airborne Warning and Control System (AWACS) planes are vital for situational awareness and increasing their respective fighter's radar and weapon range. The USAF only has 16 active E-3 Sentries in service, based on the ancient Boeing 707. The youngest one is 42 years old,

and they are technologically behind, lacking an AESA (Active Electronically Scanned Array) radar. This would not be that bad, if their replacement, the E-7 Wedgetail, had now just been cancelled in a wave of cost cutting measures at the Pentagon (Rogoway, Trevithick, 2025). The 80 E-2D Hawkeyes of the US Navy are slated to fill the gap, but this is an imperfect solution as the Hawkeyes lack the E-3s range and are no match for China's growing fleet of about 60 AWACS aircraft, some of which are equipped with AESA radars. Relief for the US might come from an unlikely source, with General Atomics and Saab partnering up on the MQ-9B AWACS variant, called "Sky Guardian" (General Atomics, 2025). This system uses the MQ-9B STOL (Short take-off and landing) UAV (unmanned aerial vehicle) as a basis, iterating on the proven MQ-9 Reaper design, well known for its widespread use in the War against Terror. It can be launched by the US Marine's amphibious assault ships and the British carriers, increasing the number of launch platforms able to operate AWACS aircraft significantly (Newdick, Rogoway, 2025). If and how many might be procured is unknown, as the offering is brand new. If 42 years makes an aircraft old, the B-52 is borderline geriatric, with the youngest active airframe being 63 years "young". Old airframes not only have a limit in how far they can be upgraded, falling technologically behind, but they also require more and more maintenance, reducing readiness rates due to increasing structural fatigue.



Figure 1: Image of B52 at RIAT: "A B-52H landing at the RIAT airshow in the UK, the specific aircraft pictured was built in 1961, photograph by Ferdinand Wegener"

On the other hand, China is aggressively expanding its aerial capabilities. Their modernization of the aviation component of their military is planned to be completed by 2035. In 2025, Chinese Aviation consists of 1,300 semi modern combat jets, while all US military branches together came to 3,000 fighters. And that is without counting any allies in the region, which would assist the US in a conflict with the CCP. The gap of 1,700 means the Chinese need to build about 200 planes per year to reach parity with US numbers by 2035, when including the types retired by then. And they are actually right on schedule to meet that goal (Aldeghi, 2025b).

Formulating the problem in the words of the US DoD leadership, Pete Hegseth said on a podcast appearance a few weeks before becoming the current US Secretary of Defense that the way the bureaucratic and slow weapons procurement system works, the US is always a decade behind, fighting the last war. He contrasts this with China, which is building an army specifically dedicated to defeating the United States of America (Carroll, Trimble, 2025a).

others entering the conflict on the side of the US. It would also include the unparalleled US military satellite intelligence gathering capacity. And existing US aircraft would have their capabilities greatly enhanced by new air-to-air missiles like the AIM-260 and AIM-174B entering service. Not to mention the upgrades to the F-22 and F-35, such as the proposed "Super F-22" with a new, more powerful AESA radar or the currently in production Block IV upgrade to the F-35 with engine and AESA radar improvements (Carroll, Trimble, 2025b). Getting even more exotic, Lockheed Martin CEO Jim Taiclet suggested a so-called "Ferrari"-version of the F-35, a 5+ Generation fighter with 80% of the capability of a 6th Gen fighter at 50 % of the cost, entailing new sensors, improved stealth coating and stealthy drop tanks, increasing the F-35 range by up to 600 miles (Hollings, 2025a).

But, besides all those points, the USAF has two stealthy aces up its sleeves that are definitely not designed for "the last war", and if they are supposed to be "a decade behind", then the US is undoubtedly living in the future. Those aces are the F-47 fighter and the B-21 bomber.

## Fighting an already lost battle?

So, is that it? Is the aerial might, the strongest part of the US military power, irreparably lost to the Chinese? Not so fast. A conflict in the Pacific would not only involve an aerial component but also large naval engagements and include most likely Japan, South Korea, Australia and many

## The F-47 - What we know, what we think we know, but don't & what we can assume

First things first: We don't know that much. We especially don't know as much about the F-47 as we think we know. So, what do we know?



Figure 2: Image of F47 "Rendering of the F-47, as envisioned by an artist"

The F-47 is the product of the US Air Force Next Generation Air Dominance (NGAD) program, started after a concept study in 2014. The F-47 is, according to President Trump and USAF statements made in the unveiling press conference on March 21st, 2025, the world's first 6th Generation fighter jet. If that is still true in light of the Chinese J-36 is as much up for debate as the actual features that define a so-called 6th Generation fighter. Therefore, all this really tells us is that the F-47 will be very advanced,

beyond the capabilities of 5th Gen fighters like the F-35 and F-22, and that it will likely have the features most associated with the evolving definition of the 6th Gen moniker, chief among them all-aspect stealth. According to President Trump, an experimental version of the plane has been flying for almost five years. This probably doesn't refer to a prototype F-47, but to technology demonstrators that paved the way for the F-47, akin to the Boeing Bird of Prey.



Figure 3: Image of Boeing Bird of Prey: "The Boeing Bird of Prey, now on display at the National Museum of the USAF in Dayton, Ohio"

Prototypes are hand-built versions close to the finalized aircraft, built to test the entire platform shortly before entering full scale production. On the other hand, technology demonstrators serve to test specific new aspects like radically new stealth designs or revolutionary airfoil layouts, without the goal of developing the demonstrator into a production aircraft. Rather, they are used as a stepping-stone to be able to integrate the tested systems into upcoming production aircraft. From USAF and DoD budget sources, we know about \$ 29 billion has been spent on the F-47 so far, with \$ 9 billion going to the development of its new engines. Boeing's offer was chosen, beating out competitors like Lockheed Martin. Lockheed Martin had already dropped out of the soon-to-be-chosen but rumored to be cancelled F/A-XX competition, the US Navy's NGAD, probably leaving Lockheed Martin without a production contract for a 6th Gen fighter. Coupled with

lower-than-expected sales of the F-35 because of current US foreign policy, Lockheed Martin's fighter branch might be looking at tough times ahead. Export of the F-47 was discussed right away by President Trump, alluding to an export version toned down by 10 %, available for purchase to certain key allies. This might seem like another jab by the Trump administration against its allies, but only offering them a watered-down export version. But this isn't historically uncommon, just look at the export versions of the T-72 that the Soviets sent to Iraq. And it actually might be more forthcoming than prior US governments. The export of the F-47 would be a departure from the approach established by the US with the F-22 Raptor to not export its top air-dominance fighter. Key allies like Japan, Israel and Australia had shown strong interest in the F-22, but a 1998 act by Congress (HR 2266) forbade the US from ever selling the plane or its secret stealth technology.



Figure 4: Image of F-22 Raptor: "The F-22 Raptor was deemed so advanced that a congressional act was passed into law to prohibit its sale even to the closest US allies"

## What we can assume about the F-47

Although the following facts may not always have been stated outright, we can assume most of them with a high degree of certainty, as the contextual information makes different interpretations quite unlikely.

New features of the F-47:

- Variable flow engines by Pratt and Whitney (XA-103) or General Electric (XA-102) which have not been chosen yet (Carroll, Trimble, 2025c). They offer a „speed over two“ according to President Trump, meaning above Mach 2, faster than the F-35. Their main feature is enabling high fuel efficiency by having a third engine opening that increases airflow. Before this next generation, variable flow engines, a jet turbine could be either optimized for high speed or fuel efficiency, not both.
- Next generation stealth characteristics, with all-aspect stealth and resistance to broad band radars expected. All-aspect stealth means stealthiness from all angles of attack, be it from ground radar or airborne radar. This is achieved partially by a tailless design with no vertical stabilizers for ultimate stealth against low frequency, long wavelength radars (Carroll, Trimble, 2025c). • Widely increased data networking and controlling capabilities, with the ability to task drone swarms and smart weapons and to communicate and transfer sensor data seamlessly between other platforms like other fighters, drones, ships and satellites.
- Autonomous flying with the pilots on board acting more like Weapon Systems Officers (WSO), who concentrate on managing long range weapons, target locks, radar and sensor data while the plane flies itself in most situations, decreasing pilot load and freeing him up to concentrate on other, new tasks like controlling aforementioned drone swarms. In former F-14 fighter pilot Ward Carroll's words, the F-47 "fired the pilots and kept the WSOs", while Aviation Week reporter Steve Trimble estimates that "the flying part of the aircraft will be almost completely autonomous" (Carroll, Trimble, 2025c).

We know that each F-47 will cost dozens of millions of dollars per plane. Former Air Force Secretary Frank Kendall III confirmed the cost of the F-47 as "three times that of a F-35" (Hollings, 2024). Depending on the F-35 variant, with the USAF A model as the most likely basis, and

the exact batch referenced, this leaves us with estimates ranging from \$ 200 to \$ 300 million per plane. Because of the high cost and low initial production numbers, the F-47 will work together with Collaborative Combat Aircraft (CCA), an unmanned aerial combat vehicle that will work as a wingman to the F-47, carrying extra weapons, extending the sensor range and being somewhat expendable. The CCA will cost about \$ 30 million per drone, with at least two CCAs flying alongside each F-47 (Aldeghi, 2025c). This is also a sign that the USAF has shelved the concept of a light fighter as a cheap alternative to the F-47 for now. We can also assume that the F-47 will be compatible with most upcoming, long-range

US air-to-air missiles like the AIM-260 JATM, as they are vital for its air dominance role in the pacific. According to USAF General David Allvin, X-plane demonstrators specific to the F-47 programs have been flying since 2019 (Binkov, 2025a). We can therefore expect an accelerated timeline for the program, enabling a pre-production prototype to take flight by 2028, before the end of the Trump Presidency (Aldeghi, 2025d). The first jets may roll off the production line by 2032. This might still put the program behind the timeline of the Chinese J-36, a presumed 6th Gen stealth fighter, as the first J-36 prototype seems to have taken flight in December of 2024 (Wege-ner, 2025b).



Figure 5: Image of Chengdu J-36: "The Chengdu J-36 observed on one of its purposefully poorly hidden test flights"

Back from the dead, NGAD was revived. It seemed like the program was close to cancellation, with no recent progress reported and the program ranking lower and lower on the USAF priority list by the month. Secretary of the Air Force Frank Kendall had ordered a halt to the NGAD program in March of 2024 over concerns of the plane being overpriced (3 times the price on an F-35 per plane). The Chinese J-36 fighter reveal might have put NGAD pack on the radar. NGAD now has survived despite a prior shift within the Air Force to instead focus on the NGAS program, a next generation stealthy tanker aircraft, which is supposed to replace or more likely augment the existing fleet for Boeing KC-135 tankers. These tankers were supposed to be more survivable in a modern peer to peer war, especially when facing long range PLAAF anti-air missiles like the PL-15, designed for the

purpose of taking out American high value aerial assets. With a stealthier tanker platform, refueling was envisaged to take place closer to the combat area, enabling the fighters to carry less of their own fuel, therefore becoming lighter, smaller and cheaper. This concept was tested in war gaming simulations and must have been found to be less attractive than the NGAD approach, even though the service is still pushing for a stealthy next generation tanker plane that is more suited for the Pacific theatre, although at a now reduced pace. NGAD was originally intended to replace the F-22 in service, but after the cost of the NGAD per plane and the operational need for as many stealth planes as possible against China became evident and a fix for the F-22's integrated helmets was implemented, the NGAD is now slated to only augment the existing fleet of F-22s.

## Artist's renderings and their (in)significance

But what about the artist's renderings? Don't we know much more about the F-47 from those? As the name suggests, artist renderings are just that: an artistic impression of what a graphic designer thinks the plane will look like. This might mean that they were shown early, simplified

models of the plane or that they have just had the aircraft or its features described to them and they used their creativity to fill in the blanks and create an image. This most definitely does not mean that they had access to a top-secret prototype (if one were to exist) or the accompanying schematics. So, to a high degree, they are as in the dark about the F-47 as we are.



Figure 6: Artists rendering of F47: "Another artist's rendering of the F-47"

So, we can conclude that the real F-47 will certainly look different than the renderings. This is a given because a flying, to scale prototype for the F-47 most likely doesn't exist yet and a pre-production or production version is not even close to reality. There will be deviations between current information and whatever will be produced down the line. That begs the question: if the rendering doesn't show what the F-47 will look like, is it worthless? No, because it does show an aircraft that will at least bear some of the main features that the actual F-47 would incorporate.

Firstly, the rendering does show a fighter sized and shaped aircraft, unlike rumors of the F-47 being more of a bomber sized plane optimized only for stealth, range and payload or even being a specialized version of the upcoming B-21 Raider bomber, rebuilt for an air-to-air loadout

and fitted with a radar. The renders also show a single wheel configuration for the front landing gear, suggesting an aircraft lighter than the new, massive Chinese stealth plane (J-36), rumored to be about 25 tons empty, 40 tons fully loaded, and more in the ballpark of the F-35 (about 14 tons empty, 30 tons fully loaded) (Binkov, 2025a). Furthermore, the artist's impression has canards (the small triangle shaped forewings forward of the main wing), a feature that an artist would have specifically been told about. Canards are quite unusual for US stealth designs. Canards on production stealth aircraft are currently only found on Chinese designs like the J-20. Canards do offer more maneuverability, but their shape also introduces reflective surfaces to the design. One might think that this new US approach signals that the F-47 compromises some stealth feature for more maneuverability. But quite

the opposite might be true. By using canards as extra control surfaces, the F-47 probably gains the ability to eliminate any vertical stabilizers. Removing the vertical tail entirely increases the stealthiness of the design by a lot, in sum most likely much more than having to add canards to the design to balance out the loss of vertical control surfaces. Canards were found on the 1997 McDonnell Douglas X-36, which was a stealthy 28 % scale prototype that was built for remote piloting. Importantly, this

design was also entirely tailless, using the canards, coupled with thrust vectoring to achieve the desired flight characteristics without vertical stabilizers. With McDonnell Douglas merging with Boeing in the same year, the X-36 may give us at least a little glimpse of what to expect of the F-47, although it must be said that stealth technology has changed a lot in the almost 30 years since then (Stewart, 2024).



Figure 7: Image of X-36: "The X-36 Tailless Fighter Agility Research Aircraft, a 28% scale test aircraft, in flight, now part of the exhibit at the National Museum of the USAF in Dayton, Ohio"

The tailless design enables better stealth especially against Chinese low frequency, long wavelength radars. Such radars are best suited to detect incoming stealth aircraft. Although, at this point it must be stressed that spotting and targeting a stealth plane are not the same thing. These low frequency radars can spot the approximate position of a plane but mostly cannot achieve a target grade lock, meaning they cannot guide anti-air-missiles to the exact location of the intruder. Modern Chinese air defenses combine a low frequency radar for spotting with a high frequency radar for targeting, but sharing information between them is technologically difficult and increases the overall complexity greatly. And even this complex

design might not be enough to even spot the new, tailless and therefore extra stealthy F-47.

## An aviation expert's insight into the F-47

Concerning the characteristics of the new US planes, I interviewed Prof. Dr. Dieter Wegener<sup>1</sup>, an aeronautical engineer who did his PhD thesis on the secondary flow phenomena in aero engines. He has worked as research scientist at the DLR, the German Aerospace Center, lovingly called "German NASA" by Prof. Wegener. During his stay at DLR, he conducted experimental and theoretical work, including numerical 3D-calculations with the supercomputer Cray-1<sup>2</sup>.

<sup>1</sup> The Interview was conducted on the 12th of June 2025; EPIS and the author thank Prof. Wegener for his time and expertise. Prof. Wegener on LinkedIn: <https://www.linkedin.com/in/prof-dr-ing-dieter-wegener-672502259/>

<sup>2</sup> Prof. Wegener is not only an aviation expert, but, maybe just as important, also the author's father.



Figure 8: "A picture of a variant of the Cray-1 supercomputer in use at the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado"

Firstly, we discussed the engines of the F-47. The variable flow engines of the F-47 present both an enormous engineering challenge to master and a tremendous achievement in engine design, if successful, according to Prof. Wegener. The introduction of a variable flow engine on a production aircraft would be a US quantum leap far surpassing Chinese engine technology in his view. This is echoed by Chinese struggles to develop suitable engines for their current and future aircraft fleet, resorting to using copies of imported Russian designs instead of domestic designs, having to compromise on reduced thrust output of indigenous engines or even using an unusual three engine layout on its new J-36 prototype. Concerning the switch from the resident stealth fighter expert Lockheed Martin (F-35 A, B, C and F-22) to first time stealth fighter manufacturer Boeing, Prof. Wegener judges this as a smart strategic move to foster competition. Unlike countries like China and Russia, who rely almost entirely on single, specialized design bureaus for specific aircraft types like Chengdu for all Chinese and Sukhoi for all Russian stealth fighters, the US had a different approach. Even after the consolidation phase of aircraft manufacturers into fewer, bigger conglomerates following the end of the Cold War, the US made sure to keep at least two companies in competitions in each sector of interest. By keeping

at least two big aviation companies as direct competitors in any project for the following decades, the US acquisition policy ensured a steady pressure to innovate and a true contest of ideas between design bureaus to take place. This not only ensured a plurality of different approaches to the same challenge that could be iterated upon, but also made strategic decisions possible, such as choosing between a proven but less advanced or a more experimental but revolutionary aircraft proposal. However, this strategy does require the US to keep both competitors in the market and thus also necessitates switching winners from time to time, just to keep both companies invested in the sector. Therefore, a switch from Lockheed to Boeing could be less about the aircraft design itself and more about having two companies in the US capable of designing cutting-edge stealth fighters. This could be happening with the switch from Lockheed Martin to Boeing for the next US stealth fighter manufacturer, Prof. Wegener surmises.

## What is missing?

The artist's rendering and our assumptions do leave out a lot of detail. We know the F-47 will be stealthy, but we have no idea how stealthy. Will it have the radar cross

section of a F-35 or a B-2? Or a new level of stealth, far beyond anything flying today? How big will the tradeoff between stealth and maneuverability be? What radar and other sensors will the F-47 carry? Does it have a crew of one or two? Is manning entirely optional? Will it be able to launch a wide variety of anti-ship and anti-surface weapons in addition to the air-to-air loadout or be truly optimized only for its air dominance role? How big is the aircraft really? How efficient will the engines be and what is the range? Will it be powered by one or two of those new engines? All these and many more fundamental questions remain unanswered. All we know is that the leap in all of its characteristics is presumed to be large

and the systems will therefore be the state of the art in all areas, although what that means in real world numbers is also unknown.

## Where are the missing jets between F-35 and F-47?

What happened to the numbers between F-35 and F-47? The public hasn't heard much of the X-plane numbers after the X-35 was chosen to become the F-35, but in reality, the number of X-planes already goes up to X-66, at least as far as they are declassified.



Figure 9: Image of X-35: "The X-35B prototype on display at the National Air and Space Museum, Virginia, photograph by Ferdinand Wegener"

The X-designations are not only used by the USAF but also by NASA and DARPA, and not only fixed wing planes get X-numbers, just like not all aviation prototypes are assigned X-designations (see Boeing Bird of Prey). The designation X-47 was but already in use for three separate prototypes, the A, B and C, two being naval based UCAVs and the other being a manned bomber design. None of those are the basis for the F-47. But Donald Trump is 47th president of United States of America, so you do the math. Also, the F-47 might be a reference to

the venerable P-47 Thunderbolt, one of the most successful fighter-bombers of WW2. Back then, fighters were designated "P" for "Pursuit", which only changed into the "F" for "Fighter" after the end of the war, leaving the F-47 designation ripe for the taking. Although sharing its multirole ability for air-to-air and air-to-ground engagements, the P-47 and F-47 really share nothing beyond that, with the large P-47 and its roaring 18-cylinder-engine being quite the opposite of stealthy. This also explains why the P-47 went on to lend its nickname to the A-10 Thunderbolt II, a

legendary ground attack aircraft much more suited as a spiritual, modern-day successor of the P-47 Thunderbolt.

## Revealing the B-21 without repeating the B-2's mistakes

The roll-out of the B-21 was carefully scripted, done under the cover of darkness and with views restricted to certain angles. Only chosen personnel were allowed to attend, and everyone's phones were collected to eliminate unwanted photos. All official photographs were heavily policed, and every photo had to be approved, with only specific zoom settings allowed. These are direct lessons

learned from the B-2 unveiling in 1988, when the first plane was rolled out to similar fanfare. The audience was similarly allowed to only view the B-2 from the front, but the B-2 was rolled out of the hangar and during daylight hours, without closing the airspace above the ceremony. A clever reporter from Aviation Week saw an opportunity, rented a Cessna and gave the world the first clear shots of the B-2 from above, revealing the futuristic angular stealth airframe design to the public (Carroll, Benitez, 2022). Someone certainly got fired for that oversight, and that seems to have done the trick, since no similar mistakes occurred with the B-21.

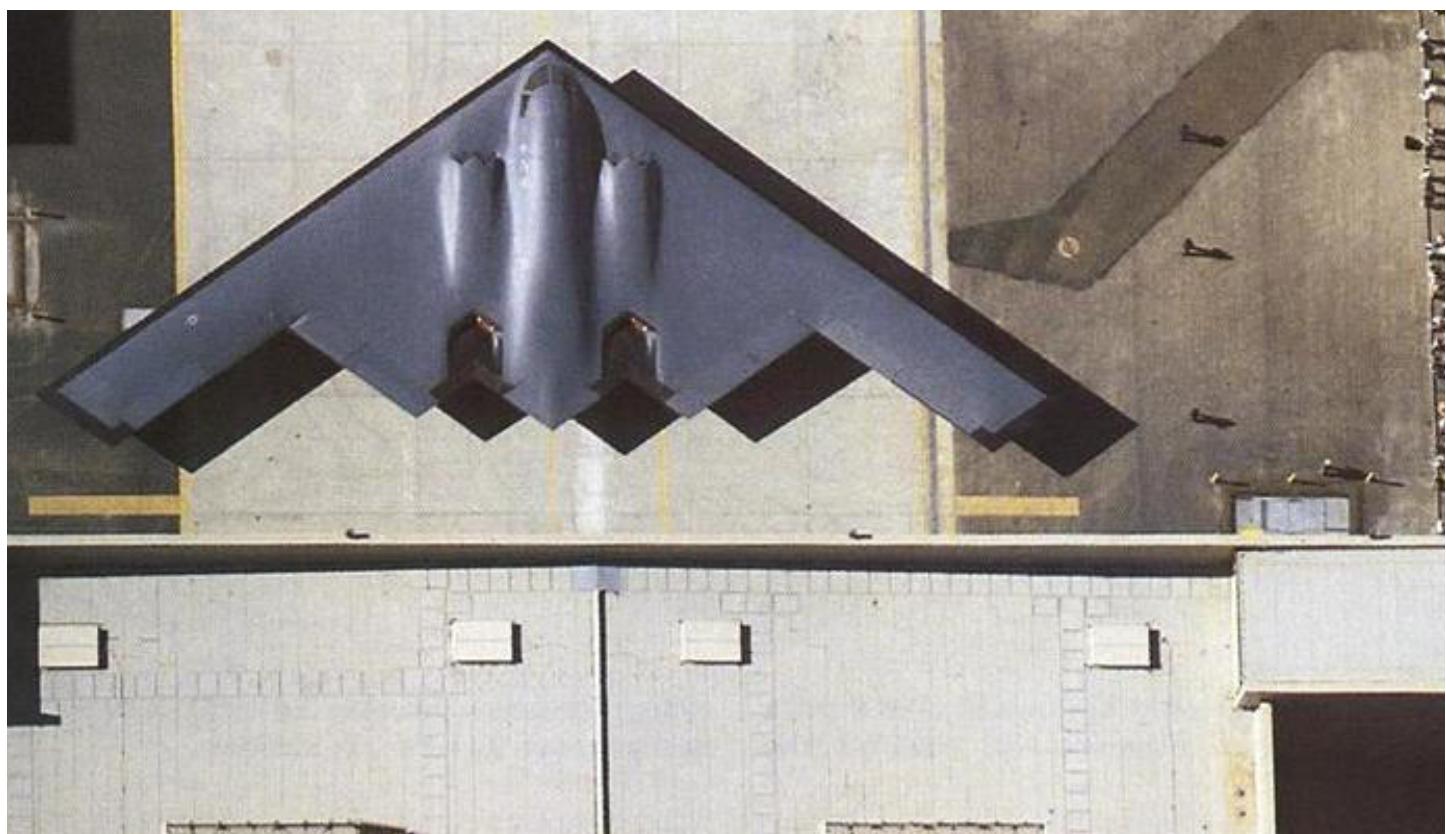


Figure 10: Image of 10 B-2 Overhead: "The B-2 Spirit was unveiled to the public on a sunny day and rolled out all the way from its hangar, leading to this aerial photograph being taken by a quick-thinking Aviation Week reporter and revealing the B-2 stealthy edges to the public"

## Evolution instead of Revolution

The B-21, the USAF chosen new stealth bomber, went down a completely different route from the radical design approach of the F-47 from the onset. The B-21 is built by Northrop Grumman, the proven name in the small world of stealth bomber designers. The B-21 is, by all accounts, not a revolutionary, but an evolutionary aircraft (Wege-  
ner, 2025a & Aldeghi, 2025e). Instead of moving away

from its spiritual successor, the B-2 Spirit, the B-21 Raider seems to take what makes the B-2 great and improves on every aspect of it. Where the B-2 is exceedingly stealthy, the B-21 is borderline invisible to radar. Where the B-2 has the range to strike almost any target on earth, the B-21 achieves that same range with a smaller, more efficient airframe.



Figure 11: Image of B-2 Spirit in flight: "The B-2 Spirit is seen as the spiritual predecessor of the B-21 Raider"

Some have dubbed the B-21 the "B-2.1", a reference to the B-21 just being a slightly improved B-2 (Aldeghi, 2025e)<sup>3</sup>. But, that is not even close to true. While not an aviation revolution that the B-2 was and the F-47 aims to become, the B-21 is still a substantial evolution of an entirely new plane, based upon the sound design ideas of the B-2, far from a mere "upgrade".

Northrop Grumman executives Steve Sullivan and Kathy Warden describe the B-21's stealth coating as a big improvement over the B-2, with overall significantly increa-

sed survivability and aerodynamic performance over the predecessor (Binkov, 2022).

The biggest improvement over the B-2 seems minor at first. Not only is the effectiveness of the RAM (radar absorbing material) coating increased, but also its durability. According to USAF generals and NG execs, this results in a higher cycle aircraft, meaning it can fly every day, unlike the B-2 which needs extensive maintenance for its radar absorbing material coating after every sortie (Binkov, 2022).



Figure 12: Image of B-21 Raider in hangar: "The B-21 evolves the concept of the B-2, taking the essence of what made the B-2 great and improving on every aspect of it"

<sup>3</sup> Aldeghi is not agreeing but only referencing the B-2.1 comment to highlight a viewpoint critical of the B-21.

The B-2 also needs specialized hangars and a huge logistics train to support, something the B-21 will move away from, as this does not only introduce extra complexity and cost but also makes the B-2's supply chain more vulnerable to attack and reduces the number of airfields it can be based on (Aldeghi, 2025e). The B-2 was a shoot-for-the-moon project with climate-controlled hangars and only technologically feasible by integrating not one, but multiple unproven, experimental scientific advancements (Binkov, 2022). This risky approach achieved a remarkable aircraft far ahead of its time and any adversary's capability, being unmatched even today (i.e. see: Iran's former nuclear sites). But it also led to an incredibly complex machine, with only 21 Spirits ever built at a price

point of about \$ 2 billion per plane. And that is billion with a b. That is not what the B-21 aims to be. The B-21 integrates cutting-edge but proven improvements in stealth, fuel efficiency and combat capabilities into a single, high cycle, high combat readiness aircraft. Instead of building less than two dozen, the USAF aims to procure at least 100 B-21s (Lopez, 2022), with former Air Force Secretary Frank Kendall III proclaiming that number could rise as high as 145 B-21s (Binkov, 2022). The B-21 is also scheduled to "only" cost \$ 550 million in 2010 dollars, meaning a maximum of \$ 778 million in 2024, adjusting for inflation (Hollings, 2024). The B-21 seems to currently be on target to meet or even undercut that cost figure, a presumed first for any government acquisition.

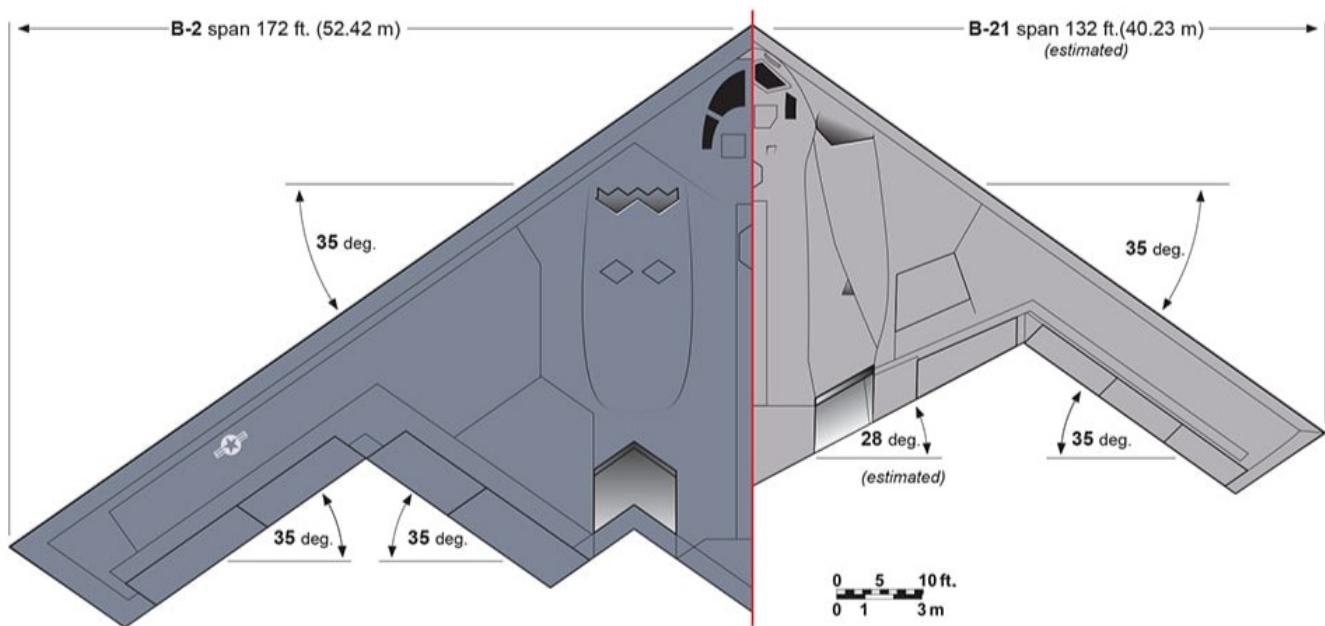


Figure 13: Image of B2 B21 side by side: "A side by side comparison of the B-2 and B-21 bombers"

According to Prof. Wegener, the B-21 Raider's design is innovative when compared to the B-2 Spirit, incorporating a reduction of airframe length and wing span by 23 % which results in overall surface area that is not 23 %, but roughly 40 % smaller than that of the B-2, offering a greatly reduced radar cross section (RCS), even before accounting for all the expected improvements in stealth technology such as better radar absorbing material (RAM) or airframe geometry. The designs reduced surface area in conjunction with a similar range and speed to the B-2 also showcases US technological progress. Via the minimization of the airframe and therefore reduced

drag and need for power for generating lift, increased fuel efficiency and range can be achieved. This is vital for the Pacific theatre. Prof. Wegener noted a significant change in the design of the control surfaces of the B-21 compared to the B-2. The B-21 adds an additional flap on the outer wing but omits those on the inner wing, exemplifying an advancement in flight control systems and software, whereby more stable and maneuverable flight characteristics of the B-21 can be achieved with less overall control surfaces than on the B-2, reducing weight and hydraulic system complexity with increased software capabilities. Comparing the overall layouts, the expert took

note of similar angles of attack for the wings of the B-2 and B-21, which imply similar designed cruise speeds. The engine intakes and outlets on the B-21 have significantly improved stealth features, almost blending with the wing of the B-21, while still being quite pronounced on the B-2, and, again unlike the B-2, omitting any sharp angles or corners, presenting only one continuous, smooth surface. This in turn, further diminishes radar returns. Contrasting the newest American designs with the latest Chinese Chengdu J-36 stealth jet, Prof. Wegener noted the less

stealthy engine inlet and outlet shapes, being more akin to the B-2's angled design and less like the B-21 smooth air intakes. This suggests stealth characteristics lagging a generation behind the US designs. Other experts asserted that the cabin and fuselage are also much more blended into the wing on the B-21 than on the B-2, which, in conjunction with the intakes hidden into the wing, invites comparisons with the Northrop "Tacit Blue" stealth technology demonstrator (Binkov, 2022).



Figure 14: Image of Tacit Blue: "The advancements in stealth technology made with the Tacit Blue can still be observed in the lineage of the B-2 and B-21, as the setup and angle of the cockpit windows is a clear evolution of the Tacit Blue's design"

Prof. Wegener notes that the fuselage body of the B-21 has been substantially thickened and widened to allow for enough internal volume for all sub systems and weapon bays, leading to a bulkier design with the hull bulging out of the straight lines of the flying wing shape, another deviation from the B-2's pure flying wing heritage.

## Roles, Replacement and Requirements

Former Secretary of Defense Lloyd Austin said during the unveiling that the B-21 would be able to deter or defeat threats anywhere in the world, while "even the most ad-

vanced air defenses in service around the world would struggle to detect the B-21" (Lloyd, 2022). This is not only a reference to state-of-the-art stealth characteristics, but also extraordinary range. The B-21 is estimated to at least match the range of the B-2 at 9600 km unrefueled, with only about half the fuel carried (Binkov, 2022). It achieves this in part by using less engines than the B-2, said to be powered by only 2 engines instead of the B-2's four (Binkov, 2022 & Carroll, Benitez, 2022). This not only increases fuel efficiency, but also saves weight, complexity and allows for smaller air intakes and a smaller overall airframe, beneficially maximizing

the aircraft's stealth characteristics. The engine used is likely a modified version of the F-35's F135 powerplant (Carroll, Benitez, 2022). This engine is a proven design with all the early kinks ironed out and with an established supply chain and maintenance cycle. It is therefore another example of the B-21 design's philosophy of using only a few truly new systems to ensure program success and prevent cost overruns. Interestingly, the B-21 is scheduled to replace the B-2 and B-1B in service, but not the venerable B-52, the oldest of the three bomber types in US service. The "unretireable" B-52 will probably fill the role of long-range cruise missile delivery platform with its large payload as far away from contested airspace as possible, while the B-21 will be tasked with the high-risk missions into enemy territory, dropping free-fall bombs and bunker busters in addition to stand-off munitions. Another fascinating novelty about the B-21 is the fact that Australia has expressed serious interest in buying the B-21 for itself (Carroll, Benitez, 2022). That would mark a first for the nation and add Australia to the very short list of the world's strategic bomber operators. Only the US (B-52, B-1B, B-2), Russia (Tu-95, Tu-22M3, Tu-160) and China (H-6) currently have such fleets in active service. Adding the B-21 into its inventory would also make Australia only the second NATO country to presently have the capability for strategic bombardments. How many B-21s Australia would want to buy, if their budget could afford such an expensive stealth plane and its upkeep and if the US would even sell them to Australia is unclear at the moment, but with the AUKUS deal and the US trying to arm its allies against China, the chances for an Australian B-21 sporting a kangaroo or koala bear as nose art are less than zero. Make sure to write this down, as Australia becoming the operator of a strategic bomber fleet will surely be a popular aviation nerd trivia question.

## **Raiding the Red Scourge – The B-21 playbook**

So, how will the B-21 get through the sophisticated network of Chinese SAM (Surface-to-Air Missile) sites and air patrols? Some of these systems, like the HQ-9, are now even battle-tested in the air war between India and Pakistan and fared favorably, at least according to first estimates and the loss of at least one Indian Rafale, one Mig-29 and one Su-30MKI.

Before answering that question, there is a question asked far more often. Why spend hundreds of millions of dollars per bomber and then risk such a high value manned asset in a strike mission, when one could just use cruise missiles instead? That would indeed be a neat solution, it is impractical for multiple reasons though. Firstly, the US cruise missile inventory might be the largest in the world at about 10,000 but it is still not enough for the thousands of military targets that would need to be struck in a war with China. But cheaper air-dropped munitions like the precision strike JDAM family of bombs are available in sufficient numbers (Binkov, 2025b). Secondly, some targets need bunker busting bombs, and those are too heavy for cruise missiles to carry. Operation Midnight Hammer, the US strikes on bunkers hiding Iran's nuclear weapons program, has recently demonstrated the need and strength of such a capability. If Iran's nuclear sites, buried under mountains, can be hit, so can the most hardened Chinese command bunkers. By necessity, bunker busters must be heavy to have the structural integrity and build up the kinetic force needed to punch through meters of earth, rock or concrete. The now famous GBU-57, used against Iran, weighs in at 30,000 lbs. or 14 tons. The B-2 can carry two, the B-21 probably has the requirement to carry at least one (Binkov, 2025b).

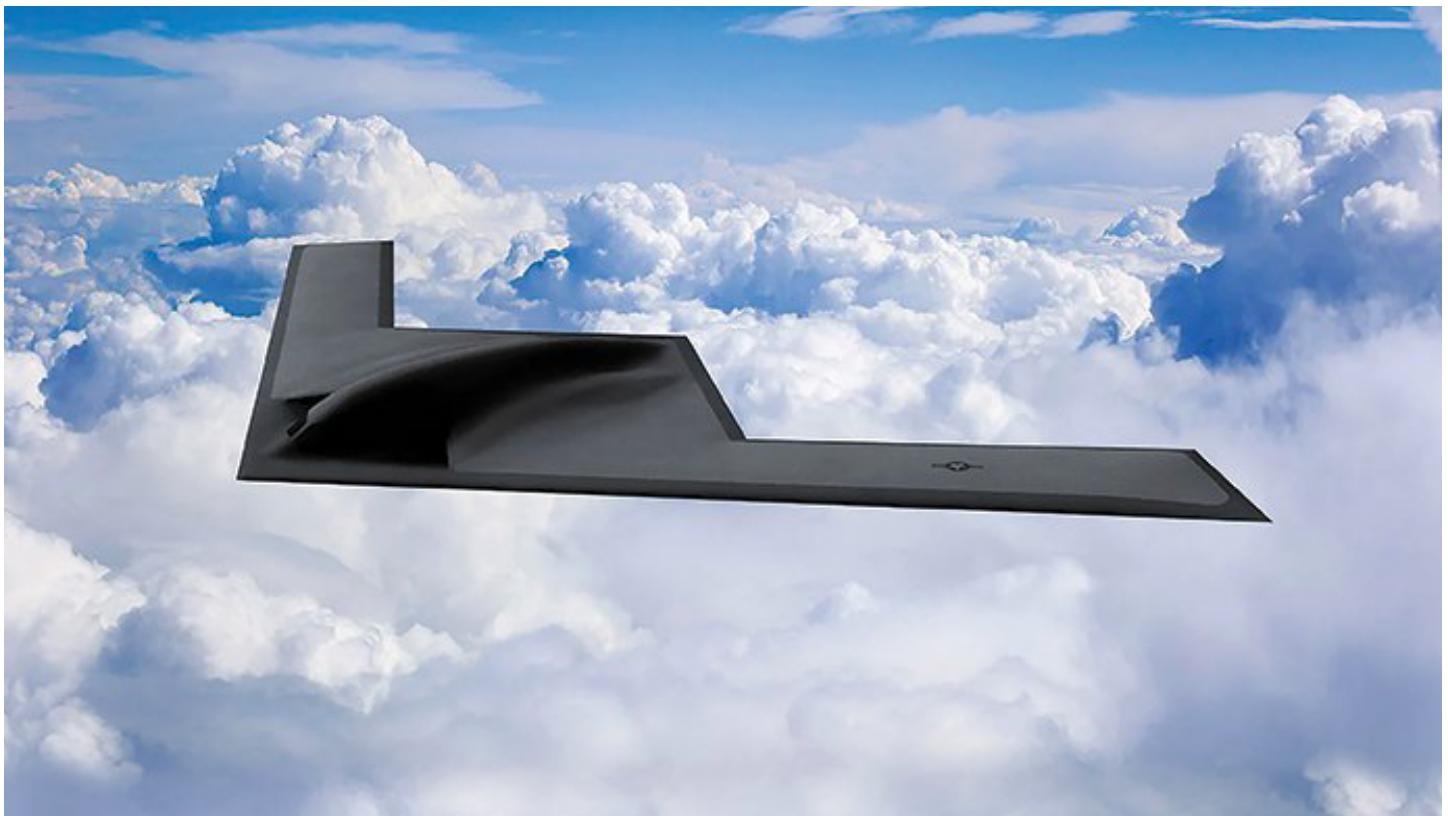


Figure 15: Image of B-21 Artist render: „An artist's rendering of a B-21 Raider in flight“

Some targets, like the J-20 production sites at Chengdu, the submarine construction sites in Wuhan or Beijing itself are also too far inland for some cruise missiles to hit. Less of a concern to the planning of an attack route against China is the stated max range of the B-21. An asset like the B-21 would certainly be air-refueled at least once in a given mission, extending its range into the theoretically infinite and making its approach vector highly unpredictable. B-2 bombers have flown 30 hours non-stop mission from mainland US to Yemen and back to hit Houthi targets in the Gulf of Aden. For these reasons, the B-21 is still very relevant against China, even with a vast anti-air missile array. The US could use its large number of military satellites to map out the location of Chinese SAM-sites and air-defense radars, planning routes with the least amount of coverage, such as gaps near the Chinese shoreline. Alternatively, the B-21 could overfly less well defended areas such as taking a detour through North Korean airspace with its much less capable air defense or routes from mainland US over the sparsely populated and even less defended Russian tundra, approaching China from the North unexpectedly (Binkov, 2025b).

## **China's view of the B-21: Keeping your enemies closer**

Taking a page right out of Sun Tzu's "The Art of War", let's take a look at what the enemy is thinking. The B-21 has been closely watched and studied by our CCP adversaries.

The People's Liberation Army Airforce (PLAAF) research institute stated in a report that the B-21 will be too costly and not produced in significant numbers to have a strategic impact. It also mentions that „Some country could achieve a breakthrough in strategic technology someday that could offset America's B-21 stealth“ (Hollings, 2025b). Hidden behind this crude criticism is timid confession: The report includes an unwanted indirect acknowledgement that the B-21 bomber does pose a threat to Chinese targets, especially when mass-produced and that its stealth is hard to counter for the Chinese military with its current air-defense systems.

When we think about the Chinese PLAAF today, we think of modern stealth jets like the J-20 being produced in high numbers, a sheer never-ending number of newly spotted prototypes like the J-36 and J-50, and of the large arsenal of long-range air to air missiles like the PL-15.



Figure 16: Image of J-20: "The Chengdu J-20 is China's first stealth fighter, first flying in 2011 and has already entered large scale production, with almost 100 being built each year"

Only looking at the decreasing numbers of jets in the US arsenal or plummeting readiness is just half of the picture. From China's point of view, the good side. But it is an inherent strength of the Western systems to allow criticism and a pluralism of opinions. It does, however, lead us to the risk of thinking the grass is always greener on the other side, when your neighbor has erected a tall fence around his yard and holds a gun to the head of anyone who dares to speak about how he cuts his grass poorly or what an unreliable sprinkler system he is using. This situation of suppression of dissenting opinions, the inability to criticize and a lack of agency within the officer corps persists in most dictatorships and has a significant impact on military effectiveness, staying hidden until war exposes it quickly and with brutal consequences. Examples can be found everywhere in history, from the deficiencies within the Soviet army that have continued into "modern" Russia and

helped the extreme miscalculation for the plan to invade Ukraine, to the abysmal combat record of the Arab armies against Israel and against each other, to, in China's case, the Sino-Vietnamese war in 1979, among other military failures.

When we think of China's aerial forces, we must not only think of the J-20 and the newest AESA radars. We must also think of the large fleet of about 340 geriatric J-7 and J-8 aircraft, still based on the vintage Mig-21. We can't forget the low flight hours per Chinese pilot. They are climbing higher but are still overstated compared to US training hours. Chinese pilots, just like their Army and Navy brethren, spend an estimated 30 % of their total training time in propaganda classes and ideological indoctrination lessons. This is vital to a dictatorship that wants to have a strong military while averting a military coup, but it also reduces time for real combat training significantly.



Figure 17: Image of J-7: "The Chengdu J-7 with the fitting NATO reporting name "fishcan" first flew in 1965 and, apart from China, is still in service with airpower giants like Bangladesh, North Korea and Zimbabwe"

So, if we think about what Chinese challenges the F-47 and B-21 might face in the future, we must not forget what challenges China itself faces.

## Conclusion and findings

The F-47 and the B-21 are two planes with very different design approaches that complement each other very well. The F-47, if successful in all its goals, will be a revolutionary step forward in fighter aircraft design. The B-21, on the other hand, is shaping up to be safe, on budget and on time choice that will improve over its predecessor in every important metric, be it stealth, readiness, logistics or the simple but vital stat of number built. As they say: Quantity has a quality of its own.

Does that answer our question? Will these two jets alone be enough to stem the crimson tide? The question answers itself with the addition of the word "alone". War is and always has been a highly complex, multifactorial affair. There are allies to consider. There is a Navy and a Marine Corps and an Army next to the Air Force. And, modern war is more about logistics than ever before, especially in

the Pacific. Can airbases be supplied and defended from attack? Can the planes stationed there be rearmed and refueled in time? Even if the two planes were as good or better than discussed, that wouldn't matter if the production numbers were slashed and only very few were built (although the B-2 is quite an impressive example to the contrary). And next to those 6th Gen planes, there will be a far larger flock of 5th and 4th Gen aircraft in the sky, at least for the foreseeable future. Not to mention ever evolving aerial weaponry like the AIM-260 or AIM-174B, which by itself could make an impact as big or bigger on the battlefield than the platform that launches them. Additionally, to again and very loosely reference a lesson from the "Art of War" by the great master strategist Sun Tzu, it does take two to tango. As classified and publicly unknown the details of the new US planes and their battle plans are, the details on the Chinese side are even more obscure. The J-36 might outperform the F-47. Or it might lack behind in performance but be so widely mass-produced that it still shifts the air war in China's favor. There is a myriad of other known unknowns, both on the US and the Chinese side of the fog of war.



Figure 18: Image of B-21 during test flight: "A B-21 prototype photographed during a test flight in 2024"

Therefore, giving a conclusive answer to the question this essay poses in its headline is impossible. But you probably knew that before you started reading it. And if you didn't, I at least got you read it. The impact of the F-47 and B-21 in the Pacific will have to be assessed and re-assessed over and over again, as their success depends on too many factors for an easy, one and done conclusion. What we can say is that they follow different but sound design approaches and promise to be cutting-edge machines at the top of their respective class, giving the US both the most capable fighter and bomber in the World.

## Epilogue: Nickname suggestions

The B-21 will be the Raider, which, sadly, is quite a bland name for an aircraft that cool. Then again, with deep infiltration air raids against China as its mission, the stealthy Raider gets straight to the point, with its payload and its name. A nickname for the F-47 has not been chosen yet.

Going with the usual USAF convention of naming fighter jets after birds of prey (F-22 Raptor, F-15 Eagle, F-16 Falcon), may I suggest naming the F-47 „Sparrowhawk“. The Sparrowhawk is native to China and therefore a nod to the intended hunting grounds for both birds of prey, the feathered and the metal kind. More importantly, the sparrow was also one of the so called „Four pests“, targeted in a 1958 propaganda campaign by the Chinese Communist Party (CCP). This campaign, aiming to remedy prior central planning failures in agriculture induced by Mao, entailed the extermination of almost every sparrow in China, seen as a capitalist representative eating the collective harvest, causing a severe ecological imbalance when, like a biblical plague, the locust population exploded because all their natural predators had been decimated. This, among other man- or rather Mao-made reasons, led to the Great Chinese Famine, killing an estimated 55 million. An American fighter jet, alluding to one of the CCP's biggest failures, would indeed be poetic.



Figure 19: Image of the four Pests: "Chinese poster reading "Exterminate the Four Pests" from 1958, picturing the sparrow, rat, fly and mosquito"

For those readers who have not been overloaded with aviation information yet, I will recommend my article "The Untold Story of Operation Spider Web: How an Old-fashioned Aviation Museum Led to Cutting-edge AI That

Made Putin's Pearl Harbor Possible" on my coincidental trips to Odesa during Operation Spiderweb and to the Strategic Aviation Museum in Poltava on a previous visit to Ukraine<sup>4</sup>.

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<sup>4</sup> Essay "The Untold Story of Operation Spider Web: How an Old-fashioned Aviation Museum Led to Cutting-edge AI That Made Putin's Pearl Harbor Possible" by Ferdinand Wegener, EPIS Think tank e.V., Link: <https://www.epis-thinktank.de/post/the-untold-story-of-operation-spider-web-how-an-old-fashioned-aviation-museum-led-to-cutting-edge-a>

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