New Chinese Stealth Jet J-36

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The images shocked observers in the West: On December 26th, 2024, a dark grey silhouette appeared prominently over the Chinese city of Chengdu, home of the aircraft manufacturer of the same name. Pictures of the new prototype aircraft quickly spread across the web and were brought up in discussions by politicians, within the aviation industry and among the military. The new plane was quickly dubbed J-36 by Western analysts.

With the little information that is publicly available, every minor detail seems important thus far: While to some, a test flight on the 26th of December might signify a belated Christmas present to military officials, the date was most likely chosen to gift the plane to someone far more important in the eyes of the CCP. On December 26th, 1893, the former Chinese dictator

Mao Zedong was born. Presenting the revered leader with this plane is not purely symbolic but is also intended to convey a high degree of trust in the J-36's potential and future performance. You wouldn't want to present your dear leader with a shoddy prototype that gets silently scrapped, would you?

Media hype: Is China winning the race for a 6th Gen fighter against the US?

The Chengdu J-36 quickly became a media sensation. It was hailed as the World's first 6th Generation fighter, and it was said that China is now ahead of the US in the development of stealth jets.

To put these sensational statements into context, there is no consensus yet on what comprises the characteristics of a 6th Gen fighter, but all-aspect stealth seems to be the foremost attribute on the very short list of things the experts can agree on. All-aspect stealth is achieved when the design is stealthy from all angles of attack, be it from ground radar from below, from fighter radar from behind or from AWACS (Airborne Warning and Control System) radar from above. This capability seems likely, given the stealthy airframe shape and tailless design of the J-36. Other must-have features seem to be super cruise and next level data networking, two traits the J-36 may or may not have.

The J-36 is probably quite a bit ahead of the development cycle of the new Boeing F-47 stealth jet of the US, unveiled by President Trump on March 21st, 2025. That plane, to the public at least, only exists as artist renderings so far, making a first flight of a pre-production prototype (not already flying technology demonstrators, as referenced by Pres. Trump) likely by 2028. In a shameless plug, read more about the F-47 and its relevance to the air power balance in the Pacific in my upcoming EPIS magazine article.

Playing with fire: The dangers of provoking an overcorrection to a perceived tech domination

The J-36 reveal seems to have produced the desired outcome for Beijing, spooking US officials in Washington and hastening the announcement of the selection of the F-47 to quell political pressure.

But, importantly, if the J-36 in fact is technologically superior to the upcoming F-47, remains entirely unknown. One must remember the unveiling of the Soviet Mig-25 interceptor, whose overestimated performance by the West led to the introduction of the F-15 Eagle. While the Mig-25 turned out to be a dud, with a less capable radar, short lifespan engines and horrible manoeuvrability, the F-15 became the best air superiority fighter of its time, with a legendary air-to-air record of 104 kills to zero losses in countless conflicts around the globe.

With a long history of Soviet and CCP overstating their technological achievements contrasting with a reluctance of US forces to disclose the true capabilities of their tech, one must start to wonder: Did Beijing just waste the reveal of the J-36 on a Pyrrhic victory, choosing a short-term propaganda win against the US while igniting the perception of being technolog-

ically behind within the US military and politics, leading to accelerated US tech development and the preservation of American air dominance for years and – more crucially – wars to come.

Facts about the J-36 – Heavy, stealthy, unusual

So, the J-36 may or may not be 6th Gen and may or may not be ahead of US tech. But what do we know so far? We know the J-36 is heavy, with an estimated max takeoff weight of 50 tons, about 20 tons more than a USAF F-35A. We can also entertain that by the size of the plane and the double wheel nose landing gear, needed to support the large weight of the plane, unlike the single wheel nose landing gear configuration on the F-35 or F-47. Double wheels on the nose landing gear are more typically associated with bombers or strike fighters.

The J-36 has a dual, side-by-side cockpit configuration for pilots, also more akin to bombers like the American F-111 or the Russian Su-34 and unusual for fighters. It also has multiple large, distinct weapons bays, long enough to fit the longest range current PLAAF air-to-air missiles like the PL-15 and most likely even the upcoming PL-21 and PL-17. These missiles fit a specific niche mission type of going after high value US airborne assets like AWACs or tanker aircraft. If the J-36 is also fit to fill the role of a bomber will be determined not only by the length but also the depth of the weapons bays, which is a measurement currently unknown but presumed to be deep enough, given the airframes thick shape.

The J-36 is, at least going by its shape, exceedingly stealthy, the stealthiest of the manned Chinese jets so far. China's first stealth fighter, the J-20, also built by Chengdu Aircraft Industry Group, in service since 2017, used canards (small triangle shaped forewings forward of the main wing), which offer more manoeuvrability, but their shape also introduces reflective surfaces to the design, therefore trading ideal stealth for some manoeuvrability. With the J-36, Chengdu chose a different path. They not only forewent canards but also went for a tailless design without vertical stabilizers, akin to the US B-2 stealth bomber (first flight 1989), placing all control surfaces into the structure of the main wing, opting for stealth above manoeuvrability at every turn. This doesn't mean the J-36 is the world's stealthiest plane or even that it is stealthier than any US stealth planes currently in service, as there is much more to stealth than shape alone. But it does mean that the designers have done almost everything possible to reduce the airframe's radar return, such as sacrificing the plane's speed and agility, hinting at good overall stealth characteristics and radar cross-section optimization also in other areas of the J-36's design.

The mystery of the third engine

Most unusual about the J-36 is its third engine, something entirely unheard of in the modern jet fighter world. Some hailed the engine as a great innovation, enabling the J-36 to achieve hypersonic speeds or even operate in space.

The truth is more mundane and less positive for the J-36. The J-36 is not only heavy, but big and wide. In fact, it is almost as wide (est. 20m) as long (est. 22m). This results in a configuration unsuited for high supersonic speed and an inability to reach hypersonic (Mach 5+) speeds. The engine is not a ramjet nor a scramjet engine, but rather a regular fighter jet engine, going by the shape of the engine intakes. This, among a myriad of other things, also makes clear that the J-36 is not "space capable", as the 3rd engine is also air breathing, somewhat of a hindrance in the vacuum of space.

The large size and heavy weight of the J-36 also imply long range. The 3rd engine somewhat reduces that estimation.

There are multiple possibilities for the third engine:

All these options are design-wise inefficient and suboptimal, as they come with the high extra cost of the weight of a third engine, as well as the loss of a substantial amount of internal space to fit it. The third engine is not a sign of innovation, but rather of a sign of an inability of the Chinese aviation industry to design and built a jet engine strong enough to power its newest designs, leading to the necessity to downgrade those designs. Two larger, more powerful engines are always more efficient, as an additional engine also means the addition of another set of all the necessary sub systems such as electrical wiring, air intakes, fuel lines etc. The J-36 won't be winning any "efficient design" awards.

On the edge of material science – flexible stealth coating

Some aviation experts have speculated that the J-36 uses new, flexible RAM to coat the control surfaces. RAM stands for radar absorbing material and is used by all stealth aircraft to further reduce the radar cross-section by using specific geometry within the airframe coating to scatter radar beams, reducing the strength and clarity of the return signal. Because of the tailless design of the J-36, there are large control surfaces in multiple separate flaps built into the rear of the main wing. These serve to enable manoeuvrability, but the gaps between those flaps are a well-known source of additional, outsized radar returns, as radar waves bounce between them easily. This is the reason why most modern stealth aircraft appear so smooth, a combination of stealthy design choices and the application of RAM. RAM itself is not new and was first used to hide German submarine snorkels during WW2, starting from late 1944. What is new about the new Chinese RAM on the J-36 is that it appears to be flexible, folding up and down with the actuation of the flaps, following its movement and therefore covering the gaps. This might seem like an easy design fix, as RAM could be applied to rubber or other materials. But crucially, as mentioned before RAM works via geometrically distorting the radar beams, therefore its specific shape and depth is always imperative to its function. The new flexible Chinese RAM could implicate that this type of RAM is less dependent on its geometry and uses a more sophisticated material composition that adapts to the movement of the flap. On the other hand, it could just mean that it works at a

reduced capacity when the flap is in the up or down position. Nevertheless, this seems to be the first case of bendable RAM on a prototype military jet.

Production ready or propaganda prototype?

The J-36 seems somewhat close to a production ready aircraft. There have now been 6 observed test flights, some of which showed the plane going through landing gear deployment and retraction, and one even showed a fuel dump test. The ability to dump fuel is an emergency feature to reduce landing weight that all production jets have, but that might not be present on early prototypes. Chengdu Aircraft Industry Group is also in a prime position to produce the J-36, having already designed and built China's 5th Gen stealth fighter, the J-20. All signs point to us not only seeing a prototype, but a production version of the J-36 someday.

Predicating the assumption of J-36 entering production as true, will the J-36 turn out a dud like the Mig-25 or a star like the F-15? We really can't say yet, for one simple reason: even if the J-36 enters production and the plane exceeds expectations, the best plane becomes close to irrelevant if there is only a handful of them. The size and scope of the J-36 as well as the leap in capability for China do suggest a high price per plane, which might correlate with lower production numbers. Of course, two arguments against this point readily come to mind: There have only ever been 21 B-2 Spirit stealth bombers at about $2 billion per plane and their impact has enormous. Secondly, Chengdu is not in the business of handcrafted small-batch production, having built an estimated 200+ J-20 stealth jets already.

Conclusion: Power shift or paper tiger?

The J-36 is shaping up to be a capable aircraft, providing China with a big boost in stealth design and adding another worry in the list of US military planners, either as a long-range missile shooter threat to high value air assets and/or as a stealthy strike bomber. It will probably be built in sufficient numbers to be a noteworthy threat, complementing but not replacing the J-20 in service.

So the J-36 certainly is no paper tiger. However, with the odd, makeshift solution of a third engine, unknown sensor and stealth performance combined with the lack of generational milestones like variable flow engines, the J-36 also seems less like the "great leap forward" some Chinese military officials might have been hoping for. The J-36 might be good, but might not be (much) better than current US jets. My money is on the upcoming F-47 to surpass the J-36 in stealth, sensor performance and engine efficiency, keeping air dominance over the Pacific in US hands for the foreseeable future.