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China's J-20 Stealth Fighter vs. America's F-35, Taiwan's F-16 and Japan's F-15: Who Wins?

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Who would win the ultimate battle for Asia's skies?

The Chinese Military has advanced dramatically over the past quarter century.

No longer is Beijing's armed forces filled with recruits that are poorly trained or lacking the arms needed to fight a major war.

China has invested in platforms that are specifically designed to take on the United States in contested parts of Asia, such as Taiwan, the East China Sea and the hotly disputed South China Sea. Systems include the much discussed DF-21D (or commonly referred to in the press as the 'carrier-killer' missile), cruise missiles, advanced mines, submarines, drones and other anti-access/area-denial weapons of war.

In the air, Beijing has also made some major advances. Of specific note is the J-20, or China's new 5th generation fighter. Meant to counter America's 4th and 5th generation planes as well as aircraft from Japan, Taiwan and others, the plane has generated tremendous interest in the U.S. as well as international defense community.

But how would the plane do in combat? Could it take on, for example, the F-35 Joint Strike Fighter? What about Taiwan's F-16s or Japan's F-15s? Below, we have taken past articles written by Dave Majumdar and two by Kyle Mizokami and packed them into this one post for your reading pleasure.

So who would win a future battle for Asia's skies? Read on.

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By Dave Majumdar: The United States Air Force would maintain an "asymmetric" advantage over potential adversaries in the Western Pacific even after the Chinese People's Liberation Army Air Force inducts the Chengdu J-20 stealth fighter [3] into operational service. That's the contention of the service's top uniformed officer—who was asked about the potential geopolitical implications of the introduction of the new Chinese warplane.

"When we apply fifth-generation technology, it's no longer about a platform, it's about a family of systems," Air Force chief of staff Gen. David Goldfein told reporters at the Pentagon on Aug. 10 [4]. "It's about a network and that's what gives us an asymmetrical advantage, so that why when I hear about an F-35 versus a J-20, it's almost an irrelevant question."

Indeed, as Goldfein noted, the Air Force will likely to continue its focus on a family of systems approach where networking and the sharing of data are key instead of fixating on the performance of individual platforms. A direct comparison of the Lockheed Martin F-35 and the J-20 [5]—in Goldfein's view—would harken back to the his days of flying the Lockheed Martin F-117A Nighthawk stealth fighter—which was almost entirely cut off from outside contact when buttoned down to penetrate enemy airspace. "You'll see us focusing far more on the family of systems and how we connect them together and far less on individual platforms," Goldfein said.

While Goldfein used the Nighthawk as a comparison—he probably did not intend to suggest that the J-20's systems are quite as basic as the 1980s-era F-117. While accurate information about the J-20 is scarce, there are indications that the Chinese aircraft is equipped with a phased array radar, a robust electronic warfare systems and an electro-optical/infrared sensor that is similar in concept to the F-35's systems. However, while it is possible that the Chinese aircraft might have decent sensors—Air Force officials have suggested that the J-20 lacks the "sensor fusion" and networking to be as effective as the F-22 or F-35.

One area that the Chinese are almost certainly lacking is what Air Combat Command commander Gen. Herbert "Hawk" Carlisle once described to me as "spike management." Fifth-generation aircraft such as the F-22 and F-35 have cockpit displays that indicate to the pilot the various angles and ranges from which their aircraft can be detected and tracked by various enemy radars. The pilots use that information to evade the enemy by making sure to avoid zones where they could be detected and engaged. It is a technology that took decades for the United States to master—through a lot of trial and error.

Meanwhile, at the same press conference, Air Force secretary Deborah Lee James decried the possibility of facing another year where the Congress fails to pass a budget. Even if Congress passes a full year continuing resolution (CR)—which maintains the previous year's spending levels—it would massively disrupt the Air Force's procurement efforts because the service would not be able to award new start program contracts. "We certainly hope that won't be the case, we know the Congressional staffs are working very hard even while their members are back home this summer, but we are hearing that either a six-month CR or one-year CR is at least a possibility," James said.

Indeed, Congressional sources are not optimistic about the prospects for a new budget in the fall. Thus, the Pentagon faces additional budget turbulence even as it grapples with a readiness crisis. [6]

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By Kyle Mizokami: The balance of air superiority over the island of Taiwan is slowly shifting. Once assured by a fleet of sleek, modern Republic of China Air Force fighters, the rise of China—and the decline of Taiwan's defense budget—has gradually changed the equation in favor of China.

Following the end of the Chinese Civil War, the government of the Republic of China evacuated to the island of Taiwan. Less than two hundred miles separate the island from a hostile Chinese mainland. Yet as long as Taiwan maintained a strong navy and air force, and more importantly, as long as China remained poor, Taiwan might as well have been on the far side of the moon.

But China is no longer poor, and it is building a military that matches its newfound wealth. China is able to build more combat aircraft than Taiwan can support, and has embarked on a two simultaneous fifth generation fighter programs.

The Chengdu J-20 "Soaring Dragon"—which is currently in development—will be one of the most dangerous threats ever posed to Taiwan's national security. A large, twin engine aircraft with stealthy characteristics and long range, a version of the J-20 (and there may indeed be more than one) might be configured as a long-range air superiority fighter.

Previous Chinese fighters were hobbled by relatively short ranges that limited the amount of time they could spend over Taiwan. The J-20, with its long, wide fuselage has plenty of room for internal fuel storage. The J-20 will be able to sortie from mainland bases and have the fuel to conduct fighter sweeps over the island, hunting Taiwan's air force. If the J-20's stealthy design is effective as its might designers intend, Taiwanese radars could have difficulty tracking the fifth generation fighter.

The J-20's suite of sensors probably include a new nose-mounted active electronically scanned array AESA radar—currently thought to be under development—and an infra-red search and track (IRST) system, which would allow it to passively track and shoot down aircraft enemy planes.

Once over the island, the J-20 might be able dish out a formidable amount of firepower. The Soaring Dragon has three internal weapons bays—two for short-range missiles and one for medium to long-range missiles. A normal payload for the air superiority mission might be four PL-9 infrared short range missiles and four PL-15 radar-guided long-range missiles. Powered by a ramjet engine, the PL-15 might have a range anywhere between ninety-five to 125 [7]miles.

The J-20's primary Taiwanese opponent, the F-16 Fighting Falcon, is a different beast altogether. Originally a lightweight, day-only fighter design to complement the U.S. Air Force's F-15 Eagle, the F-16 has evolved into an all-weather multi-role aircraft. Relatively inexpensive and capable of a wide variety of missions, the F-16 was a good fit for Taiwan.

Taiwan's 150 F-16A Block 20 aircraft were ordered in 1992 and delivered between 1997 and 2001, making the oldest nearly twenty years old. The Block 20 version included an AN/APG-66(V)3 radar capable of guiding AIM-7 Sparrow and AIM-120C7 AMRAAM medium-range radar-guided missiles, Raytheon electronic countermeasures pods and a Pratt & Whitney F-100-PW-220 turbofan engine.

In 2011, an order for sixty-six new F-16s fell through. Subsequently, the United States and Taiwan concentrated on upgrading the island nation's existing F-16 fleet. Most of the improvements will be "under the hood", consisting of sensor, navigation and armament upgrades. Each will be equipped with the APG-83 Scalable Agile Beam Radar [8] (SABR), a new radar system with hardware and software derived from the F-22 and F-35 radars.

Taiwan is also considering equipping F-16s with the SNIPER pod, an air-to-ground precision targeting pod that is also useful in an air-to-air infrared search and track role. In addition to the pod, the Taiwanese would buy the AIM-9X Sidewinder—the most advanced dogfighting missile—in the U.S. inventory as part of the package.

Loaded for the air superiority mission, a Taiwanese F-16 might be equipped with four AIM-9X Sidewinders and two AIM-120 AMRAAM missiles.

So, in a duel, who would win? Again, like other comparisons, we have to differentiate between the beyond visual range battle and the visual range battle.

In the beyond visual range battle, the J-20 will probably outshoot the F-16. The J-20—at least if the designers are successful—will probably have a formidable combination of stealth, decent radar and very long range missiles. There is a possibility that the F-16's SABR might be able to detect the J-20 at a fair distance—but the Taiwanese fighter will be hobbled by the AMRAAM missile's performance in a jamming environment. Armed with PL-15 missiles and cloaked by its stealth, J-20 could theoretically be able to engage the F-16 before the Taiwanese pilot even knows the Soaring Dragon is there.

In the short-range battle the J-20 will probably be less maneuverable. The single-engine F-16 will be more maneuverable, and will have the benefit of AIM-9X Sidewinder missiles. But with the advent of high off-boresight missiles, visual range fights are increasingly becoming mutually assured destruction scenarios.

All of this means that the Republic of China Air Force will have a very difficult time dealing with the J-20. The J-20 will be difficult to detect and would probably be able to engage Taiwanese fighters first. One possible tactic the Republic of China Air Force could use is to use the island's mountainous terrain to hide their low-flying fighters—potentially denying the J-20 the beyond visual range fight. That's assuming Chinese look-down shoot-down capabilities are not quite as well developed as Western radars. If Taiwanese low-frequency ground-based radars or if its E-2T Hawkeyes' UHF-band radar could detect the J-20, they might be able vector F-16s into ambushing the larger mainland planes in more advantageous close-range fights where they might have a chance.

The advanced capabilities of the J-20, concentrated in a single package is a real threat to Taiwan. In the face of a large and increasingly powerful Chinese Air Force, Taiwan will find it increasingly difficult to maintain air superiority over the island. It might be worth it to adopt a bastion-style defensive posture—two can play at the anti-access/area denial game.

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By Kyle Mizokami: As tensions between China and Japan have increased, there have been more encounters between Chinese and Japanese military aircraft. People's Liberation Army Air Force (PLAAF) Su-27s have been spotted near Japanese aircraft in the East China Sea, prompting Japanese F-15s based in Okinawa to scramble.

These encounters appear to be the new normal, and may continue for the foreseeable future—indeed, into a time when China's J-20 "Soaring Dragon" fighter becomes operational. China's first fifth generation fighter, the J-20 is expected to enter service by the end of the decade.

At the same time, Japan is still flying the F-15J Eagle fighter. Although an excellent fighter, Japan's Ministry of Defense had expected to replace it with the F-22 Raptor by now. Unfortunately for Japan, the now-infamous Obey Amendment [9] passed by the U.S. Congress prohibited the Raptor's export, and Japan has been stuck without a true F-15 replacement.

Japan took delivery of its first F-15J in 1981. The fighter was manufactured under license by Mitsubishi Heavy Industries, and was largely identical to American-owned jets with the exception of its electronic countermeasures suite and radar warning equipment, which the U.S. government declined to sell. The aircraft were initially armed with AIM-9 Sidewinder air-to-air missiles and the semi-active radar-guided AIM-7 Sparrow—later replaced with the AIM-120 AMRAAM missile. An M61 nose-mounted 20-millimeter gatling gun rounds out the F-15J's armament.

Japan has taken delivery of 223 F-15Js, with eight lost to accidents.

The F-15J has been in service for a long time. Japan initiated an upgrade program in the early 2000s that saw a new infra-red guided missiles (AAM-3 and AAM-5), improved engines, improved AN/APG-63 (V)1 mechanically-scanned pulse-doppler radars and the ability to carry AAM-4B radar-guided missiles added to the jet. Improved electronic countermeasures and a nose-mounted infra-red search and track (IRST) sensor were also added to bring the fighter up to date. However, the upgrade is expensive and is only being applied to fewer than ten aircraft per year. Only about half of Japan's F-15Js have received the upgrades.

The Chengdu J-20 is an intriguing mystery. As China's first fifth-generation fighter, the J-20 was first revealed in 2011. A twin-engined, single seat aircraft with forward canards and a stealthy profile, the J-20 is thought to be slightly longer than the F-15J. It has a long, broad fuselage for internal weapons and fuel storage. It appears to have three internal weapons bays, two smaller bays for short-range missiles and one larger bay for long range air-to-air missiles and air-to-ground ordnance.

The J-20 appears to have a nose cone large enough to conceal an advanced active electronically scanned array (AESA) radar, giving it the ability to detect distant targets and attack them with radar-guided missiles. Newer prototypes appear to be equipped with an infra-red search and track system and an electro-optical targeting system for air-to-ground attacks.

The J-20's precise role is not known. The aircraft appears to be built for long-range missions. The "Soaring Dragon" could be like the Russian-built MiG-31, a high speed (and stealthy) interceptor that will pay particular attention to shooting down enemy aerial refueling tankers, AWACS early warning and control aircraft, reconnaissance and intelligence collection aircraft and so on. Alternately, it could be fitted out to be a long range medium bomber, like the American F-111—capable of striking targets like Okinawa and bases across Japan.

For the sake of argument, let's assume the J-20 is outfitted as a long-range air superiority fighter. Pitted against the F-15J, which plane would win?

Assuming the J-20's designers were successful in reducing the plane's radar cross section, the F-15J may have trouble detecting it at longer ranges. At the same time, the lack of stealth on the F-15J means that with a competent radar, the J-20 will easily detect the Japanese fighter. This doesn't bode well for the F-15J in the beyond visual range fight, especially if the J-20 is armed with PL-15 missiles. Successfully tested [7] in September 2015, the PL-15 includes an active radar seeker and possibly dual pulse rocket motor propulsion (it might also be ramjet-powered).

At closer ranges the F-15J may have the advantage. The J-20 is reportedly underpowered, at least for now, while the F-15J has an excellent thrust-to-weight ratio. The F-15 family of aircraft are renowned as unparalleled dogfighters and could be able to use the Eagle's superior thrust and excellent maneuverability to gain a positional advantage.

One final consideration: although still in prototype stage, the J-20 has so far not been seen outfitted with a gun. Although air power experts are split on the utility of a gun, in a close-in dogfight, the F-15J's ability to fire a snap-shot with its M61 gatling gun could come in handy.

In our comparison of the multi-role Chengdu J-10 and the Mitsubishi F-2, the close-in advantage went to the J-10, with the long-range advantage going to the F-2. When it comes to air superiority fighters, the tables are reversed. Relief for Japan is on the distant horizon, as the ATD-X demonstration fighter is scheduled to fly later this year. Regardless, China's imminent leapfrogging its historical adversary into the world of fifth-generation fighters will be a major upset in great power rivalries.