


The New PI



A pair of F-22s (top) fly in formation with F-15Cs from Kadena AB, Japan, during a Raptor deployment to the Far East.

By John A. Tirpak, Executive Editor

The Air Force has begun radically revising its combat playbook for the F-22 fighter. Instead of employing the Raptor en masse, as previously planned, USAF will use it as a scarce but extremely powerful enabler, deployed selectively in those times and places when it can enhance the performance of the entire combat air force.

Plans call for F-22s, in small numbers, to work in cooperation with more numerous but aged F-15s, which are expected to serve for another 15 years. The two air superiority fighters, old and new, will share air combat duties and hew to employment tactics suitable for a mixed force.

The F-22, with a potent suite of sensors and electronics, will supplement E-3 Airborne Warning and Control System airplanes and other surveillance systems. It will identify and track some targets behind enemy lines, directing aircraft against targets in urgent need of destruction and away from those posing no danger.

The Raptor will spot pop-up surface-to-air threats—either missiles or guns—and, when ordered to do so, attack with on-board weapons, either suppressing or destroying enemy air defenses. It will be able to jam certain radars—performing an electronic warfare function—and protect high-value flying assets such as the AWACS and E-8 Joint STARS aircraft.

In addition, the Air National Guard plans to use the F-22 in defending US territory against a surprise cruise missile attack.

All signs are that the Raptor will only get better over the next decade. Fortified with a planned \$7 billion in improvements, the F-22 will move more and more into the role of quarterback in any air conflict fought by the United States. It will have that job for about the next 25 years.

The revised employment plan was made necessary by the now near-certainty that the Air Force will never acquire 381 F-22s or anything close to that number. The Air Force has since 2002 held fast to the claim that it required 381 F-22s in

aybook

This F-22 superfighter, few in number, will quarterback the war for the combat air force.



Photo by Jim Haseltine



Photo by Jim Haseltine

An F-22 is prepped for a mission at Kadena in June. Like the queen on a chessboard, the F-22 will be carefully deployed to achieve maximum effect.

order to comfortably guarantee control of the air under the demanding scenario of having to fight two major conventional wars at more or less the same time.

Yet the requirement for 381 F-22s fell hard when the USAF Chief of Staff, Gen. Norton A. Schwartz, told Congress that he believed such a number was excess to actual Air Force need. Schwartz argued instead for building a fleet of 243 F-22s, which USAF could have attained through the production of an additional 20 Raptors per year for three more years.

Such a plan would have kept the US building so-called fifth generation stealth fighters until the F-35 program ramped up. It would also have allowed the Air Force to put a full squadron of F-22s in each of its 10 Air and Space Expeditionary Forces. Instead, it will have less than half a squadron for each AEF.

The argument for more was made succinctly by Air Combat Command chief Gen. John D. W. Corley. In a June letter to Sen. Saxby Chambliss (R-Ga.)—who had asked Corley for an unvarnished opinion on how many F-22 are needed—Corley wrote that a force of 381 would deliver “a tailored package of air superiority to our combatant commanders and provide

a potent, globally arrayed asymmetric deterrent against potential adversaries.”

Schwartz had described a fleet of 243 F-22s as a “moderate risk” force. Corley said that “in my opinion, a fleet of 187 F-22s puts execution of our current national military strategy at high risk in the near- to midterm.”

That strategy called for maintaining a capability to fight and win two major regional wars simultaneously, or at least in close succession. This summer, though, Defense Secretary Robert M. Gates signaled heavily that he was preparing to lower this bar of readiness, and require capability to fight only one conflict. For that, he reasoned, 187 F-22s would be adequate.

A letter to Chambliss from Lt. Gen. Harry M. Wyatt III, head of the Air National Guard, noted that his organization believes the F-22 is essential to combating “current and future asymmetric threats to our nation, particularly from seaborne cruise missiles,” and is the only platform “with the requisite speed and detection to address them.”

After a spirited debate in Congress—with direct lobbying by Gates and a veto threat from President Obama—efforts to keep the F-22 in production past 187 aircraft faded in late July. Supporters in Congress vowed to press their case, but the Air Force likely will have to make the best use it can of just 186 F-22s (one has been lost in an accident).

The F-22 became operational in 2005, and is now nearing the performance expected of it at “maturity”—commonly described as when all aircraft have been delivered, or 100,000 flight hours. Its mission capable rate has gradually crept up, now at about 62 percent, versus about 70 percent for mature fighters such as the F-15 and F-16, which have been in service for more than three decades. Air Force managers believe the F-22 will achieve MC rates comparable to the F-15 and F-16 some time next year.



USAF photo by MSgt. Kevin J. Gruenwald

A quartet of F-22s from Alaska arrives at Andersen AFB, Guam. The Raptor has demonstrated it can deploy worldwide and function perfectly in any climate.

Deploying the Raptor

The F-22 will be permanently based at five locations, with the bulk assigned in the Western US or Pacific Theater, as follows:

Tyndall AFB, Fla.: 32 aircraft
Langley AFB, Va.: 40 aircraft
Elmendorf AFB, Alaska: 40 aircraft
Holloman AFB, N.M.: 40 aircraft
Hickam AFB, Hawaii: 20 aircraft

Squadrons consist of 18 primary aircraft authorized, or PAA, as well as two spares each. A further 16 aircraft will be involved in test, depot maintenance, or tactics development functions.

By all accounts, the F-22 does everything it was expected to do, and more. In Air Force-run wargames such as Red Flag in Nevada, or Northern Edge in Alaska, the F-22 has racked up almost absurdly lopsided air combat victories of more than 140-to-one. Its stealth capabilities have a profound influence on the air battle.

“The technology absolutely works,” said Brig. Gen. Mark A. Barrett. Now ACC’s inspector general, Barrett was the commander of the 1st Fighter Wing at Langley AFB, Va., from April 2007 to May of this year.

“It’s hard to explain or describe it to somebody [who] hasn’t flown it,” he said in an interview, but “I’ve been flying fighters for 30 years; most of my background is in F-15Cs. And the F-15 is a great airplane, but ... all the magic you wish the F-15 could do, the F-22 can do.”

Barrett said the F-22 is simply invisible to other fighters and ground radars. That allows it to sneak up on enemy fighters and line up for an optimal shot with radar guided missiles. In a flash too quick for enemy radars to see, the weapons bay opens, a missile comes out, and the enemy is dead before he even knows he’s under attack. By then, the F-22 is either long gone or on to another target.

“I have literally flown over the top of another [fighter] at [a separation of] 1,000 feet, and he had no idea I was there,” said Maj. Geoff Church, an F-22 pilot and chief of tactics development for ACC. So powerful is the F-22’s all-aspect stealthiness, Church said, that “we’ve kind of worn out our welcome” with units who have flown against the Raptor.

He noted, “It’s not fun to fight us. When you always die, you always lose, and if you never see a Raptor, it’s not fun. It’s not good training for anyone else. ... You can’t see anything.”

“Stealth platforms provide very poor ‘Red Air,’” Barrett said, “so there’s not a lot of payback for a unit that’s going to host an F-22 unit for a couple of weeks, because if you’re not fighting them within visual range, they don’t get a whole lot out of it.”

What the F-22 brings to a combatant commander has changed with the cut in planned production, Barrett said.

With some 750 aircraft—the earliest planned total of F-22s—the airplane could deliver “complete air dominance, anywhere, from Day 1, ... 24 hours a day,” and without “a whole lot of help from the legacy fighters or support aircraft.”

But at 186 aircraft, “then I have to start looking at different ways of employing it. ... I’m going to have to start employing it with other legacy airplanes.”

Directing the Fight

The F-22s will likely be moved around frequently, responding to mounting tensions in a given part of the world. Units practice packing up their aircraft and equipment and making long deployments. There won’t be enough of them to economically deploy them permanently in forward locations; they will be designated reinforcements for other US and coalition aircraft.

The good news, Barrett added, is that the F-22 “can make the whole fighting force ... better.” But, he added, “they have to do it together. ... [You] embed it with whatever you have.”

Barrett said that the 1st Fighter Wing has two squadrons of F-22s and one squadron of F-15s. That’s on purpose. The F-15s and F-22s operate together, he said, to “maximize the number of missiles” that hit enemy aircraft. Typically, “we’ll take out a four-ship [flight] of F-22s and an eight-ship of F-15s, and in a combined force, we will go out and fight together.”

Enemy fighters tend to point at what they can see, he explained, and when they pick up the F-15s on radar, they zero in on them. However, the F-22s, with their stealth and speed, “skirt around, avoid jamming, avoid detection, and then get a little bit closer to provide kills.” In other words, while the enemy is concentrating on the F-15, the F-22 sneaks around and kills him from another angle.

“You want to have the F-15s in a position where they can get their best probability of a kill, and you want to use the F-22s to help direct that fight and clean up what’s left,” Barrett explained.

The F-22 changes what had become a fairly equal situation, in which the

F-15 and comparable fourth generation fighters could detect each other at about the same distance, employ comparable jamming methods, fire missiles, and “if both survive,” Barrett said, do it all over again until one made a mistake and died or fled the engagement. With the F-22 in the mix, enemy aircraft are seen and targeted first, and the combined force can husband its overall fuel and weapons to get the most kills possible.

The F-22’s sensors not only collect lots of information on their own, they collate it with a flood of data coming in from off-board sensors such as AWACS and other intelligence-surveillance-reconnaissance systems. In the F-15, a pilot must integrate in his head data and other cues from radio calls, radars, and radar warning receivers. The F-22 “does all that for you,” Barrett said, allowing the pilot to spend his time managing the air battle, and not the sensors.

Squadrons of F-22s have flown both against and alongside all types of US fighters, as well as those of coalition air forces in exercises, he noted. Afterward, the other pilots are “amazed,” Barrett said. They usually have no idea how comprehensive the F-22’s view of the battlespace is. It improves the odds for any allied force.

The radar invisibility not only leads to one-sided air combat, it allows the F-22s to operate with impunity inside heavily defended enemy airspace—the only machine that can do so in all weather, and in day as well as night. From that vantage point, F-22 pilots can see ground and air targets that may not be visible to AWACS controllers.

Church said the F-22’s cockpit displays allow him to “overlay” radar tracks of enemy aircraft that are being sent out by AWACS over the battle network. If his sensors pick up something the AWACS doesn’t, he can call the AWACS or directly to a flight of fighters that don’t know they’re headed into danger.

Aggressor units at Nellis AFB, Nev., and Eielson AFB, Alaska, have tried to devise ways to thwart the F-22’s advantages, Barrett said. They’ve tried throwing large numbers of fighters at F-22s to overwhelm them, or flying extremely tight formations to make it difficult for the F-22’s radar to distinguish individual targets. It “doesn’t work particularly well,” he observed dryly.

“I haven’t seen anything that’s been particularly effective, to be quite frank.”

Sometimes, the Red Air pilots, even though they can’t see their quarry, will begin to violently maneuver at the call

of “fight’s on,” to make it hard for the F-22s to target them.

“Well, that’s OK, because if they’re maneuvering and doing everything they can to avoid getting killed, they’re not being particularly effective in their mission, and that allows us to go on and do what we need to do,” Barrett said.

The F-22 has made several long-distance deployments, and doesn’t need to bring any specialized climate controlled hangars with it to let crews maintain the stealth surfaces, as the B-2 requires, Barrett reported.

“We’ve proven we can take it on the road, and it doesn’t need any special facilities,” he said.

The squadron brings what it needs along with it to do all maintenance, including that on the surfaces. It was designed to operate out in the open, on exposed runways without shelters, he noted. There have been deployments to Kadena AB, Japan, Andersen AFB, Guam, and Eielson, and in no instance did extreme humidity, cold, or heat affect the systems adversely. In fact, Barrett said, after the first deployment to Kadena, “when they came back, they were in as good a shape with their [low observable surfaces] ... as they were when they left. ... They were fine. So, it works.”

The F-22 can fly higher than the F-15—60,000 feet versus 50,000, according to Church—and at Mach 2 versus the F-15’s age-limited speed of Mach 1.5. The Raptors tend to fly farther apart and can cover a wider area of airspace than the F-15s.

However, the key difference, Barrett said, is survivability.

“If you have to operate in a heavily defended area, a fifth gen fighter is survivable, and the nonstealth airplane is not. And I don’t care if it’s fourth generation or ... 4.5 or 4.7. You’re either stealthy or you’re not. If you’re stealthy, you can survive.” Putting “1,000 F-15s or F-18s” into an “anti-access environment” of modern air defenses means “they’re going to die, and you’re going to lose all those airplanes. And F-22s and F-35s are going to survive.”

The F-22s can share what their sensors pick up immediately and digitally through a special communications system that only they can pick up. It’s what’s called a “low probability of intercept” system that is classified, but uses extremely thin beams of energy that constantly shift. The picture they acquire cannot be shared with other types of aircraft, though. In a planned upgrade, the Air Force plans to equip the F-22 with the Multifunction

USAF photo by MSGT Kevin J. Gruenwald



A brace of Raptors escorts a B-2 bomber off the coast of Guam. Peppered in with the legacy fleet, the limited number of F-22s will enhance USAF’s overall combat power.

Advanced Data Link, or MADL, which will permit digital data sharing with F-35 and B-2 aircraft, USAF’s only other stealth aircraft. That will enable the three types to collaborate early in an air campaign when stealth is of the highest importance.

New Mission Creep

Air Force Secretary Michael B. Donley told Congress in June that the Air Force will spend about \$7 billion over the next five years on F-22 upgrades. Those upgrades focus on the connectivity of the F-22 with other aircraft, software, and new weapons. However, even the upgrades will be applied selectively.

The Air Force plans to have three versions of the F-22, divided into blocks. Block 20 aircraft will have the fewest improvements, and will be used at Tyndall AFB, Fla., to train pilots new to the F-22. Block 30 and 35 aircraft are intended to be the flying machines, although the Block 20 airplanes will be completely combat-capable.

The Block 20 upgrade sets a standard configuration such that Raptors within the block will be easier to update with new software. This will be accomplished by 2013.

The Block 30 and 35 machines will first receive the capability to drop the 250-pound-class Small Diameter Bomb. This will increase the number of ground targets an F-22 can hit from two today—with the 1,000-pound Joint Direct Attack Munition, or JDAM—to eight with the SDB. The first tranche of the upgrade will add a synthetic aperture radar view, or 3-D view of a target area, as well as an improvement in the F-22’s ability to pinpoint and identify ground targets.

The second round of upgrades will add capability to carry the AIM-9X

missile. The AIM-9X can be fired at high off-boresight angles, meaning the pilot doesn’t have to point the F-22 directly at the target to shoot it with the short-range, heat-seeking missile. The second round will also add the MADL for connectivity to the B-2 and F-35, and likely the capability to carry the AIM-120D AMRAAM radar guided missile—the most advanced version yet. Further upgrades will have to wait until the first two are installed and prove out.

Church said the increased loadout offered by the SDB will allow the F-22 to strike more ground targets on a single sortie, and they are of sufficient size to be capable against things like air defense systems. Whether the F-22 would be tasked to do such a mission would be up to the combatant commander to decide, he said.

Barrett said the Air Force is still learning what the F-22 can do, and that new missions will inevitably creep into its repertoire. Although not yet tasked to do so, the F-22’s phenomenal ability to collect ISR will doubtless become a mission unto itself in the future. But for now, the plan is to get the most capability possible out of the limited numbers of F-22s that USAF will field, and that will be substantial, if far less than originally envisioned.

“I can penetrate an anti-access area ... any place in the world,” Barrett asserted. “I can take down key nodes with my air-to-ground capability. I can survive and I can start breaking down the door to allow the less-survivable airplanes, the legacy airplanes, to come in and do more work. ... I can provide defense of high-value assets or of any other force that’s going in. ... The airplane can do all of that.” ■