

The Raptor Arrives

Debriefing the pilots who got the first crack at the F-22.

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Air & Space Magazine



The F-22 Raptor performing at the Fort Worth Alliance Air Show in 2010. (Lockheed Martin)

AIR FORCE CAPTAIN MICHAEL "WACO" CABRAL can barely remember his first flight in a new F/A-22 raptor. He recalls feeling immense power at takeoff and then—a blank. "It was just like 'Holy cow I'm in a raptor, holy cow I'm in a raptor,' and I'm trying not to screw up."

Cabral has better recall of his fifth, sixth, and seventh flights, during which he flew his Raptor against another in a Basic Fighter Maneuvers exercise. (The second aircraft simulated a Russian Sukhoi Su-27.) "The briefer said, 'Look, BFM in the Raptor is boring.' And it was true. The plane is so powerful and responsive, it can turn so tight and sustain such high Gs and angles of attack, that I can fly to the center of his turn circle and keep my nose and weapon on him all day. Whatever he tries to do, I can just point my airplane.

"When I was flying defensive BFM, he simply couldn't enter into my turn circle. Even if he flies his weapon to the best of its capabilities and I make errors, he cannot win. It's almost too easy."

Cabral made his training flights out of Tyndall Air Force Base in Panama City, Florida. Tyndall, Edwards in California, and Nellis in Nevada are the first Air Force bases where pilots are learning how to fly the F/A-22, the Air Force's first new fighter in three decades. Like Cabral, these pilots, veterans of the F-15C, F-15E, and F-16, rave about the Raptor's performance. "It's much better than we expected," says Major Robert Garland, F/A-22 division commander at Nellis. It's revolutionary." The Raptor is the Air Force's latest air superiority fighter, but it's also intended to serve as a ground attack aircraft, one that the pilots say will "kick the doors down" and "sanitize the battle space," paving the way for waves of F-117s and B-2s hunting surface-to-air-missile sites.

Judging by the way these new Raptor drivers talk, the training is perfect, the sims are flawless, the jet is invincible. Though they haven't flown the Raptor in combat, you won't hear them express any skepticism on that front. The reason is simple, says military analyst John Pike, director of GlobalSecurity.org and usually a skeptic himself when it comes to expensive new weapon systems: "The one lesson [the Air Force has] learned in the 20th century is that the people with the best airplanes win. And this is the best airplane."

Like most military bases, Tyndall looks slightly worn out. The elevators in the air traffic control tower are clunky; the carpet in the canteen is threadbare. But it's a different story in the new headquarters of the 43rd Fighter Squadron, the unit being trained to fly the Raptor. Four flat-screen televisions mounted on the wall show Fox News, satellite weather data, and flight schedules in a lobby graced with new leather sofas. The pilots' lockers are dark burnished wood. The Raptor pilots themselves are so relentlessly positive about the aircraft that you can imagine them coming from the perfect suburb of Stepford.

The first eight Air Force pilots to learn to fly the aircraft had trained at Nellis; now, they are here teaching eight Tyndall instructors in the first 18 production jets, flown in fresh from the Lockheed Martin factory in Marietta, Georgia.

The Nellis eight are "patch wearers"—graduates of Nellis' Air Force Fighter Weapons School—and instructors with a minimum 2,000 hours each in their primary fighters. At Nellis' Force Development Evaluations, where pilots brainstorm about what an aircraft is capable of, then test their speculations, these pilots developed a tactical playbook for the F/A-22.

As for the Tyndall pilots, squadron commander Michael "Bam Bam" Stapleton, 38, and operations officer David "Kooler" Krum, 37, look like frat boys, but they're both lieutenant colonels, and each has over 2,500 hours in F-15s. The others in the 43rd, like Cabral, are also young but are senior captains or majors, Formal Training Unit flight instructors with at least 1,000 hours in their primary weapons. "The cost of [the F/A-22] program is so high that every mistake will be on the front pages of the paper," says Stapleton. "We don't want to steal the top guns from every squadron, but we need to put the most talented folks we can on the plane as early as we can."

Cabral, a compact man with eager brown eyes, takes me out on the flightline. Rows of F-15s and F-16s sit uncovered against the Florida rain and sun, but the Raptors get parked in new shelters that resemble suburban carports.

Compared with their neighbors, which bristle with weapons, the Raptors look neutered; their weapons bays are internal, so the airplanes generate a much smaller radar signature. The Raptors' stealthy shape sends most of a radar return away from the signal's source. The cleaner airframe also produces relatively little drag.

The Tyndall pilots' training syllabus lasts 60 days. Cabral tells me that the first 21 days were all academic. He had to sit through 57 hours of classes (including five tests), plus 16 hours in the simulator. There are no two-seat F/A-22s, so when Cabral took off for the first time, it really was his first Raptor flight. The day before, he'd sat in the aircraft for the first time, then started it up. "It's got that new car smell," he recalls. "It's louder than an [F-15] Eagle, it rumbles more, and the nose slopes down so it feels almost like you're falling out of the plane."

He had three basic "transition" rides—transitioning from the simulator—and a check ride, then his training continued through a series of carefully scripted steps that would simulate increasingly complex threat scenarios.

All combat jet training begins with BFM: one jet against another within visual range. Pretty standard stuff, except that in the case of the Raptor, power, big control surfaces, and vectored thrust enable 60-degree angles of attack and the ability to turn on a dime. The Raptor is the first U.S. fighter able to perform cobra maneuvers—in which an aircraft rears up into high angles of attack—and J-turns, in which the craft then almost swivels in the air while pointing its weapon. "An F-15's turning radius is 3,000 to 5,000 feet, but this plane can almost rotate in space," Cabral says. "An F-15 requires a lot more finesse and a lot more constant practice of stick-muscle memory to get it to pull 9 Gs. The Raptor is simple: You pull on the stick and you get 9 Gs almost instantly. Little inputs on stick and the throttle give you large outputs. Its responsiveness and maneuverability over anything else airborne is instantly apparent."

BFM for the Raptor consists of just four flights (the F-15, by comparison, requires 12). Air Force planners expect that the Raptor will spend little time dogfighting; "supercruise and stealth are so much more important," Cabral says. In a Raptor, a visual encounter should take place only "because you choose it," he says, "and you arrive in the merge with complete surprise."

After BFM, pilots learn advanced combat maneuvers, with multiple airplanes working as a team. Even more differences emerge between the Raptor and its siblings.

F-15s and F-16s fly in close visual formation; because they're not stealthy, they must work together to scan the airspace in front of them. "In an F-15, you live and die by putting your radar in the right piece of sky to find threats and ID them," says Cabral. But looking from the ground to 60,000 feet—120 degrees of sky—takes the F-15C's radar 14 seconds. Flying within visual formation, the flight lead takes the low half and the wingman takes the high half. A sensor called the Radar Warning Receiver indicates if an airplane or a SAM is looking at you.

Flying at 500 knots (575 mph), Cabral says he alternates between the RWR and radar, while using “my eyeballs and moving my head to look for stuff. If the radars pick something up—bandits are merely green blips, and you don’t know if a blip is one airplane or two close together—I have to ask: Do I need to defend myself? Is it a threat? Or do I need to call an AWACS [Airborne Warning and Control System aircraft] and give them the information?”

Flying and fighting in the F-15 is “task prioritization,” Cabral continues. “You have to generate a mental picture of the airspace and battlefield in your mind. Sometimes I even literally sketch a picture on my kneepad, all while talking on comms and cross-checking the systems.”

In the Raptor, on the other hand, the radar sweeps 120 degrees of sky instantly, and computers synthesize the incoming data and display the results on a single eight-inch-square color display. Bandits are red triangles; their flight path, altitude, and relative speed are apparent at a glance. Friendlies are green circles. Unknown aircraft are yellow squares, other F/A-22s are blue. SAM sites are depicted as yellow pentagons, the sizes varying relative to the distance at which the radars can pick up the stealthy Raptors. The Raptor’s radar range is classified, but Stapleton says he has “seen targets beyond 320 miles.” Attack and defensive displays, respectively on the right and left of the main display, can show tactical information in even more detail. The attack display, for instance, can show all tracked aircraft—“tracks”—in the current shoot list, which tracks you’ve deployed missiles against, and what the status of those missiles is. The defensive display, on the other hand, might show which tracks are illuminating the Raptor and what their range is. Says Dave “Shotgun” Lopez, a pilot in the 43rd: “The airplane is just a huge sponge in the sky soaking up information.”

Cabral recalls that in one training exercise, “I was flying a -15 with Raptors against SAMs, and the Raptor is high, ‘meching’ the space [working the radar mechanics to scan the airspace], calling where everything is. I don’t have to work the radar mechanics myself. I put the missile in the air and make the kill and no one even sees the Raptor.”

Raptors talk to one another over a secure digital link, so every Raptor in a formation knows about the others: how much fuel a wingman has, which weapons have been fired, even which enemy aircraft have been targeted. “Everything he sees, I see, and vice versa,” Cabral says, and what they see is a real-time, constantly evolving and updated God’s-eye view of the airspace.

Because of the aircraft’s stealth and its knowledge of what the others are doing, Raptor formations can be much more widely spaced than F-15 formations; the aircraft can stay beyond visual range of one another—what’s known as “detached mutual support.”

“Typically we’re outside of five miles from each other in different chunks of the sky,” says Cabral; “even if [a bogey] sees one of us, he won’t see all of us. And that gives us a significantly different tactical mindset. We can pick and choose who and when to engage.” If the Raptors are attacking SAM sites, for instance, “it may not be necessary to kill every aircraft that’s in front of you,” says Cabral, because some may not even know he’s there. “I can get

past them, get the SAMs, and then do whatever—I can fly away or I can sit up there parked or choose what to kill.”

The next portion of training is working against SAM threats and planning for JDAM—joint direct attack munition—delivery. From days 50 to 60 the scenarios grow more complex: fighting against bandits that outnumber you; working in four-ship formations; night attacks; even taking out cruise missiles—with its enhanced radar and high speed, the Raptor is better suited than F-15s for going after and killing those.

The graduating ride is called a Global Strike Profile: “It’s putting everything we learn together in a high-threat missile environment,” explains Cabral. That could be Raptors escorting B-2s or F-117s, Raptors escorting Raptors, even Raptors escorting F-15s.

In sum, what the pilots learn is that the Raptor is brainy, agile, fast, and almost invisible to radar. “Based on those four tenets,” says Garland, “we say it’s best for high-threat surface-to-air environments where other weapons have to stop.” One aircraft that had to stop, he says, is the F-15C during the 1991 Gulf War. “We could attack any air threat with an F-15C, no problem, as long as it engaged us. But if that air threat decided to hide in a SAM zone and not come out and fight, we had to stop. We couldn’t chase that airplane into a high-threat environment.”

Potentially high-threat environments include China, Russia, Iran—places defended by the latest SAM batteries, which transmit information among themselves by deeply buried fiber-optic cable. If the United States decides to go in, the Raptor will lead the charge. “We don’t have anything on the streets besides the Raptor that can gain access to those threats,” says Tyndall’s Stapleton. “We can use B-2s or F-117s, but they’re subsonic and can only go in slow. If a MiG-21 with an Atoll missile gets a tally on one, he can actually get them, so the B-2s and -117s are limited to night strikes. Only the Raptor gives us the speed and stealth to sneak up and open the line of scrimmage 24/7.”

Today at Tyndall, the only threat is the pounding rain and low ceiling. The Raptors are grounded, so Cabral, Krumm, Lopez, Captain Jeremy “Huck” Durtsch, and Christopher “Moto” Niemi gather in the squadron’s spotless new bar and pour a round of Balvenie single-malt to celebrate Lopez’s first Raptor flight, which he made the day before. “After the sim, nothing surprised me,” Lopez says, taking a sip. “I didn’t feel behind the jet at all.”

“It’s such a giant change it’s hard to fathom,” says Moto. “You see everything. All you do is make battle management decisions, and you don’t make bad ones. You just overrun everything with your speed and stealth. They don’t even know you’re there and you’re calling them dead.” Says Durtsch, “It’s like clubbing baby seals.”

I’m having a hard time figuring out how much of their enthusiasm is due to the Raptor’s seeming invincibility and how much is due to their unflappable, upbeat nature. Probably a bit of both.

Their love of the Raptor is not universally shared. At a time when Iraq is eating billions, the Army is clamoring for more bullets and armor, and the cost of the Joint Strike Fighter is

escalating, the Raptor's cost—\$258 million apiece— seems like a lot for an airplane that has no competition and that will be virtually useless against what is probably the most common threat U.S. forces now face: suicide bombers. Not to mention an airplane whose job can still be done, with various degrees of success, by other aircraft. Still, says military analyst John Pike, "even if they don't have a clue why they need it now...they know that something like the Raptor might come in handy in 2040."

But in war, unexpected things happen. In 1999, an F-117 Nighthawk, the first fighter designed for stealth, was brought down in Yugoslavia by ground fire—at night. It's one thing for a bunch of veteran pilots to practice scenarios over the Gulf of Mexico against simulated Flankers and advanced SAM sites, another for regular guys to fly it for real. And in quieter moments, that's something even Cabral acknowledges. "The F-15 has been around for 30 years and its tactics have evolved," he says. "But we don't have a lot of Raptor data points yet—we're still building them. It's a big gray area. Honestly, we don't know what we don't know."