

The F-22 was grounded five months for a vexing oxygen supply problem. Maintainers made the most of the difficult situation, and now pilots are rebuilding their skills.

# Raptor Return

By Aaron Church, Associate Editor



**T**he Air Force's F-22 pilots are rebuilding their proficiency, shaking off the dust that accumulated during a nearly five-month grounding because of problems with the Raptor's onboard oxygen-generating system (OBOGS).

During what proved to be the longest flight suspension the Air Force has ever had to endure for a frontline fighter, the 1st Fighter Wing at JB Langley-Eustis, Va., made the most of the difficult situation. The grounding offered unheard-of training opportunities for maintainers and permitted aircraft to be upgraded to the latest configuration on an accelerated schedule.

The grounding began in early May. Gen. William M. Fraser III, then head of Air Combat Command, halted F-22 flying because oxygen supply problems had led to some dangerous close calls and might have contributed to a crash. Raptor pilots had reported an unusually high incidence of "in-flight physiological events" symptomatic of oxygen deprivation.

They noted hypoxic symptoms at a rate three times higher than crews from other similar aircraft, a USAF official said. A

dozen incidents were reported over three years. In one event, a pilot flying an F-22 clipped a tree while landing at JB Elmendorf-Richardson, Alaska, and later couldn't recall the event.

Another Elmendorf F-22 crashed during a night training sortie, killing pilot Capt. Jeffrey A. Haney. The cause of the November 2010 mishap had not been identified by press time, but investigators were able to rule out a problem with that aircraft's oxygen system. "We do not have a smoking gun here," Gen. Norton A. Schwartz, Chief of Staff, said in September.

The Air Force Scientific Advisory Board investigated the OBOGS situation and looked to identify potential remedies. Although a definitive solution had not been found when the Raptors returned to flight, "we now have enough insight from recent studies and investigations that a return to flight is prudent and appropriate," Schwartz said when lifting the grounding in mid-September.

He left some restrictions in place, but allowed Raptor pilots who had lost their type certifications to return to flight, rebuild their piloting "muscle memory," and restore their proficiency. For the time being, Schwartz said F-22 pilots would wear "certain



*A1C Aaron Tate enters Raptor data into a portable maintenance aid at Kadena AB, Japan. The stand-down offered maintainers an unprecedented opportunity to mentor trainees.*



protective equipment” on their missions, receive new emergency procedure training and be monitored for physiological changes.

By mid-October, all the instructors and half the line pilots were back up to snuff.

“The stand-down was something that we would have preferred not to do, of course, but at the same time it was ... required for confidence in the aircraft,” explained Col. Kevin Robbins, 1st FW commander at Langley. He said the Raptor pilots are “completely confident that the Air Force did exactly what they needed to do.”

### Knocking Off Rust

While investigators found “no indication” the OBOGS was flawed, modifications should mitigate pilot risk if a malfunction occurs in flight. “We’ve done a bunch of inspections. ... We’ve done baseline bio-testing on the pilots, and if there [are] any incidents at all, we do more bio-testing,” explained Robbins. “There are systems in place to gather data, there are systems in place to protect the pilots, and then we still have more testing going on out at Edwards Air Force Base” in California.

The safety and review procedures were quickly tested when a pilot reported hypoxia-like symptoms on a training sortie from Langley on Oct. 20. As a precaution, Raptors at Langley and Elmendorf suspended flying over the weekend to investigate the incident. “Part of our protocol is to allow units to pause operations whenever they need to analyze information collected from flight operations to ensure safety,” explained Air Combat Command spokeswoman Capt. Jennifer Ferrau.

Three days later, the Raptors were once again airborne, with Langley’s reconstitution plan returning to full swing.



**Top: F-22s are readied for flight during an April operational readiness inspection at JB Langley-Eustis, Va. A maintainer pulls the chocks on an F-22 at Holloman AFB, N.M., Oct. 1, where some 20 Raptors were grounded for more than four months.**

“We’re not combat-ready yet, ... but we are working on getting our qualifications back,” said Lt. Col. Jason Hinds, director of operations for Langley’s 27th Fighter Squadron. “Obviously, the stand-down for the pilots was painful when it comes to proficiency.”

Normal training is focused on air dominance—the skills needed to defeat an adversary in the air. However, reconstitution is “not so much looking at that combat capability” but regaining basic proficiency—“the kind of things we can’t really do in a simulator,” Hinds stressed.

The first sorties in September and October focused on skills as basic as instrument flight, aircraft handling, and reacclimation to G forces. “That’s knocking off rust; that’s not getting them better,” he said.

Weather permitting, basic requalification was slated to wrap up in November. “We’re probably looking maybe another two months beyond that to where we’ve actually got the repetitions—the scrimmage games to get us back to where we were” before the grounding, said Maj. Darren Gray, 149th FS assistant director of operations.

When the grounding was ordered in May, wing leadership didn’t know whether to expect it to last weeks or months.

“The next day, ... everyone ... came to work with a mindset to train to deploy and to fight,” said Robbins, setting the wing’s tone for the duration of the

flight ban. “As I started to formulate my ideas on how we ought to be conducting ourselves, in a lot of ways it was just a reflection on what the men and women in the 1st Fighter Wing were already doing,” he said.

For maintainers, the stand-down offered an unprecedented “opportunity ... to shine,” said MSgt. Christopher Baldwin, 1st Maintenance Squadron structural maintenance chief. Paradoxically, with the jet aircraft on the ground, “our workload seemed to increase,” he observed.

As it became apparent the grounding would be extensive, the maintenance group intensified training, having a bounty of aircraft to work on. This was combined with tackling heavy maintenance projects that normally



USAF photo by A1C Teresa Zimmermann

**A Raptor takes off from Langley. During the months-long grounding, Langley's F-22 pilots made heavy use of simulators to keep some semblance of polish.**

would take an aircraft out of service for a long period.

"Instead of training being what we could fit between fixing the jets for the sorties, we were allowed to slow down and really work with airmen," explained TSgt. Ryan Martin, an avionics craftsman assigned to 1st FW's associate unit, the Virginia Air National Guard's 192nd Fighter Wing.

The grounding allowed experienced hands to mentor newer maintainers on time-intensive fixes and other procedures they'd seldom get to practice unless the aircraft was actually broken—the stress of which makes for poor training. Opportunities for heavy maintenance procedures such as removing and replacing landing gear, flight-control surfaces, stabilizer actuators, and horizontal stabilizers are rare in an operational unit, explained Michael Wise, a propulsion equipment specialist at Langley. Replacing an F-22's horizontal stabilator, for example, is a labor-intensive task requiring five or six days.

"A guy might go through his time at Langley and never see how to do that job," said Lt. Col. Pete Fesler, commander of Langley's 27th Fighter Squadron. He added, "You have very few people qualified" on such a procedure, "because they've not seen it," so the group took advantage of the downtime to "essentially break and put back together parts of that airplane that don't normally break in order to get a broader set of guys the skill sets needed to deal with just about anything."

Langley's F-22 shop, however, focused on much more than just training during the operations hiatus. Like any aircraft, especially one as new as the F-22, the Raptor fleet is subject to an unceasing series of technical change orders meant to enhance its capabilities and remediate long-term issues. In just the first two months of the grounding,

technicians worked their way through an entire year's worth of tech orders designed to upgrade performance and maintainability.

"We did a total of 858" upgrades, roughly nine times the normal rate, said Maj. Matthew Hummel, ANG maintenance operations officer with the 192nd FW. "A lot of these were heavy maintenance. ... They're intrusive," demanding long downtime. By focusing on these upgrades, the support groups were able to get ahead of themselves "at least a year, if not a year-and-a-half."

### Time-in-Cockpit Essential

The most formidable task was reworking 97 skin panels—which have special stealth treatments—that allow access to the aircraft's innards.

While it takes a mechanic just minutes with a screwdriver to get into an F-16, F-22 technicians had to spend hours sanding through layers, chipping out filler putty, and pulling seals in order to gain access to some areas of the Raptor. After a repair, specialists then had to reapply the 20-coat layers in a tedious

task requiring 24 to 48 hours to fully cure. According to Lt. Col. Gregory Hutson, the 1st Maintenance Group deputy commander, before the grounding, the coatings alone were responsible for "50 percent of our nonmission-capable time due to maintenance."

Maintainers have been "beating down Lockheed's door for the last few years" demanding a less labor-intensive process, Hutson said, and the company "responded beautifully" with a time-saving fix.

Guessing the grounding would continue for some time, Langley's shop set to work cranking out precoated panel sets for the entire fleet, based on Lockheed's change order.

"It's the same panel being used, except now the panel's being coated differently, so all they have to do is remove screws like they would a traditional panel and they can access it and put it back on as much as they want," explained TSgt. Charles Echols, a coating specialist with the 1st MXS. "We're able to manage the fleet health regarding the radar cross section ... and not have to spend all that time to remove all that coating," accomplish the repair, and restore the finish, said Echols.

Hutson estimated the time will really add up, saving an average 200 to 300 man-hours each month, as well as returning the aircraft to duty days earlier than before.

"What would have taken well over 120 maintenance hours has only taken us about 10 on some component replacements because of the low observable form-in-place panels that we ... made during the stand-down," he reported.

Pilots faced a tougher challenge during the grounding. Type proficiency demands flying time in a real aircraft, regardless



USAF photo by A1C Camilla Elizeu

**A1C James Haubrich, a crew chief, tracks maintenance on an F-22. In the first two months of grounding, technicians handled an entire year's worth of upgrade tech orders.**



**Raptors line up at Langley. Although the F-22s are cleared to resume flight throughout the combat envelope, the aircraft and pilots will be closely monitored.**

of the fidelity of simulators, and pilots had to be able to get back up to speed as quickly as possible when the grounding was lifted.

Accordingly, Langley's F-22 squadrons—the 94th Fighter Squadron, 27th FS, and 149th FS—made heavy use of simulators and spent the downtime on tactics and employment strategies.

“We spent a lot of time here at Langley using our simulators; the other bases aren't that lucky,” noted 27th FS boss Fesler. “Our guys were getting two to three simulator [sorties] per week to try to maintain some semblance of currency and combat capability,” while F-22 pilots at Elmendorf and Holloman AFB, N.M., “had to fly out here and use our simulators, so they were getting maybe two to three simulator [sorties] a month.”

Pilots traveled to Marietta, Ga., to take advantage of high-fidelity combat simulators at Lockheed Martin facilities there, which also permitted the chance to confer with F-22 pilots from across the force.

“What it allowed is that free-flowing exchange of tactics and lessons learned,” Robbins said. While the pilots wouldn't have planned it that way, “we may be better because of it,” he admitted, adding upon reflection, “guaranteed we are.”

Back at Langley, “we spent a lot of time teaching academics and doing tactics talks to try to get into the books a little bit more than we would during flight operations,” Fesler noted.

Some pilots came to the F-22 directly, having no previous experience in another kind of fighter. The grounding allowed such rookies time to fly in F-15s and F-16s. That experience gave them insight into those aircraft, “so they can see ... some of the challenges ... and how they fit together with Raptor integration,”

said Hinds. “They got their eyes opened, which was awesome,” he added.

As the grounding wore on, it became clear the F-22 units would need a plan to reconstitute pilot proficiency when the time came. ACC leaders had each wing generate a tailored reconstitution plan based on its unique pilot certification and training cycles.

#### Hurrevac

On Aug. 25, Hurricane Irene, having battered the Bahamas, took a turn toward Langley. The wing received orders to get the Raptors out of harm's way and had only 24 hours to get the 28 flyable F-22s ready to go. “It's a stand-down. It's not that the jet can't fly; we could go do our mission tomorrow and we better be ready to go do it,” asserted Robbins. And so “Friday morning, we had one shot,” he said. “Saturday, the winds were going to be too high.”

The reconstitution plan was already spelled out, making it much easier to accomplish what was officially termed a “hurrevac”—getting capital gear out of the way of an approaching major storm.

“It was really easy to tell the boss, ‘Everyone who is going to fly is in line with ... our reconstitution plan,’ ... because it had already been coordinated,” Robbins noted.

Eight of Langley's F-22 were already out of danger, stranded at Hill AFB, Utah, in May when the grounding order was imposed. At Langley, four F-22s were down for corrosion repairs so “we had ... 28 jets that were possible to fly, and we generated all 28,” said Robbins. That was unheard of, even for aircraft already on flight status.

Friday morning, the fly-out evacuation to shelter at Grissom ARB, Ind., was “the largest launch of F-22s in history,” he said.

“It was amazing to me all day watching the guys, because we hadn't flown in three-and-a-half months. The maintainers just went out there like another day at work,” Robbins said. “It could have easily been, ‘We need you in Guam—go,’ and we would have done that the same way we did the hurrevac.”

Cleared for the straight-shot ferry flight to Indiana and back, the evacuation was “just about getting the jets safely out of the way of this hurricane and bringing the jets safely home,” Robbins added.

At the end of September, a month later, ACC officials cleared the F-22 to resume largely unconstrained flight throughout the combat envelope—albeit with ongoing monitoring of the aircraft and pilots.

The near-term goal is to get ready for a February Red Flag at Nellis AFB, Nev.

“We want to spin up to get to that point” as soon as the wing returns to a regular training plan, Hinds noted. Longer term, Robbins sees the wing making worldwide strategic deployments with increasing frequency. This may be hard on Langley's Air Guard associate unit.

The 192nd's association is a boon to Raptor operations at the base, but raises some long-term questions.

“It's a great partnership, and the Guard brings exactly what they're supposed to bring to the fight, which is experience, continuity, longevity, ... but a lot of them have full-time jobs,” explained Robbins. Unlike wartime activation of the Guard, ANG members deploy in peacetime on a strictly volunteer basis. “They're ready to go when the flag goes up, but if the flag only goes partway up, it becomes more difficult,” Robbins noted.

For routine Raptor deployments to Guam, Japan, or South Korea, “how do you tell your employer that you need to be gone for four months or six months out of every year?” As a result, “if we deploy a lot, it's mostly the active duty that deploys and that just creates a burden that becomes difficult to sustain over time,” Robbins noted.

“If I look at the Raptor and where we're going, I think we'll be on the road a lot,” providing forward presence, he predicted.

“I think our adversaries and potential adversaries around the world are very well aware” of the F-22's capabilities, “and I think it frightens them. ... It provides a different tool” than anything else in the US inventory.

Keeping the right mix of manpower in place will be key. ■