No experience **required**

As the first class to take on F-22 pilot training without prior fighter experience, the four students who recently completed the Boeing-designed "B" (basic) course had to complete 88 hours of simulated flight—as opposed to 24 hours for students who transition from operational F-15 or F-16 squadrons. U.S. AIR FORCE

F-22 team finds a way to train Raptor pilots from the ground up

By Doug Cantwell

"There were the doubters," said Lt. Col. Derek France, commander of the U.S. Air Force's 43rd Fighter Squadron, "who said we'd never succeed at making F-22 pilots out of inexperienced students. But these first four guys have shattered those doubts."

This quartet graduated at Tyndall Air Force Base, Fla., in November from a grueling eight-month B (basic) course that used trainers and courseware designed, developed and integrated by the Seattle-based F-22 Training Systems team. The Boeing team made it look easy, but what they came up with behind the scenes—an eleventh-hour solution to end-user needs—borders on heroic customer focus.

Brig. Gen. Darryl Roberson, commander of the 325th Fighter Wing, recognized the Boeing team at the ceremony as a "key contributor to the students' preparedness." The training marked the first time in recent history that tactical fighter pilots proceeded directly to solo flight from simulator training without "backseat" supervision from an "IP", or instructor-pilot.

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–Dean Proffitt, manager of Pilot Training Systems

NO BACKSEAT DRIVER

When they originally set out to meet the training simulation requirements during the EMD (engineering, manufacturing and development) phase of the program, team members based their planning on the assumption that there would be a two-seat trainer variant of the Raptor. An IP in the back seat greatly eases the student's transition from simulated to actual flight. It also reduces the scope of performance and degree of fidelity required for the simulation phase of training.

When budget constraints forced cancellation of the two-seat F-22, the training curriculum needed dramatic changes. As a consequence, the team had to work more iterations of software to meet requirements. "On top of that," said Barry Cossel, F-22 Training Systems manager, "some surprises came up along the way that called for operational fixes in midstream."

These now-urgent requirements focused on handling the air vehicle and troubleshooting malfunctions. "We needed to ensure that takeoffs and landings for the B-coursers were so similar to actual flight that the crossover from simulator to airplane would feel transparent," Dean Proffitt, manager of Pilot Training Systems, explained.

In addition, the customer asked for a more realistic simulation of electrical and avionics malfunctions. They were particularly interested in "cascading," which happens when one system's glitch causes another system to malfunction, which in turn affects another. "The inexperienced student typically has a rough time pinpointing where the cascade originated," said Cossel, "which can make for some anxious moments."

Another challenge stemmed from the aircraft's unprecedented user-friendliness. "Trying to simulate emergency procedures for the Raptor is challenging," Proffitt explained, "because the airplane flies itself to such a degree that it's tough to coax it out of control—and even tougher to keep it out of control long enough for the student to practice recovery steps."

The Air Force was able to reprioritize work at the last minute, which for the Boeing team meant adding an unscheduled software delivery just two weeks before the first students were scheduled to start class. "Our customer wanted all the I's dotted and T's crossed, especially for the malfunctions," said Proffitt. "We were happy when they reviewed the new software and told us it exceeded their expectations."

TIME FOR THE HOT WASH

The success of this first class was aided partly by stringent criteria for selecting pilots. However, the Air Education and Training Command's longer-term objective is to integrate the Raptor into the overall fighter training pipeline. So the F-22 training team's goal now is to review what it's learned from these first students and create a second edition of the B-course that's scaled to the mainstream of pilot trainees.

To that end, Boeing teammates will spend the next four months conducting a "hot wash" of the course and revising it before Tyndall takes on a second class of students. They will compile feedback from 15 debrief sessions held with the first students to assess which facets of the course they need to augment, which need less emphasis and which, if any, they can eliminate.

After logging 88 hours in the simulators in their first few months at Tyndall, did the B-coursers encounter any surprises during that much-anticipated first flight in a high-performance Raptor? "It was actually very similar to flying the FMT (full mission trainer)," said First Lt. Ryan Shelhorse, "except for the sensation of wind rushing past the canopy, of moving through a sea of air that has mass and density."

Back in Seattle, the team is not resting on its laurels. "The sim fidelity we achieved for this first class has served the purpose," said Profitt, "but you never want your simulators to be a training limitation. Maturing that fidelity is a continual, never-ending process." ■

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