

Not by the seat of his pants

Test pilot Chuck Killberg demystifies his job—and the F-22 Raptor

By DOUG CANTWELL

He's flown more than 180 different aircraft, including the world's most advanced fighters. He currently flies C-17s, T-33s and various derivatives of the 737, 757 and 767.

It's easy to imagine his kind as cowboys of the sky, but Chuck Killberg debunks that image. "Test pilots are first and foremost engineers," he said. They're fascinated by all complex systems, especially those that fly. They study a new winged machine, wondering what they can learn from it—whether it's a Piper Cub, a 737 or an F-22 stealth fighter.

Killberg cited one of his heroes, test pilot and astronaut Neil Armstrong. "You might expect he'd want to talk about walking on the moon," said Killberg, director of Flight Operations for Global Mobility Systems in Integrated Defense Systems. "but he'd much rather discuss the characteristics of some interesting aircraft or an engineering problem."

THE MISSING LINK

Killberg spent most of his first decade at Boeing as one of the test pilots who helped developed the F-22, for which Boeing pro-



Chuck Killberg sits at the controls of a Boeing C-17 in Long Beach, Calif., where he is currently director of Flight Operations for Global Mobility Systems. Killberg's experience includes having been a Boeing test pilot for the F-22 Raptor.

GINA VANATTER PHOTO

vides the wings, aft fuselage, avionics integration and training programs. Indeed, he has a special fondness for the Raptor and the team that brought it to life. “We pilots tried to beat everything out of the airplane that didn’t make sense,” he recalled. They wanted to free the pilot to concentrate on tactics rather than on operating the aircraft. “We wanted this advanced fighter to be the most user-friendly.”

The test pilots appealed to F-22 subsystem engineers to automate as many aircraft startup functions as possible, which eventually reduced the number of discrete steps from 18 to just three. Today, the entire startup sequence for the F-22 is: battery—ON; auxiliary

for example, would describe what happens during a particular malfunction.

“Sometimes you’d see a light go on when another engineer would realize that the hydraulic failure would also cause problems with his system, one he hadn’t expected,” Killberg recalled. “That was one of the most intense and satisfying parts of the job.”

RAPTOR 03’S FIRST FLIGHT

Killberg piloted the first flight of Raptor number 4003, the third F-22 but the first structurally representative airframe. Even though it wasn’t Raptor 01, there was still uncertainty in the air.

“Blessedly uneventful would be a good

sign and build it. “You just happen to be the lucky guy who gets to fly it,” he said.

“After it’s over, you owe the team a thorough and technically accurate debrief on how their systems and subsystems performed and interacted,” he added. “But while it’s happening, you want to convey the enthusiasm and pride they all feel.”

ON THE FLYING TEST BED

Killberg joined Boeing in 1991 after 21 years in the U.S. Air Force, where he’d directed developmental flight test of the F-15E Strike Eagle fighter. Besides serving as Boeing’s first F-22 test pilot, he was assigned in 1995 to manage a team that operated and maintained the prototype Boeing 757 as it was transformed into a flying avionics lab.

The 757 Flying Test Bed (FTB) resembles a giant prehistoric bird with its chin pod, F-22 radome nose and sensor wing mounted on top of the fuselage just aft of the cockpit. It was used to test the Raptor’s avionics in flight, before the first F-22 ever flew. This was critical because the F-22’s avionics—more highly integrated than anything in existence—needed a head start. The flying lab sped development while reducing risk and costs.

Killberg has logged about 1,000 hours flying the FTB and will fly it again during the next phase of avionics testing, which starts later this year. Although a 757 doesn’t provide the visceral thrill of the Raptor, he knows it makes a serious contribution.

“The FTB allows engineers to ‘fly’ on board an F-22, observing their systems first-hand in real time on a moving platform,” he said. “That gives them a huge advantage over looking at recorded, post-flight data.”

Sooner or later, one has to ask a test pilot the inevitable question: Has he ever had to “punch out” (eject from an aircraft) during flight?

“Fortunately, takeoffs equal landings so far,” Killberg responded. He’s come close to ejecting a few times but in each case resisted the impulse long enough to find a better solution.

“Folks assume that test pilots have lightning-fast reactions,” Killberg said. “But sometimes a slow, deliberate response is better.

“Or maybe it’s just slow reactions,” he added with a shrug, “and an innate distrust of parachutes.” ■

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Besides flight-testing the F-22 (as he’s doing here), test pilot Chuck Killberg managed operation of the prototype 757 (shown here, above the F-22) as it was transformed into a testbed to expedite development of the Raptor’s avionics. LOCKHEED MARTIN PHOTO BY KEVIN ROBERTSON

power unit—START; throttles—IDLE. All other systems start automatically and perform initial checks with no pilot input.

In this and other areas, Killberg and his colleagues contributed an operational perspective on how individual systems needed to interact with one another and with the pilot, even though they lacked the detailed knowledge that the individual systems engineers had.

During emergency procedure reviews preceding first flight, test pilots and subsystem engineers would gather in a conference room and work through every anticipated failure of every subsystem. The lead hydraulic engineer,

way to describe it,” said Killberg of the March 2000 flight at Marietta, Ga. “Because of all the buildup work, we knew there might be failures but were hoping for no big surprises.”

But surely there was a good deal of pressure on the man operating the world’s first fifth-generation fighter, “destined to change the way we fight wars,” as proponents were promising.

“Several thousand people came out to see the flight, and you’d hate to screw up with that many people watching,” Killberg said. But more than anything, he realized he was carrying the hopes and dreams of thousands of people who had worked long and hard to de-