The midnight ride

787 simulator helps ensure 1st flight's safety

By Lori Gunter

JEFF HAWK PHOTO

Mike Carriker, chief test pilot for the 787, "flies" the Dreamliner on a nighttime test in the 787 engineering cab.

At 11:45 p.m. on Nov. 7, a Boeing 787 Dreamliner pushes back from Gate N10 at Sea-Tac International Airport and heads out for a flight to John F. Kennedy International Airport in New York. Capt. Mike Carriker, chief test pilot for the 787 program, sits in the left seat and guides the airplane down the runway and into the air. This is Carriker's second flight of the day.

Pushback takes longer than expected. The flight isn't airborne until well after midnight.

The flight is anything but perfect—warning bells sound, fault messages appear and not everything works. But that's what a simulator is for.

Located in Seattle, the 787 engineering cab is not a motion-based simulator. But for anyone susceptible to motion sickness, the images outside the cabin "windows" provide a real enough sense of movement. The cab is being used to test new systems software loads for performance before they are loaded onto a real airplane.

TESTING SOFTWARE

A new software load had been made shortly before the flight, and not surprisingly, everything was not perfect.

Carriker and others, including Tom Cogan, chief project engineer, Jeff Hawk, director of certification, and Dan Murray, engineering lead for 787 Systems, called out the errors as they occurred. Chad Douglas, a flight crew operations integration engineer sitting at a laptop computer behind Carriker, recorded them. Dale Pool and Sean Hagen, Engineering Flight Deck Simulator integration and test, watched the digital readout of what the flight crew saw in the cabin as they managed the computer simulation.

"Some of these are easy fixes; some are the beginning of a lot of work," said Rob Davis, senior flight deck engineer. "The integration of the systems is enormous; we've got functionality from one supplier being hosted on a system by another supplier and being displayed through a graphics program and hardware provided by a third supplier."

With every load comes increased functionality and new issues—which have to be resolved before first flight around the end of the first quarter in 2008.

"It would be great to come in here and have everything work perfectly," said Carriker. "But we aren't there yet. This is just the hard work that has to happen to get us where we need to be."

And just as there are disappointments with faults and functionality, there are successes, too.

At this particular session, the head-up displays were working better than they had with the previous software load, a good sign. Likewise, a troublesome graphics issue that had caused the captain's navigation display to blink had been addressed.

The flight never makes it to the New York airport. The big tests for the night focus on the takeoff and landing sequences. Flying at cruise on autopilot for hours to get to the landing—that just doesn't make sense.

As arranged during the preflight briefing, Carriker invents a reason to divert—he radios to air traffic control, a role being played by Davis for the night.

"We have a medical emergency and we need to get to medical assistance," Carriker says as he requests permission to divert to Moses Lake in Washington state.

Davis gives permission. A new route is plotted and soon it is time for the landing sequence.

The airplane is on the ground by 2:15 a.m., after several touch-and-go landings that test the system. Flying late at night means when first-shift people arrive, they have plenty to work on. It's good practice for what is expected to be an around-the-clock flight-test program.

Carriker estimated he's flown more than 1,000 hours in the simulator and will log 200 to 300 more before the real first flight.

"The process of building airplanes, testing them and getting them ready to fly isn't easy," he said. "There's a lot to do, and it takes a team of incredibly gifted experts to get everything working together and ready.

"We won't fly the 787 until it is ready. In addition to being structurally sound, that means the systems check out. We aren't there yet, but we will get there." ■

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