

# Fly by wire



## The Wordchipper<sup>SM</sup>

by Larry Gauper • #227

Wordchipper@Gmail.com  
Blog: www.Wordchipper.com

Although several books have been published about the highly successful ditching of US Airways flight 1549 in New York City's Hudson River on January 15 of last year, I've only read one, and it was terrific! I'm referring to *Fly by Wire: The Geese, the Glide, the Miracle on the Hudson* by William Langewiesche, published in 2009 by Farrar, Straus and Giroux, New York City. You don't have to have an interest in the technical aspects of modern aviation to enjoy this book—but the more you're interested in airplanes, the more you'll like this treatment of one of the decade's most fascinating and inspiring life-in-the-balance events.

*Fly by Wire* isn't just about the masterful flying skills of Captain Chesley B. Sullenberger, III, 57, and the exemplary performance of his experienced crew: First Officer Jeffrey B. Skiles, 49, and Flight Attendants Sheila Dail, 57, Doreen Welsh, 58, and Donna Dent, 51. This book is also about how the Airbus A320 aircraft, specifically its "fly by wire" design, played a key role in the successful ditching in the Hudson.

Just two minutes after take-off, as the jetliner climbed through 2,650 feet at 250 miles per hour, it was struck by a flock of geese, resulting in loss of power to both engines. As is now well-known, Sullenberger and Skiles were forced to land the plane on the Hudson River. Incredibly, all 150 passengers on board, plus the crew, survived.

Ever since the introduction of the first Airbus, designed and built in Toulouse, France, 22 years ago, parts of its paradigm-shifting operational design have been a source of concern and some controversy among pilots. In most modern jets from any manufacturer, mechanical gauges have been replaced by computer displays (the so-called "glass cockpit"). These new-generation planes also make use of wires to carry commands to electric motors, rather than using hydraulic-fluid lines; hence the term "fly by wire." However, it's the way Airbus carries out their *automation* that upsets pilots.

Airbus, according to Langewiesche, designed their software so the computer—not the human pilot—is the supreme authority in flying the airplane. In some critical cases, the pilot cannot exceed certain flight parameters even if he or she tries to because the computer manages and "enforces" the "flight envelope." This means that if a pilot wants to climb or descend at a speed and/or inclination beyond what HAL (the computer) says the plane can do, then the pilot simply can't make this maneuver. The plane's computer won't allow it.

On the other hand, with Boeing's automation, the pilot can do anything that a human thinks is needed. This means if the pilot needs to descend or climb in a manner that exceeds the plane's specifications, the pilot can go ahead and do just that (and assume the risk). This makes the captain the supreme authority in the cockpit.

With the Airbus A320, the type of aircraft that landed on the Hudson, the computer is top dog in the cockpit.

Pilots, I can understand, would prefer to be totally in charge of the plane they're flying, and the conventional wisdom is that Captain Sullenberger would have found the Airbus A320's automation a hindrance as he faced what was an extremely rare emergency calling for decisions and maneuvers that weren't in the book.

Langewiesche, however, takes the opposite view. He asserts that the A320's automation actually *assisted* Sullenberger in making a masterful water landing. The plane's computer did this by taking over some of the more routine adjustments of the aircraft's control surfaces, while the captain made the choices that only a human could make in that situation. It became a dance in which the aircraft's automation followed the human's lead. And this teamwork—of human and machine—worked very well.

Had Sullenberger and his co-pilot been forced to make all the routine decisions and manually execute the actions that the Airbus's computer was doing for them, the human crew would have had to deal with many more distractions from their central mission of landing a powerless plane.

How all of this happened and why, along with a history of the development of the Airbus and interesting details about being an airline pilot today, makes for one exceptional book. After reading it, I would love to hear from a current airline pilot regarding the automation controversy and Langewiesche's views.

All in all, the cockpit professionalism of Capt. Sullenberger and First Officer Skiles was certainly a far cry from the behavior exhibited by the crew that recently overflew Minneapolis by 150 miles. Thankfully, from talking to several pilots I know, the former is far more prevalent than the latter. Comforting to know the next time you fasten your seatbelt and get ready for takeoff.