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# Atlantic Airbus Crash Pits Brain Against Computer Encroaching on Cockpit

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By Andrea Rothman and Laurence Frost - May 26, 2011 11:41 AM GMT+0100

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The cockpit of the Airbus A330-200. The interaction between man and machine in the last two decades has moved toward computers flying the jet, with pilots more at the receiving end of electronic commands rather than the other way around. Source: Airbus via Bloomberg News.

The crash of Air France flight 447 in 2009 that killed 228 people casts the spotlight on pilots' ability to execute split-second decisions and avert disaster in an era when computers have taken control of the cockpit.

Evidence gleaned from the Airbus A330's last transmits shows the autopilot disengaged after speed readings became unreliable, forcing the two co-pilots in the cockpit to take over, just as the jet traversed a storm. Data from the final minutes indicate the aircraft went into a stall before crashing into the sea, four hours into its flight to Paris. The French investigators will publish a detailed report tomorrow.

The findings will likely fan the debate whether modern-day pilots, accustomed to simulators and automated flight controls, still possess the airmanship skills and training routine needed to overcome sudden adverse scenarios. The interaction between man and machine in the last two decades has moved toward computers flying the jet, with pilots more at the receiving end of electronic commands rather than the other way around.

"Automation is inevitable, yet the whole interface between pilot and automated systems must be rethought," said Hans Weber, president



The Airbus A330 jet that crashed on June 1, 2009, was a wide-body aircraft using so-called fly-by-wire technology that replaces traditional manual flight controls with an electronic interface. Source: Forca Aerea Brasileira via Bloomberg



Data from the final minutes indicate the aircraft went into a stall before crashing into the sea, four hours into its flight to Paris. Source: BEA via Bloomberg

yoke of older aircraft.

The BEA, France's flight-accident investigator, will reveal its first findings from the analysis of the two data recorders tomorrow. The boxes were retrieved from the bottom of the Atlantic this month, after almost two years of intermittent search missions. The data and voices proved to be intact, allowing the BEA to reconstruct Flight AF447's last minutes.

## Tropical Storms

The aircraft took off on May 31, 2009, in [Rio de Janeiro](#) under the stewardship of Chief Pilot Marc Dubois and two deputies. About four hours into the flight, the A330, now cruising on autopilot at an altitude of about 35,000 feet (10,700 meters), passed over an area known as the inter-tropical convergence zone close to the equator where storms produce icy, windy conditions that create frequent turbulence.

With Dubois taking a routine break outside the cockpit, the two less-seasoned pilots were in charge when the plane's air speed sensors failed, most likely after icing up. The absence of

of Tecop International Inc., an aviation consulting firm based in [San Diego](#), who has given safety advice to the U.S. Federal Aviation Administration and companies including Airbus parent European Aeronautic, Defence & Space Co.

## Joystick Steering

The Airbus A330 jet that crashed on June 1, 2009, was a wide-body aircraft using so-called fly-by-wire technology that replaces traditional manual flight controls with an electronic interface. Airbus pioneered the system in civil aviation more than two decades ago on its A320 single-aisle jet, which remains the Toulouse, France-based company's best-selling model to date.

Today, all Airbus planes are fly-by-wire, as is [Boeing Co. \(BA\)](#)'s 777, introduced in 1995, and its 787 Dreamliner, set for service this year. The system prescribes flight parameters that Airbus pilots cannot override completely to avoid maneuvers that would potentially jeopardize the aircraft. On Airbus, a one-hand joystick similar to those used for computer games has replaced the traditional steering

Fe  
Se  
  
Ab  
He

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Adver

Adver

FR

B  
F

reliable speed data prompted the autopilot to disengage, data transmitted from the flight has shown.

Amid darkness and likely storm turbulence, the two pilots were forced to take control and keep the correct level of thrust on the two engines to maintain the right air speed and pitch attitude, the degree to which the jet's nose is tilted upward, according to two people who have been briefed on the data recorders. They spoke on condition of anonymity ahead of the BEA's report tomorrow.

## Low-Speed Stall

Readings from the flight data retrieved from the sea bed show the jet lost velocity, which led to a low-speed stall because the plane slowed to the point where its wings suddenly lose lift. While getting out of a stall is part of any standard pilot training, coping with the challenge amid adverse weather conditions, darkness, and a multitude of automated alarm signals may have overwhelmed the flight crew.

"It's easy enough in a simulator," said Henri Marnet- Cornus, a former Air Force fighter pilot and flight captain at Air France on Airbus A330 and A340 jets. "But in reality, when you're in the middle of a storm, shaken by turbulence with airspeed warnings and a whole series of other alarms going off, it's not a safe condition."

Under Air France's continuous training and re-assessment program, every pilot has four simulator sessions each year of about 30 hours in total, focused on handling abnormal aircraft situations including stalls. Failure of any assessment sessions leads to re-training and a new assessment. Each pilot is also accompanied by an instructor on one flight a year.

## Much Safer

Captain Dubois had logged a total of 11,000 flying hours in his airline career, compared with 6,500 hours by the first co- pilot and 2,900 by the second. After the AF447 accident, Air France pilots were granted one extra simulator sessions to help deal with speed-sensor failures.

In the last half century, commercial aviation has become "100 times safer," said [Paul Hayes](#), director of safety at London-based aviation data and advisory firm Ascend Worldwide Ltd. Still, automation has increased the number of systems that pilots need to monitor, he said.

“Sometimes, the man-machine interface can introduce problems itself,” Hayes said. “It may cure 70 percent of problems, but then add a few more.”

Pilots’ rapid reaction has proven a potential life saver on recent incidents. When an engine exploded on a [Qantas Airways Ltd. \(QAN\)](#) Airbus A380 superjumbo in November, the cockpit boasted five experienced pilots because the flight was part of a training routine. That line-up allowed the crew to work through the host of warning signals and land the aircraft safely after shrapnel from the explosion had ripped away parts of the wing.

## Hudson Miracle

US Airways Captain Chesley B. “Sully” Sullenberger III, who flew an [Airbus A320](#) in his “miracle” Hudson River landing two years ago, told the [New York Times](#) in 2009 that automation is a “mixed blessing.” While computerized planes are capable of protecting a pilot, they can also produce other types of errors that would likely not have occurred in an older aircraft, he said, according to the article.

“There needs to be more hands-on, more physical awareness, and more initiatives,” said David H. Jenkins, a 72 year-old retired Boeing 747 jumbo captain who flew for Pan American World Airways and [Delta Air Lines Inc. \(DAL\)](#) “Computers make great monitors for people, but people make poor monitors for computers.”

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