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Search Is On for Wreckage of Missing Air France Jet

By [DONALD G. McNEIL Jr.](#) and [CHRISTINE NEGRONI](#)

The disappearance of an Air France jet en route from Rio de Janeiro to Paris on Sunday evening left seasoned crash investigators with a mystery to plumb and very little data to work with.

The [Airbus A330-200](#), carrying 228 passengers and crew members, is believed to have vanished in a towering thunderstorm with no word from its pilots that they were in crisis.

The plane had beamed out several signals that its electrical systems had malfunctioned and, according to one report, that it had lost cabin pressure. The signals were sent not as distress calls, however, but as automated reports to Air France's maintenance system, and were not read for hours, until air traffic controllers realized that the plane's crew had not radioed in on schedule.

As a search for wreckage began over a vast swath of ocean between Brazil and the African coast, experts struggled to offer plausible theories as to how a well-maintained modern jetliner, built to withstand electrical and physical buffeting far greater than nature usually offers, could have gone down so silently and mysteriously.

There were no suggestions on Monday that a bomb, a hijacking or sabotage was to blame. Whatever of the plane's final minutes was recorded in its black box may never be known, because it is presumably at the bottom of the Atlantic. As is common with trans-ocean flights, it was too far out over the sea to be tracked on land-based radar from Brazil or Senegal. Whether its location was captured by satellite or other planes' radar is not known yet.

The plane, Flight AF 447, was scheduled to arrive at [Charles de Gaulle](#) airport at 11:10 a.m. local time. Stricken relatives descended on Terminal 2D, where the airline established a crisis center. A black-robed priest was making his way past hordes of police officers and journalists to comfort relatives of those on the flight.

"Air France is extremely distraught, and the whole team of Air France is suffering," Pierre-Henri Gourgeon, the chief executive of Air France-KLM, told reporters in Paris. "We would like to say to the relatives of the victims that we are totally with them and will make every effort to help them."

President [Nicolas Sarkozy](#) of France said: "It's a tragic accident. The chances of finding survivors are tiny."

There were people of 32 nationalities aboard, including 58 Brazilians, 61 French and 2 Americans, Air France said in a statement based on information from Brazilian authorities.

The flight took off from Rio de Janeiro at 7:30 p.m. local time (6:30 p.m. Eastern time), and its last verbal communication with air traffic control was three hours later, at 10:33, according to a statement from Brazil's civil aviation agency. At that time, the flight was at 35,000 feet and traveling at 520 miles per hour.

About a half-hour later, it apparently encountered an electrical storm with "very heavy turbulence," Air France said. The last communication from it came at 11:14 — a series of automatic messages indicating it had suffered an electrical-system malfunction. The Associated Press reported that it also suffered a loss of cabin pressure.

Brazilian officials said the plane disappeared over the Atlantic somewhere between a point 186 miles northeast of their coastal city Natal and the Cape Verde islands off Africa. The area is known as the "horse latitudes," where the tropics of the Northern and Southern Hemispheres mix, sometimes creating violent and unpredictable thunderstorms that can rise to 55,000 feet, higher than commercial jetliners can go.

Experts were at a loss to explain fatal damage from lightning or a tropical storm, both of which jetliners face routinely, despite efforts to avoid them — as much out of concern for passengers' nerves as for the planes' safety.

Pilots are trained to go over or around thunderstorms rather than through them. Brigitte Barrant, an Air France spokeswoman, said the highly experienced pilot had clocked 11,000 flying hours, including 1,100 hours on [Airbus](#) 330 jets.

"A completely unexpected situation occurred on board the aircraft," Mr. Gourgeon told France's LCI television.

"Lightning alone is not enough to explain the loss of this plane, and turbulence alone is not enough," he said. "It is always a combination of factors." By some estimates, jetliners are typically hit by lightning at least once a year. But the strike normally travels across the plane's aluminum skin and out the tail or a wingtip. Passengers are insulated in the nonconductive, largely plastic interior, and vital equipment is shielded.

A loss of cabin pressure could suggest a break in the fuselage, but planes are built to withstand buffeting from a storm's updrafts and downdrafts. It could also be a consequence of an electrical failure, if the plane's air compressors stop working.

Large hailstones created by some thunderstorms have been known to break windshields or turbine blades, though pilots would be likely to rapidly report something like that.

The missing aircraft was relatively new, having gone into service in April 2005. Its last hangar maintenance check was on April 16, Air France said. No [Airbus](#) A330-200 passenger flight ever had a fatal crash, according to the [Aviation Safety Network](#).

Hans Weber, head of the Tecop aviation consulting firm in San Diego, offered a hypothesis about the episode, based on his knowledge of severe losses of altitude by two Qantas jets last year.

The new Airbus 330 was a "fly-by-wire" plane, in which signals to move the flaps are sent through electric wires to small motors in the wings rather than through cables or hydraulic tubing. Fly-by-wire systems can

automatically conduct maneuvers to prevent an impending crash, but some Airbus jets will not allow a pilot to override the self-protection mechanism.

On both Qantas flights, the planes' inertia sensors sent faulty information into the flight computers, making them take emergency measures to correct problems that did not exist, sending the planes into sudden dives.

If the inertia sensor told a computer that a plane was stalling, forcing it to drop the nose and dive to pick up airspeed, and there was simultaneously a severe downdraft in the storm turbulence, "that would be hard to recover from," Mr. Weber said.

Donald G. McNeil Jr. reported from New York, and Christine Negroni from Greenwich, Conn. Reporting was contributed by Sharon Otterman and Micheline Maynard from New York, Caroline Brothers from Paris, Alexei Barrionuevo from Buenos Aires, Brian Knowlton from Washington, and Andrew Downie from São Paulo, Brazil.

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