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Air France Black Box Search Harnesses Hollywood for Crash Clues

By Andrea Rothman and Matthew Campbell - Apr 20, 2011

Investigators seeking to explain why Air France flight 447 plunged into the night ocean two years ago will rely on gear pioneered by telecommunications and oil companies as well as a Hollywood director to unlock the mystery.

The wreckage of the Airbus SAS A330 jet was discovered this month 3,900 meters (12,800 feet) deep in the Atlantic Ocean off the coast of Brazil after multiple searches. Few aircraft salvage missions have probed the same depth, where the sea is perfectly black, temperatures approach freezing and water pressure is equal to the weight of a car on a postage stamp.

Diving deeper than the Titanic's final resting place, a robot tethered to a surface ship will sift through the aircraft debris in search of the two flight recorders bolted inside the tail of the fuselage. Their data promises the best chance yet to explain the crash, the deadliest in Air France's history. Complicating the mission is the presence of numerous bodies, some still strapped into their seats and preserved by the cold water and lack of oxygen or light.

"At that depth, it is pitch black, and the difficulty is knowing where you are while keeping track of things," said Dave Gallo, director of special projects at the Woods Hole Oceanographic Research Institute in Falmouth, Massachusetts, whose robots helped locate and map the wreckage. "It's a question of operational skill."

No Survivors

The Airbus disappeared en route to Paris from Rio De Janeiro on June 1, 2009, leaving no survivors among the 228 aboard. While some fragments and bodies were recovered from the surface of the sea, most of the jet remained missing until this month. The data recorders are built to withstand submersion and extreme impact, though until retrieved there is no certainty the data they stored will be readable.

The expedition will gather at the port in Dakar in Senegal tomorrow, before traversing the Atlantic on the Ile de Sein vessel to the location of the aircraft, about 435 nautical miles off the coast of Brazil.

French phone-equipment maker Alcatel-Lucent SA is providing the 140-meter ship, which normally

lays deep-sea cables. Aboard will be 70 people, including members of the French BEA air accident authority, investigators from the U.K. and Brazil, experts from Airbus and Air France, as well as one psychologist. Family members of the victims were not permitted aboard.

Robot Submarines

Underwater engineering company Phoenix International Holdings Inc. is sending one of its two "Remora" robotic submarines, or ROVs, equipped with high-resolution cameras and two manipulator arms. The basket on the ROV can recover as much as 200 kilograms (440 pounds) of debris in a single mission.

"There are about six to eight ROVs in the world capable of descending as deep" as the Remora, said Tim Janaitis, business development manager at Phoenix, who spoke from Largo, Maryland. Typically, the robot's missions include work on deep-sea oil drilling, and a recent descent took the vehicle to the Titanic wreck in the northern Atlantic, Janaitis said.

The search for the remains of the doomed ocean liner in the mid 1980s, and the 1997 blockbuster movie directed by James Cameron helped advance deep-sea technology, spawning high- resolution cameras and robots that can scour through wrecks.

Nazi Battleship

Following the success of the Titanic movie, which won 11 Academy Awards and cost about $200 million to make, Cameron embarked on an underwater expedition to Nazi battleship Bismarck, which sank in the Atlantic in 1941.

"Stuff like that is enough at times to help keep research going," said Robert Jensen, chief executive officer of Kenyon International Emergency Services, a Houston-based company that helps airlines handle disasters. "Look at what they spent on the Cameron movies. He went down on several submersibles to look at ships, to recreate as realistically as possible what happened."

The Remora robot can work as far down as 6,000 meters. To ensure steady operation, a team of nine Phoenix experts will operate the 900-kilogram sub from the ship using large video monitors to track its progress. Every movement of the vessel at the surface is translated to the Remora's umbilical cable with a delay, said Brennan Phillips, manager of ROV operations at the University of Rhode Island in the U.S.

Delayed Reaction

"If the ship moves, it takes half an hour for the vehicle to feel it," he said. "You need an extremely stable ship."

Of the almost 100,000 photos taken of the wreck and surrounding area, BEA publicized several black-and-white images of the landing gear, an engine, a wing and parts of the fuselage. While the black boxes have not been spotted, the robot has located the part of the tail that normally houses the recorders. Investigators withheld images of bodies and made them available only to researchers involved in the mission. For some, the sight was too much to bear.

"There were many bodies, and our people initially said they would not like to participate in any such recovery operation," said Peter Herzig, director of the Leibnitz Institute of Marine Sciences in Kiel, northern Germany, whose Remus 6000 robot sub was one of three that located the wreck.

Team members later changed their minds, though in the end, Herzig's group wasn't asked to participate, he said.

Should the recorders be found, they will be pried from the wreck, lifted aboard the Ile de Sein and immediately placed under seal, before being transported by a French Navy vessel to a French port. From there, they will be sent by air to the BEA under the responsibility of a judicial police officer.

Recovering Bodies

Recovering the victims is a more complex and contentious task. Only 51 bodies, including the pilot, were recovered from the ocean surface in the weeks after the crash.

Nelson Marinho, who leads a group of victims' relatives, said not all families want to see corpses brought up, though they recognize the obligation to present forensic evidence for a criminal probe. A French prosecutor is pursuing allegations of manslaughter against both Airbus and Air France, and autopsies may help answer questions such as whether passengers were still alive when the plane sank. BEA said all decisions concerning human remains will be made by France's Justice Department.

"The worst feeling, for us, is the risk of even more damage to these corpses," Marinho said. "French officials want to transport them to France, but we want to bring them directly to Brazil." Among the victims were 58 passengers from Brazil, 61 from France, 26 from Germany, and other nationalities including travelers from China and South Korea.

TWA Crash

Past aircraft salvage missions have managed to recover the bodies of victims. The U.S. National Transportation Safety Board brought up all the bodies from TWA flight 800, which crashed off Long Island in 1996, and EgyptAir 990, which went down 60 miles from Nantucket in 1999, former director Jim Hall said.

"I think as human beings, it's the humane practice, and it would be a disservice to family members by

the airline and regulators not to recover them," he said.

The greatest technical challenge will remain operating at an extreme depth. Only one past air crash has forced salvage teams to dive deeper. The wreckage and black boxes of a South African Airways Boeing 747 that disappeared near Mauritius in 1987 were located 14 months later under 14,000 feet of water.

"It's only relatively recent that we even have the technology to consider these kind of recoveries," said Paul Hayes, director of safety at London-based aviation consultant Ascend Worldwide Ltd. "And it sounds simplistic, but I think we tend to forget how vast the oceans are."

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