

FLIGHT SAFETY FOUNDATION WHITE PAPER

Deployable Flight Recorder Systems – A Key to Preventing Accidents

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Obtaining flight data recorder (FDR) and cockpit voice recorder (CVR) content as quickly as possible after an aircraft accident is crucial in determining the causes and contributing factors, and, more importantly, in developing safety recommendations to prevent similar accidents. Some historic accidents and more recent events — such as the disappearance of Malaysia Airlines Flight 370¹ earlier this year and the 2009 crash into the Atlantic Ocean of Air France Flight 447² — have shown that in some accident scenarios, timely recovery of these flight recorders proved to be impossible. When an accident occurs in a remote area, over water or at an unknown location, recovering the flight recorders can be a significant challenge.

To address this challenge, Flight Safety Foundation strongly supports the development of a deployable flight recorder system (DFRS) for commercial air transport aircraft, a system that will preserve the important flight information generated aboard the accident aircraft and make it available to accident investigators in a timely manner. One way to do this would be with a “virtual DFRS” that transmits FDR and CVR information when specific, predetermined triggering conditions are met. Another method would involve an ejectable container that includes an FDR, a CVR, an emergency locator transmitter (ELT) and a strobe light, all protected by one hardened container that is also buoyant. This “physical DFRS” type would be ejected from an aircraft to transmit information when predetermined triggering conditions are met.

Neither the physical DFRS nor the virtual DFRS would replace the current, FDR and CVR systems that are permanently affixed to the aircraft, but would augment them in case of an accident in a remote or overwater location. Even in a non-remote accident scenario, a DFRS would facilitate the expeditious recovery of critical flight and location information.

A DFRS provides two significant advantages over permanently affixed flight recorders. First, because it incorporates global navigation satellite system technology (such as the U.S. global positioning system [GPS]), the deployable ELT in a physical DFRS ensures that the accident location can be identified relatively quickly — particularly useful if the accident occurred over water or in a remote location — and that search and rescue, and the accident investigation, can begin without delay. Second, if the permanently affixed recorders are damaged enough to prevent successful data retrieval or are inaccessible, the DFRS provides accident investigators the backup source of information. Deployable systems have been used for years by U.S. military services, which have had 100 percent success in recovering their deployed systems after mishaps, and have been used similarly in many civilian helicopters, especially those flying in the offshore resource industry.

The concept of expanding DFRS use to commercial air transport aircraft has been discussed and studied by government and industry organizations since the 1960s. Deployable flight recorders have also been the subject of numerous accident report safety recommendations for many years.

Among the more recent were several recommendations from the French Bureau d'Enquêtes et d'Analyses (BEA) during its investigation of the Air France crash that called for a study of the possibility of requiring airplanes on public transport passenger flights to regularly transmit data on basic flight parameters. Another BEA recommendation urged requiring that public transport aircraft that travel over remote or maritime areas be equipped with devices to enable the "triggering of data transmission to facilitate localization as soon as an emergency situation is detected on board."

A number of relevant systems already exist for the automatic transmission of data from aircraft to ground stations, usually for maintenance or flight monitoring purposes and they have influenced current discussions.

Especially in response to the accidents in which important flight recorder information has been lost, or its availability significantly delayed, many national and international aviation organizations are studying ways to make the recovery of the FDR and CVR information more consistent and reliable. Flight Safety Foundation fully supports these efforts.

In addition, the Foundation believes that the many excellent, but disparate, ongoing efforts around the world addressing various aspects of DFRS should be coordinated to obtain the maximum value. The Foundation has a long history of facilitating projects like this and is ideally suited to lead this effort because of its record leading highly successful international safety campaigns involving issues such as approach and landing accident reduction, functional check flights and runway excursion risk reduction. The Foundation would ensure that international representatives from regulators, manufacturers, operators and industry organizations are included in the effort and would coordinate the research, fact-finding and experts' conclusions concerning technology, cost, type and feasibility of DFRS. In summary, Flight Safety Foundation is well positioned to develop a consensus on recommendations to enable the timely installation of DFRS in all commercial air transport aircraft.

Notes

1. Flight 370 was a Malaysia Airlines Boeing 777-200ER that lost contact with air traffic control on March 8, 2014, about an hour after departure from Kuala Lumpur for a flight to Beijing. The Malaysian government's accident investigation determined after several weeks that the flight "ended in the southern Indian Ocean," and a multinational search for the wreckage was continuing. All 239 people aboard are presumed to have been killed.
2. Air France Flight 447 was an Airbus A330-200 that disappeared over the Atlantic Ocean on June 1, 2009, during a flight from Rio de Janeiro, Brazil, to Paris. After a search of nearly two years, the flight recorders and the wreckage were located in March 2011 and recovered two months later. All 228 people aboard were killed. The BEA said the airplane crashed into the water after the crew responded improperly to the loss of reliable airspeed information, the airplane stalled and the crew did not take appropriate action to recover.

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