



Flight Recorder Delivers Weight Savings and Improved Performance

Challenge	Solution	Result
Limited space and weight budget available	Compact and lightweight flight recorder	More optimum aircraft performance for lower operating costs
Reliable and trusted data storage needed	Proven supplier	100% positive accident data retrieval
Simple and quick access to data required	Fast Ethernet interface	Data downloaded in under two minutes

Challenge

An intermediate twin-turbine helicopter developed for a wide range of applications required a flight recorder. These applications include executive/VIP transport, emergency medical services (EMS), search and rescue (SAR), offshore oil, gas, and petrochemical support, firefighting, law enforcement, and military roles. This flight recorder would need, at a minimum, to capture all the data from the avionics suite and meet the relevant EASA and EUROCAE regulations.

The aircraft manufacturers also wanted a compact recorder that could fit easily into the helicopter's tail boom to keep valuable cockpit and passenger space free. It was also essential to keep the weight down, both for the recorder itself and the required installation and wiring, to minimize the impact on aircraft fuel burn and range.

In the unfortunate event of an accident, it is vital to have reliable data about the aircraft's performance and the pilot's actions to establish the cause. This means that not only does a recorder need to survive a crash event, but that it also functions without fail for many years in a hostile environment. Making the data easy and quick to access is always helpful. Still, it is especially so for more frequent applications such as investigating minor incidents (e.g., a hard landing) and for operational or maintenance reasons. In these programs, quick and easy data access can save time and money.

Solution

The manufacturer chose a combined flight data, cockpit, and datalink recorder from Curtiss-Wright. All the aircraft data is processed by an avionics suite, where one of the two integrated main avionic units outputs an ARINC 573/717 data stream that acts as the input to the flight recorder. Over 700 aircraft parameters are captured, including engine data, avionics information, installation parameters, and fuel parameters. The recorder can store in excess of 25 hours of flight data at 512 words per second in a continuous loop and weighs just 7lb, making it one of the lightest on the market.

Curtiss-Wright has over 60 years of experience manufacturing crash recorder products. In 1994, Curtiss-Wright was the first to create a combined cockpit voice and flight data recorder and obtain approval for solid-state versions. Further product upgrades and developments have since followed. The proven heritage was one reason it was selected to become a standard fit device on the manufacturer's helicopter. At the time-of-flight recorder selection, the Curtiss-Wright solution was the only digital small, light, standalone-combined recorder ready to interface with the ARINC 717 bus that didn't require additional software.

The helicopter manufacturer received the flight recorder already configured, and installation was straightforward, requiring only the connection of one cable and four screws. The small system fits in the tail boom, and the cable routing is easy thanks to a single connection that supplies data and power to the system. Importantly, this compact unit attaches directly to the airframe without the need for bulky equipment racks or antivibration mounts. On-aircraft download from the flight recorder is quick, and the recorder can also be networked directly to a remote operational base for remote diagnostics and fault reporting. Due to the availability of the data, many end users are also using the flight recorder in-flight data monitoring programs.

Results

The compact and lightweight flight recorder was easy to install and has resulted in more optimum aircraft performance for lower operating costs than similar heavier and bulkier alternatives. The flight recorder is one of the most versatile compact units available that is fully approved for current and anticipated crash recorder requirements. Although operating in the harsh environments found in offshore transport, law enforcement, mountain rescue, and so forth, the flight recorder has never been returned due to an operational fault or suspicious activity.

To date, in every accident investigation case that required data retrieval off the flight recorder, there was 100% customer satisfaction and positive feedback. Even if the device was severely damaged or submerged in water, investigators have been able to retrieve both audio and flight data (although water contamination required a full recorder disassembly and memory board cleaning). To date, no flight data has been lost due to memory corruption.

Information retrieval is via an integrated web server accessed via an Ethernet interface directly to a portable transfer device or analysis PC using standard

network hardware and protocols. The result is that flight data can be downloaded onboard in less than two minutes, and the recorder can be networked directly to a remote operational base. The standard interface means that accident investigators can download and process the data on the crash site, saving the time and money typically incurred waiting for data retrieval and processing post-accident. The flight recorder is supported by the PGS data analysis and visualization software (plug-and-play software that makes it simple to download the data and convert it into a graphical, visual, and audible format that's easy for us to understand).