

Onboard Crash Data Device Aids Reconstruction Efforts

*By David J. Mulholland,
Lieutenant and Commander,
Information Technology and
Communications, U.S. Park Police,
and Member, IACP Law
Enforcement*

In the early 1970s the National Transportation Safety Board had a vision for the development of a device that would collect crash data in order to help the National Highway Traffic Safety Administration (NHTSA) evaluate information from vehicles involved in crashes. As a result, many motor vehicles collect data in collisions involving air bag deployments and in most collisions that do not deploy air bags. General Motors and Ford have made this data accessible to third parties including law enforcement. Approximately 15 percent of the vehicles manufactured today have onboard devices that capture crash data that can be harvested. This data is extremely useful to the law enforcement crash investigator and reconstructionist.

The Little Black Box

The advent of air bags brought sophisticated collision detection devices that determined when a collision was severe enough to generate an airbag deployment. The restraint control module, often called the motor vehicle black box, generally captures and stores data ranging from the instant the collision sensor determines the need to deploy an air bag up to five seconds prior to the crash. The data collected normally includes engine RPM, vehicle speed, deceleration, throttle percentage, braking status, and status of the driver's seat belt.

In a crash that generates an air bag deployment, this data is permanently written to the restraint control module. Most devices also capture data in nondeployment crashes. Data from crashes that do not involve air bag deployment is accessible for a limited amount of time. Generally, the data is stored for a length of 250 ignition cycles, or approximately

50-60 days of normal vehicle use. However, a subsequent crash of worse severity will overwrite any previous nondeployment crash data.

An Investigative Tool

The data retrieved from the motor vehicle black box is crucial to the law enforcement agency investigating a serious injury or fatal crash. At a cost of approximately \$2,500, a law enforcement agency can purchase the tool to retrieve this information from select General Motor vehicles dating back as far as 1994. The Vertronix CDR (crash data retrieval) system enables the crash investigator or reconstructionist to plug a laptop into the diagnostic link connector or directly into the restraint control module. Downloading the information takes approximately 5 to 10 minutes. The vehicle does not need to have power in order to download the data.

The most significant use of the data for the crash reconstructionist is to obtain true velocity factors. A focal point in every crash reconstruction for determining crash severity is the change in velocity during the crash. Known as Delta V, this critical factor is often determined by reconstructionists using computers that calculate the result on algorithms based on selected parameters that may not truly replicate the actual crash conditions. By obtaining data directly from the vehicle involved in the crash, the reconstructionist obtains true and accurate Delta V information.

Injury Sciences, based in San Antonio, Texas, has released a product designed to help insurance investigators make sense of data harvested by the Vertronix CDR system. WrExpert software provides tools that would be of significant value in assisting a crash investigator with understanding the data from the restraint control module. The software combines this data with other information gathered during an investigation to include damage repair estimate information and damage profiles of any other vehicles involved in the crash. WrExpert includes a fully illustrated reference library that provides information about accident events, human anatomy, injury causes, and treatments for

specific injuries. Although the software is primarily designed for the insurance industry, it could be used by law enforcement crash investigators to more fully understand the dynamics of the crash under investigation.

Black Boxes Come to Court

The first well documented case involving data retrieved from a restraint control module occurred in 1992 in a fatal crash involving professional football player Jerome Brown. Brown's survivors filed a multimillion-dollar suit alleging that Brown's air bag deployed after his Corvette struck a pothole, causing him to lose control of the vehicle, which then struck a tree. Brown's survivors lost the case when data from the restraint control module showed that the air bag deployed on impact with the tree.

More recently, data from the restraint control module that has been harvested by law enforcement has been used successfully in the criminal courtroom. In February 2003 a driver from Ipswich, Massachusetts, slid off an icy road and struck a tree with her GMC Yukon, killing her passenger. The data from the restraint control device was used to show that her speed was well above the legal limit and was the basis for pursuing vehicular homicide charges. In May 2003, a driver from Pembroke Pines, Florida, struck and killed two teenage girls. The data retrieved from the restraint control module showed that driver was traveling four times the posted speed limit of 30 miles per hour. The driver was sentenced to 30 years in prison.

Enhancing the Crash Investigation

As onboard computer systems become more advanced, an increase in the deployment of dedicated event data recorders in automobiles is inevitable. In return for a relatively small investment of money and time, agencies can give their investigators the tools and skills they need to use to obtain data from motor vehicle black boxes. Training on the Vertronix CDR system, for example, is not intensive, generally lasting about an hour.