

## Event Data Recorders

by Joseph E. Badger

In my world of accident reconstruction consulting, I have occasion to discuss crashes with law enforcement personnel. Imagine my surprise when – in a case involving the speed of a car – I asked the trooper if he had downloaded the EDR data and he said, “What’s an EDR?”

When I explained that an Event Data Recorder [aka Motor Vehicle Event Data Recorder, (MVEDR), aka Sensing and Diagnostic Module, (SDM)] is a part of the air bag module system, and that it collected such data as whether a seatbelt was fastened at the time of impact to how fast the car was going a few seconds before the crash, he asked astonished, “Do they really have ‘black boxes’ for cars?”

Yes.

Not all makes and models, but we are getting there.

In the middle 1970s, the National Highway Transportation Safety Administration (NHTSA) collected data from several hundred vehicles that had been equipped with devices that would measure and analyze delta-Vs (up to 20 mph) and deceleration times. General Motors manufactured some cars with airbag systems that recorded deployments and near-deployments. Thus began the introduction of EDR technology into the transportation industry.

Read more on EDR history online at <http://www-nrd.nhtsa.dot.gov/edr-site/history.html>.

The problem for law enforcement, however, was that there was no way – aside from asking a GM dealer to download the data – to discover anything about the car’s speed prior to an accident. Along came Vetronix Corporation, which, beginning in March 2000, sold its Crash Data Retrieval (CDR) system to the general public and law enforcement. Their system permitted individuals outside the dealership to download data from automobiles and light trucks equipped with air bags and EDRs.

Granted, automobile “black boxes” are not like those installed in aircraft. Motor vehicle EDRs are part of the air bag system and, naturally, aircraft cockpits do not have air bags. Nevertheless, they are similar in scope. According to Vetronix Corporation, here are some of the data of interest to law enforcement available on newer GM vehicles:

★ The vehicle and engine speeds five seconds before impact [An EDR can record up to 10 seconds of crash data; however, this is rare as it requires specific and unusual crash circumstances.]

★ Brake status & throttle position five seconds before impact

★ Whether the driver's seat belt was on or off [Note: This item may indicate "On," however that does not necessarily mean the driver was actually *wearing* the belt. It is possible the driver fastened the belt then simply sat on it.]

★ If the passenger air bag switch was enabled or disabled

★ The amount of time from impact detection (actually Algorithm Enable) to air bag non-deployment (formerly called near-deployment)

There are a couple of "problems" with the current technology.

#### 1. Cost

Instruments currently commercially ready cost approximately \$2500. According to Vetronix, their devices "interface" with only certain GM and Ford vehicles. "An agreement with a new vehicle manufacturer is needed to enable Vetronix to write software and build cable for air bag module systems other than those equipped in GM and Ford vehicles."

Also required is a laptop computer with a 9-pin serial port connection or a connection converter, an external 12V power supply, various hand tools, voltmeter, etc. Total investment in EDR specific equipment may run close to \$5000.00. I highly recommend enrolling in a class where they teach all the system's details and nuances.

2. Downloaded data is limited to only a few vehicle makes. Data from pre-1996 vehicles, whether air bag equipped or not is not obtainable with the Vetronix apparatus. [This may expand to some 1994 models with the next software release, v. 2.0, and will include Ford.]

From 1996 through 1999, most GM cars and light trucks contained the needed information. Then in 1999, the list expanded to include most Buicks, some Pontiac models, the Chevrolet Camaro and Corvette.

View a complete list of vehicles equipped with the necessary mechanism online at <http://www.harristechnical.com/cdr.htm>. Read pertinent information about the commercially available device at [www.vetronix.com](http://www.vetronix.com).

One item not yet fully understood is who owns the data in the air bag module. Is it proprietary to the vehicle manufacturer? Does it belong to the car owner? If the driver is involved in a crash – caused in part by his or her speeding – is data from the device admissible or might it be a form of self-incrimination? On the other hand, is it the same as a gun-owner, whose weapon's specific ballistics is tested by police and subsequently introduced in court?

In NHTSA and the Federal Highway Administration's opinion, the owner of the vehicle owns the EDR data. Those entities take the position that law enforcement personnel would need "permission" from the owner to download the data. Absent the owner's consent (or authorization from next-of-kin or legal representative in the event the owner died), police should have no trouble obtaining a warrant to "search" the device for possible evidence of a crime.

In a paper presented at the Proceedings of the Canadian Multidisciplinary Road Safety Conference XII; June 10-13, 2001; London, Ontario, Alan German, Jean-Louis Comeau, Brian Monk, et al., noted that "Potential uses of information from crash recorders are subject to issues relating to the ownership of the data, under what circumstances data may be accessed, and to what purposes the data may be applied.

From a research perspective, these questions are unimportant, since investigators generally conduct most such studies with the informed consent of study subjects, which usually includes the vehicle's owner or operator. Researchers then record and store the resulting study data in an anonymous manner. In contrast, the nature of the available data is such that the information will doubtless prove useful to various parties involved in litigation over a given crash. Eventually, the courts will have to test the admissibility of data obtained from EDRs with respect to issues such as its reliability, and to determine such factors as the need for search warrants, and any requirements for disclosure."

Ultimately, and perhaps by the time this goes to press, the issue of ownership will be decided in the courts.

A definitive paper, written by James Harris of Harris Technical Services, on the topic of EDRs, *A Protocol for the Recovery, Maintenance and Presentation of Motor Vehicle Event Data Recorder Evidence*, is online at [www.harristechnical.com/cdr6.htm](http://www.harristechnical.com/cdr6.htm).

EDR data was the focal point in trials in a number of court cases. Some of those mentioned below were decided in trial courts and therefore not published.

Wright v. CSX Transportation, 5:01-cv-324-4 (M.D. Ga. Oct. 1, 2002)

Harris v. General Motors Corp., Electronic Citation: 2000 FED App. 0039P (6th Cir.)

Bachman, et al, v. General Motors Corp., Uftring Chevrolet-Oldsmobile, Delphi Automotive Systems and Delco Electronics Systems, Illinois App. Ct., 4th Dist., No. 4-01-0237, Appeal from Circuit Court of Woodford County, no. 98L21 (2002).

Anderson-Barahona v. General Motors Corp., No. 99A19714, GA, Cobb County Cir. Ct., Apr. 7, 2000.

Colorado v. Cain, 1st Judicial District Court, Division 3, Jefferson County, Case No. 01 CR 967 (2002).

Florida v. Walker, 20th Judicial Circuit, Lee County, Case No. 00-002866CF RTC (2003).

Pennsylvania v. Walter Thomas Rhoads, Montgomery County, Court of Common Pleas, Criminal Division, Docket No. 746701 (2002).

California v. Michael Beeler, San Diego Superior Court, Case No. SCD158974 (2002).

The technology is out there and eventually the data should be available and downloadable from any motor vehicle equipped with air bags. As with most electronic devices, the cost should come down as improvements in the technology gets better. Those in law enforcement who investigate traffic accidents should not only be aware of the technology but also become proficient in its application.

And so that individual police officers and their agencies are aware, Mr. Harris asked me to remind them: "Police cars are not exempt from having an MVEDR on board."

*Joseph E. Badger is an internationally known accident reconstruction consultant and a frequent contributor to accident reconstruction periodicals. You may reach Mr. Badger by writing to 4210 Woodlyn Dr., Bloomington, IN 47403 or by email: jebadger@kiva.net*

## **Event Data Recorders**

by Joseph E. Badger

In my world of accident reconstruction consulting, I have occasion to discuss crashes with law enforcement personnel. Imagine my surprise when – in a case involving the speed of a car – I asked the trooper if he had downloaded the EDR data and he said, "What's an EDR?"

When I explained that an Event Data Recorder [aka Motor Vehicle Event Data Recorder, (MVEDR), aka Sensing and Diagnostic Module, (SDM)] is a part of the air bag module system, and that it collected such data as whether a seatbelt was fastened at the time of impact to how fast the car was going a few seconds before the crash, he asked astonished, “Do they really have ‘black boxes’ for cars?”

Yes.

Not all makes and models, but we are getting there.

In the middle 1970s, the National Highway Transportation Safety Administration (NHTSA) collected data from several hundred vehicles that had been equipped with devices that would measure and analyze delta-Vs (up to 20 mph) and deceleration times. General Motors manufactured some cars with airbag systems that recorded deployments and near-deployments. Thus began the introduction of EDR technology into the transportation industry.

Read more on EDR history online at <http://www-nrd.nhtsa.dot.gov/edr-site/history.html>.

The problem for law enforcement, however, was that there was no way – aside from asking a GM dealer to download the data – to discover anything about the car’s speed prior to an accident. Along came Vetronix Corporation, which, beginning in March 2000, sold its Crash Data Retrieval (CDR) system to the general public and law enforcement. Their system permitted individuals outside the dealership to download data from automobiles and light trucks equipped with air bags and EDRs.

Granted, automobile “black boxes” are not like those installed in aircraft. Motor vehicle EDRs are part of the air bag system and, naturally, aircraft cockpits do not have air bags. Nevertheless, they are similar in scope. According to Vetronix Corporation, here are some of the data of interest to law enforcement available on newer GM vehicles:

- ★ The vehicle and engine speeds five seconds before impact [An EDR can record up to 10 seconds of crash data; however, this is rare as it requires specific and unusual crash circumstances.]

- ★ Brake status & throttle position five seconds before impact

- ★ Whether the driver’s seat belt was on or off [Note: This item may indicate “On,” however that does not necessarily mean the driver was actually *wearing* the belt. It is possible the driver fastened the belt then simply sat on it.]

- ★ If the passenger air bag switch was enabled or disabled

★ The amount of time from impact detection (actually Algorithm Enable) to air bag non-deployment (formerly called near-deployment)

There are a couple of “problems” with the current technology.

## 1. Cost

Instruments currently commercially ready cost approximately \$2500. According to Vetronix, their devices “interface” with only certain GM and Ford vehicles. “An agreement with a new vehicle manufacturer is needed to enable Vetronix to write software and build cable for air bag module systems other than those equipped in GM and Ford vehicles.”

Also required is a laptop computer with a 9-pin serial port connection or a connection converter, an external 12V power supply, various hand tools, voltmeter, etc. Total investment in EDR specific equipment may run close to \$5000.00. I highly recommend enrolling in a class where they teach all the system’s details and nuances.

2. Downloaded data is limited to only a few vehicle makes. Data from pre-1996 vehicles, whether air bag equipped or not is not obtainable with the Vetronix apparatus. [This may expand to some 1994 models with the next software release, v. 2.0, and will include Ford.]

From 1996 through 1999, most GM cars and light trucks contained the needed information. Then in 1999, the list expanded to include most Buicks, some Pontiac models, the Chevrolet Camero and Corvette.

View a complete list of vehicles equipped with the necessary mechanism online at <http://www.harristechnical.com/cdr.htm>. Read pertinent information about the commercially available device at [www.vetronix.com](http://www.vetronix.com).

One item not yet fully understood is who owns the data in the air bag module. Is it proprietary to the vehicle manufacturer? Does it belong to the car owner? If the driver is involved in a crash – caused in part by his or her speeding – is data from the device admissible or might it be a form of self-incrimination? On the other hand, is it the same as a gun-owner, whose weapon’s specific ballistics is tested by police and subsequently introduced in court?

In NHTSA and the Federal Highway Administration’s opinion, the owner of the vehicle owns the EDR data. Those entities take the position that law enforcement personnel would need “permission” from the owner to download the data. Absent the owner’s consent (or authorization from next-of-kin or legal representative in the event the owner died), police should have no trouble obtaining a warrant to “search” the device for possible evidence of a crime.

In a paper presented at the Proceedings of the Canadian Multidisciplinary Road Safety Conference XII; June 10-13, 2001; London, Ontario, Alan German, Jean-Louis Comeau, Brian Monk, et al., noted that "Potential uses of information from crash recorders are subject to issues relating to the ownership of the data, under what circumstances data may be accessed, and to what purposes the data may be applied.

From a research perspective, these questions are unimportant, since investigators generally conduct most such studies with the informed consent of study subjects, which usually includes the vehicle's owner or operator. Researchers then record and store the resulting study data in an anonymous manner. In contrast, the nature of the available data is such that the information will doubtless prove useful to various parties involved in litigation over a given crash. Eventually, the courts will have to test the admissibility of data obtained from EDRs with respect to issues such as its reliability, and to determine such factors as the need for search warrants, and any requirements for disclosure."

Ultimately, and perhaps by the time this goes to press, the issue of ownership will be decided in the courts.

A definitive paper, written by James Harris of Harris Technical Services, on the topic of EDRs, *A Protocol for the Recovery, Maintenance and Presentation of Motor Vehicle Event Data Recorder Evidence*, is online at [www.harristechnical.com/cdr6.htm](http://www.harristechnical.com/cdr6.htm).

EDR data was the focal point in trials in a number of court cases. Some of those mentioned below were decided in trial courts and therefore not published.

Wright v. CSX Transportation, 5:01-cv-324-4 (M.D. Ga. Oct. 1, 2002)

Harris v. General Motors Corp., Electronic Citation: 2000 FED App. 0039P (6th Cir.)

Bachman, et al, v. General Motors Corp., Uftring Chevrolet-Oldsmobile, Delphi Automotive Systems and Delco Electronics Systems, Illinois App. Ct., 4th Dist., No. 4-01-0237, Appeal from Circuit Court of Woodford County, no. 98L21 (2002).

Anderson-Barahona v. General Motors Corp., No. 99A19714, GA, Cobb County Cir. Ct., Apr. 7, 2000.

Colorado v. Cain, 1st Judicial District Court, Division 3, Jefferson County, Case No. 01 CR 967 (2002).

Florida v. Walker, 20th Judicial Circuit, Lee County, Case No. 00-002866CF RTC (2003).

Pennsylvania v. Walter Thomas Rhoads, Montgomery County, Court of Common Pleas, Criminal Division, Docket No. 746701 (2002).

California v. Michael Beeler, San Diego Superior Court, Case No. SCD158974 (2002).

The technology is out there and eventually the data should be available and downloadable from any motor vehicle equipped with air bags. As with most electronic devices, the cost should come down as improvements in the technology gets better. Those in law enforcement who investigate traffic accidents should not only be aware of the technology but also become proficient in its application.

And so that individual police officers and their agencies are aware, Mr. Harris asked me to remind them: "Police cars are not exempt from having an MVEDR on board."

*Joseph E. Badger is an internationally known accident reconstruction consultant and a frequent contributor to accident reconstruction periodicals. You may reach Mr. Badger by writing to 4210 Woodlyn Dr., Bloomington, IN 47403 or by email: jebadger@kiva.net*