

## **Car 'Black Box' Reveals Details From Accidents**

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<http://www.monkey.org/geeks/archive/9906/msg00002.html>

One of the effects of new technologies is to provide more information about our activities even though such disclosure is not always the primary function of the technology.

This article is not provided to make you paranoid and to get you ripping out the airbag controllers but to increase awareness of the interplay of various technologies and the wide range of uses for data.

Side note: Regarding vehicles, the EZ Pass system has yielded some privacy questions. A few years ago, a lawyer in a New York state divorce case obtained the EZ Pass records for a vehicle, seeking to hint that the other party was driving to an adulterous meeting. To reduce privacy concerns, it is reported that many states using EZ Pass promise that the records will not be used for criminal investigations. Other people protest that such use of the EZ Pass info would be greatly beneficial. (Left out in the fray are the crucial distinctions of different kinds of investigative approaches to using the data, including fishing trip pattern matching, scans for a vehicles specifically identified as suspect, etc. A big difference between looking for records of a vehicle reported as stolen and searching for any vehicle that shows up in the vicinity of an area where a crime occurred.) In *The Road Ahead*, Bill Gates ponders upon a "black box" data recorder for cars. He notes that such tracking would reduce privacy but, on the other hand, it would protect people by "proving their innocence."

This is an interesting and bothersome shift coming in the networked world. In days of less tech capability, innocent until proven guilty was radical in a sense but the lack of capabilities made it easier to practice. Now, there is growing tension with this US legal concept and the real & perceived data capabilities. It may well come to a complete flip-over in a few decades where the innocent until proven guilty precept is treated as an anachronism and cases are decided increasing upon surveillance footage and various data collection devices. There would be the notion that innocent people will naturally disclose their data to show their innocence. The ethical justification cited for such a change would be the difficulty in not using the data capabilities to improve and protect society. This tension, I believe, will be a major force in social changes regarding technology. The maintenance of various liberties we have grown up with, in large part, was helped more by technical limitations than by ethics and discipline. Will such discipline and ethics hold out?

-JDA

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<http://www.nytimes.com/library/national/053099car-black-box.html>

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Car 'Black Box' Reveals Details From Accidents

By MATTHEW L. WALD

Northwest 54th Street in Miami was crowded at 4:30 p.m. on Feb. 7, 1997, and many people saw the three-car collision that killed Detective Robert Vargas. But none of them could help police determine why he died.

The 29-year-old detective, responding in his unmarked car to a robbery call, had what looked to investigators like a relatively minor collision with a Chevy Blazer entering the intersection from his right. His year-old Chevy Lumina skidded across the double yellow line into oncoming traffic and was struck head-on by a Mercury Marquis.

Calculating the force of the crash from the skid marks and wreckage, investigators determined that Vargas' air bag could have saved his life.

Why it did not was explained by a witness who never "saw" the crash, but reported many of its details electronically.

A black box about the size of a videocassette under the Lumina's front seat recorded that the air bag had, in fact, deployed when the Blazer struck the first blow more violently than the human analysts suspected. The bag had deflated before the head-on collision, leaving Vargas, who was not wearing a seat belt, unprotected.

The telltale recorder -- known as a Sensing and Diagnostic Module, or SDM -- was one of 6 million quietly put into various models of General Motors cars since 1990.

A newly developed model being installed in hundreds of thousands of GM cars this year records not only the force of collisions and the air bag's performance, but also captures five seconds of data before impact. It can determine, for example, whether the driver applied the brakes in the fifth second, third second or last second. It also records the last five seconds of vehicle speed, engine speed, gas pedal position and whether the driver was wearing a seat belt.

Ford has equipped hundreds of thousands of cars with a similar system, and is developing a device to read the data. An industry committee is trying to develop standards for the recorders.

Specialists in car crashes say the devices could revolutionize some aspects of accident research.

The devices could also bring important changes in insurance settlements, crash litigation, automobile design, and even the medical treatment of crash survivors. At the same time, important issues are being raised about who should have access to the data.

"The data from the SDM, in future crash litigation, can be the equivalent of DNA in paternity suits and murder cases," said Edward Ricci, a lawyer who is currently suing GM in a case brought by the family of Jerome Brown, a former professional football player who was killed in his Corvette in a 1992 accident. Ricci said the recorder in that car proved that the cause of the crash was the air bag deploying when the car hit a pothole; GM disagrees.

But few lawyers or other crash specialists know much about the recorders, whose existence is virtually unknown to the public.

The advanced model, which records the final five seconds of data, was first installed in 1998 Cadillacs sold to rental car companies, but it was done so quietly that even executives at Avis, which buys hundreds of such cars, were unaware of the recorders.

At National Car Rental, a spokeswoman said executives were broadly aware of the system but had never seen any data from a crash.

"I'm sure, potentially, it would be useful," said Veronica Valentino, a spokeswoman at National's headquarters in Minneapolis. "I would think it's additional evidence, and if it could be brought into court, would certainly provide an opportunity to look at more information that previously wasn't available."

In many states, rental car companies are responsible for damage done by the cars they own. They have paid millions of dollars in judgments that might have been avoided if crash box data showed the accident was not the renter's fault, some experts say.

Insurance executives are interested, too. "They could lead to better settlements as time goes on," said Donald Griffin, an executive at the National Association of Independent Insurers, a trade association that represents 620 insurance companies. The data could quickly clarify who was at fault, he said, though the industry would have to have more experience with the boxes before deciding whether to rely on them.

Some medical researchers think the boxes could save lives. If ambulance crews could read them on the spot, they could determine whether a crash was severe enough to create a likelihood of head injuries, for example.

Some head injuries only become evident hours after the accident, said Dr. Jeffrey Augenstein, a professor of surgery at the University of Miami who has been working with GM to develop the recorders. But the recorders could alert doctors to watch for brain swelling or other symptoms.

Augenstein, who also has appeared in court as an expert witness in crash cases, said the data would give a better picture of what had happened, but "it will still require interpretation."

"You won't just plug it into a computer and say, 'You're at fault; you pay \$10 million,'" he said.

The automotive black boxes could be almost as useful as those on airplanes. The National Transportation Safety Board, best known for its plane crash investigations, recommended last year that they be used in cars. But compared with flight data recorders on planes, whose role is defined by federal law, the automotive versions are hitting the roads in a legal vacuum.

"It is an untested area of law," said Lawrence Friedman, a personal injury lawyer in Boca Raton, Fla., and the chairman of the American Trial Lawyers Association's Motor Vehicle, Highway and Premises Liability section.

Massachusetts hopes to establish a pilot program later this year that would analyze data from the devices in GM cars involved in fatal crashes and compare the results with conclusions reached by human analysis, to help confirm the electronic recordings. But the state trooper planning the program, David Noonan, said that he did not know if he could ask a judge for a search warrant to obtain the boxes in a criminal investigation.

That has not been Massachusetts' purpose, or GM's in obtaining or analyzing the data. GM has been circumspect about the boxes because it does not want them used in litigation; in fact, executives are concerned that car buyers could shy away from such cars if they thought the data could be used against them.

The company has been using the information mostly to refine its on-board safety systems, and wants the information from the newer boxes to show what a typical driver's behavior is in the seconds before a crash.

"Our interest is in safety research, and we're not going to encourage its use" in other forums, said Robert Lange, engineering director of auto safety at GM. As for other uses, he said, "We are not going to be able to prevent that and control that."

Right now, only GM can download and decode data from its own boxes, but that will change within the next few months as software becomes commercially available. GM has an agreement with Vetronix of Santa Barbara, Calif., to develop software and a cable that will allow anyone with a laptop to interrogate the box. Vetronix also hopes to begin selling the software, including a proprietary circuit board that decodes the information, in August for a few hundred dollars, according to the company.

"Probably the owners of the vehicles will be the ones who will be ultimate arbiters as to whether such information is retrieved, and if retrieved, how it's utilized," Lange of GM said. But lawyers and others said this was an open question.

As a practical matter, GM has already found that if it does not let others, like the police, retrieve the data, it may not get much of the data. Once a car is sold, there is no way for GM to know whether that car becomes involved in a serious crash, so no way to know when to try and retrieve the box.

Some engineers wince at the coming legal battles. "Everyone probably is hesitant to open this Pandora's box," said Adrian Lund, a crash expert at the Insurance Institute for Highway Safety.

For the handful of researchers now using them in collaboration with GM, the data boxes promise a gold mine of information never before obtainable. Highway safety experts say the information retrieved could change the way air bags and other safety systems are designed. Air bags are currently made to meet the government's 30-mph frontal-crash test standard, but data from real accidents could show that the accidents causing the most injuries are at a higher speed or a lower one, or are not head-on collisions. That might lead to new passenger protections.

The recorder is "an invaluable tool," said James Stratton, a senior crash investigator at the William Lehman Injury Research Center at the University of Miami School of Medicine, who helped reconstruct the crash that killed Vargas.

The recorder is an almost accidental outgrowth of the computerization of cars. Air bags already come with computers that measure the "crash pulse," or change in velocity, and calculate whether and when to deploy the bag. Many cars also have computers that keep track of engine speed, car speed and the like. GM's innovation involved adding an inexpensive system that records all this data on a microchip if the car is bumped hard enough, or almost hard enough, to deploy the air bag.

The enhanced recorders are installed on all 1999 Buick Century Park Avenue and Regal models; the Cadillac Eldorado, DeVille and Seville models; the Chevrolet Camaro and Corvette, and the Pontiac Firebird. The company plans to have them on all its vehicles in the 2004 model year.

Noonan, of the Massachusetts State Police, said, "This has great implications for public safety and public health." Sometime soon, said Noonan, in one of the 400 or so fatal crashes that occur in his state each year, two new cars will collide and researchers will have data from both of them, which could show tailgating, speeding or other signs of bad driving.

Private use is more problematic. A driver charged with speeding or some other violation after a crash might seek to bring his own data to court, to exonerate himself, but Noonan said it has not been determined if such evidence would be admissible.

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