A Spy Under the Hood: Controlling Risk and Automotive EDR
Peter R Thom; C Arthur MacCarley
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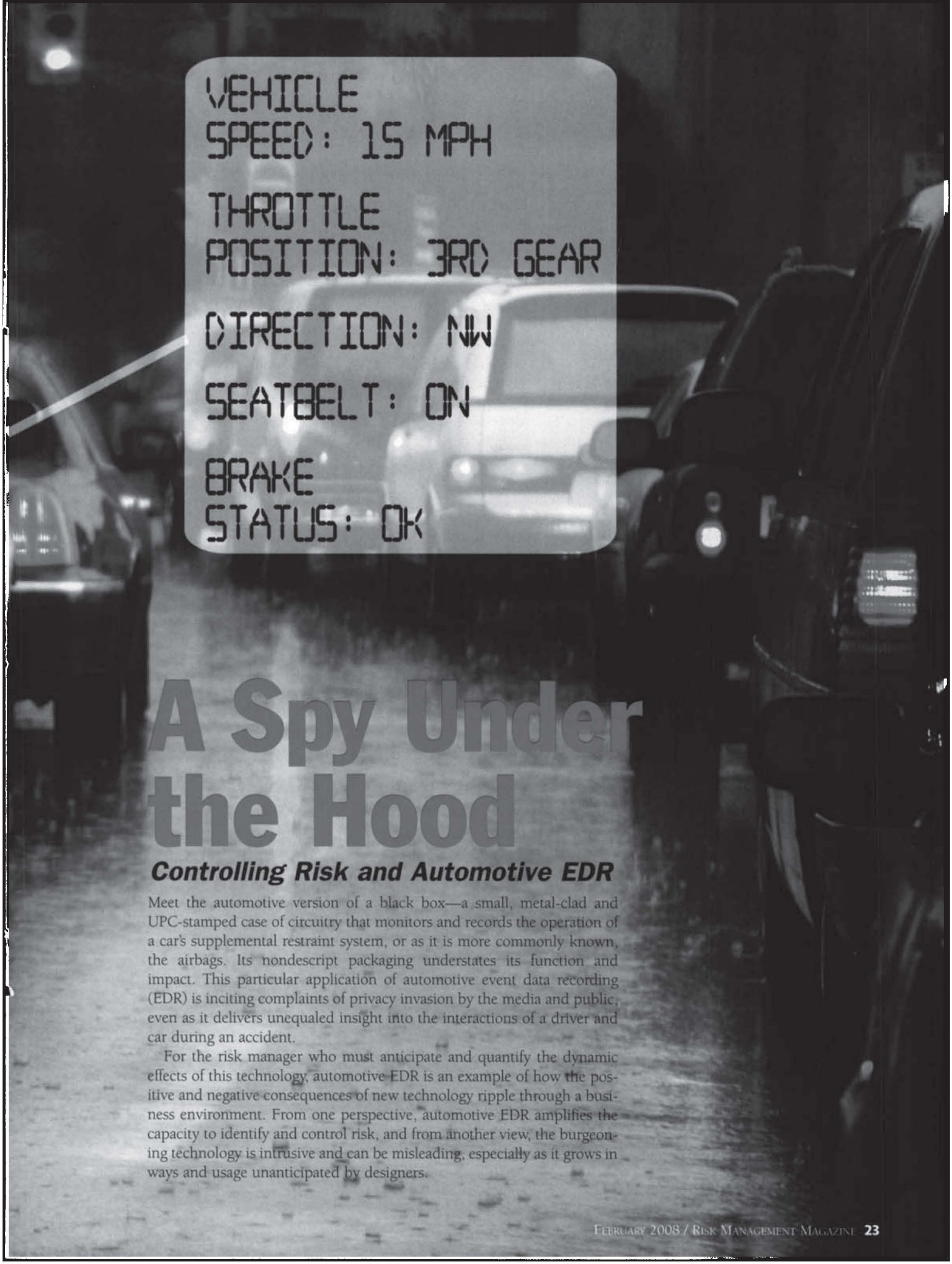

A Spy Under the Hood

Controlling Risk and Automotive EDR

Meet the automotive version of a black box—a small, metal-clad and UPC-stamped case of circuitry that monitors and records the operation of a car's supplemental restraint system, or as it is more commonly known, the airbags. Its nondescript packaging understates its function and impact. This particular application of automotive event data recording (EDR) is inciting complaints of privacy invasion by the media and public, even as it delivers unequaled insight into the interactions of a driver and car during an accident.

For the risk manager who must anticipate and quantify the dynamic effects of this technology, automotive EDR is an example of how the positive and negative consequences of new technology ripple through a business environment. From one perspective, automotive EDR amplifies the capacity to identify and control risk, and from another view, the burgeoning technology is intrusive and can be misleading, especially as it grows in ways and usage unanticipated by designers.

What does the risk manager who will harness the information gleaned from EDR need to know in order to use the data effectively? The first step is to gain an understanding of the current capabilities and limitations of automotive event data recorders and to see the distinctions between EDR modules in airbags and similar technology in other automotive systems.

Inevitably, risk managers will look at airbag EDR data over any of the others because, at least for now, that data is most accessible and relevant to accident investigations. Beyond that, a keen understanding of the public policy ramifications of automotive EDR will guide the risk manager through its judicious use.

Essential Automotive EDR and CDR

The roots of automotive event data recording are tied most directly to the development of airbags. As manufacturers refined airbag triggering mechanisms in the mid-1990s, they also enhanced data-gathering resources in order to collect real-world data for optimizing airbag performance. The iconic crash test dummy, although a ready volunteer for all manner of crash experiments, only supplies a limited data set compiled from staged accidents. Inserting data-recording capabilities into safety systems is a significant enhancement because EDR data from airbags can freeze the decisions, reactions and system responses that culminated in a real accident.

At a minimum, these intelligent supplemental restraint system control modules retain some or all of the "crash pulse," or the rapid deceleration associated with the impact that deployed the airbag. Much more detailed information has been retained since 2003, especially with the installation of smart, two-stage airbags in newer cars. Upon airbag deployment (or sometimes near deployment), the data stream usually can store about five seconds of pre-crash and crash data including vehicle speed, engine speed, brake status, throttle position, seat belt status, airbag status, time from impact to airbag deployment and the deceleration history or crash pulse during the event.

A crash data retrieval (CDR) interface can download data from an airbag's EDR module and display the results in graphs or lists. This is the information that provides mute testimony to the sequence of operational events leading to an accident. Failure to be sensitive to the proper interpretation and limitations of the EDR data from any manufacturer, however, can easily lead to incorrect but convincing conclusions. This reality underscores the need for high-level understanding of the technology as well as ample common sense when integrating the revelations of EDR with the traditional results of collision dynamics analysis and the physical evidence from the vehicle or crash site. Automotive engineers are generally the best qualified to secure the EDR data and render accurate interpretations.

Benefits of EDR

Automotive EDR delivers benefits at several levels to the risk manager who monitors the exposure potential of a transportation fleet. When the accident data can be tapped, EDR may deliver the information that clarifies the events leading to and succeeding accidents. For example, the driver may claim he braked to avoid a collision, but the EDR data reveals that he did not apply the brakes. The risk manager can then handle fault issues expeditiously with facts, not suppositions. Bottom-line benefits of reduced costs accrue incrementally with each accident that can be resolved with the application of EDR data.

At a higher level—companywide or even industrywide—the risk manager may note fewer accidents as a result of positive behavioral changes by employees who drive company-owned vehicles. Trucking companies see driving behavior improve quickly when they adopt more intrusive methods of monitoring their drivers. Trade unions

EDR in the Air and on the Ground

Those new to the technology tend to see automotive event data recorders as earthbound versions of the better-known aviation black boxes that record flight data and cockpit conversations. The link between the two is, at best, remote. EDRs in cars are more task-specific and dispersed than in the aviation applications that route comprehensive data to crash-protected storage units installed in fuselage tails. Aviation black boxes can withstand infernos and fathoms-deep submersion and still deliver intact data. This is not so with automotive EDRs, which are more fragile with data retention that varies enormously since some data is erased when the engine is turned off. As for the gritty details: cockpit recordings offer painful perspective into the last tragic moments of an air disaster, whereas automotive EDRs turn deaf ears to car-compartment confessions. Differences in application and function notwithstanding, automotive and aviation event data recorders share a mandate of accident prevention. Any particle of data that pinpoints a flaw to remedy or a behavior to change saves future lives and costs.

and others may raise issues of privacy invasion, but many truck drivers appreciate the benefits of the scrutiny because they have resources in place that can clear them just as easily as assign them fault. While current automotive EDR does not deliver such a high level of oversight, the understanding that companies can harvest the data for auto accident claims resolution means savvy employees will eliminate risky driving behaviors, while those who expose companies to unnecessary litigation face lost employment. Again, the benefits to the bottom line appear over the long term with reduced expenses as a result of diminished risk.

This longer-term view of automotive EDR benefits also applies to litigation exposure, which has grown substantially for many companies over the past 20 years. At least for vehicle claims, companies involved in litigation will be able to reduce legal expenses as they turn to the real-time, measurable data from the EDR modules to support settlement negotiations. As settlement rates rise, litigation costs will drop. For now, EDR evidence is itself on trial with each courtroom appearance. The judicial trend is to allow EDR data with evidentiary challenges resolving issues of validity, accuracy and access. Its usage in the courtroom certainly will increase with judicial familiarity.

EDR and CDR Challenges

The challenges for EDR and CDR come with the expanded use of the technology by law enforcement, insurance companies and lawyers. A module intended originally for gathering diagnostic data is now being used as a tool for investigating automobile accidents, and policy-making parties like the National Highway Transportation Safety Agency (NHTSA) are scrambling to guide the development of the technology in order to meet the information needs of a broader audience. When government agencies and independent researchers look at EDR they see an underdeveloped resource of real-world accident data that could be tapped more easily if automakers complied with standardized data and interface formats.

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Car manufacturers, however, see EDR very differently. EDR capabilities in any number of embedded modules help them diagnose problems. If an airbag fails to deploy, they need to know why and they need to fix the problem—that is the reality of their liability exposure.

Nevertheless, automakers acknowledge that the EDR in airbags has broader implications for safety engineers and policy makers as well as for those who need a forensic understanding of individual automobile accidents. To date, of the larger manufacturers, only Ford and GM have made the data in their airbag control modules accessible via a third party data retrieval system developed by Vetronix Corporation, a wholly owned subsidiary of Robert Bosch GmBH. But compatibility does not extend to all its models. Some of the other auto manufacturers are willing to download data and generate reports on a fee basis, but at least until 2011, manufacturers are not required to disclose whether their airbag systems even have EDR capability, nor will they be required to develop compatible systems any time soon.

The lack of data standards and the haphazardness of data collection and retrieval were two of a number of EDR issues that encouraged the Department of Transportation (through the NHTSA) to issue an EDR rule in August 2006. Aside from the disclosure obligations and durability issues, the rule also requires automakers to collect a standard set of crash data. The response from interested parties has been mixed with manufacturers questioning their ability to meet the 2011 deadline and safety advocacy groups hoping for more comprehensive reporting. Compliance is voluntary, but that is open to reappraisal if insufficient numbers of automakers adhere to the standards.

EDR's Caveat Emptor

Most cars manufactured in the past 15 years have some built-in data gathering and retention capabilities in airbag and related modules; on-board diagnostic systems; performance features like anti-lock braking, traction control and active stability enhancement; and value-added options like GM's OnStar with its 24/7 monitoring. The NHTSA estimates 64% of model year 2005 cars include some EDR capability. Installation of some of these systems results from federal and state agencies requiring automaker compliance with policies directed to the common good like controlling automotive emissions as a means of reducing air pollution, whereas the others are purchased to enhance the driving experience. With every development comes the possibility of increased data gathering and retention, even though many of these newer systems currently erase the data with each engine cycle.

Rather than describing a specific device or product, EDR actually is a catch-all term defining a function that may be distributed among a variety of data-retention modules. For now public awareness of automotive event data recording and its ramifications focuses

on the modules embedded in airbag safety systems to the exclusion of the newer venues, even though they are growing in number and could collect significantly more data. Federal and state EDR regulations in force deal specifically with the EDR associated with supplemental restraint systems and no others. All other forms of automotive event data recording are accessible to and controlled exclusively by the automaker and remain outside regulatory constraints.

EDR and the Private-Car Owner

Questions of privacy invasion and EDR data ownership are pertinent to all car buyers, although privacy concerns raise the emotional temperature for individuals rather than businesses that, as car-owning entities, share a more detached perspective on EDR data collection. For Jane and John Q. Public, though, there is something disturbing about a "tale-bearing" car that appears to erode personal liberty and responsibility. Buy a new car and, chances are, event data recording is embedded in on-board electronics and, at a minimum, the airbag control module. Even if aware of and troubled by a perceived privacy intrusion, a consumer cannot disable EDR in airbags by choice because it is embedded in the car's supplemental safety restraint system and altering, disconnecting or removing such protective equipment would disable the airbags and nullify automaker warranties, at the same time increasing the chances of serious injury in an accident. Current consumer privacy laws grant opt-out rights with some data collection efforts, but highway-related matters fall beyond the scope of those laws. For now, the NHTSA response to auto buyers is the automaker requirement to divulge to the purchaser all safety-related data recording functions starting in 2011 cars.

EDR Debate

The rain cloud hanging over EDR and CDR is the issue of data ownership. Virtually all automobile owners believe they own the data, but that precept blurs in application, especially with insurance claims and litigation. The common standard is the insured has a duty to provide all relevant information to the insurance company in the settlement of a claim. States like California that vigorously defend individual privacy rights have enacted legislation that requires owner consent before retrieving data from EDR modules. California is not alone. According to privacy rights watchdogs and public interest groups, 10 states have passed EDR legislation since 2004 and 20 more states have legislation pending.

With municipalities investing in CDR systems and training their traffic investigators in the technology, local law enforcement personnel are accessing the data when possible and applying the downloaded results to their investigations. Of course they recognize car-owner rights, but they see the data dispassionately as yet one more piece of objective evidence to be noted at an accident scene. The general public is not as sanguine and distrusts technology that erodes individual control, especially when they realize auto insurance carriers and lawyers see EDR data as potential arbiters of fault. It is easy to perceive EDR as unassailable because it should be, by its nature, accurate and impartial. Nonetheless, that is not the case for EDR with its scattered platforms; inconsistent, incomplete, and sometimes, incorrect reporting; and variable use among automakers.

Placing too much reliance on the veracity and effectiveness of EDR may be premature. Automotive engineers who use EDR data to reconstruct accidents acknowledge that relying on EDR to assign fault may be asking too much of that finite stream of data. A better approach is to use EDR as an adjunct to more traditional analytical methods that, integrated and weighted, reveal the complete story of an accident. The truth is that investigating automotive accidents requires far more finesse and understanding than a quick read of a print out.

Ultimately, car owners who are resolving insurance claims, in the throes of litigation or, most critically, involved in a criminal action where EDR testimony is acting as a key witness, require that the actors involved in the resolution understand the limitations of EDR technology and CDR systems.

With astute application (and expert input), automotive EDR delivers a cost- and risk-reducing tool to the risk manager. But rather than delivering an immediate and noticeable impact to the bottom line, automotive event data recording will fulfill those savings expectations over the longer term. EDR is as yet a promising untamed child and the risk manager's challenge will be to keep up with EDRs permutations and regulatory constraints while harnessing the technology to speed up the analysis and settlement of automotive accidents. ■

Peter R. Thom *is principal of Peter R. Thom & Associates Inc., a national firm of consulting automotive engineers.*

C. Arthur MacCarley*, Ph.D., is a company associate and the chair of the electrical engineering department at California Polytechnic State University, San Luis Obispo.*