



COMMONWEALTH vs. MICHELLE M. ZIMMERMANN.

70 Mass. App. Ct. 357

May 10, 2007 - October 3, 2007

Essex County

Present: COWIN, DREBEN, & TRAINOR, JJ.

Motor Vehicle, Homicide, Operating to endanger. Negligence, Motor vehicle. Evidence, Speed of vehicle, Event data recorder, Scientific test, Expert opinion. Witness, Expert. Probable Cause. Search and Seizure, Probable cause.

A District Court judge properly denied the criminal defendant's motion to suppress evidence taken from her sport utility vehicle's event data recorder, where, in an affidavit supporting the application for a search warrant, a State trooper set forth sufficient facts to establish probable cause to believe that the defendant, who had been charged with motor vehicle homicide by negligent operation, had been traveling at a rate of speed that was greater than reasonable and prudent. [358-359]

At the trial of a criminal complaint charging the defendant with motor vehicle homicide by negligent operation, the judge properly admitted evidence taken from the defendant's vehicle's event data recorder (EDR) (a component of the vehicle's airbag control module that, in the event of a crash, stores data that has been continually recorded by the module), where a qualified expert testified to the reliability of the EDR and the length of time that the technology behind the EDR has been in use, and that the data from the EDR in the defendant's vehicle were consistent with his own calculations based on the physical and other evidence in the case; and where the judge also concluded that there is general acceptance in the relevant scientific community of data from EDRs. [359-365]

COMPLAINT received and sworn to in the Ipswich Division of the District Court Department on February 12, 2003.

A pretrial motion to suppress evidence was heard by Santo J. Ruma, J., and the case was tried before him.

Robert N. Weiner for the defendant.

Catherine L. Semel, Assistant District Attorney (William J. Melkonian, Assistant District Attorney, with her) for the Commonwealth.

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DREBEN, J. Convicted of motor vehicle homicide by negligent operation in violation of G. L. c. 90, § 24G(b), the defendant claims the judge erred in denying her motion to suppress and her motion in limine. Both motions sought to exclude evidence taken from the vehicle's event data recorder (EDR). That evidence indicated that five seconds before the accident the defendant was traveling at a speed of fifty-eight miles per hour. She claimed that her speed was between twenty to thirty miles per hour. We affirm.

1. Motion to suppress. The defendant challenges two rulings of the motion judge: one, based on Commonwealth v. Mamacos, [409 Mass. 635](#) (1991), that a warrant to search her vehicle was not necessary, and two, that the affidavit in support of the application for the warrant established probable cause. We need not reach the question whether a warrant was necessary because the affidavit established probable cause to obtain the EDR. We turn to the affidavit.

The affiant was Sergeant Stephen J. Walsh, a State police officer assigned to the collision analysis and

reconstruction section. He described his experience and training and stated that he has investigated and reconstructed hundreds of motor vehicle collisions involving death or serious bodily injury. On January 4, 2003, at the request of the Ipswich police department, he went to the site of the accident. At the time of the incident, a mixture of rain and snow was falling, and roadway conditions were deteriorating. Safe driving required a reduction in speed and extra caution. From Walsh's preliminary investigation, he learned that the defendant had operated a 2002 GMC Yukon sport utility vehicle on Argilla Road in Ipswich. "For reasons not conclusively determined," the defendant lost control of the vehicle [\[Note 1\]](#); it rotated counterclockwise as it slid off the edge of the road, and the passenger side of the vehicle struck a large tree "in a centric collision." The passenger sitting in the front seat died. During the course of his investigation, Walsh found out that the vehicle was equipped with an EDR [\[Note 2\]](#) which, as he knew, could include records of airbag deployment and the speed

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of the vehicle. Based on his observations, information learned in the course of the investigation, and his training and experience, Walsh

"deem[ed] that there [was] probable cause to believe that [the defendant] was operating the GMC at a rate of speed that was greater than reasonable and prudent, pursuant to G. L. c. 90, § 17, [\[Note 3\]](#) and that her negligent operation constituted criminal conduct pursuant to G. L. c. 90, § 24G: Motor vehicle homicide via negligent operation so as to endanger the lives & safety of the public."

He also stated that there was probable cause to believe that evidence of this crime would be found in the EDR as well as in other parts of the vehicle.

Although Sergeant Walsh did not explicitly explain why he found probable cause to believe that the defendant was going at "a rate of speed that was greater than reasonable and prudent," it is apparent that his observations as to road conditions, the need for caution and reduction of speed, and the rotation, sliding, and violent crash of the vehicle, as well as his observations of the severe trauma and death of the passenger, were significant to him and led to that finding. In view of Walsh's special experience as an investigator in accident reconstruction, see *Commonwealth v. Taglieri*, [378 Mass. 196](#), 199, cert. denied, 444 U.S. 937 (1979); 2 W.R. LaFave, *Search and Seizure* § 3.2(c), at 40 (4th ed. 2004), the magistrate was warranted in concluding that Walsh's inferences were reasonable and that there was probable cause that a crime had been committed. See *Commonwealth v. Toledo*, [66 Mass. App. Ct. 688](#), 691-692 & n.8 (2006).

2. Motion in limine. The defendant's motion to exclude evidence based on the EDR was based on her claim that the Commonwealth cannot establish the reliability and accuracy of the device. In *Commonwealth v. Lanigan*, [419 Mass. 15](#), 26 (1994), the Supreme Judicial Court "accept[ed] the basic reasoning of [*Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579

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(1993),] because it is consistent with our test of demonstrated reliability." As formulated by our cases, a plaintiff seeking to introduce expert testimony based on scientific or technical knowledge, see *Commonwealth v. Patterson* 445 Mass. 627, 640 n.11 (2005), "may lay a foundation by showing that the underlying scientific theory is generally accepted within the relevant scientific community, or by showing that the theory is reliable or valid through other means." *Id.* at 640-641, quoting from *Commonwealth v. Sands*, [424 Mass. 184](#), 185-186 (1997). See *Commonwealth v. Lanigan*, *supra* at 26.

Here, the motion judge held an extensive hearing on the reliability of the data from the EDR. He concluded that the Commonwealth's expert, William Russell Haight, was qualified as an expert in EDRs and found the EDR to be an accurate device. The judge also determined that there was general acceptance in the scientific community of the validity of such data. In our review of his decision to allow the admission of the evidence, the standard is whether there was an abuse of discretion. See *Commonwealth v. Patterson*, supra at 639. There was no abuse of discretion.

Haight, accredited by the Accreditation Commission for Traffic Accident Reconstruction, an organization supported by approximately twenty professional societies, police stations, and universities, helped develop the crash tests that formed the basis for the accreditation examinations. Haight has taught courses in crash reconstruction both in the United States and abroad, has published in the field of motor vehicle crash reconstruction and motor vehicle data recorders, and has been involved in almost 1,000 crash tests. He was on the original committee created by the National Highway Traffic Safety Administration to develop training for data recording technology. He has testified in many States as an expert in collision reconstructions and as an expert on EDRs in motor vehicles.

Haight described the function and reliability of EDRs. Every vehicle with airbags has an airbag control module [\[Note 4\]](#) that monitors a developing crash and, based on the information received,

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decides whether to deploy the airbags. In addition, the module runs a diagnostic examination to make sure that its system is operating properly. The module also has a function that records data and, after a crash, stores some of that data in the EDR, which is a component of the airbag control module.

In addition to recording such matters as the warning lamp status (which, when lighted indicates problems) and whether the driver's belt is buckled, an EDR captures information about the severity of a crash, known as the delta force or the change of speed, and the duration of the crash. [\[Note 5\]](#) Moreover, the EDR records and stores four matters for a five-second period before a crash event -- the vehicle speed, the engine revolutions per minute (RPM), [\[Note 6\]](#) the brake switch status (whether the brake has been applied), [\[Note 7\]](#) and the throttle position. [\[Note 8\]](#) In this case, the EDR indicated a forward vehicle speed of fifty-eight miles per hour five seconds before the crash.

Haight testified that he has performed over 200 crash tests since 2000, "looking to the reliability of the accuracy" of EDRs. The majority of the crashes were performed with the same type of airbag control module as used in the defendant's vehicle. The tests have been of crashes of low severity to very high severity, angle crashes, and crashes involving side impacts, cars backing, and cars "flying off of ramps . . . , hitting the ground, and then hitting another car." In performing these tests he does not rely solely on the data in the EDR, as then there would be no control. He compares the speed obtained from the EDRs with that obtained from other instrumentation including accelerometers,

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infrared traps, sensitive radar, high speed video, and tape switches on the ground. Other persons and groups have also conducted tests and have published on the topic. He explained that the EDRs are designed to be accurate within "plus or minus" four percent, but in his tests he found them to be "a lot more accurate than that." A Canadian testing group also found the EDRs more accurate than four percent.

The EDR does not function until there is a crash. After the airbag control module performs its safety function,

determining whether to deploy airbags, [Note 9] the EDR stores the "precrash parameters and [the] crash pulse information" that determined the deployment of the airbags. Storage is the function of the EDR; it "locks in" the data. The airbag control module performs its safety function every second, but the data is not stored in the EDR unless there is a crash.

In this case the crash severity was monitored for almost four-tenths of a second; thus, the contact with the tree lasted less than one-half second during which time the vehicle lost 21.34 miles per hour as measured in a front to rear direction.

Since the collision was a sideways one and the vehicle rotated, the front speed would not provide a side rate of speed at which the vehicle hit the tree. In making that calculation and determining the angle at which the vehicle hit the tree, Haight examined photographs of the damage to the vehicle, the marks in the slush leading up to the tree, the "bounce off the tree," and police diagrams--the "whole scene." He also talked to Sergeant Walsh and looked at the distances and the information found in the police report diagram. Haight concluded the side speed to be "in the low forties." [Note 10] At one second before the crash, the EDR recorded a speed of forty miles per hour. Haight testified that the front speed was less in this case than the side speed

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figure, and that his calculations for the side speed were consistent with the physical evidence. [Note 11]

Haight explained that the technology behind the airbag control module and the EDR has been in existence since the advent of computers, which date back to the 1940's. Flight data recorders for aircraft, which are similar to EDRs but capture voice, also date from the 1940's. The use of EDRs to capture crash data began in the 1990's. The devices require no maintenance or calibration for the first ten years after leaving "the factory," [Note 12] can be safely removed from a vehicle, and do not require power to maintain their information. A system of easy retrieval and printing of the data, with several safety checks to ensure data integrity, has also been developed. This is accomplished either through what is known as a diagnostic link connector in the vehicle, or directly through the airbag control module.

Haight's testimony, in sum, indicated that he was amply qualified as an expert, had conducted 200 tests on EDRs, had taught and published on the subject, and had testified as an expert on EDRs in other States; that the technology behind the EDR had been known for many years; that he and others had tested the speed of motor vehicles by other methods to compare information provided by the EDRs and had found the EDRs to be reliable; that EDRs need no maintenance and calibration for ten

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years; and that his calculations based on the physical and other evidence in this case were consistent with the EDR data from the defendant's vehicle. Based on Haight's testimony -- the defendant presented no expert at the motion hearing -- the judge ruled that evidence from the EDR met the standard set forth in *Commonwealth v. Lanigan*, 419 Mass. at 26, for reliability. [Note 13] Although the judge did not refer to the alternate prongs set forth in *Lanigan* and its progeny (reliability shown by general acceptance or reliability shown by other means), implicit in his decision is that Haight's testimony indicated its validity.

The judge also concluded that the alternative *Lanigan* ground -- general acceptance of data from motor vehicle crash recorders in the relevant scientific community -- applied in this case. In determining "whether a scientific theory or procedure has been accorded general scientific recognition, a court may rely on evidence of witnesses

called to testify, articles written by experts in the field, and the conclusions of other courts that have considered the particular issue." Liacos, Massachusetts Evidence § 7.8 at 384 (6th ed. 1994).

Although as yet there are not many decisions on the admissibility of EDR data, most seem to support admission. See, e.g., *Matsos v. State*, 899 So. 2d 403, 407 (Fla. Dist. Ct. App. 2005) (holding that hearing pursuant to *Frye v. United States*, 293 F. 1013, 1014 [D.C. Cir. 1923,] was unnecessary where sensing diagnostic module [SDM] data was not novel technique or method, and where State demonstrated that SDM data, when used as tool of automotive accident reconstruction, is generally accepted in relevant scientific field); *Bachman v. General Motors Corp.*, 332 Ill. App. 3d 760, 781 (2002) ("trial court did not abuse its discretion by [1] finding that the process of recording and downloading SDM data is sufficiently established to have gained general acceptance in the relevant community, and, thus [2] determining that the *Frye* admissibility standard had been satisfied"); *People v. Christmann*, 3 Misc. 3d 309, 315 (N.Y. Just. Ct. 2004) (citing *Bachman*, *supra*, court stated that

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admissibility of evidence of data recorded on SDM is "generally accepted as reliable and accurate by the automobile industry and the National Highway and Traffic Safety Administration"). Cf. *Batiste v. General Motors Corp.*, 802 So. 2d 686, 688-689 (La. Ct. App. 2001) (evidence from SDM admitted but challenge was not on *Daubert* grounds). See generally Note, David Hasselhoff No Longer Owns the Only Talking Car: Automotive Black Boxes in Criminal Law, 39 Suffolk U.L. Rev. 289, 319-321 (2005).

3. Conclusion. The judge was warranted in denying the motion to suppress and did not abuse his discretion in finding the EDR data admissible under the Lanigan standard.

Judgment affirmed.

FOOTNOTES

[\[Note 1\]](#) The defendant lays stress on this sentence. Since the standard is probable cause we attach no significance to the initial phrase of the sentence.

[\[Note 2\]](#) He called it a crash data recorder.

[\[Note 3\]](#) The statutory language is "reasonable and proper." G. L. c. 90, § 17.

[\[Note 4\]](#) For General Motors Corporation vehicles, this module is known as a sensing diagnostic module (SDM). For Ford Motor Company vehicles, this module is known as a restraint control module (RCM).

[\[Note 5\]](#) Haight gave an example. If he were to jump off a building and land on concrete, he "would go from some speed to zero" in a very short period. That would be a "severe crash pulse." But if he were to jump from a building and land in a net, then the "speed to zero" would take longer and would result in a "more benign crash pulse."

[\[Note 6\]](#) When a vehicle is accelerating, there are more engine rotations (revolutions) per minute.

[\[Note 7\]](#) In this case there was no application of the brake at five seconds before the crash.

[\[Note 8\]](#) If a person's foot is off the acceleration pedal, there is a zero application of throttle. If the pedal is all the way to the floor there is a one hundred percent application of throttle. In this case there was an eighty-four percent open throttle, that is, the pedal was a little more than two-thirds of the way to the floor five seconds before the crash.

[\[Note 9\]](#) The airbags did not deploy in this crash because it was a sideways collision, and the defendant's vehicle did not have side airbags.

[\[Note 10\]](#) The defendant argues that Haight's testimony that EDR data is a supplement in conducting crash reconstruction and serves as a check against values calculated in another way undercuts the application in this case, as here the methodology was used not as a supplement but rather as a substitute for other methods of reconstruction. Contrary, however, to the defendant's contention, Haight's calculations for the side speed were based in large part on the physical evidence.

[\[Note 11\]](#) On cross-examination Haight described once more the physical evidence he compared with the EDR results to determine whether the EDR vehicle speed was accurate. He also indicated that the accident could not have been caused by spinning on a patch of ice, because of the other components stored in the EDR, e.g., the throttle position and the RPM.

[\[Note 12\]](#) Relying on cases involving different devices, e.g., Commonwealth v. Whyngaught, [377 Mass. 14](#) , 19 (1979) (radar speed measuring device), and Commonwealth v. Barbeau, [411 Mass. 782](#) , 784 (1992) (breathalyzer), the defendant claims that the Commonwealth did not provide evidence that the EDR was in proper working condition and accurately recorded information at the time of the accident. She urges that Haight's statement that the EDR did not require calibration or maintenance for ten years is a conclusion with no support. In this case the evidence was that the vehicle was only two years old (thus the judge could infer the device was probably not much older), that the system has a self-checking device sending a warning light if not working properly (here, there was no light), and a diagnostic software program indicated no error. Moreover, Haight's calculations, which took into account other sources, were consistent with the EDR data. In any event, it is the technology as a whole that has to be proved reliable, not every representation made by an expert.

[\[Note 13\]](#) The defendant did not renew her objection to the EDR testimony at trial. Therefore the standard of review of its admission at trial is whether there was a substantial risk of a miscarriage of justice. Commonwealth v. Whelton, [428 Mass. 24](#) , 25-26 (1998). There was no such risk.

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