

# LAW ENFORCEMENT TECHNOLOGY

## SOFTWARE TECHNOLOGY

By Bob Galvin

### Portable solutions at the crash scene



**A**s traffic motor officers are pressed to respond to an increasing number of vehicle crashes each year, they need to reliably collect crash scene data points, achieve accurate measurements and produce a detailed diagram in far less time than possible with current methods. That's a tall order for even the most experienced traffic officers or trained crash scene reconstructionists. Can it be done?

Yes, thanks to new technology that has compressed the size of equipment needed for scene investigations, mak-

ing it portable, while slashing the time needed to map and diagram a crash scene.

With police departments feeling constricted by persistent budget cutting, and faced with a mounting workload, the need to reduce time spent on investigating crash scenes is both real and urgent. When not responding to crash scenes, traffic safety officers must focus on speed enforcement. Add to this situation the growing pressure from state departments of transportation to re-open roads in less than 3 hours, then technology that would enable an officer to measure and diagram an entire crash scene in as little as 1 hour is compelling.

#### Self-made solutions

The grassroots movement to lighten the equipment load and accelerate crash scene investigation time has been led by a few pioneering police officers. One of these is Sgt. John Naccarato, who supervises the traffic division of the Clackamas County Sheriff's Office, located southeast of Portland, Oregon. Naccarato has developed his own portable crash scene mapping and diagramming solution, which steadily has been capturing the notice and fascination of other traffic motor officers nationwide. The sergeant, who eagerly tracks all emerging law enforcement technology, has long been a user of The Crash Zone diagramming program from The CAD Zone Inc. of Beaverton, Oregon. Crash Zone is a software program for desktop computers with which officers can draw crash scenes to exact measurements based on data they gather at the scene. When CAD Zone debuted a new software product, Pocket Zone, which is used to collect crash scene data fed to it via a total station or LTI laser mapping

*"It (portable crash scene technology) has cut down on our on-scene time, court preparation and reconstruction time, and actual time spent in court,"*

*Mark Kimsey, crash investigator*



system, this caught Naccarato's attention. He decided to build his own portable crash scene data collection solution. The sergeant acquired a Hewlett-Packard iPAQ handheld PC, which is compatible with Pocket Zone software. Then, Naccarato obtained a grant from the Oregon Department of Transportation for \$3,500 to purchase an LTI UltraLyte 200 Laser from Colorado-based Laser Technology, Inc. The laser captures slope and elevation measurements (in 3D). To complete his crash mapping solution, the sergeant purchased a cable that connects the data collector to the laser, plus a monopod on which to mount his laser.

With his new solution, Naccarato is able to accurately measure one- or two-car accidents using only the equipment he carries on his motorcycle. The compact size of this equipment makes it ideal for transporting on a motorcycle. "From the motorcycle cop's side, it's a space issue," says Naccarato. "There are a couple of side bags and that's it. You've got to haul everything in your office right there roadside."

#### **Data integrity protected**

Since Naccarato's approach to investigating crash scenes is such a detour from

the normal two-officer method for crash scene measuring, just how accurate is the data that is gathered?

The CAD Zone says its Pocket Zone software automatically saves every point the user shoots. Therefore, once all data is collected and a diagram created, all of the information is protected until it can be downloaded onto a desktop drawing program. Simply, none of the shot points can ever be erased or modified, according to company.

Mapping scene data integrity is, of course, essential since the diagram generated from the data may end up in a courtroom. Tim Brown, a police officer in the crash investigation unit of Bepnap County, New Hampshire, and a trained reconstructionist, has presented many crash scene diagrams before juries and knows how crucial it is to protect captured data. Like Naccarato, Brown is a Pocket Zone user because he says the software program is an actual CAD (computer-aided design) program that takes data directly from a total station and maps it as the user measures his scene. "It (the software) creates a file in a proprietary format in which the raw data from the total station is stored," Brown explains. "Now,

*"... although you can view this data, you cannot change or manipulate the raw file in any way. That's key as far as evidence integrity is concerned."*

*Tim Brown, crash reconstructionist*

although you can view this data, you cannot change or manipulate that raw file in any way. You can't override it. That's key as far as evidence integrity is concerned."

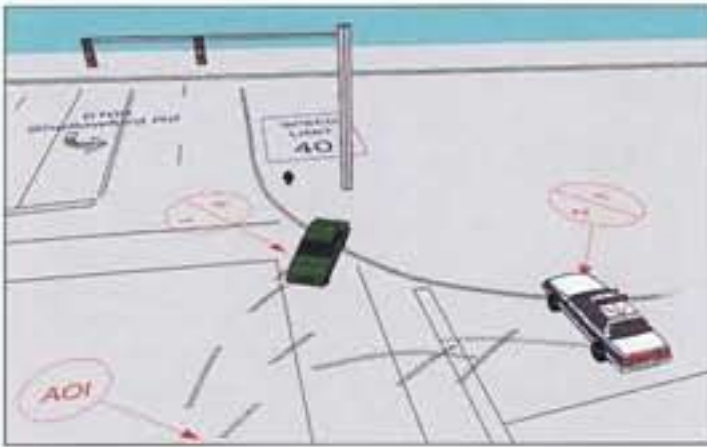
#### **Huge time savings**

One of the immediate benefits to be gained from portable crash mapping tools is the tremendous time savings. Crash investigator Mark Kimsey of the Hamilton County Sheriff's Office of Chattanooga, Tennessee, recalls how crash scenes once required three or four officers just to collect evidence. It took up to 5 hours to map and diagram the scene. Now, by combining a total station with his portable data collector, Kimsey says only he and another officer need to measure a scene, which can be done in less than 45 minutes.

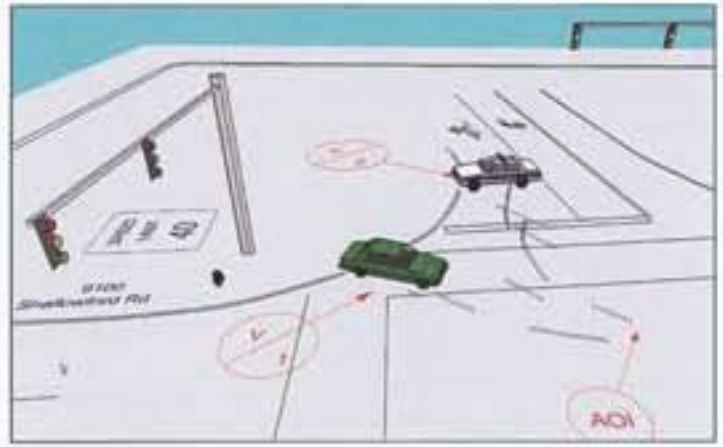
The portable mapping technology has helped streamline the entire gamut of crash scene investigation, notes Kimsey. "It's cut down on our on-scene time, court preparation and reconstruction time, and actual time spent in court," he says. In fact, due to the accuracy of the data collected with this technology, Kimsey adds, "Our actual court appearances often are declined because we present the case to the district attorney, who presents it to the defense counsel and then a plea agreement is reached."

#### **Speed enforcement another benefit**

The advent of portable software such as the Pocket Zone has been paralleled by advances in laser equipment that also are made for quick and easy crash scene measuring. According to Bob Squire, a member of the National Association of Professional Accident Reconstruction Specialists (NAPARS), the purchase of Laser Technology's UltraLyte 200 laser is ideal for his work since it combines precise crash scene mapping capability and speed



Shown is another view of a completed diagram initiated in The Pocket Zone at a crash scene, then completed in The Crash Zone software on a desktop. Once the 2D diagram is completed in The Crash Zone, the user just clicks a single button to see an accurate representation of the scene in 3D.



The completed Pocket Zone file is opened in The Crash Zone diagramming program where 2D and 3D diagrams can be completed. This image shows just a portion of an intersection with the final resting position of the two vehicles and the associated skid marks.

measurement. "We could have gotten total stations," Squire says, "but we really were looking for that dual purpose. I couldn't do speed enforcement with a total station."

#### More measuring options

Officer Jeff DeBolt, with the Beaverton Police Department's Traffic Safety Team, is another convert to portable crash mapping technology, although his approach is slightly different. DeBolt utilizes a system similar to that used by Naccarato, which consists of an LTI UltraLyte 200 LR laser along with a data collector (Pocket Zone) and a Panasonic Pocket PC. This package

*"I get the true slopes of grading, roadway and ditches to where I can just connect lines in the diagram off the points that are taken."*

— Officer Jeff DeBolt,  
Beaverton (Oregon) Police Department  
Traffic Safety Team

gives the user the ability to use the range-triangulation method of measuring points when mapping a crash scene. However, when CAD Zone unveiled its Pocket Zone software, DeBolt decided to add an LTI

Sgt. John Naccarato of the Clackamas County (Oregon) Sheriff's Office maps a crash scene using a Laser Technology, Inc. UltraLyte laser measuring system mounted on a monopod. The Pocket Zone data collection/diagramming software from The CAD Zone Inc. is loaded inside an HP IPAQ Pocket PC and connected directly to the laser. The data collector plots the data points on the PC's screen as they are shot in real time.

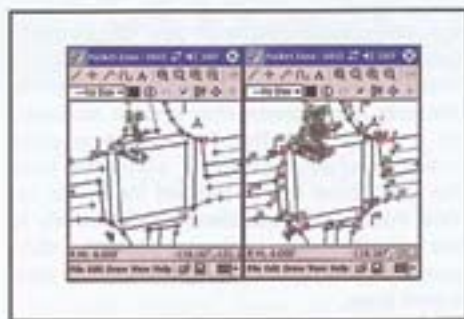


Mapstar Angle Encoder to his portable mapping solution. The main advantage of the angle encoder, which attaches to the portable LTI laser and data collector, is the ability to shoot out to points within a very long crash scene path.

"The angle encoder is doing a full 360-degree rotation and plotting each distance to identify where the point of evidence is," DeBolt explains. With that, he adds, "I get true angle of elevation because the inclinometer in the laser measures the slope. So, I get the true slopes of grading, roadway and ditches to where I can just connect lines in the diagram off the points that are taken." Next, DeBolt downloads the points from his data collector into the CAD Zone's Crash Zone software so he can create a 3D diagram.

#### Portability, speed and ease of use

Mapping tools such as the laser and angle encoder are swiftly becoming part of the crash scene measuring "toolbox" for many police departments eager to cut investigation time yet still gather accu-



Pocket Zone graphically displays crash scene data as it is collected at the scene, including points, lines, curves and symbols.

*"You don't need to be a reconstructionist (to use a portable mapping solution). If you collect data accurately, you can send it to a reconstructionist and ask him to figure out what happened."*

— Sgt. John Naccarato,  
Clackamas County (Oregon) Sheriff's Office

rate data. DeBolt, for example, said he estimates approximately 75 percent of all scenes he and his traffic safety team map can be accomplished with lasers. Data collection software that can double as a diagramming tool, and be used with any mapping solution, also are becoming key tools to have. Fortunately, data collectors can gather data points in a way that either the traffic officer or reconstructionist can use it, plus the data points can be downloaded to most commercial diagramming software programs.

In fact, Naccarato points out, "You don't need to be a reconstructionist (to use a portable mapping solution). If you collect the data accurately, you can send it to a reconstructionist and ask him to figure out what

happened. And the reconstructionist can put the data into any type of CAD program and start coming up with speed and causation factors based on the scaled diagram that you give him."

Although the portable equipment developed so far represents a quantum leap in the crash measurement field, the technology keeps evolving. Some equipment, for example, now has a built-in data collector. One tool, called the Vulcan, manufactured by Maptek, part of a consortium of offices worldwide, operates on Windows NT/2000/XP, has 3D design and data import/export functionality. However, while the Vulcan might be useful for crash scenes, its intended applications are for geological modeling, surveying and mining.

The range of equipment for crash scene measuring and diagramming, especially in portable designs, gives law enforcement agencies many choices. "There's really enough equipment out there that officers can find something in their price range," says Squire. With such affordability, along with the time savings and the fact that it only takes one person to map and diagram a scene, this new wave of technology is something for crash scene investigators to strongly consider.

*Bob Galvin is a Portland, Oregon-based writer who covers law enforcement and related technology and products. He can be reached at [rsqpr@msn.com](mailto:rsqpr@msn.com).*

## The Best Combination for the Best Portable Solution!

THE CAD ZONE

(Toll Free) Phone: 800-641-9077  
Web Site: [www.cadzone.com](http://www.cadzone.com)  
Corporate Headquarters:  
4790 SW Watson Ave  
Beaverton, OR 97005

 **LASER<sup>TECH</sup>  
TECHNOLOGY**  
Measurably Superior

(Toll Free) Phone: 800-280-6113  
Web Site: [www.lasertech.com](http://www.lasertech.com)  
Corporate Headquarters:  
7070 S. Tucson Way  
Centennial, CO 80112