

Leica Geosystems **TruStory** Forensic Analysis by Albuquerque Police Department



- **Organization**
Albuquerque Police Department
- **Scope of the project**
100' x 50' crime scene in a parking lot with a van in which a homicide shooting had occurred
- **Date**
2006
- **Instrument Sensors**
Leica HDS3000 (since upgraded to Leica ScanStation)
- **Software**
Cyclone
- **Field**
4 Hrs, 1 person at night
- **Office**
2 Hrs, 1 person

Benefits

- Definitive establishment of shooter location aided in resolving the case
- More complete data collection than using traditional methods
- Ability to view the scene in 3D for additional analyses to test crime scene theories
- Freedom to capture the scene under any lighting conditions

Background

The Crime Lab of the City of Albuquerque Police Department (APD) acquired a Leica HDS3000 laser scanner (since upgraded to a Leica ScanStation) and Cyclone software in 2005. The department has used the system to successfully capture numerous crime scenes.

In this case, two vehicles were involved in a road rage incident. Both vehicles pulled into a parking lot. After a brief physical altercation, the passenger of one vehicle fired shots at the driver of the van (pictured here). The suspect vehicle began to flee the area when it stopped near the right side of the van and the suspect fired four shots into the van. The suspect vehicle then fled the scene.

The area around the van and the outside of the van were laser scanned. The scan data was further processed and analyzed to provide evidence of the shooter's location and whether or not the shooter was moving while shooting at the van.

Field Workflow

The crime scene investigation team included one person to operate the scanner. Two others took additional photographs and managed the overall scene investigation, assisting in moving the scanner & tripod around the scene as needed.

The data collection area was approximately 100'x50'. Scanning was done at night from three (3) locations, with a focus on the van exterior, trajectory

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- when it has to be **right**

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“By quickly capturing the actual crime scene with extraordinary detail and accuracy and by being able to model and visualize the scene in 3D, Leica’s laser scanning tools have helped us reach more definitive conclusions, sooner,” says APD Chief of Police Ray Schultz. “The capabilities of our Leica scanner and software have proven well suited to many of our crime scene investigation needs.”



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rods aligned with bullet hole perforations & penetrations, and the area around the van, including evidence markers for each bullet casing location. Scan density for the site was 3" vertical x 2" horizontal spacing at a range of 50' from the scanner and 1" x 1/2" spacing for the van. The scanner was set on a standard survey tripod.

Scan targets were placed around the scene to accurately tie all three main scans together into a single, digitized 3D representation. Each scan point was accurate to 1/4". All scanning was done in a 4-hour period while other investigation tasks were being conducted at the scene.

Office Workflow

Scans were registered to each other using Cyclone REGISTER. Following registration, bullet trajectory rods were modeled in Cyclone MODEL to establish the location(s) of the shooter. A 2D plan view drawing of the scene was also created using Cyclone MODEL.

Results

Using the laser scan data, APD was able to develop an accurate 3D model to determine the location and movement of the shooter relative to the van and victim. The point of convergence of the trajectory rods was nearly on top of the cartridge casings, proving that the suspect was stationary when the shots were fired. This finding countered one theory that the shooter was moving while shooting in self-defense. The prosecution of this case resulted in a double conviction.



Scan data was collected by the standard crime scene team in approximately the same amount of time as if traditional methods had been used. However, scan data provided a more complete and accurate representation of the actual scene. Cyclone software provided the ability to view the scene in 3D and to incorporate computerized extensions of bullet trajectory rods.

In subsequent use, the department has found that their Leica Geosystems scanner collected evidence that investigators may not have realized at the original time of crime scene mapping could later be critical to resolving the case.

The Leica scanner has provided field flexibility and ease-of-use advantages over laser photography methods, while its companion software has provided the ability for visualization of the scene from any perspective. In addition, laser scanning software modeling tools have enabled accurate analyses of extended trajectories, well beyond the length constraints of the physical trajectory rods themselves.