D19 The Use of Electronic Data Collection Technology in Crime Scene Documentation

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The goals of this presentation are to review the state of electronic data collection technology, explain its current applications in crime scene work, and propose potential uses that merit further development.

In the field of forensic engineering, particularly the specialty of vehicle crash reconstruction, the use of electronic data collection technology has been well known for several years. Foremost in this field has been the use of the electronic surveying package, commonly known as the "total station." The total station migrated from its non-forensic uses in civil engineering to the realm of forensic engineering, where it has been used successfully to map crash sites, measure crush depth of vehicles, and record data for later use in the creation of computer animations. Nearly all of the forensic literature on the use of the total station is related to its applications in accident reconstruction.

An underutilized application of the total station and other electronic measuring equipment is in the mapping and documentation of non- vehicular crime scenes. Despite its origins as a land surveyor's instrument, the total station is not limited to outdoor use. Compared to traditional tape measure methods of collecting data, the total station offers the advantages of faster data collection, greater precision, elimination of transcription error, and easier transport of data between systems as well as between agencies. Furthermore, the total station allows measurement of distances and angles in three dimensions as opposed to the two dimensions measured by traditional methods. The techniques of total station mapping during archaeological excavations have been borrowed for forensic use, and have proven to be invaluable in the documentation of clandestine burial sites, mass graves, and crime scenes spread over large areas. Other situations in which the total station has been used are documentation of shooting scenes and disaster sites.

An essential complement to the electronic surveying instrument is computer-aided drafting (CAD) software. CAD software permits the data collected at the crime scene to be analyzed quantitatively and provides a means of producing scaled diagrams of the scene, as well as three-dimensional digital models of the scene that may be used in computer animations. On its own, CAD software provides a precise means of making measurements of features depicted in crime scene photographs. This technology is ideal for crime reconstruction, bloodstain pattern analysis, photogrammetry, and creation of courtroom exhibits.

Other electronic data collection devices with forensic applications include laser-distance measurement units, global positioning system (GPS) receivers, and geographic information systems (GIS).

Crime Scene, Mapping, Technology

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