D22 Advancing the Process of Post Blast Investigation

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After attending this presentation, attendees will recognize the value of applying laser-scanning technology to post blast investigations.

This presentation will impact the forensic community as well as the military and public safety bomb disposal communities by demonstrating a timely, highly accurate, and tactically safe means of documenting crime scenes; specifically the scene of a large explosion.

One of the most complex investigations is that of a large post blast scene. The actions of investigators on a Combat Zone (CZ) post blast scene are very different from those currently conducted within the United States. An investigation in a CZ, such as Iraq, is made more complex by insurgent activities and secondary devices that limit scene documentation and evidence collection to about 30 minutes, greatly compressing normal investigative timelines. An investigation within the United States, where insurgent activity is not a factor and secondary devices are rare, allow investigators an appropriate amount of time to process the scene. Once secured, investigators will photograph the scene, measure the shape and depth of the crater, plot the location with GPS, obtain soil samples, and locate anything that may have come from the device; such as, Radio Control (RC) components, command wires, switches, power sources, wires, fragmentation from ordnance or improvised sources. All of the evidence is photographed, documented, collected, and additional photographs are taken of any unique damage observed at the scene. Any evidence overlooked during this hasty process may be lost forever unless it was captured in a photograph. Consequently, the ability to photographically document a scene during this hasty process cannot be understated and any evidence not collected or photographed is forever lost.

In 2000, Total Station Mapping equipment was used for the first time on a Vehicle Bomb Improvised Explosive Device (VBIED) during a Federal Bureau of Investigation (FBI) VBIED School and quickly became the standard for processing these incidents. However, by the year 2000 the Total Station had been employed by accident investigators for approximately 12 years. Today, Laser-scanning technology is slowly replacing total station for accident reconstruction, but it has not been employed on a post blast scene in a CZ, nor can the author cannot find any examples of it being employed on a post blast scene in the United States.

The use of terrestrial 3D Laser-scanning for forensic mapping has created a paradigm-shift in the way investigators can collect and later analyze data after an incident. Using high-speed laser scanners, investigators can digitize the post-blast environment quickly and easily by making millions of highly accurate measurements. The scanner captures a "point cloud" which can be viewed in 3D from any perspective and provides a compelling visual archive of the scene. Laser-scanning is a remote sensing technology that minimizes the amount of time investigators are on scene thereby decreasing their exposure to possible hazards. Two field tests will be used to demonstrate the application of this technique. The first test involves an FBI VBIED course that will show the applicability of this technique to this type of investigation. The second test involves an FBI Combat Zone Post Blast Course utilizing a VBIED, and will reinforce the applicability of this technique and demonstrate the speed in which 3D Laser-scanning equipment can be employed -as the on-scene portion of this test will be under 30 minutes.

Manual measurement methods employed at a CZ scene may result in 20 to 40 measurements being obtained. Employing Total Station Mapping equipment would be a significant technological jump and data capture may increase to 400 or 500 points, but the time on scene is significantly increased. However, by employing the appropriate 3D Laser-scanning equipment an investigator can capture up to four million points in less than 30 minutes, greatly increasing the possibility of capturing information that may be overlooked.

Post Blast, Laser-Scanning, Point Cloud

 ** Presenting Author*