

Case Study: Surveying an Accident Scene, Nazareth, Israel

Date: August 2014

Location: Nazareth, Israel

The Survey

The required task was to survey and draft a 3D CAD plan, with a measurement accuracy of better than 2 centimeters (5-6 hundredths of a foot), of an accident scene.



Original Effort Estimate

The original effort estimate for the surveying project, using conventional surveying techniques, was 4 hours. This appraisal was based on 2 hours in the field, using a Total Station device, and 2 hours in the office to draft the detailed CAD plan of the accident scene based on the Total Station measurements and the sketch done in the field.

A key challenge was the need to complete the survey in a short time to minimize the impact on traffic in the vicinity of the accident area.

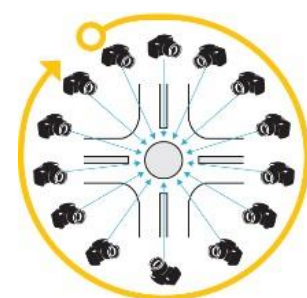
Actual Required Time Using DatGram™3D

The actual time to survey the accident scene and prepare a 3D CAD model of the accident scene was only one hour.

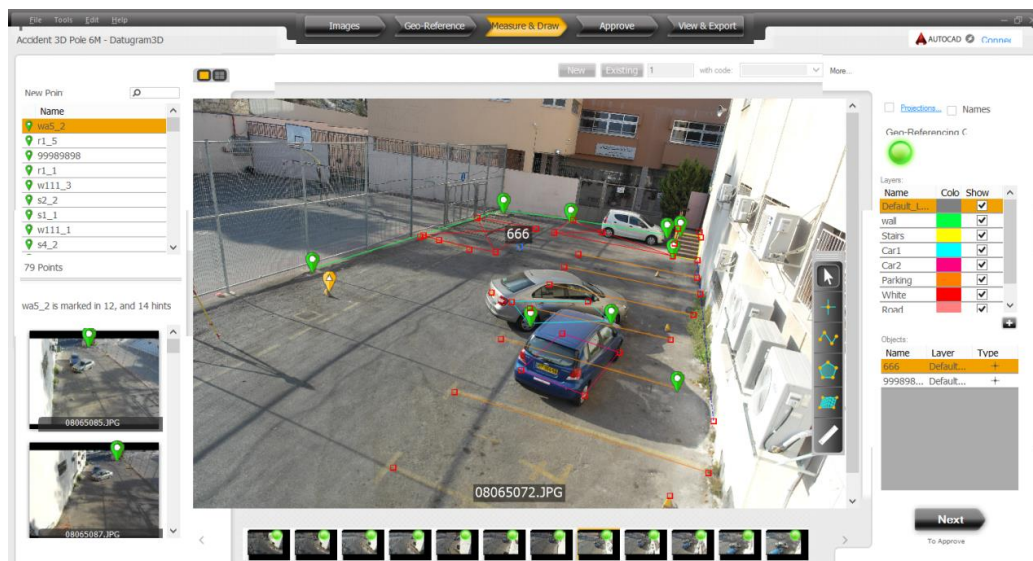
The time spent in the field was only 30 minutes: 15 minutes to photograph the accident scene, and an additional 15 minutes to measure several control points. The accident scene was photographed with a regular Samsung Smart Camera NX



1000 camera (20-megapixel resolution) with a 16-mm wide-angle lens. A total of 45 images of the accident scene were made from the perimeter of the accident scene toward the center, with an image taken every 2 meters (6 feet). To minimize foreground obstructions in the images, the camera was elevated above ground level by mounting it on an 8-meter (25-foot) telescopic pole, and was remotely controlled using the Samsung smartphone application via Wi-Fi. A total of 20 points were measured at the accident scene using a prism-less Total Station device; 10 of these points were used as control points for the geo-referencing of the images. The selected control points were high-contrast, well-defined objects such as the center of cars wheels, etc.



It is important to point out that, by surveying the accident scene with a camera, it was possible to clear the area much faster than when surveying it using conventional methods. Moreover, surveying from the images allowed the extraction of additional measurements at later stages. The actual time spent in the office to geo-reference the images and draft the 3D CAD plan of the accident scene directly on the images was two hours.



Results

A 3D CAD model of the accident scene in DXF format was generated by drafting directly on the oblique images using DatuGram™3D. In addition to the DXF file, a list of all measured points in PNT format was generated. This included the point names, codes, descriptions, coordinates, and their measurement accuracies in all axes. In total, 79 new measurements were made from the images. The measurement accuracy of all points was better than 2 centimeters (5-6 hundredths of a foot) in both position and elevation.



Lessons Learned

The survey in the field using a regular camera mounted on a telescopic pole proved to be rapid, effective, accurate and, furthermore, much safer, compared to surveying using conventional techniques. Overall, the surveyor saved significant time – from 2 hours to half an hour in the field. The accident scene was cleared faster and additional measurements were extracted from the images at a later stage.