iWitnessPRO-Agilis V3 has released

The new addition to the internationally renowned and widely-adopted iWitness and iWitnessPRO photogrammetry software suite, iWitnessPRO-Agilis, builds upon the automated network orientation and 3D point cloud functions within iWitnessPRO. High-resolution 3D point clouds, photo-textured meshes, digital surface models (DSMs) and orthoimage mosaics can be automatically generated with iWitnessPRO-Agilis, and monoplotting, which allows 3D feature extraction from a single oriented image when an underlying 3D point cloud is in place, is also supported, as is all the feature extraction functionality of iWitnessPRO.

Figure 1: High-resolution photo-textured 3D point cloud.

The new automated 3D mapping and modeling functions of iWitnessPRO-Agilis will enhance its capabilities and productivity in traditional applications areas of forensics, traffic accident reconstruction, cultural heritage recording, and engineering and architectural measurement, and also in 3D spatial data generation from photography recorded from UAVs/drones.

Example Application of iWitnessPRO-Agilis

Shown in Figure 1 is a textured 3D point cloud of the scene of a fatal motorcycle accident, generated by iWitnessPRO-Agilis. The 3D mapping utilized 91 images recorded from a drone. These images were captured in a 15 minute flight mission, before which the police used spray point to highlight particular evidence features, such as motorcycle tire marks. GPS data was used to trigger the camera at the desired locations and this same data, recorded to the EXIF header of each image, was used to georeference the mapping data produced by iWitnessPRO-Agilis.

Following the automatic photogrammetric orientation of the block of images and the dense image matching process employed to generate the 3D point cloud, DSM and ortho-imagery, and feature points of interest were gathered both through monoplotting and stereo-digitizing, as illustrated in Figures 2 and 3. This rapidly acquired feature point data and textured point cloud were then exported via DXF and both LAS and PTS format, respectively, to facilitate further diagramming of the accident scene in a CAD system, CAD Zone's CZPC software.

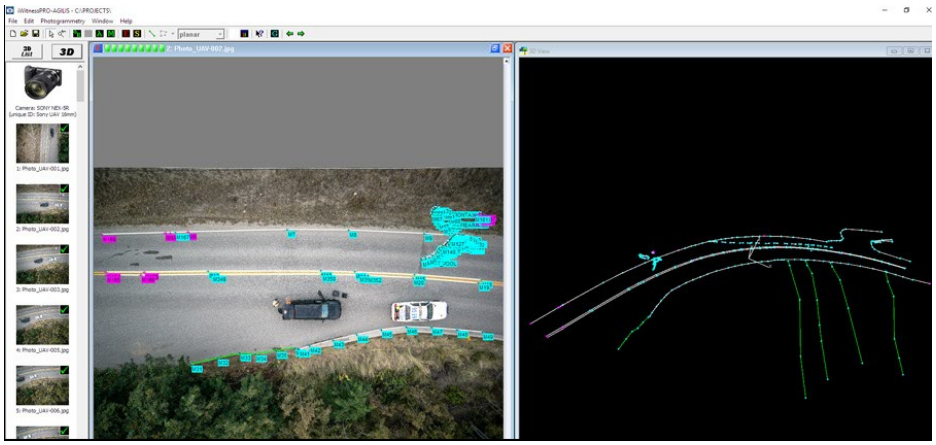

Figure 2: Feature extraction within iWitnessPRO-Agilis.

Figure 3: Extracted feature detail overlaid on a UAV image.

Shown in Figure 4 is the generated point cloud, comprising 44 million points, displayed along with tracings of features of interest, such as tire marks (red arrows) and road detail, namely the jersey barrier, fogline and double yellow center lines.

Figure 4: Feature tracing within the dense point cloud generated by iWitnessPRO-Agilis

As shown in Figures 5 and 6, in addition to tracing the final rest positions of the victim and motorcycle, vehicle symbols were imported into the 3D model in CZPC and aligned to the road surface, thus presenting an accurate and readily interpretable 3D depiction of the scene.

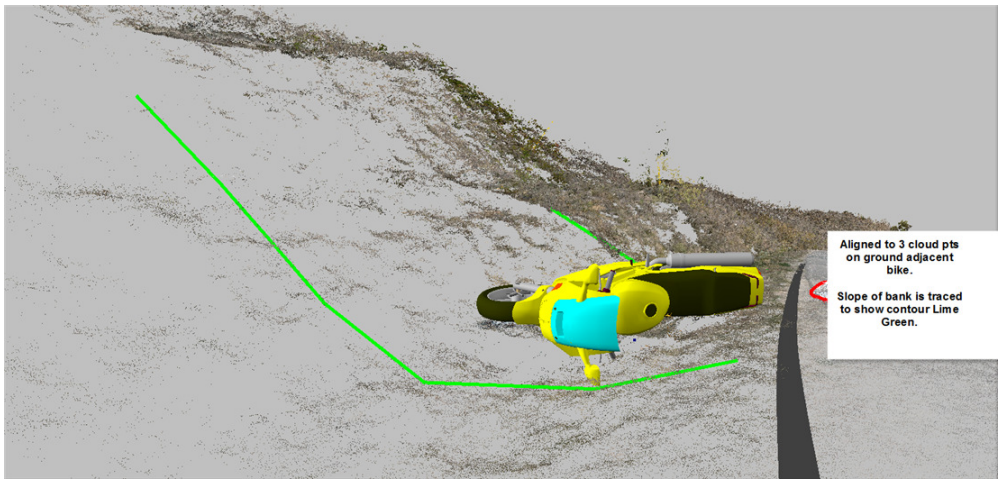

Figure 5: Motorcycle CAD symbol, inserted in the 3D point cloud.

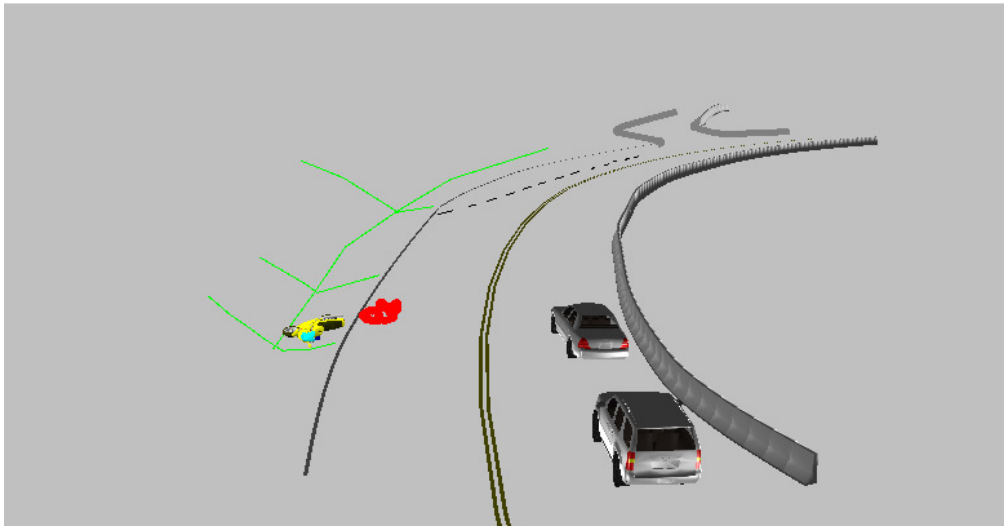

Figure 6: Highlighting of features of interest for accident analysis.

Some 35 minutes was required to complete the CZPC tracing work, with the accuracy of the iWitnessPRO-Agilis generated point cloud being to 2 to 3 centimeters. The integrity of the overall mapping is exemplified in Figure 7, which shows the shape-correct CZPC model of one of the cars positioned to scale within the 3D reconstructed scene. Notice the alignment of the car pillars and window trim to the point cloud. Also the trunk was open during the drone flight, as can also be seen in the figure.

This application has highlighted to benefits of both photogrammetry from UAV recorded images in general, and the merits of iWitnessPRO-Agilis in particular, for the fast, accurate and comprehensive mapping and 3D reconstruction of traffic accident scenes to support forensic analysis and litigation.

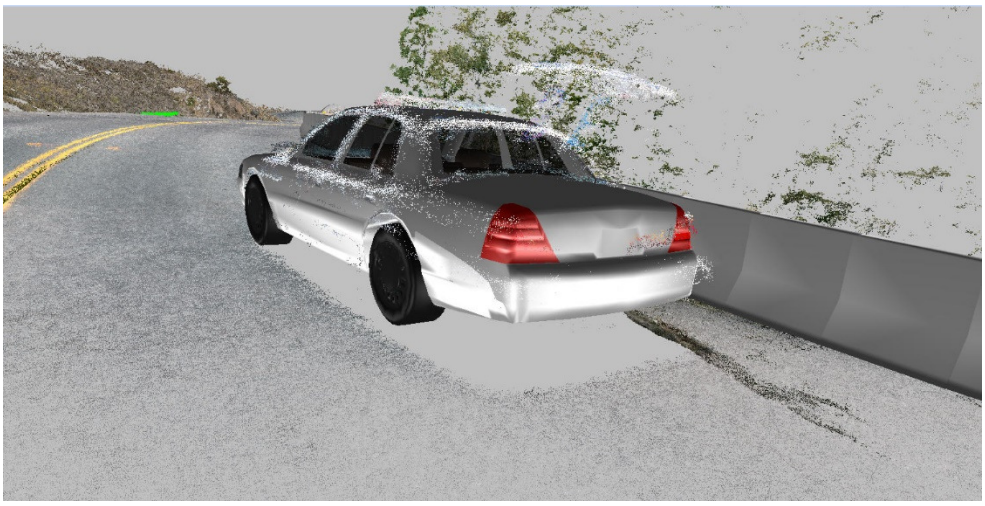

Figure 7: Accurate fitting of shape-correct car model to the generated 3D point cloud.