
European consortium is close to launching product for crime scene investigators and identification experts

Benefits

- 1st product designed specifically for fast digitising of footwear and tyre impressions directly at crime scenes
- Leveraging of optical and digital 3D technology (Fig. 9)
- 3D analysis software simplifies the process of identification
- Basis for increased gathering of evidence
- Basis for increased forensic intelligence
- Specific workflow designed into the product - from crime scene to court.
- Developed in cooperation with police authorities and other forensic experts



Fig. 9 Shoe, photograph, plaster cast and 3D data of impression in clay under field conditions. Comparison between the plaster cast and 3D data shows that the 3D data has more fine details that match with the original shoe.

3D-Forensics is an excellent solution to capture and analyse footwear and tyre impressions left at crime scenes. The system will support the solving of an increased number of cases of crime and at a lower cost, which will be a further deterrent to criminal activity.

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Partners



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The project started in July 2016 and will be completed in 2018. It will increase the Technology Readiness Level of the 1st prototype system developed in an earlier project which received funding from the European Seventh Framework Programme (FP7/2007-2013) under grant agreement No 312307.



3D-FORENSICS/FTI

Mobile handheld high-resolution 3D-Scanner and 3D data analysis for forensic evidence – fast track to innovation



Footwear and tyre impressions are valuable forensic evidence but collection and analysis is time consuming and outdated

Footwear and tyre impressions at crime scenes are important evidence for criminal investigations and proceedings in court. The common operational methodology to record these impressions is through the making of plaster casts (Fig. 1). The physical impressions are then provided to experts to assess for the presence of identifying characteristics such as cuts, scratches, tears and holes.

Plaster casting of impressions has a number of disadvantages:

- Slow procedure, requiring preparing, pouring and drying of plaster
- Low level of accuracy, one attempt
- Not user friendly (e.g. messy, dusty, etc.)
- Contaminates impressions
- Artefacts such as blood, glass and hair need to be removed beforehand
- No 3D digital data
- No impression comparison automation
- Cast needs to be physically sent to experts
- Time required often prevents collection of the evidence
- Whole analysis requires special experts



Fig. 1 Plaster casting of footwear impression

Fast and contactless 3D-acquisition of footwear and tyre impressions directly at the crime scene – workflow through to court

3D-Forensics has created an innovative system to record and analyse footwear and tyre impressions.



Fig. 2 Trace recovery

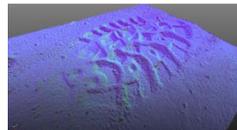


Fig. 3 3D point cloud

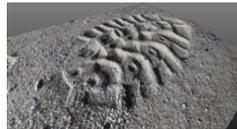


Fig. 4 Colour mapped

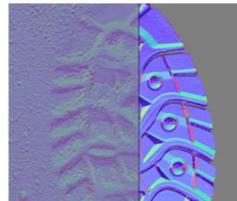


Fig. 5 Investigation

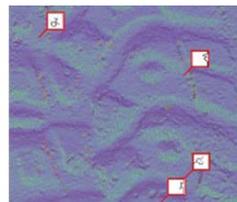


Fig. 6 Annotation

Fig.2 shows the handheld usage of the system. The scanner provides highly resolved 3D point clouds (Fig. 3) and colour images are taken simultaneously with an attachable high resolution camera. The colour images are mapped onto the 3D point cloud (Fig. 4).

The integrated 3D measurement and colour data can then be analysed with a set of software tools to investigate characteristics of the footwear and tyre impressions. The software has been designed to allow an analysis of the new 3D data in a way in which forensic experts are used to working with traditional techniques.

Class characteristics are determined by the user by comparing the impression with images from manufacturers' or other sole databases (Fig. 5). Individual identification characteristics can be marked by the user with an annotation tool (Fig. 6).

Collection of digital 3D-data and easy extraction of features out of scanned impressions and their forensic analysis

- Capturing of traces of footwear and tyre impressions (Fig. 7) within some seconds
- Recording the 3D-profile of impressions in a digital point cloud in μm – accuracy (Fig. 8)
- Measurement without contact, no contamination
- Identification of class and identification features
- Easy exchange of digital 3D-data
- Connection with other survey 3D-data

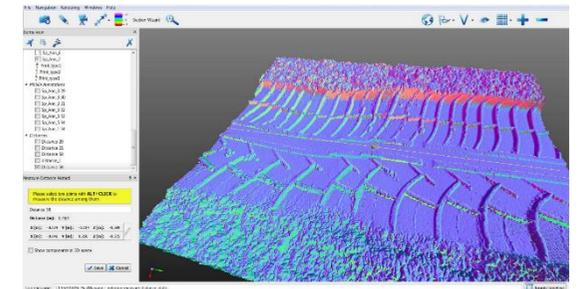


Fig. 7 Tyre tread impression with high definition 3D scanning

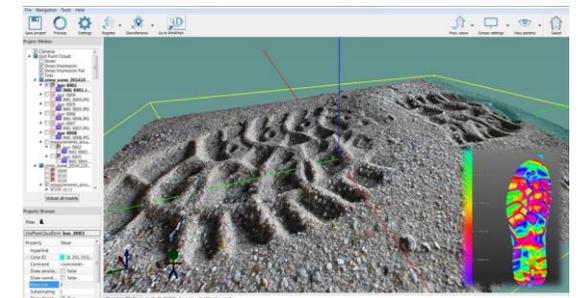


Fig. 8 Footwear impression with colour map and depth