

RECONSTRUCTION OF THE COURSE OF EVENTS BASED ON BLOODSTAIN PATTERN ANALYSIS

Project realized as a part of Defence and Security Programme (2012-2015)
Project financed by The National Centre for Research and Development

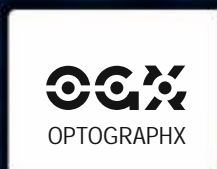


Partners of the Consortium :

Leader of the consortium – Warsaw University of Technology
Partner – Central Forensic Laboratory of the Police
Partner – University of Warsaw
Partner – CYBORG IDEA s.c.

The Project aims to combine the advances in imaging technology and 3D data processing techniques to establish a complex system not only to register and document but also to analyze, reconstruct and finally to visualize in 3D the crime scene with particular focus on bloodstains. The System will be able to preserve the crime scene and generate a 3D model from the digital data that can be used for further analysis with the dedicated software provided with the system. The specialized analyzer module for bloodstains will provide forensic experts with an opportunity to perform precise, quick and objective assessment. In addition, the implemented bloodstains database will support the expert in determining the mechanism for generation of the bloodstains at the scene. This solution will be capable of presenting the distribution and layout of stains in an unambiguous, trustworthy and objective way. These are crucial factors to draw the right conclusions about the origin mechanisms of bloodstains. The goal of the system is to assist law enforcement in investigative processes and facilitate subsequent legal process that rely on the forensic evidence.

Warsaw University of Technology, Institute of Micromechanics and Photonics
Sw. A. Boboli 8
02-525 Warsaw



The Innovation of the Solution

Innovative features of the system:

- replacement of subjective situational sketches and traditional photography with digital 3D data,
- reconstruction of the crime scene in 3D virtual reality that retains highly accurate modelling of relevant details,
- opportunity for experts to draw conclusions based on object-oriented data, even without appearing personally at the crime scene,
- complex nature of the technological idea starting from hardware and software solutions through database design, to conclude with prototype tests and training and instruction of the end users.

Interdisciplinary team

The successful realization of a project of such complexity requires the combination of both knowledge and experience of experts from many disciplines. The team originating from Warsaw University of Technology has more than 10 years of experience in developing scientific and practical solutions for 3D imaging and parallel processing of large datasets. The Central Forensic Laboratory of the Police is the only institution providing professional scientific support of forensics in criminal cases. CYBORG IDEA is experienced in developing solutions for documentation, analysis and reconstruction of the traffic accidents and crime scenes and applying photogrammetric techniques. The Department of Criminology at the Faculty of Law and Administration at University of Warsaw is the leading academic centre of its kind.

The Outcome

The final outcome of the project will be a system prototype that will be operational under real conditions and will consist of:

- three 3D scanners (broad, situational and detail scanners) for preserving bloodstains at the scene:
 - 3D scanner for registration of the overall scene (time of flight technique), registration volume is a 25m sphere with 2-3mm resolution with measurement uncertainty below 4mm,
 - 3D scanner for situational scanning (structured light projection technique), registration volume is 1m x 0.6m x 0.5m box with resolution up to 0.3mm and measurement uncertainty below 0.1mm,
 - 3D scanners for scene details (structured light projection technique), registration volume is a 100mm x 60mm x 50mm box with resolution up to 30 μm and measurement uncertainty below 5 μm .
- bloodstains database to support analysis in 2D and 3D,
- dedicated software for reconstruction of the crime scene in 3D virtual reality, capable of presenting even the most detailed measurements along with any additional materials.