

# COMPUTER AIDED CRIME SCENE SKETCHING

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**ABSTRACT:** The use of Computer Aided Design (CAD) in forensic science is not new. However CAD did not become a (quality) standard for crime scene sketching. If the crime scene sketch is an effective way to present measurements, it must respond to accuracy criteria to supplement the documentary work by note taking and crime scene photography.

The forensic photography unit of the Zürich Police changed already some years ago from hand drawn crime scene sketches to CAD sketches. Meanwhile the technique is used regularly for all major crime scene work. Using the Rolleimetric MR-2 single-camera measuring system combined with commercial CAD-software, crime scene sketches of a high quality standard are obtained.

**KEY WORDS:** Crime scene sketching; CAD-sketching; Photogrammetry.

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## INTRODUCTION

The traditional documentary work at the crime scene includes photography of the general situation as well as all sorts of physical evidence. The more photographic information are available for criminal profiling and evidence purposes, the better it is. An often neglected factor of high documentary value is the mapping respectively sketching of a crime scene or a disaster. The accurate measurements of the locations of persons, objects and physical evidence are in many cases of major importance when reconstructing the crime scene pictorially for investigative purposes or for illustration for the Court.

Manual crime scene drawing is still of major importance for (police) work, in spite of an increased use of visual documentary techniques such as (digital) photography and (digital) video-taping. The rough crime scene sketch is completing the pictorial techniques by a simple and easy to handle way to fix and present measurements. The rough hand-drawing from a crime scene might not be accurate enough to allow the calculation of the exact locations of physical evidence, positions of persons, due to missing spatial relationship and 3D-viewing.

## PHOTOGRAPHIC MAPPING AND CAD SKETCHING

Photographic mapping of a crime scene encounters a major difficulty – the exact recording of sizes, shapes and distances. This difficulty might be overcome by photogrammetry and recording of the scene by a twin-camera system and stereoscopic evaluation of the photographic data. Traditional photogrammetry is frequently used for road traffic accidents where it has given proof of effectiveness. It does demand for a target of known size, relatively flat surfaces as well as a high evaluation of the photographic camera system to get accurate measurements. If these conditions for best results are mostly given for scenes of road accidents, they are rarely met in criminal cases. Therefore traditional photogrammetry is of no practical interest for an effective sketching of the scene of crime.

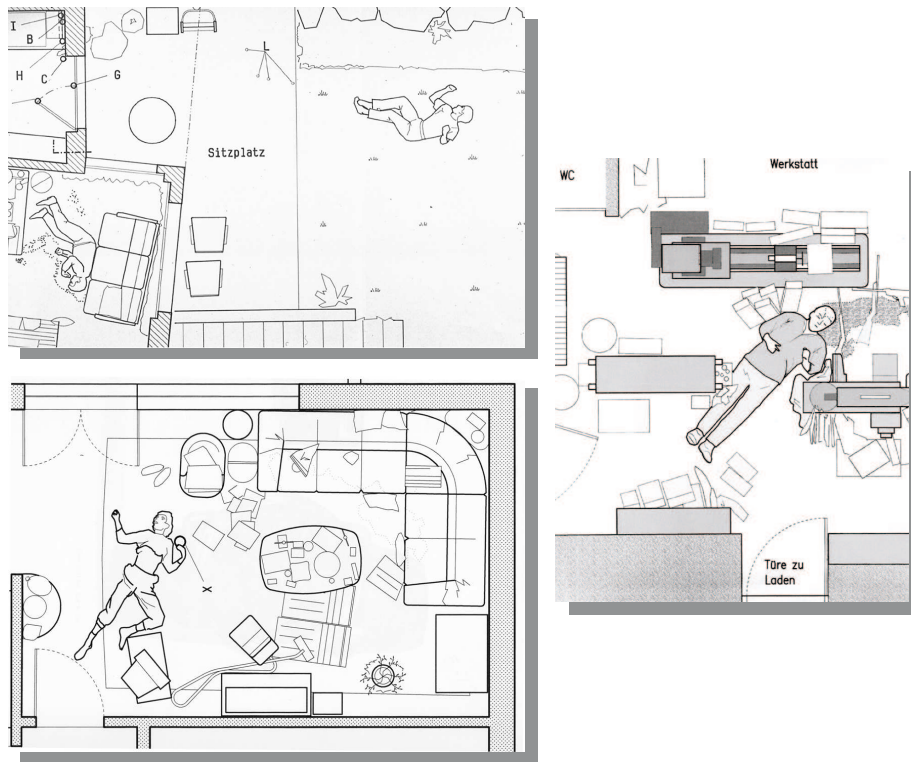


Fig. 1. Examples of CAD sketches of serious crime scenes (by courtesy of Unfall-technischer Dienst Stadtpolizei Zürich, Kriminalfotodienst Kantonspolizei Zürich).

New photogrammetric systems include easy to use single-photo cameras and computers to handle the image data for sketching. Their application in

forensic science is not new [1, 2]. Among a few CAD based photographic measurement systems available on the market, the Rolleimetric MR-2 system offers a number of advantages, which makes it a valuable tool for routine use sketching of a serious crime scene or a major disaster. The calibrated camera (Rolleiflex 3003) is operated like any other camera. The only additional requirement in comparison to ordinary crime scene photography is to have clearly visible reference targets on the picture (such as white disks or other markers), with defined distances between each other. These reference measurements are recorded in the same way all other information from the scene are fixed photographically. Moreover the photographer has to take care to shot pictures with different views of angle to produce overlapping pictural information for best possible results. The more pictures are taken the better it is! The final scaled sketch is then produced by evaluating the photographic data on the computer, using the system software as well as complementary CAD tools to produce neat and clean drawings of the scene. The system has also been useful for the recording and sketching of large scenes from major disasters, by aerial mapping to show the relationship among objects which are at great distances; e.g. air plane crash.

## RESULTS

Several years of experience with the Rolleimetric MR-2 system on many serious crime scenes show the advantages compared to traditional hand drawings:

- fast and effective crime scene processing,
- standardised approach,
- accurate results.

### References:

1. Brüs chweiler W., Braun M., Fuch ser H. J. [et al.], Photogrammetrische Auswertung von Haut- und Weichteilwunden sowie Knochenverletzungen zur Bestimmung des Tatwerkzeuges – Grundlegende Aspekte; *Rechtsmedizin* 1997, Bd 7, S. 76–83.
2. Heinert W., Computer Aided Preparation of Crime Scene Drawings; Proceedings of the 11th Interpol Forensic Science Symposium 1995.