

# Current Developments in the HCU Mobile Mapping Systems and Its Use in Research and Teaching

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## SUMMARY

At the HafenCity University a mobile mapping system has been developed in recent years. Consisting of an inertial measurement unit (type: IMAR RQH-1003), a GNSS receiver (Novatel OEMV-2), an odometer and a terrestrial laser scanner (Z + F IMAGER 5010), it is used in various fields. From the very beginning the installation of the system on different types of vehicles was in the foreground. So it can be mounted inside the building on a trolley or outside on various motor vehicles or ships. This versatility is made possible by a modular construction of the instruments. The central module here is the IMU, which is fixedly connected to the module carrier. It forms the center of the measuring system, both topologically and geometrically. This year, the measurement system has been extended by two digital cameras (Point Grey Flea3) and two profile scanner (Sick LMS 151). Due to the easy expandability and versatility of the system, a variety of current research issues around MMS can be edited. Exactly these questions reflect the trend towards the kinematic and thus faster surveying. The system is actively used in research-based learning so that students and young researchers are able to participate on this trend. The results of several theses are presented here in summary: The basis for the following thesis has been given in the master's thesis "Evaluation and calibration of a mobile mapping system". The calibration method developed in this study was taken up and examined in detail in the bachelor's thesis "Review and further development of the calibration of a mobile mapping system". For the extension of the system with two cameras, a master's thesis "Investigations of trajectories with the stereo camera system" has been developed which deals with the topic of automatic registration of image data. Furthermore the bachelor's thesis "Generation of 3D point clouds from image data of a mobile mapping system" serves to automatically generate point clouds from the acquired image data using the 'structure from motion' principle. Based on this work, the use of modern measuring method and system in research-based learning is shown as an example.