Column: 3D Mobile Mapping

Over the last few years street-level mobile mapping and reality capturing has quietly become one of the most important geospatial mapping technologies. There are already hundreds of mapping vehicles collecting vast amounts of geospatial data. But what we see today is only the start, believes Stephan Nebiker from the University of Applied Sciences and Arts Northwestern Switzerland (FHNW).

In the future, accurate and dense 3D representations of the urban environment along traffic corridors and within buildings will be captured and created fully automatically and upated regularly if not in real-time. These digital realities will serve a multitude of purposes, including infastructure management, urban planning, automated change monitoring and as base maps for autonomous driving. But where do we stand now and how will we get there?

Over the last four years, the focus of ISPRS's scientific activitities included the improvement of direct and integrated georeferencing, the automated co-registration of terrestrial and airborne data and automated object detection. There were also numerous contributions researching the use of new low-cost 3D sensors, such as Microsoft's Kinect or Google Tango. We have also seen the emancipation of image-based 3D mobile mapping with Lidar-based systems – also due to the succesful adaption of SGM-based image matching methods to ground-based applications. Last but not least, we are witnessing a transition from mobile mapping products to cloud-based 3D services. This is the result of tremendous progress in cloud-based computing and data storage.

In the near future I expect great advances in integrated and image-based georeferencing by further adapting Lidar and Visual SLAM concepts from robotics and computer vision to high-end mapping tasks. This will enable the use of small, light-weight and inexpensive devices for mobile 3D data capture and for easily updating existing digital 3D realities. These low-cost devices will become particularly valuable in building information modelling (BIM) and facility management. A further democratisation and explosion of mobile 3D geospatial data collection can be expected from the various geosensors in future autonomous vehicles. The input from these sensors could be used for continuous and automated updates of the underlying digital 3D realities. However, there a number of challenges to be overcome. A key requirement will be to siginficantly improve 3D scene understanding in order to distinguish 'slow' changes in highly complex urban environments from the countless rapid changes. Better 3D scene understanding will also be crucial to the automated creation and updating of semantically rich urban and indoor models. In short, mobile mapping and digital realities offer great opportunities for the ISPRS and its members.

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