VRsurv: a Virtual Planning and Educational Tool for Surveying Tasks

Peter Bauer and Werner Lienhart (Austria)

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SUMMARY

Todays typical surveying tasks, like staking out or monitoring, take place in a dynamic and fully 3D environment with many dependencies on other objects. Obstructions and disturbances of the line of sights have to be foreseen often at a very early stage of a project. Also the high precision of modern surveying instruments requires a detailed evaluation on systematic effects to fulfill nowadays accuracy demands.

Conventional planning of a geodetic network may fulfill requirements with respect to precision and reliability but may yield configurations which cannot be realized on site. In order to overcome these shortages, the planning environment for modern geodetic network design needs to be in 3D and object orientated to cover the relations between different object groups within the monitoring scenario. Moreover, it should be capable of processing meshed reality capture data sets and design models from architects to serve as a basis for the feasibility study of the concept.

Such a 3D planning tool is realized with the experimental software VRsurv at the Institute of Engineering Geodesy (IGMS) of Graz University of Technology. Technologies from the entertainment industry have been applied on geodetic datasets to perform quality checks in a 3D environment in real time. The software was developed in the coding environment Unity with the usage of virtual reality (VR) technology as a human computer interface. The VR gear should overcome the limitations of conventional 3D viewers in complex 3D scenarios and provide the user an immersive first person view on the data. The usage of VR is also beneficial to training new staff or for educational purposes in student courses.

The paper describes the developed software solution with the a priori quality investigation of the systematic effects. Moreover, a big emphasis is placed onto the developed software routines, the

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functionality of the user interaction concept with virtual reality and the adequate integration in existing concept creation workflows.