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CTI Success Story

3D Data for Golf Course Design and Control of Construction Machinery

In landscape planning, although projects are increasingly being executed digitally, the workflows are still very costly and time-consuming. The planning office uses the surveyor's data, and sends this back for staking out the land. The construction firm then uses this data as the basis for modelling the terrain.

Holcim Group Support Ltd. wanted to accelerate the work processes with a workflow for real-time 3D models. The group was looking for suitable partners in order to optimise excavation planning at their cement works in Untervaz, in the Swiss canton of Grisons. Peter Petschek, the IT specialist in the Landscape Architecture Department at the University of applied Sciences Rapperswil (HSR), initiated a CTI project. He was also able to convince Leica Geosystems AG to come on board as an industry partner, because this company saw real-time 3D landscape modelling as a new market segment. ViewTec Ltd. became an additional partner, as this firm wanted to implement online 3D visualisation of high resolution terrain data using virtual reality.

Digital Workflow for Gardening and Landscaping

In collaboration, a digital workflow for gardening and landscaping was created, with the new 9-hole Bad Ragaz golf course as an example. The terrain data acquired from the surveyor was sent to the golf course designer Harradine. The Harradine staff first constructed an analogue design in 2D, then used Map3D from software developer and project partner Autodesk AG to construct the 3D digital terrain model. With interface optimisation, the project team made it possible to walk through the terrain interactively

in 3D, in order to enable the landscape architects to perform optimisation work. The planning data was then transferred to the Leica Dozer 3D GPS system for on-site terrain modelling with a bulldozer.



From data acquisition, to virtual design visualisation in 3D, right through to the construction machinery's control data, a complete automation chain is completed. This image shows the virtual real-time journey through the test terrain model. Photo: HSR

The roadwork and excavation firm Toller AG implemented the concept on site, and in October 2004 modelled the 10,000 m² of the Heidiland golf course. With the developed GPS and real-time 3D planning, the time-consuming measuring and staking-out procedures were not needed, and the workflows were made faster, more comprehensive, and considerably more precise than with conventional methods.

Benefits for Industry and College

Holcim is using the developed model for the first time in the Untervaz cement works in order to visualise the planned excavation. It is also possible to generate new models from planning data and additional geographical data, at a reasonable cost. In a further step, Holcim would like to offer the creation of real-time 3D excavation models to its works as a service.

Leica can implement 'real-time 3D landscape modelling' commercially. Furthermore, the knowledge gained from 3D control of a bulldozer in Bad Ragaz can be adapted to control of excavators, so as to tap into this market segment as well, a segment which lies outside traditional road and track construction.

ViewTec Ltd. applies the results of this project in the products TerrainView and TerrainView-Lite. The latter is provided as freeware via download.com, and among other things, can generate real-time 3D landscape models as a service. As a result of the CTI project, ViewTec Inc. was founded in Los Angeles.

The HSR was able to gain competence in the CTI project, and to participate in the development of a virtual reality planning system, which due to its flexibility and economical price-performance ratio, is used as a tool in service projects, and for further education, particularly in the post-diploma course for architects and planners. The HSR runs product training for gardening and landscaping in consultation with Leica Geosystems.

Further Information

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