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Magic or deceptively real?

by Roland Herr

Optical effects shimmer deceptively over the surface of a large building, which appears to move. Suddenly, the lines break, and new geometric shapes arise. The building wavers, without budging. The optical illusions are supported with acoustics, in order to further blur the lines between the real and virtual worlds. The artists at Urbanscreen create media installations, which bring the viewers to the very edge of their perceptive abilities. Leica Geosystems' 3D laser scanner makes these feats possible.

The 10 person team at Urbanscreen is at home surrounded by computers and brainstorming tables in the chilly northern German city of Bremen. But when Thorsten Bauer, the young company's creative director and co-founder, discusses beginnings, projects, and visions, there's a fire in his eyes. In 2005, the founders dared to take the first step, and today they have executed close to 50 of these spectacular media installations around the world. "We create and develop media installations that involve a highly technical play of optics and acoustics," Bauer explains. "This is only made possible thanks to 'Projection Mapping', which allows high-quality, custom projection onto



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■ The Leica ScanStation P20 positioned in the gasometer ready to scan.

the objects in question. The technology itself is not so new at all, but there has been a lot of development in the field of realistic 3D mapping with laser scanners, and this has opened the door to countless possibilities.”

Bauer’s team is made up of both artists and technicians. Architects, media artists and designers are just as involved in the technical production of the images as media technicians are responsible for their implementation. The core of each project lies in the correct production of the images, and the precise production techniques. This is only possible through an absolutely perfect measurement of the situation at hand.

At first, the team used a portable laser by Leica Geosystems, but as the projects became more and more complex, the tool became limiting. Its measurements were too complicated and not precise enough for the media specialists’ demands. After taking down measurements with the portable laser,

photos had to be taken, from which the measurements could be modelled. A sophisticated, secure system had to be found, so the resourceful artist researched four laser scanner companies, including Leica Geosystems. It was clear to him from his very first discussions with the technicians that Leica Geosystems’ laser scanners were the right fit, and that the “chemistry” was right too.

In 2012, four productions went live on four different continents. The use and implementation of the Leica ScanStation P20 is easy. “We take the laser scanner out, set up the equipment, and all we have to focus on is entering the location data. This is a tremendous advantage for us, since we can work much more creatively and innovatively with excellent data,” Bauer explained on site.

While the set up can be described in fairly few words, the actual execution of each project is far more complicated and elaborate. In most cases, Urbanscreen is asked to come up with a media installation. That





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■ The Gasometer Oberhausen installation "320° Licht" is open until December 30, 2014.

was the case with the 110 meter (547 feet) high gasometer in Oberhausen/Germany, which offers its space to different artists every eight months. During the laser scan, preliminary ideas and sketches for the presentation are developed on site. These ideas are then brought back to Bremen, where the collected data is used to develop a concrete concept. Since the middle of April – and scheduled to continue until the

end of December 2014 – Urbanscreen's "320° Licht" project has blurred the boundaries between real and virtual rooms in the gasometer, with a fascinating interplay of shapes and light. Spherical sounds in the background dazzle the viewers' senses.

For the technical execution of the installation, it is especially important for the images being generated

CAD Modelling

The buildings are scanned to generate huge amounts of data in a point cloud. This information can be fed into different CAD and modelling software, like AutoCAD, MicroStation, 3ds Max and manipulated from there. Then, specialists "build" the entire building in their computers. For art installations, enormous amounts of data are required. A good 3D model needs to generate a work plan for calculating the dif-

ferent derivations of different requirements. "Each aspect of the building can be shrunk or expanded, angles and corners can be transformed, and we can create new geometries or illusions of space," Thorsten Bauer explains of the development of an installation. This realistic, computerised re-creation of the building is the basis for the artistic modelling, and thus for the link between the real and virtual worlds.

How does it work?

Leica Geosystems' ScanStation P20 produces highly precise 3D point clouds, which are made up of several million individual dots. These dots recreate reality with an unbelievable level of detail. They are then manipulated using software like 3ds Max, using Leica CloudWorx, in order to create a three dimensional surface model. This model serves as a virtual projection screen, and as the basis for perfectly distorted images, animations, and videos.

The 3D laser scans also have the unique additional effect of incorporating all the surroundings, and of recreating potentially distracting elements like lamps or trees. These might be in the way, but this data is useful for finding the perfect positions for the projectors.



and manipulated on the computer to perfectly reflect reality. In the cylindrical Oberhausen gasometer, 21 large, high-performance projectors were placed in precisely designated positions around a platform, which was roughly the height of a third storey building. Viewers could then stand on this platform to admire the projection on a 20,000m² (23,920yd²) section of the interior wall and ceiling of the approximately 110m (547ft) high, 24 corner cylinder.

Bauer is fascinated by the possibilities of the Leica Geosystems' 3D scanner. 'Without the scanner, we could never do what we do. We use the tool artistically, in ways nobody else has ever tried. Everything is measured perfectly, and we are free to create models, knowing they are tailor-made for their environments.' If a balcony protrudes from a wall, the projection can build a new one, move the original, or integrate it into a whole new setting. Now, not only the projection, but the entire object finds itself renewed and changed in its old environment.

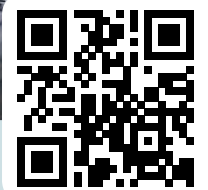
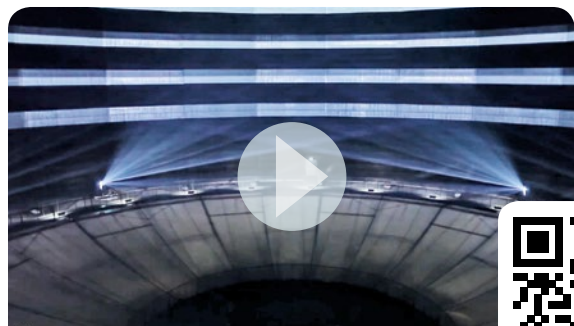
Urbanscreen is now world renowned for its installations at the Sydney Opera House, at Rice Univer-

sity in Houston, and the Light-Sound compositions exhibited at the Kunsthalle in Hamburg, Vienna's Kunstquartier, and Dessau's Bauhaus. ■

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