



SCANNING THE HORIZON

ARTIST BENJAMIN BUSCH HAS USED LIDAR AS PART OF A PROJECT AIMED AT DOCUMENTING BERLIN'S QUEER SPACES

As you enter Benjamin Busch's 3D immersive virtual experience, you float through dreamy hues of pink, red, and blue where vibrating points give you the impression of being weightless. As you pass through the point cloud, you discover the points warp, reacting to your touch. Different spaces arouse different experiences. Travel into the Darkroom and you're suddenly shrouded in blackness. You may begin to feel claustrophobic or lost.

This art project is an archival document and prototype for a new work by Benjamin Busch, a multi-disciplinary artist based in Berlin, Germany. Busch first experimented with 3D laser scanning in 2018 when commissioned to document a theatre with lead architect Frans Dikmans. Busch

scanned the theatre with LiDAR and used the data to create a 3D model of the theatre, which the production's scenographer and lighting designers worked with later.

Busch could see the technology's artistic potential and sought to exploit the digital reality in an aesthetic way. Thus, he began experimenting with point clouds and the digital twin.

A space odyssey

In 2020, Busch's experiments began to form the foundations of a personal project, *Scanning the Horizon: An Immersive Archive*, a project aimed at documenting Berlin's queer spaces using LiDAR.

"The original impulse for this project

came from the [realisation that] places that were important to me were disappearing. One quality of urban life is that it's constantly in flux. Things appear and disappear. People come and go. There's always a risk that some place that's so integral not only to my life, but to the lives of other people, will someday not be there anymore."

Busch sought to create not only a digital reality ready to be explored, but a digital archive, or as he describes it, "an archival documentation of space".

Busch's experimentation with the point cloud eventually developed into a fully immersive 3D experience. "One really interesting aspect of 3D laser scanning is that it allows us to document a space not



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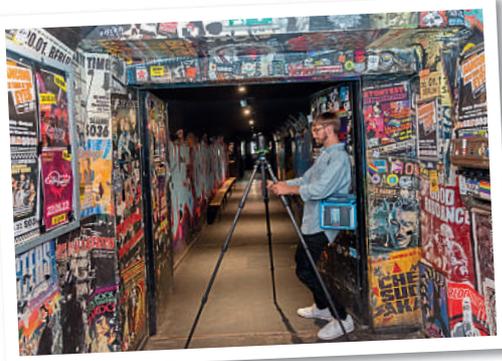
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LASER SCANNING



Benjamin Busch with the BLK360 and Cyclone Field 360 at SO36, Berlin. © Antonio Castles Gómez, 2022

only as a photograph or a two-dimensional image, but also as an immersive three-dimensional archival document.”

The viewer can jump into a virtual reality and have a sense of being there, experiencing a space they might not have had the opportunity to explore otherwise, and creating their own memory of the space.

Saving cultural heritage

Identifying as a queer person himself, Busch chose queer spaces to document because he wanted to get closer to them and their histories. Moreover, he wants them to be remembered.

“I also want to insist that these spaces are cultural heritage that deserve to be preserved in the same way as a cathedral or some other very important architectural landmark,” he says.

While Berlin has long been known as a haven for queer spaces, some of the city’s most important places of queer subculture have disappeared, leaving underground mythologies and personal memories in their wake. During the pandemic, many of the community centres, bars and clubs Busch scanned didn’t know if they would survive.

Busch scanned these spaces using the Leica BLK360, his scanner of choice for its ease of use, portability and HDR imaging. To capture the spaces in a way that represented lived experience and formed seamless transitions between inside and outside, he often scanned interiors during the day when empty and building facades at night, capturing different lighting. He

describes his relationship with the BLK360 as a kind of dance born of the constant movement of the scanner between setups and of himself to keep out of the scans.

Leica Geosystems’ reality capture software solutions helped streamline his laser scanning workflow. Using Cyclone FIELD 360, Busch was able to operate the BLK360 with a tablet, and by using Cyclone Register 360, he easily pre-registered all his scans at the sites. Register 360 enabled Busch to immediately work with the scans through detailed visualisations and guided workflows, speeding up the registration process and at the same time ensuring the high accuracy required for the 3D experience.

He then directly imported the pre-registered scans into his PC where he worked to optimise the HDR quality. For scans with images in natural or day light, he applied the basic Reinhard HDR settings, adjusting the intensity and blue values as needed to correct the white balance. In cases where there was only artificial light, such as night scans of the street, he adjusted the settings to linear HDR, giving a more cinematic quality to the images and resulting in more natural, homogenous colouring of the points between spaces.

Cyclone enables file export in industry standard formats to enhance compatibility and extend possibilities for point cloud development. Using this feature, Bush easily exported the processed scans as an E57 file, which enabled further work in CloudCompare 3D computer graphics software to prepare for the website and VR display. In this software, he further edited the scans to reduce noise, and remove intrusive reflections or unwanted artefacts for clean scans. However, in keeping with the principle of the project, he kept many of the glitches from reflections in the experience.

“There is a kind of question around how to use this technology in an artistic way,” Busch explains, “and one way of doing that is to insist that the glitches are part of the process and have inherent quality.”

Interaction with digital realities

The first phase of Scanning the Horizon was published online in December 2021



Scanning the Horizon: An Immersive Archive (2022) by Benjamin Busch at Monitoring – Exhibition for Time-Based Media Art, 39th Kasseler Dokfest

at queerspaces.berlin. The website offers interactivity of his 3D scans to the viewer. “I think the medium of 3D laser scanning itself is more interesting when the viewer has agency to navigate, manipulate, resize, look from different perspectives.”

This interactivity is something that isn’t possible with traditional visual arts media such as film or video. By allowing the viewer to interact with the spaces, they are given an agency that will enable them to absorb the experience of the scan in their own way, creating their own experience.

Growing from the initial website into a virtual reality installation, Busch further leveraged the capabilities of digital reality and interactivity in the second phase of his project. A VR headset offers the viewer a more immersive and unique experience. They can travel through the point cloud at their own pace, exploring different angles, areas or rooms. The viewer experiences the environment as unstable. The points themselves have a slight vibration to them and can be manipulated with the hand, details Bush incorporated into the experience to make it more immersive.

As the viewer wanders through the point cloud, they can listen to audio recordings from the spaces or trigger interviews, activating an oral retelling or a memory. From the vibrating points to the audio recordings, all elements allow the viewers to experience the space in their own way. They also add to the archival documentation of some of Berlin’s queer spaces; a memory that will remain forever in digital reality, preserving the cultural heritage of these spaces.



Scanning the Horizon: An Immersive Archive (2022) by Benjamin Busch

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