

CAVE INFRASTRUCTURE

A CAVE is a spatial installation in which virtual content is displayed on LED walls, creating an immersive 3D experience. As part of the discourse theatre, the CAVE is a place where visual representation and content-based discussion are combined. The contributions shown are presented by both our mediators and scientists, actively involving the audience in the discussion of the content presented.

RENDERING AND DISPLAY

The CAVE consists of three LED walls and a walk-in LED floor area. The total active area covers around 15 m² with a room height of approx. 3.50m.

RESOLUTION

All LED modules are arranged in such a way that they create a closed field of view with high luminance, colour fidelity and image homogeneity. The LED display has an image refresh rate of 120 Hz and a pixel pitch of 1.25 mm.

3D CAPABILITY

The three-dimensional effect is created by special shutter glasses. These ensure that each eye sees slightly different images, which are displayed synchronously, creating a spatial 3D impression.

TRACKING

The movements of visitors are recorded by two systems, enabling direct, position-dependent interaction with the content displayed in the CAVE.

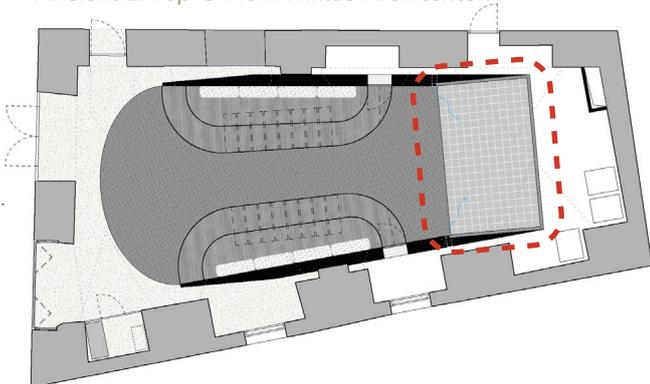
SOUND SYSTEM

The integrated sound system ensures that the content displayed can also be experienced acoustically.

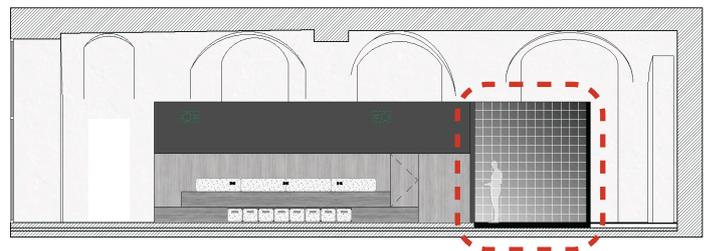
VIEWS:

The following views show the construction project for the CAVE (highlighted in red) as part of the Discourse Theatre.

Ansicht 1: Top © Mohr Niklas Architekten



Ansicht 2: Side view/cross-section © Mohr Niklas Architekten



SOFTWARE IMPLEMENTATION

The content in the CAVE is implemented as **real-time visualisations**. The LED floor and wall surfaces are synchronised and can be operated interactively. The technical implementation is carried out in collaboration with software developers. Your scientific content is visualised in the CAVE with the help of a graphics engine. **Unreal Engine** or **Unity** are preferred for this purpose, but other engines can also be used as required. Together with you and our developers, we work out how your research data can be presented in the CAVE.

APPLICATION EXAMPLES

WHAT CONTENT CAN BE DISPLAYED?

The CAVE offers many different options for displaying scientific data. Content can be presented in real time, shown as a video or experienced interactively by visitors.

Below are examples of different display options.



© Antwerp Tomorrow: MAS Pavilion



© Andrew Tallon: Digital reconstruction of Notre Dame cathedral

DATA VISUALISATIONS/SIMULATIONS

Complex data such as heat maps, physics simulations or social networks – including their development over time – can be visualised immersively and communicated clearly.

POINT CLOUD

Detailed 3D point clouds, for example from archaeology, monument preservation or building research, can be turned into walk-in scenarios in the CAVE. This allows rooms to be displayed and experienced in their original size.



© Rijksmuseum: Operation Nightwatch - Gigapixel



© Scan the World: 3D scanning at the Nationalmuseum, Sweden, 2019

ULTRA-HIGH-RESOLUTION IMAGES

Paintings, drawings, maps or graphic works can be visualised on a large scale and in high resolution. Fine details that would otherwise remain hidden become visible through zooming, highlighting and targeted focusing.

3D SCANS/CROSS-SECTIONS

Mechanical assemblies, biological structures or technical systems can be displayed as interactive cross-sections and exploded views. Models can be rotated, enlarged, opened and examined in real time.