

Theatre Space

A COMPLEX RESOURCE OF TANGIBLE
AND INTANGIBLE CULTURAL HERITAGE

Towards a Digital Twin Model

VESSELASTATKOVA | Academy of Music, Dance and Fine Arts | IMI - BAS

The background image is a dark, atmospheric photograph of a theatre stage. A spotlight illuminates a section of the wooden floor in the foreground, creating a strong contrast with the surrounding darkness. Above the stage, a hazy, ethereal light source, possibly a moon or a stage light, casts a soft glow through the dark space. The overall mood is mysterious and dramatic.

Theatre space represents one of the most complex
heritage environments because multiple heritage layers
coexist within the same physical space

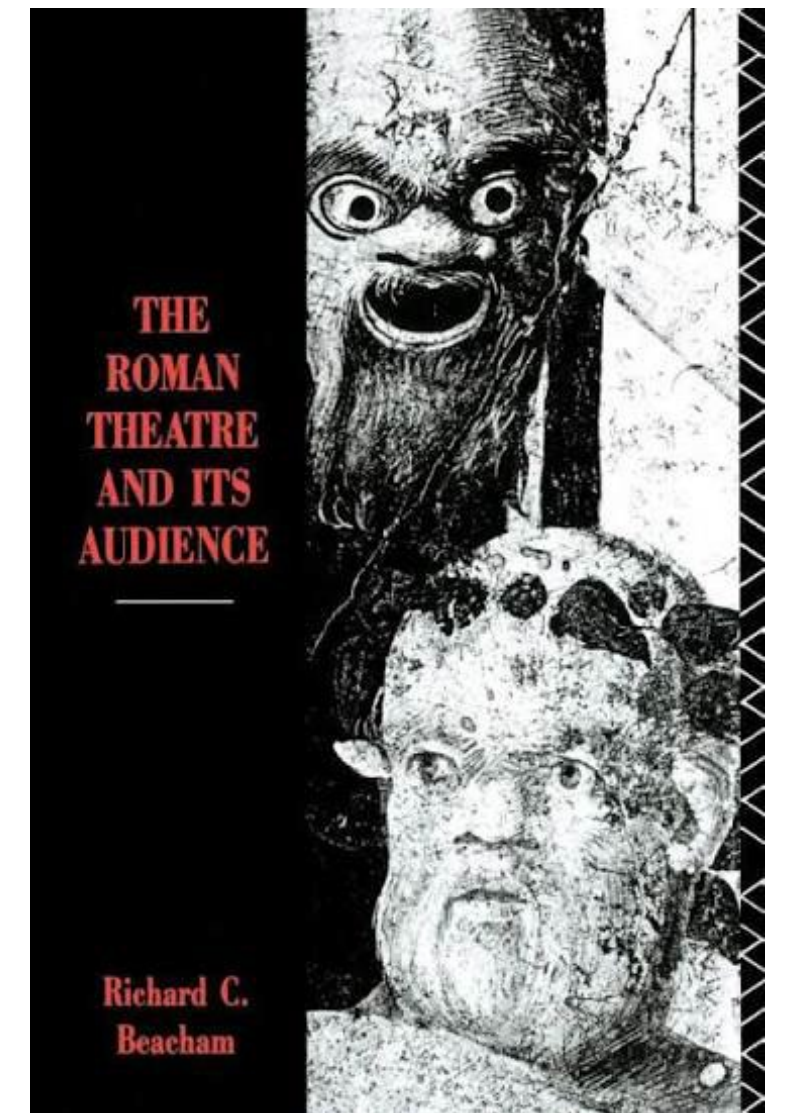
Act I — The Empty
Stage



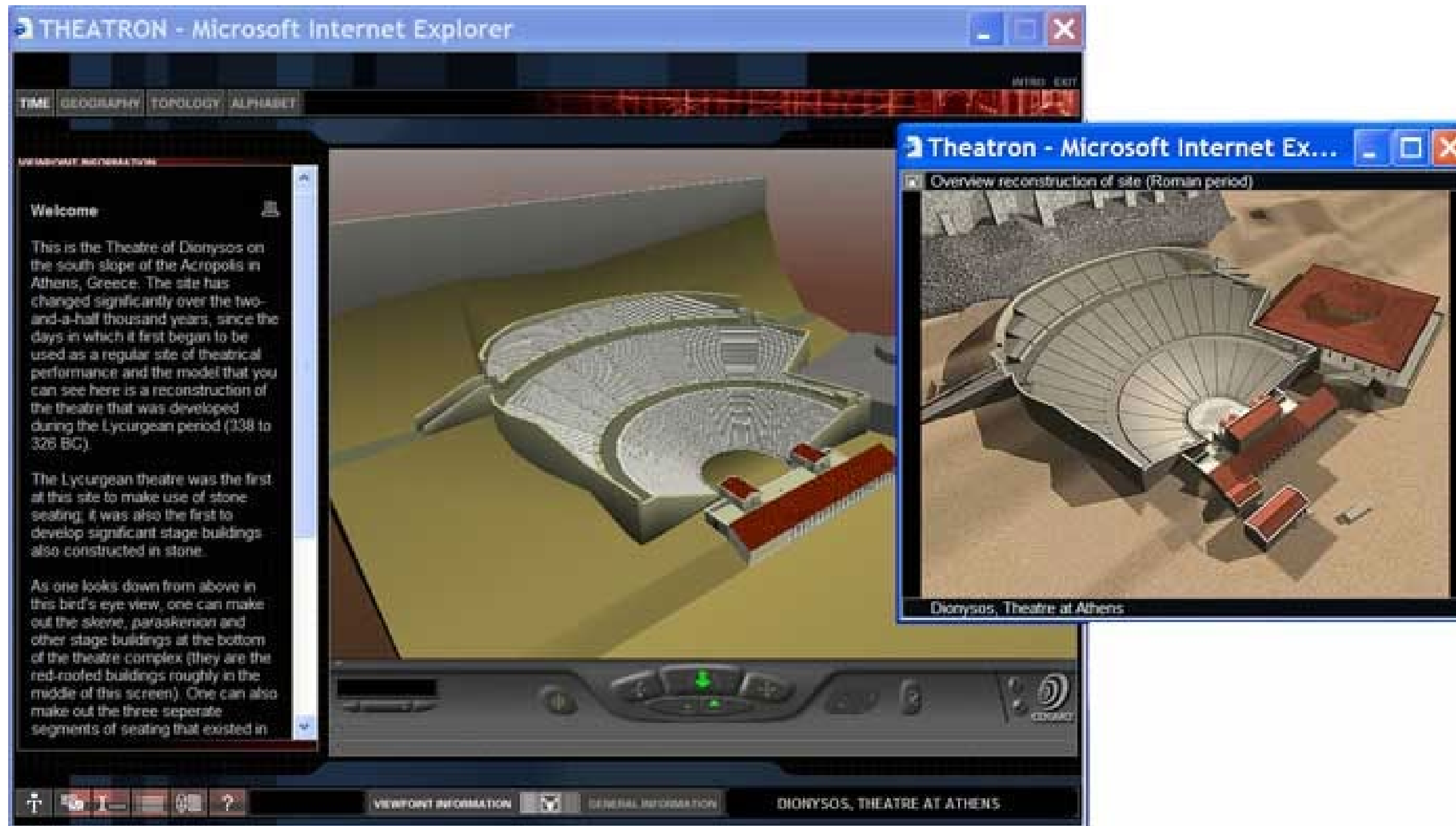
THEATRON project

Theatre History in Europe:
Architectural and Textual Resources Online
2009

Prof. Richard C. Beacham
School of Theatre Studies
University of Warwick
UK



Theatron Module interface with real-time navigable model in main window and high-detailed model in inset window



The core of the application:
3D digital models of selected
historical stages and theatres.

Temporary Stages

- Greek comic stage
- Roman stage
- Fairground booth
- Medieval Pageant Wagon

Odeon of Pericles, Athens

Theatre of Dionysus, Athens

Hellenistic Theatre, Epidauros

Theatre of Pompey, Rome

Italian Renaissance Theatre,

Sabbioneta

Globe Theatre, London

Court Theatre, Drottningholm

Festspielhaus, Bayreuth

Theatre du Vieux Colombier,

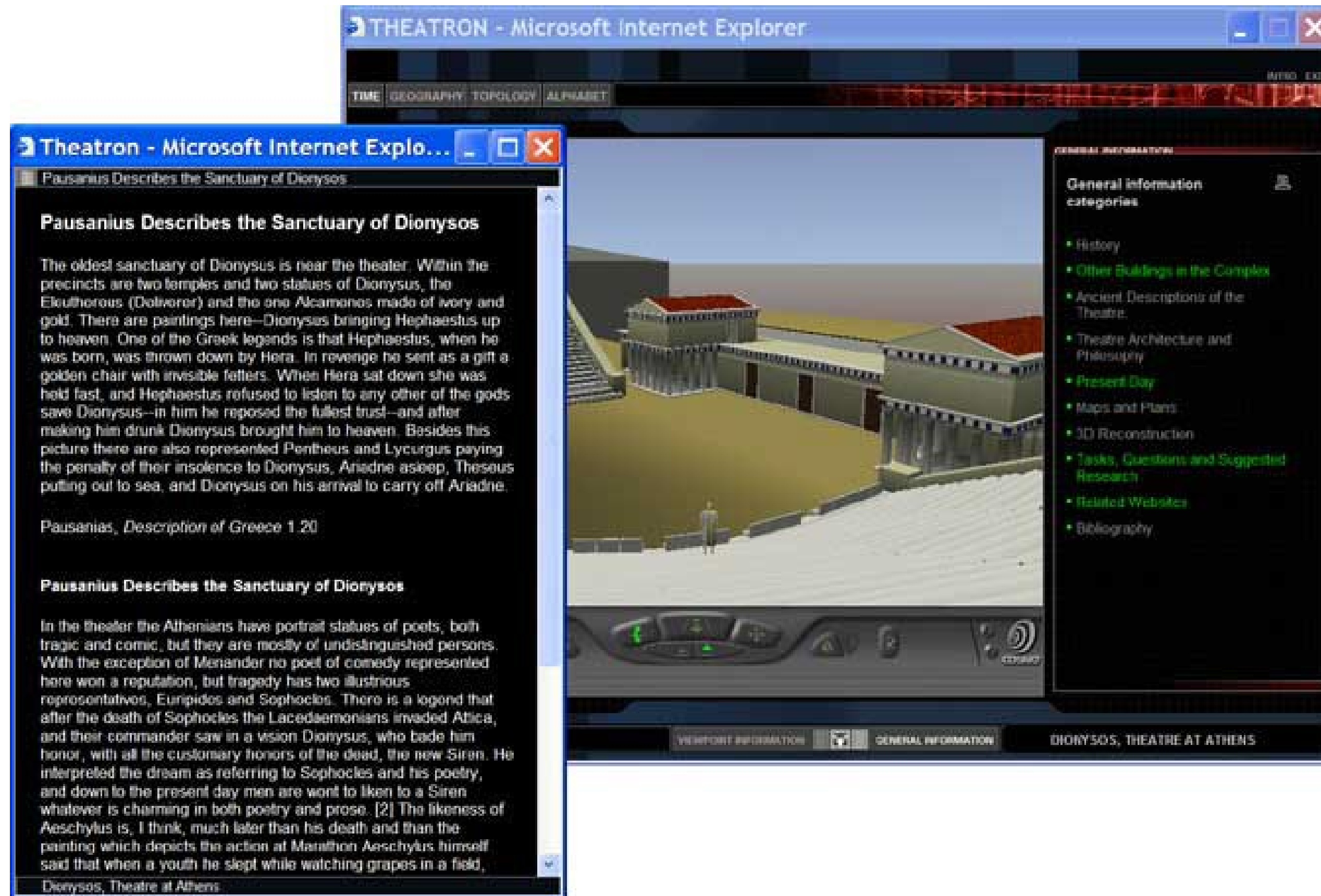
Paris

Festival Auditorium, Hellerau

Schaubuhne am Lehninerplatz,

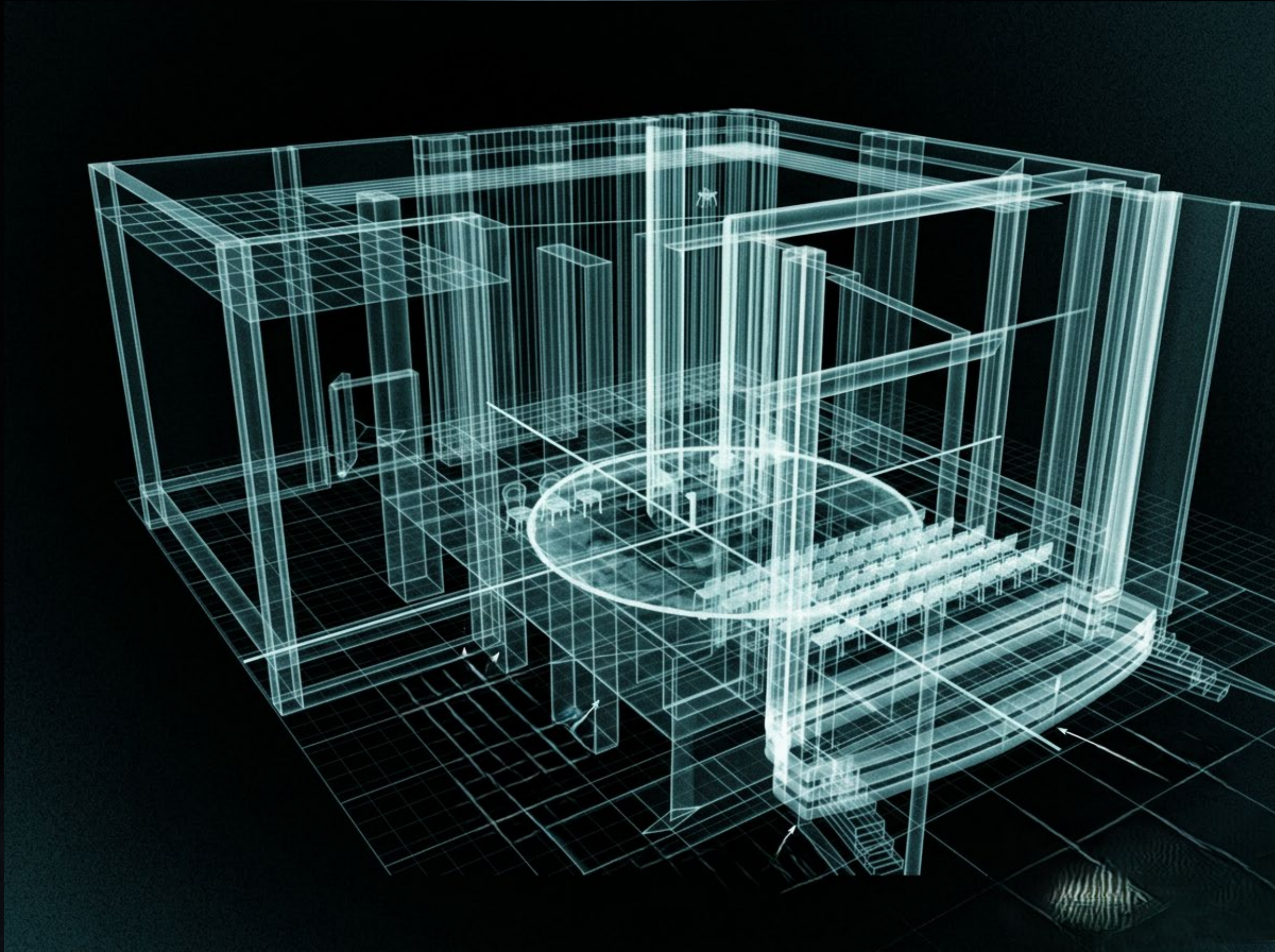
Berlin

Previous Projects and Research Context



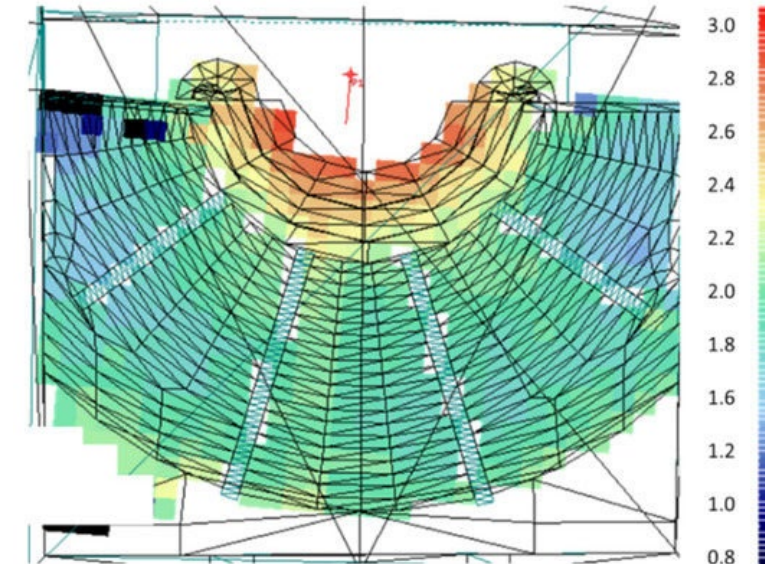
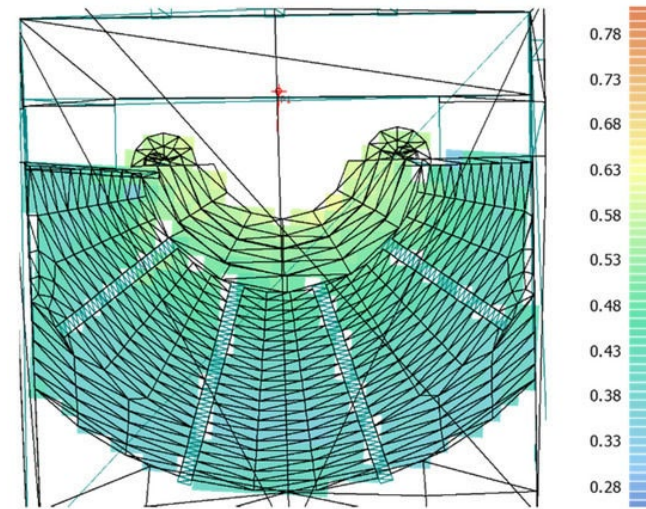
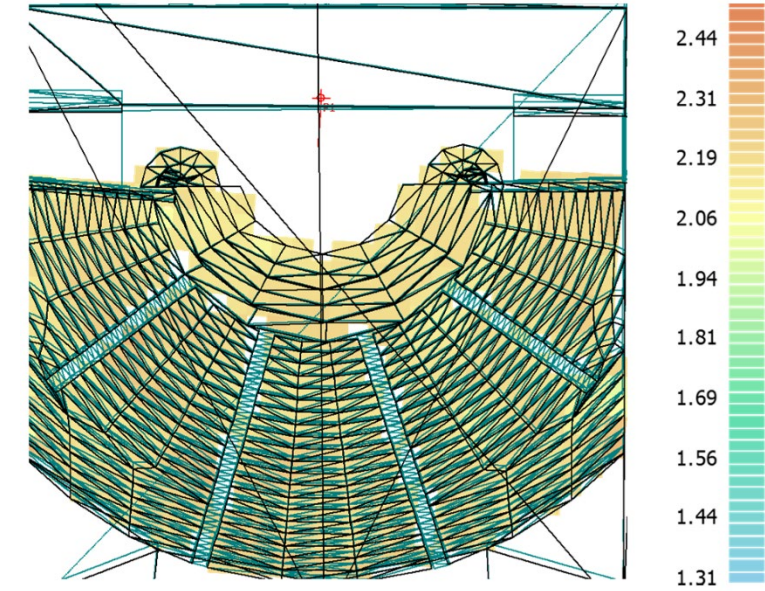
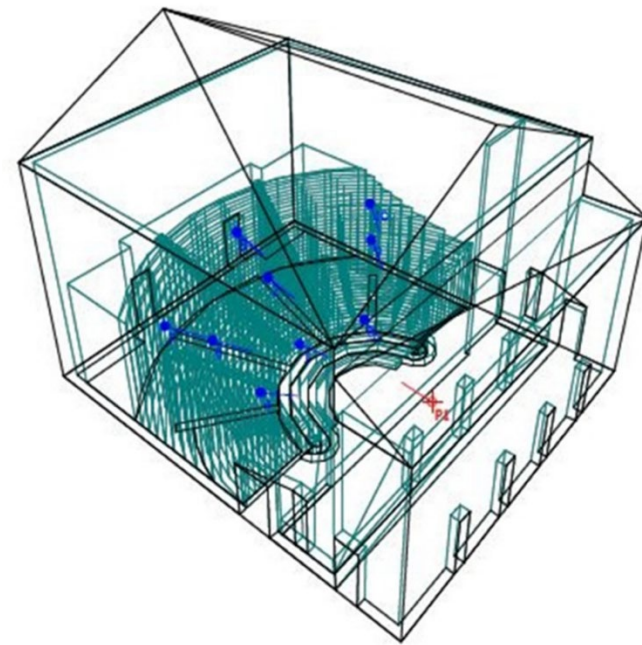
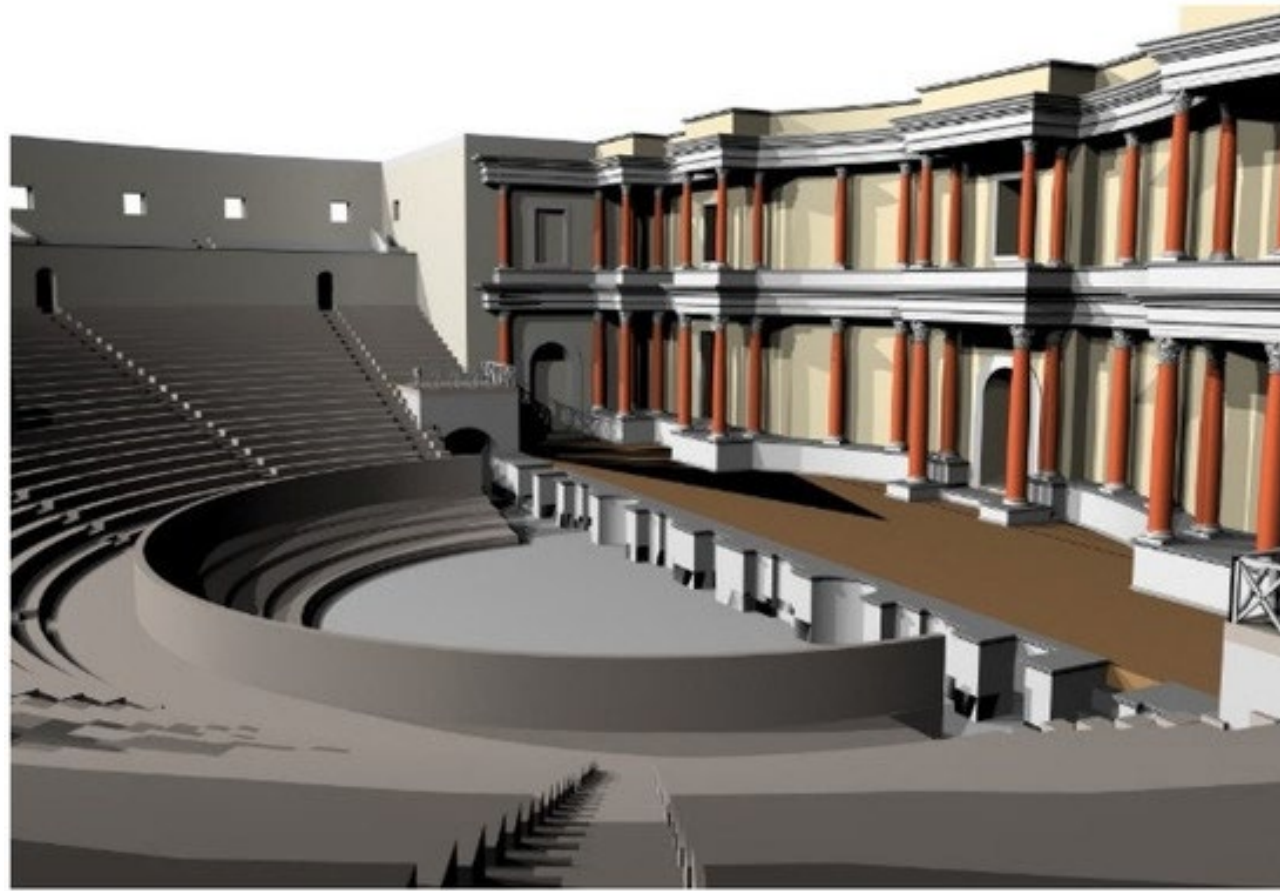
Theatron Module interface with accompanying historical documents in inset window

Act II — Beyond Geometry



Virtual reconstruction of the historical acoustics of the Odeon of Pompeii

Umberto Berardi & Gino Iannace & Luigi Maffei (2016)



A dark, atmospheric stage setting. A spotlight illuminates a section of a wooden floor in the foreground, showing the grain of the planks. Above the floor, a beam of light descends from the top center, creating a hazy, ethereal glow in the dark space. The overall mood is mysterious and dramatic.

Act III — From Space to Experience

Previous Projects and Research Context

A person is shown from the side, wearing a VR headset and holding a controller. The image is overlaid with a blue color effect. The person's face is partially visible through the headset's visor. The background is blurred, showing what appears to be a window or a doorway.

Immersive Storytelling Studio
National Theatre London

<https://www.nationaltheatre.org.uk/about-us/skilled-makers/immersive/>

**Akademie für Theater und Digitalität
Dortmund**

In Cooperation with Theatre Dortmund
& Fachhochschule Dortmund

<https://theater.digital/>

A dark, atmospheric stage scene. A spotlight illuminates a section of a wooden floor in the foreground, showing the grain of the planks. Another spotlight shines down from the ceiling, creating a bright, hazy area above. The rest of the stage is in deep shadow.

Act IV — Theatre Memory



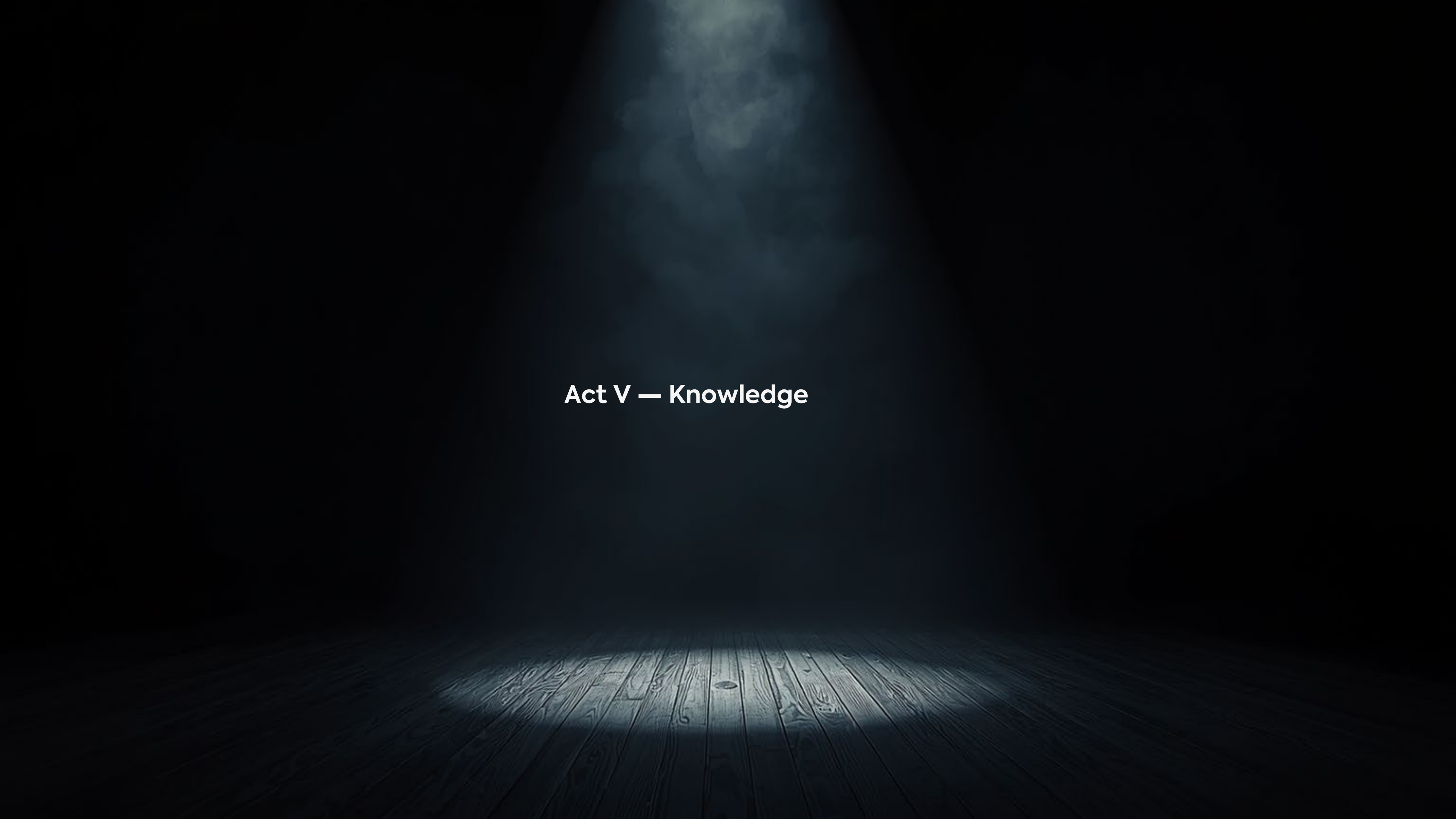
<https://digital.dthg.de/en/schauspielhaus-vr/>

A project by digital.DTHG (Commission for Digitality and New Technologies of the German Theatre Technical Society) and the Friedrichstadt-Palast Berlin. Funded by the Federal Government Commissioner for Culture and Media, 2019–2021.

Opening Night at the Große Schauspielhaus Berlin

Time Travel with Virtual Reality
– Berlin 1927

Visit Berlin 1927 and explore the VR-reconstruction of the famous theatre. Three storytellers, Walter, Fritzi and Otto, invite you to share their anticipation of the opening night – behind the scenes and on stage. Our digital theatre opens new perspectives; cultural heritage comes alive virtually

The image features a dark, moody atmosphere. A spotlight from above illuminates a section of a wooden floor, showing the grain and texture of the planks. Above the floor, a misty or smoky area is also highlighted by the light, creating a sense of depth and mystery. The rest of the scene is in deep shadow.

Act V — Knowledge

Previous Projects and Research Context

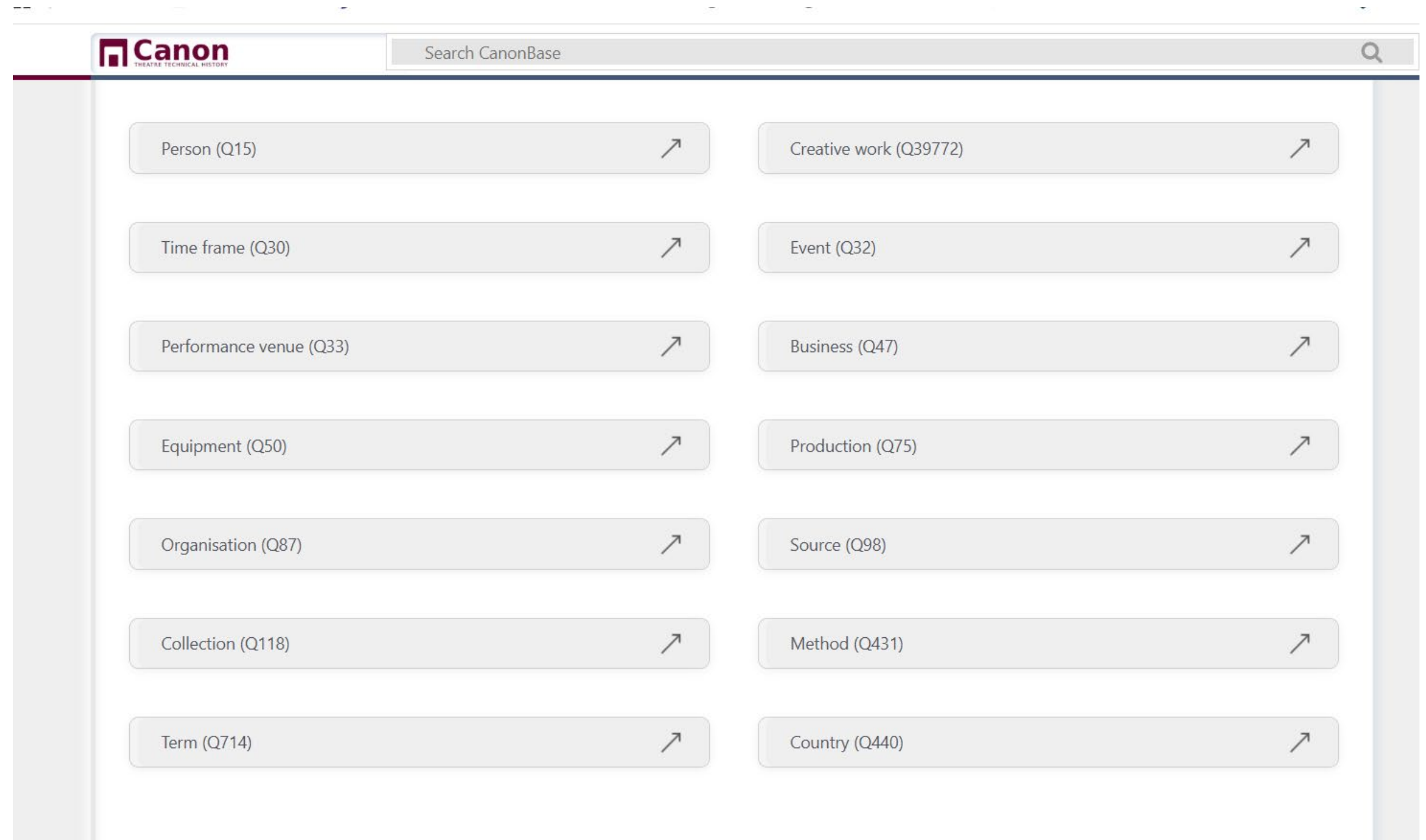
CanonBase - part of the
European *Canon of Technical
Theatre History* project

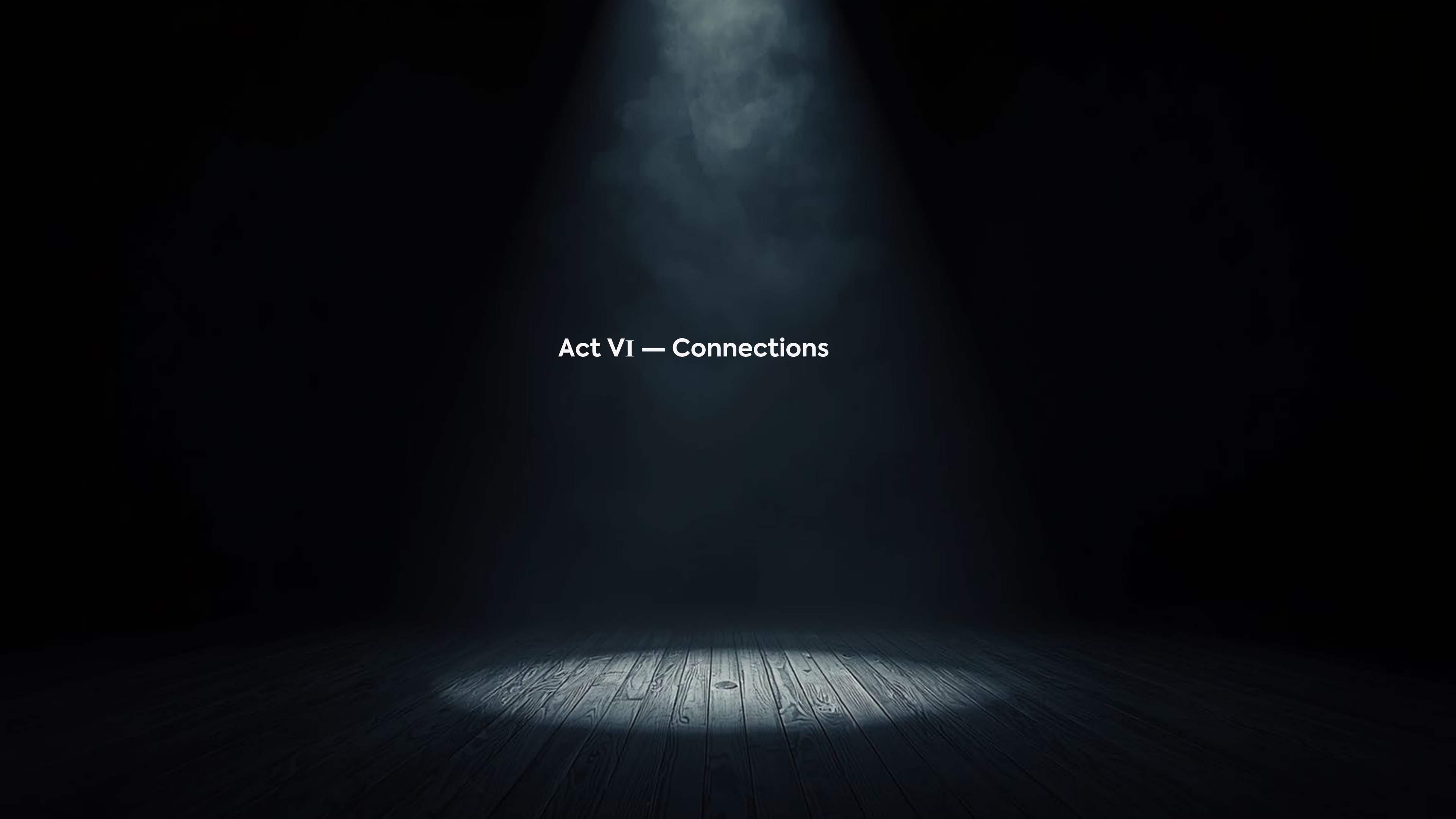
The CanonBase maps and visualises the history of technical theatre in a new and different way. It contains sources, historical events, people, theatres, equipment, manufacturers, methods and collections, and links them to each other and to existing information sources. To enable the project, we have developed (and are still developing) a unique taxonomy. The information is presented in the form of maps, timelines, tree structures and word clouds, so we can see new relations and discover new connections.

<https://canonbase.eu/wiki/Item:Q22938>

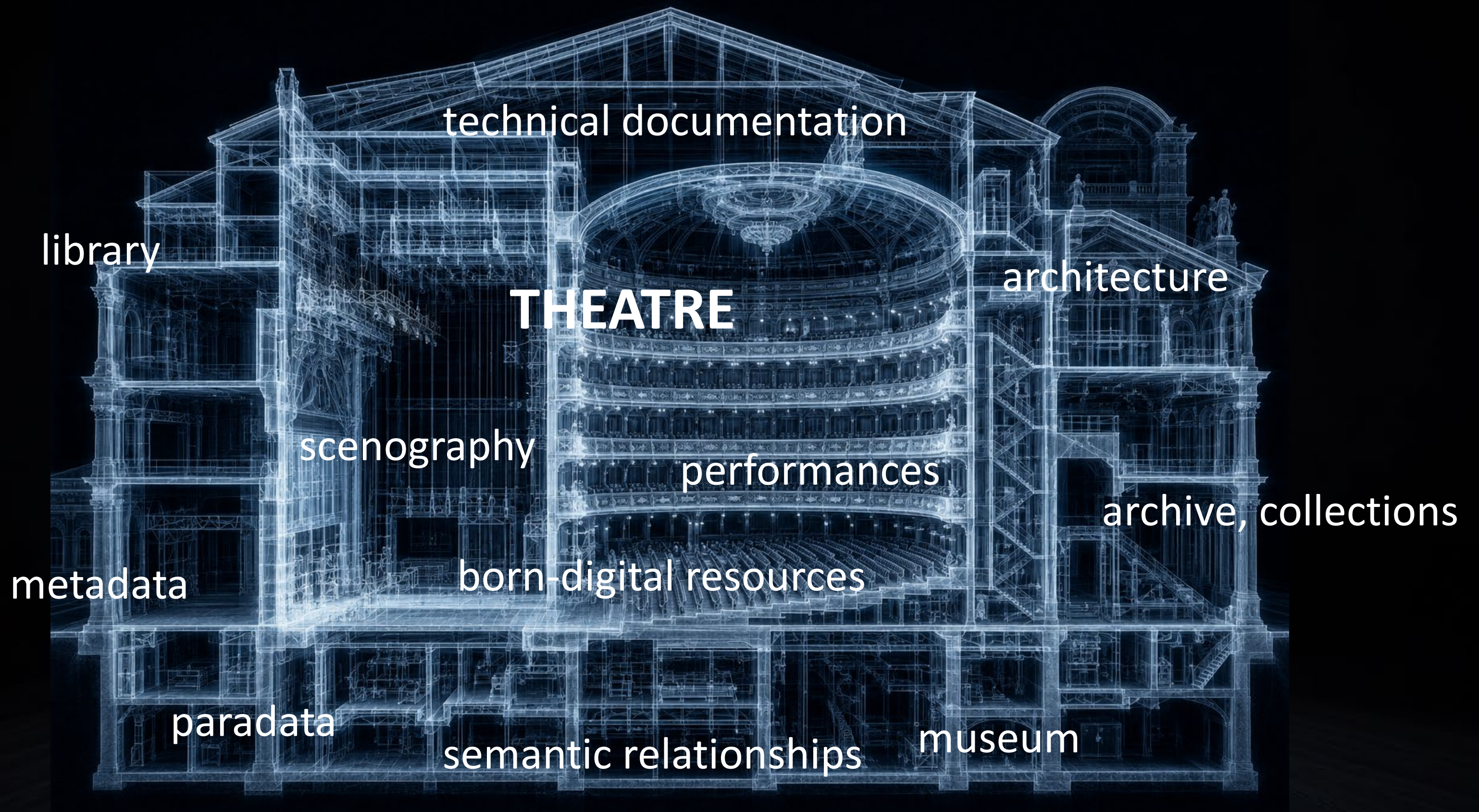
THEATERBAUWISSEN project – canonbase.eu

“the CanonBase is – and always will be – a work in progress”



The background is a dark, moody scene. At the bottom, a spotlight illuminates a section of a wooden floor, showing the grain and texture of the planks. Above the floor, a large, ethereal beam of light descends from the top center of the frame, creating a hazy, atmospheric effect. The rest of the scene is in deep shadow.

Act VI — Connections



Theatre space as a living cultural ecosystem

Layers of Heritage



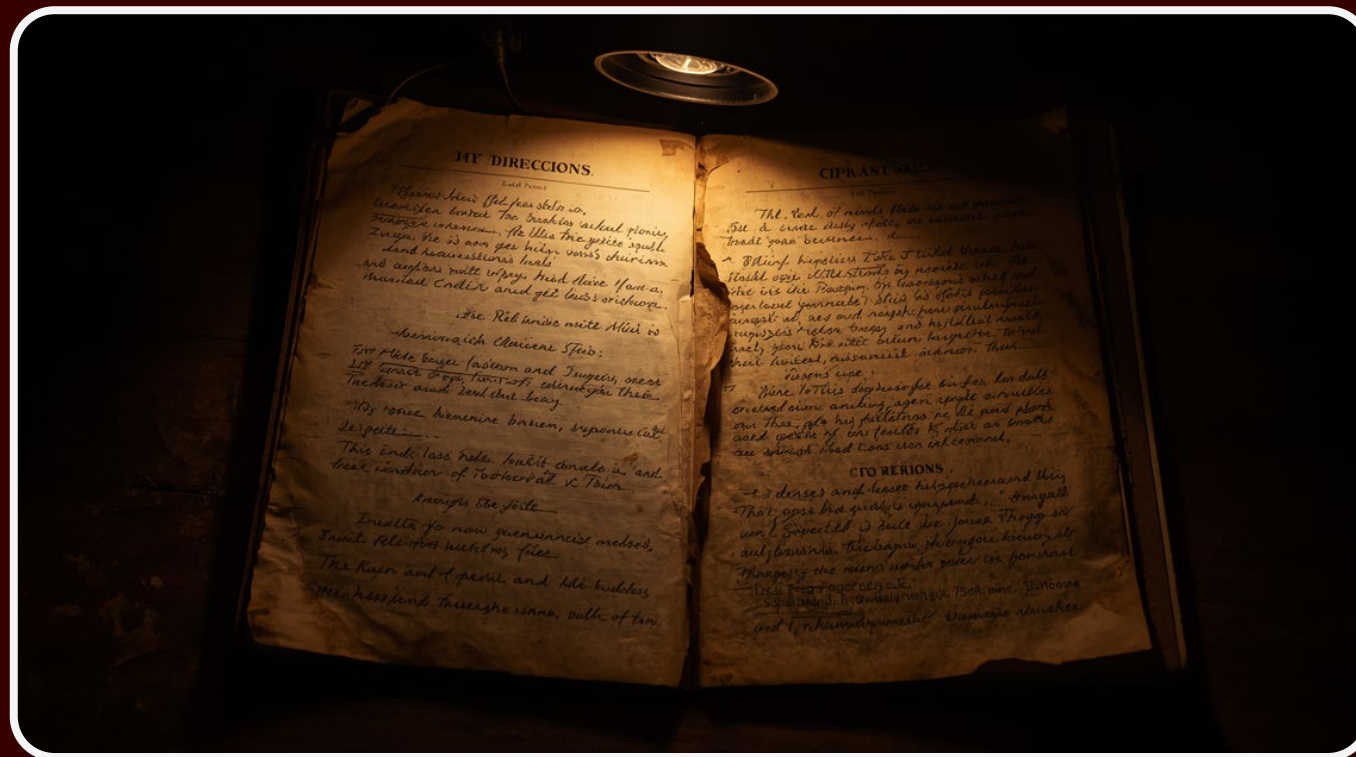
**Architecture &
Stage Machinery**



The physical
infrastructure that
enables performance:
rigging, trap doors, fly
galleries

From physical traces to intangible memory





Archives & Performance Traces

Scripts, photographs, costume designs, and scenographic sketches

These tangible artifacts preserve the ephemeral moments of theatrical performance across centuries.

Digital Archives

Иван Вазов
НАРОДЕН
ТЕАТЪР

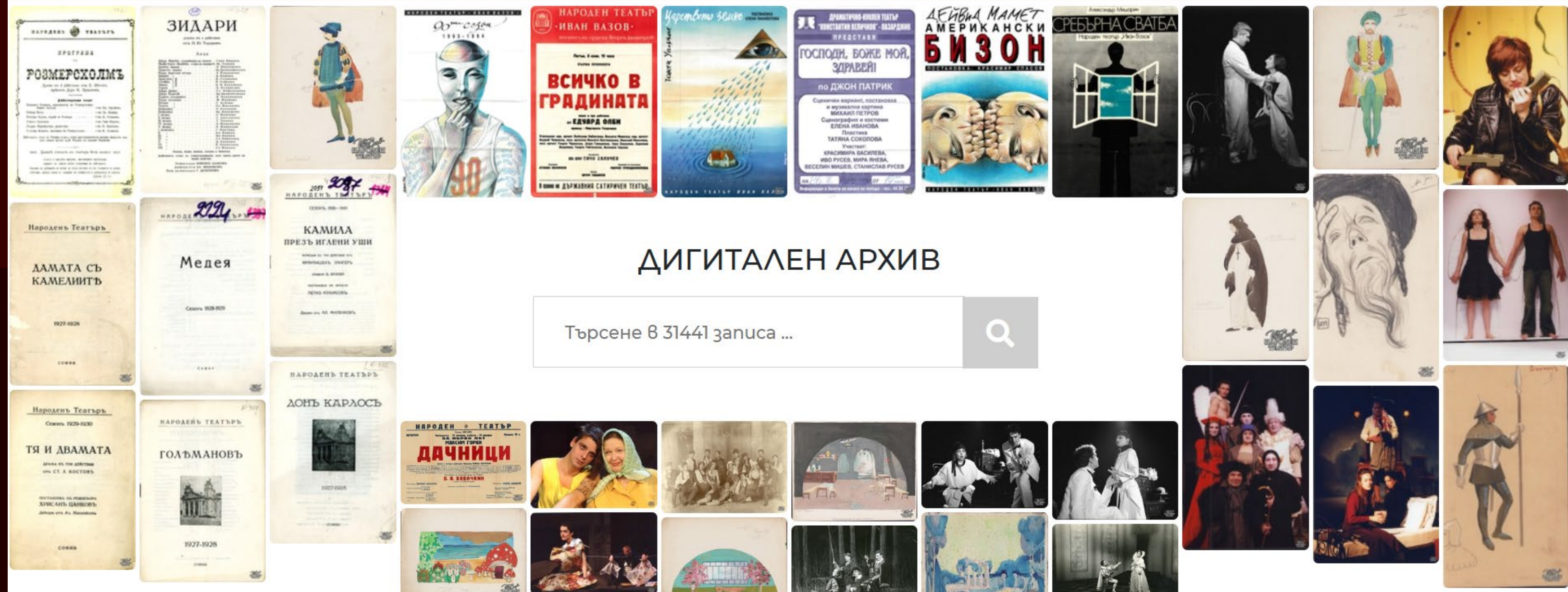
НАЧАЛО

КАК ТЪРСИМ?

ФОНДОВЕ

ЗА НАС

КОНТАКТИ

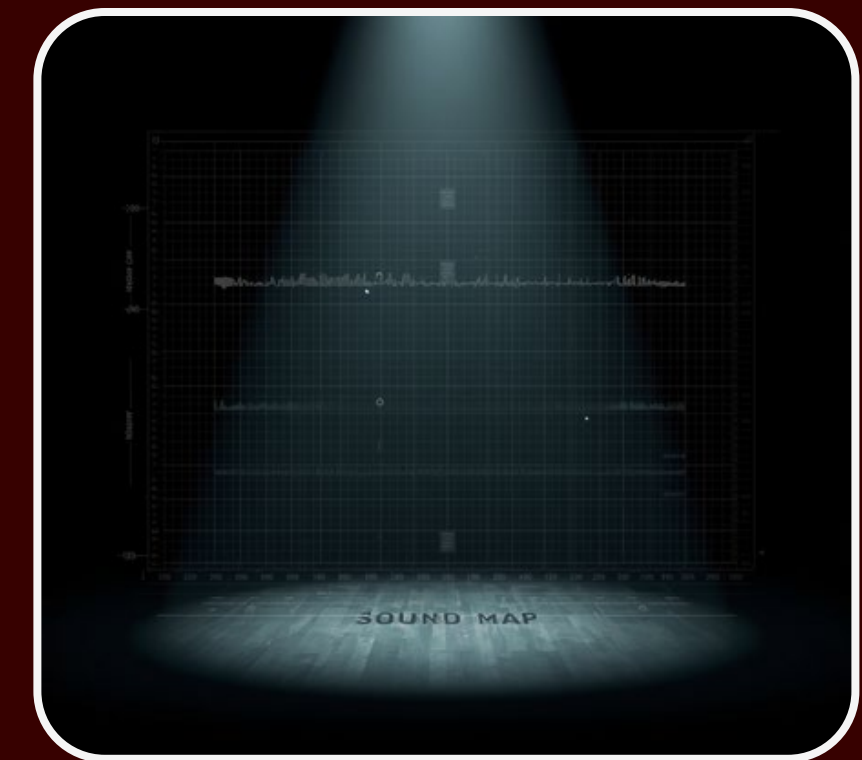
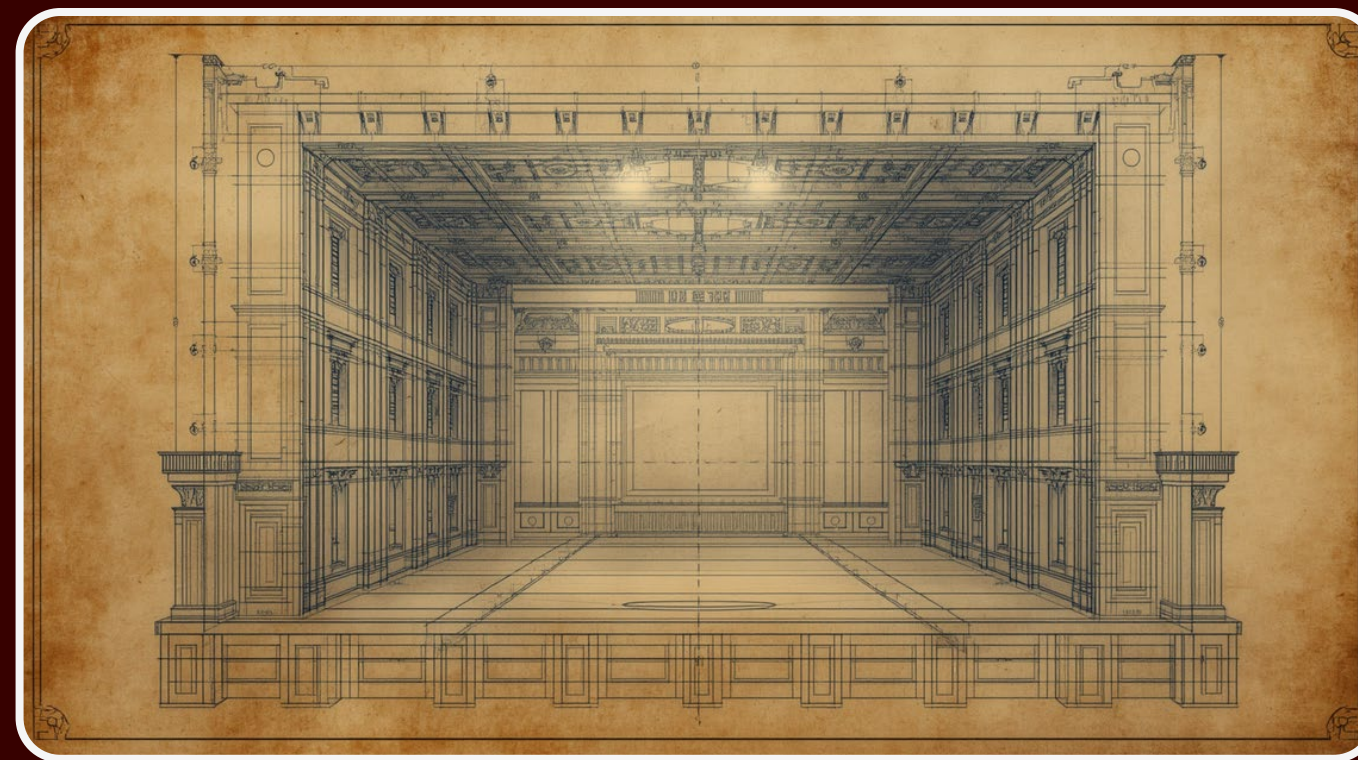


The digital archive of National Theatre "Ivan Vazov"

Technical Documentation

Architectural plans and construction drawings form the foundational blueprint of theatrical heritage.

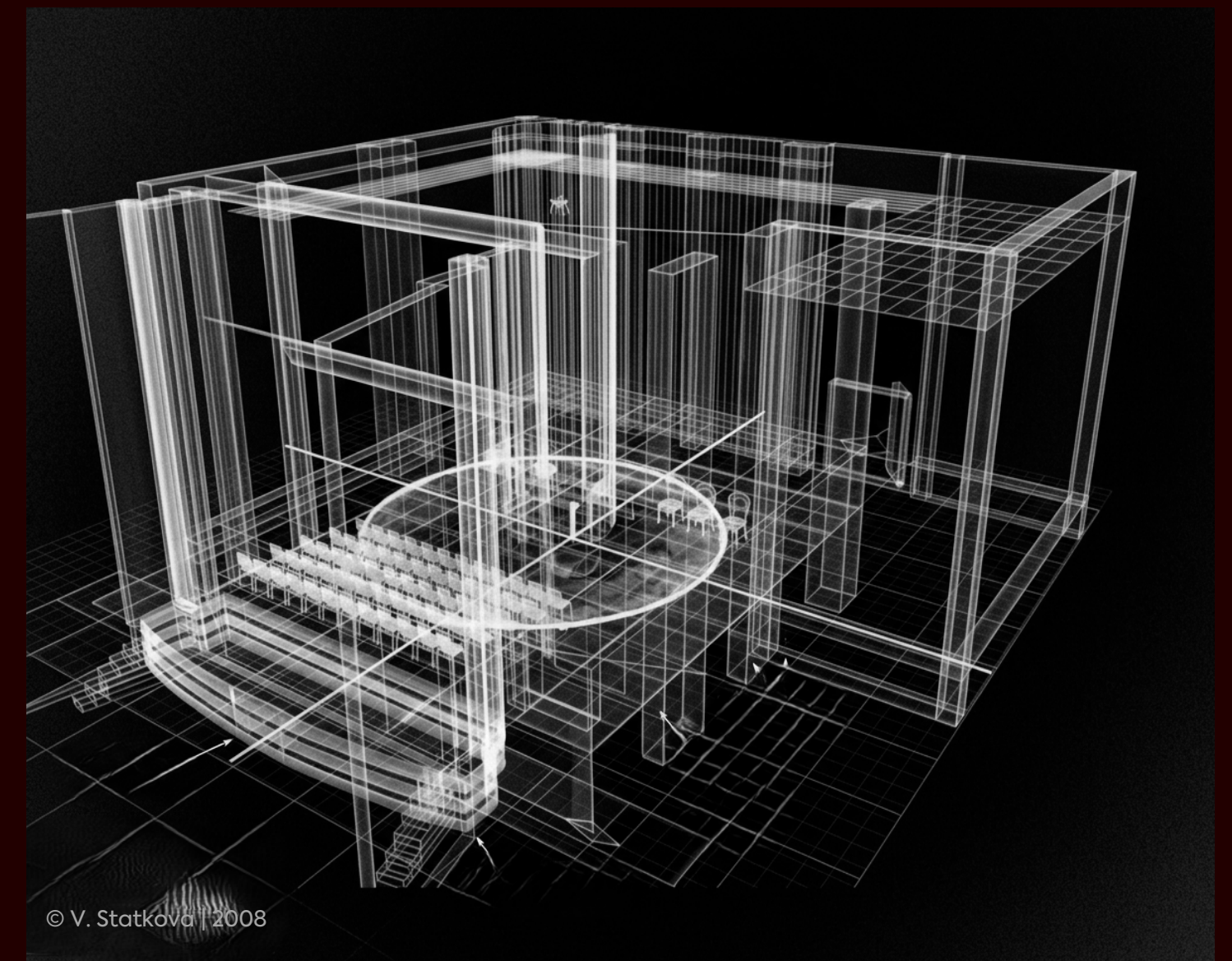
Lighting plots, sound maps, and stage plans document the precise technical specifications preserved across generations.



born-digital resources



3D models PreViz of Scenography
Architectural plans and construction drawings.



Point Clouds & Wireframes

Photogrammetry

3D scanning captures spatial data as millions of discrete points.

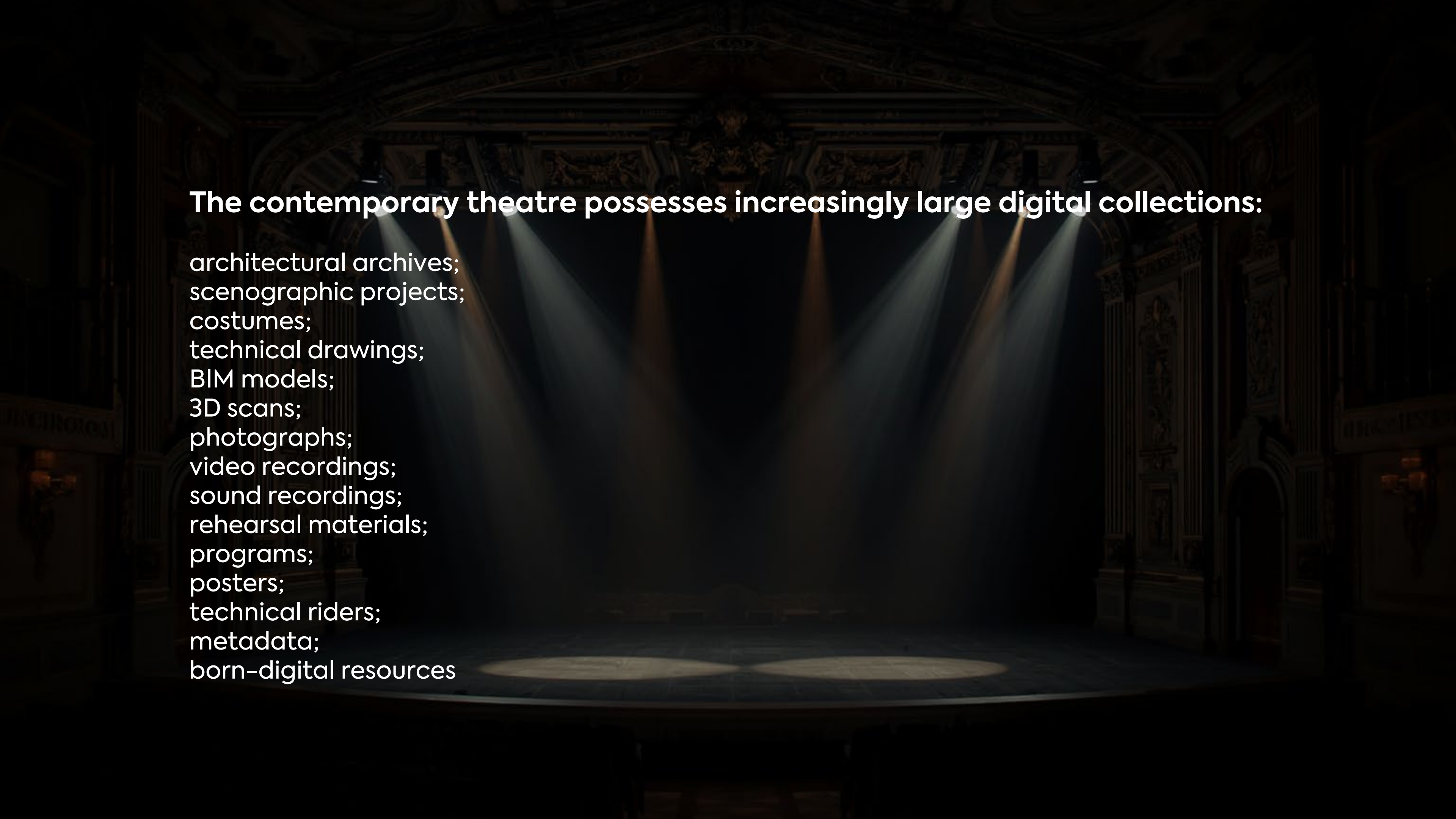




Semantic Data Metadata Paradata

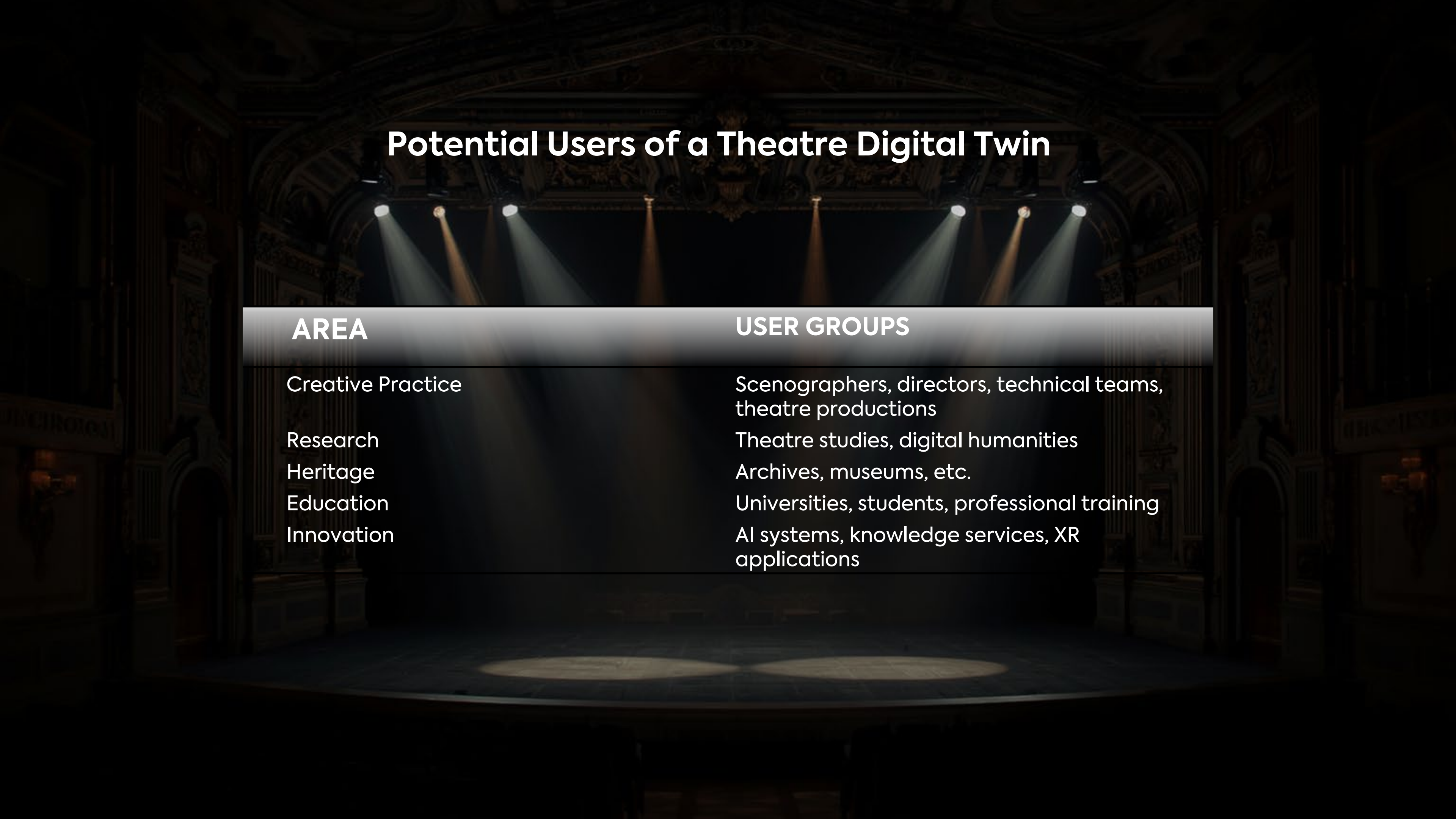
Ontologies and linked data structures create the semantic backbone of the digital twin.

Knowledge graphs connect heritage elements through meaningful relationships and context.

The background image shows the interior of a grand, dark theatre. The stage is illuminated by several spotlights from above, creating bright pools of light on the floor. The architecture is highly detailed with ornate columns and a decorative ceiling. The overall atmosphere is dramatic and focused on the stage area.

The contemporary theatre possesses increasingly large digital collections:

architectural archives;
scenographic projects;
costumes;
technical drawings;
BIM models;
3D scans;
photographs;
video recordings;
sound recordings;
rehearsal materials;
programs;
posters;
technical riders;
metadata;
born-digital resources

The background of the slide is a dark, atmospheric photograph of a grand theatre interior. The focus is on the stage, which is illuminated by several spotlights from above, creating bright pools of light on the dark floor. The architecture is highly detailed, with ornate columns and a decorative ceiling. The overall mood is dramatic and sophisticated.

Potential Users of a Theatre Digital Twin

AREA	USER GROUPS
Creative Practice	Scenographers, directors, technical teams, theatre productions
Research	Theatre studies, digital humanities
Heritage	Archives, museums, etc.
Education	Universities, students, professional training
Innovation	AI systems, knowledge services, XR applications

The image shows the interior of a grand, ornate theatre. The stage is illuminated by several spotlights, creating a dramatic effect. The architecture is highly detailed, with classical columns and intricate carvings. The text "Theatre is the missing laboratory of GLAM" is centered on the stage.

Theatre is the missing laboratory of GLAM

The image shows the interior of a grand, ornate theatre. The stage is dark, and several spotlights are mounted on the ceiling, casting beams of light onto the stage floor. The architecture is highly detailed, with ornate columns and a decorative ceiling. The text is centered on the stage.

We will build better knowledge.
And perhaps theatre is the ideal place to begin.



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