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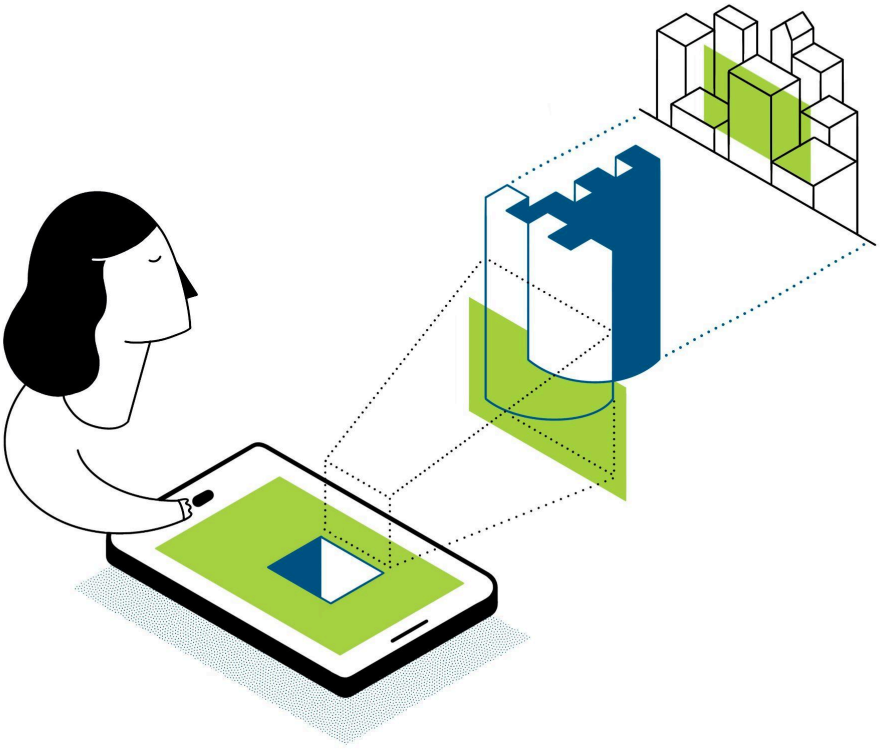

3D XR Studio

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1. Introduction

This step-by-step guide explains how to use the 3D XR Studio, a web-based authoring platform for creating immersive XR experiences. It is designed specifically for cultural heritage professionals and curators who want to bring history to life for their audiences, without the need for advanced technical skills.

By following this guide, you will be able to:

- Create a new XR project in the 3D XR Studio web component
- Define a geographical area and import 3D models within it
- Design a guided tour with points of interest, narratives, and multimedia
- Fine-tune the placement of 3D models using the mobile component
- Share the experience with visitors on their phones via a downloadable app

This guide is intended for

- Cultural heritage professionals, archivists and museum curators
- Researchers involved in digital heritage projects

Before you start you will need

- A computer with a web browser
- Valid credentials to access the 3D XR Studio (compatible with the EGI Single Sign-On)
- Your 3D models ready (GLB format recommended), along with any images, videos, or audio files you wish to include
- A smartphone (compatible with Google ArCore) if you plan to use the on-site fine-tuning functionality via the mobile component

Preparation of your materials and workspace

Before opening the 3D XR Studio, prepare the following materials:

- **3D Models**: Export them in GLB format. Optimise polygon count for mobile rendering.
- **Images**: JPG or PNG files to be used as information panels or decorative elements.
- **Audio files:** most common formats, for narration.
- **Video files**: most common formats, short clips (keep file sizes reasonable for download).

2. Overview of the workflow

Step 1 – Plan	Select your media assets and decide the scope of your XR experience (which area, which 3D models, which narrative).
Step 2 – Create	Log in to the web component, create a new project and configure the area on the map.
Step 3 – Build	Import 3D models, place them in the virtual environment, and set coordinates, orientation, and scale.
Step 4 – Narrate	Define the guided tour route by placing path points. Add points of interest and associate media to each of them (text descriptions, audio, video, images).
Step 5 – Totem	Set up physical totems with QR codes at the site.
Step 6 – Refine	Use the mobile component on-site to fine-tune model placement and validate the experience in Augmented Reality.
Step 7 – Visit	Visitors download the app, scan the QR code, and enjoy the AR experience.

3. Step-by-step guidelines

3.1 Prepare your assets

STEP 1	**Gather and Organise Your Media** Collect all content before opening the tool.

Before accessing the 3D XR Studio web component, prepare the following materials:

- **3D Models**: Export them in GLB format. Optimise polygon count for mobile rendering (for an AR application is a good practice to use less than 30.000 polygons).
- **Images**: JPG or PNG files to be used as information panels or decorative elements.
- **Audio files**: most common formats, for narration.
- **Video files**: most common formats, short clips: keep file sizes reasonable for streaming, considering that the wifi is not guaranteed, it is a good practice to upload video in a 720p resolution (1280x720).

3.2 Log in to the web component

STEP 2	**Authenticate and Access the Dashboard** Use your institutional credentials.

1. Open your browser and navigate to the 3D XR Studio web component URL.
2. Click Log In and authenticate using the EGI Single Sign-On (SSO) mechanism
3. Once logged in, you will land on the main Dashboard, where all your environments are listed.

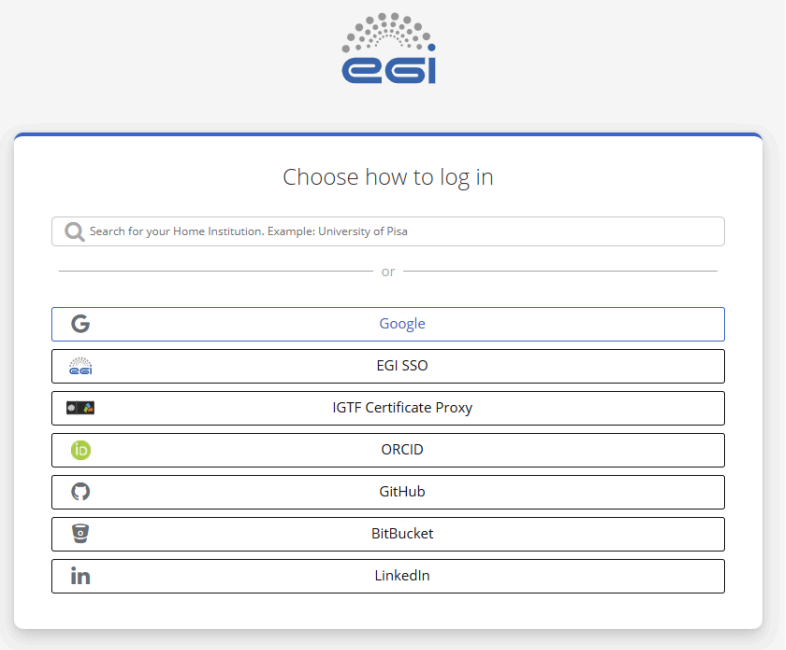

Figure 1 EGI Single Sign-On (SSO)

3.3 Create a new environment

STEP 3	**Set Up Your XR Experience Environment** Define the basic parameters of your experience.

1. From the Dashboard, click **Create New Environment**.
2. Enter a descriptive name for your environment (e.g., "Ancient City Walls AR Tour").
3. Specify Longitude and Latitude of the geographical area visible on the world map.
4. Fill the eight input field boxes defining the borders of the area within which the XR experience will take place.

5. Click Save Changes to confirm. A blue shape will highlight the borders of the area available for the next steps.

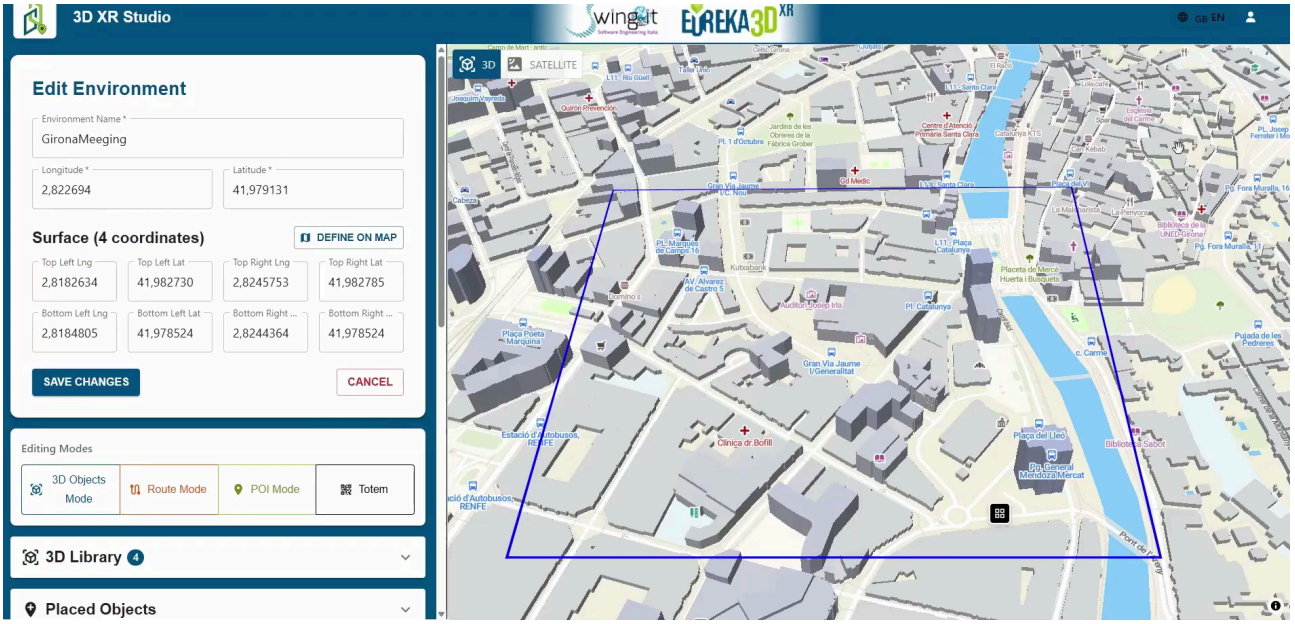

Figure 2 Input screen for editing environments

3.4 Import and position 3D Models

STEP 4	**Add 3D Models to Your Scene** Place and orient models within the virtual environment.

1. Add 3D Objects in the library.
2. Insert them in the scene.
3. The models will appear in the 3D scene.

Once a model is in the scene, position it precisely:

- **Set Coordinates:** Enter latitude, longitude, and altitude to position the model geographically.
- **Set Orientation**: Adjust the rotation (x, y and z axis) so that the model aligns correctly with its physical counterpart.
- **Set Scale**: Resize the model to reflect real-world dimensions or the desired visual effect.

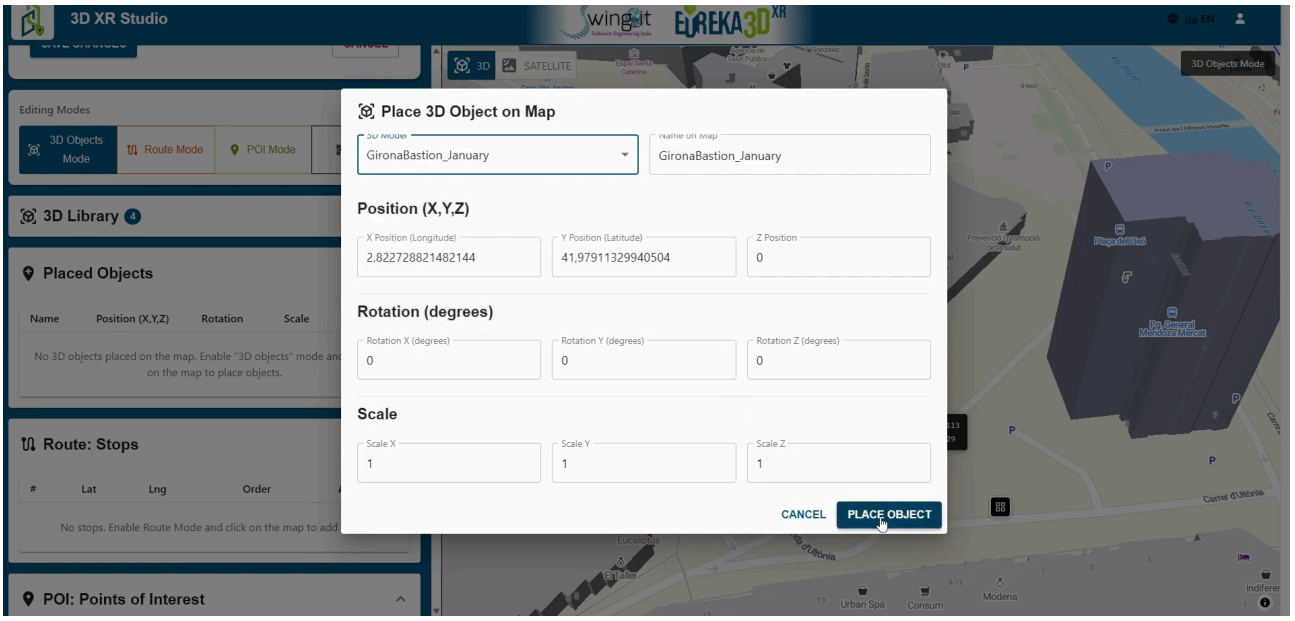

Figure 3 Input screen for positioning 3D models

> 💡 Tip: Iterative Fine-Tuning
> *Do not worry about achieving perfect placement at this stage. You will have the opportunity to fine-tune all model parameters on-site using the mobile component (Step 7).*

3.5 Create the guided tour route

STEP 5	**Define Path Points and Points of Interest** Structure the narrative journey for your visitors.

PATH POINTS

1. Click on the map to place Path Points. These define the suggested walking route for visitors.
2. Add, delete, or move points by clicking on them and using the edit controls.

POINTS OF INTEREST

1. Identify locations where you want visitors to stop and engage.
2. Click on the map to place Points of Interest (POIs).
3. For each Point of Interest, you can associate the following content:

    - Title and descriptive text (displayed as an information panel)
    - Audio narration: plays automatically or on tap
    - Images: displayed in a gallery
    - Video clips

Figure 4 Overview of route stops

3.6 Set up physical totems and starting points

STEP 6	**Anchor the AR Experience in the Physical World** Define where visitors begin their journey.

The 3D XR Studio uses **physical totems** — printed panels placed at the site — as real-world reference. Visitors use these totems to initialise the AR experience.

1. You can edit the correct placement for each totem in the map.
2. For each physical totem, put the correct QR code on it.

💡 How Visitors Use the Totem

When a visitor reaches a totem, they scan the QR code, download the app (if not already installed), and hold their phone next to the totem. The app uses the totem as a spatial anchor to calibrate the AR scene — no internet connection is needed once the initial download is complete.

3.7 Finetune with the mobile component

STEP 7	**On-Site Refinement Using AR** Use the curator view of the mobile component to perfect model placement.

The mobile component has a dedicated **Curator Mode** that allows you to adjust 3D models in real time, directly in the field.

1. Install the 3D XR Studio mobile component on your smartphone: https://3dstudioxr.eureka3dxr.fedcloud.eu/download
2. Log in with your curator credentials.
3. At each totem location in the real world, initiate the AR scene by scanning the QR code.
4. In Curator Mode, you can:
    - Select any 3D model and adjust its position, scale, and rotation in real time
    - Add visual occlusions to make models appear correctly behind real-world elements
    - Add, move, or delete Path Points along the tour
    - Preview what the visitor experience will look like from a visitor perspective
5. Save all changes: they are synced back to the web application automatically.

💡 Key Reminder
It is highly recommended to export 3D models in GLB format for best compatibility.
Optimise model file sizes before uploading to ensure smooth AR performance on mobile devices.
Test your experience on various smartphones.

3.8 Review

STEP 8	**Final Checks and Go Live** Validate your experience and make it available to visitors.

Finally run through this checklist:

- ☐ All 3D models are correctly positioned and scaled
- ☐ All Points of Interest have titles, descriptions, and associated media
- ☐ The tour route flows logically and whenever possible avoid areas with heavy traffic
- ☐ The totem are placed correctly with their attached QR codes
- ☐ You have tested the full visitor experience on a mobile device

4. The visitor experience

Once the experience is published and the totems are in place, visitors can engage with the AR tour as follows:

Step 1 – Find the Totem	The visitor locates a physical totem at the site, following on-site signage.
Step 2 – Download	The visitors follow the instructions on the totem in order to download the 3D XR Studio mobile component.
Step 3 – Calibrate	After opening the app, the visitors read the instructions inside the app.
Step 4 – Explore	The AR experience starts: 3D models appear overlaid on the real world, a suggested path is displayed, and audio/text/video media is accessible at each POI.
Step 5 – Navigate	The visitor follows the path, discovering each point of interest. The experience now works fully offline.

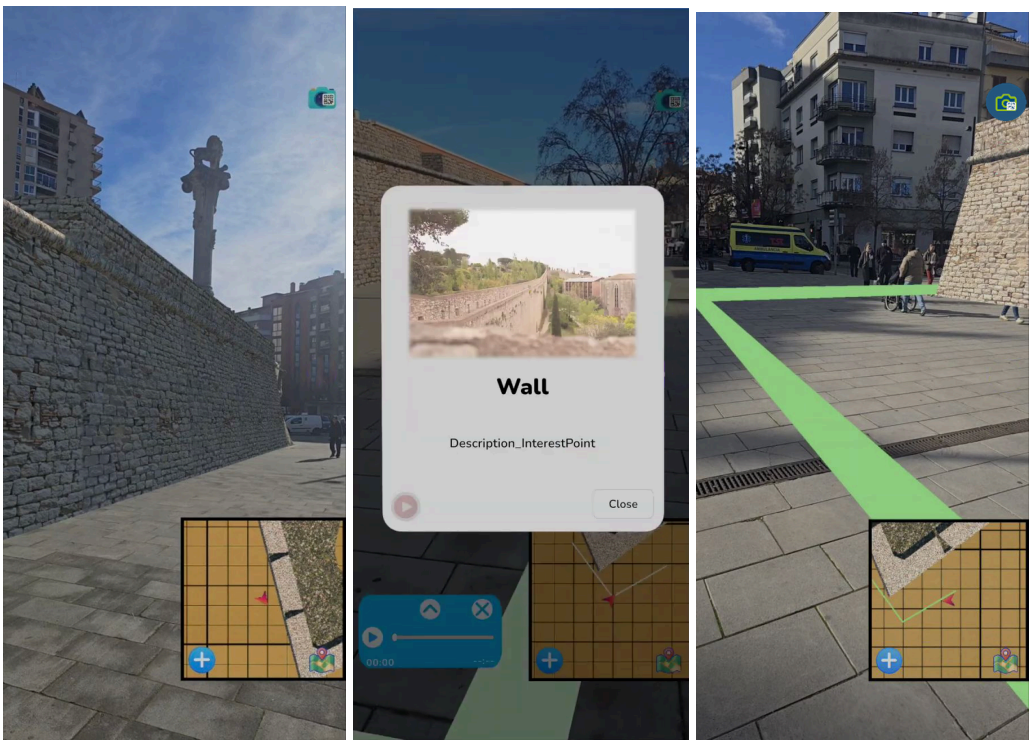

Figure 5 Visitor view on an AR experience

5. Help and more information

Should you encounter any issues or have any questions, please do not hesitate to contact Swing:It via email (info@softwareengineering.it). Further information, as well as the latest contact details, are available on the official website at swing-it.net.