

# Building and presenting custom AR tours



*Leonidas Mavrotas, NTUA*



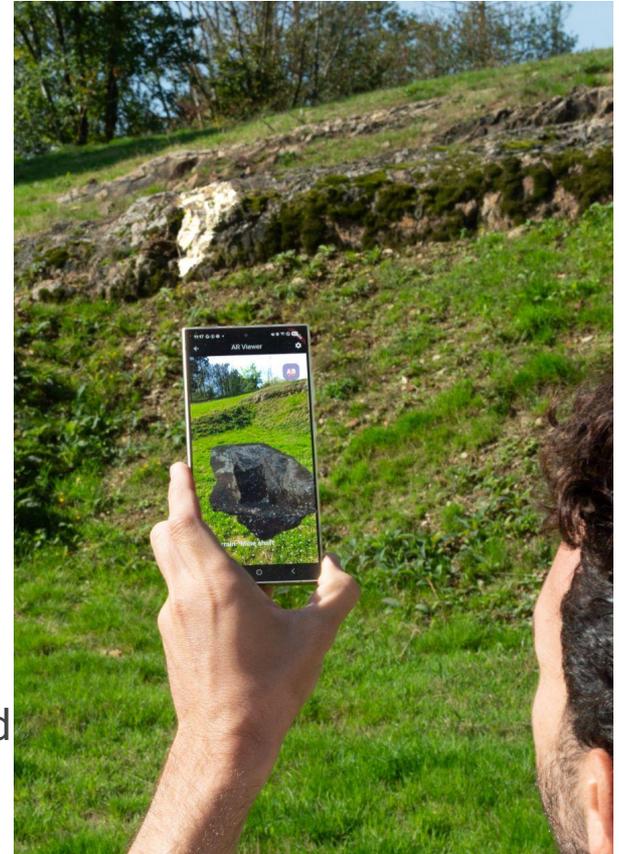
B I B R A C T E

BIBRACTE – Centre archéologique européen

MONT BELVUROY – MORVAN – BOURGOGNE

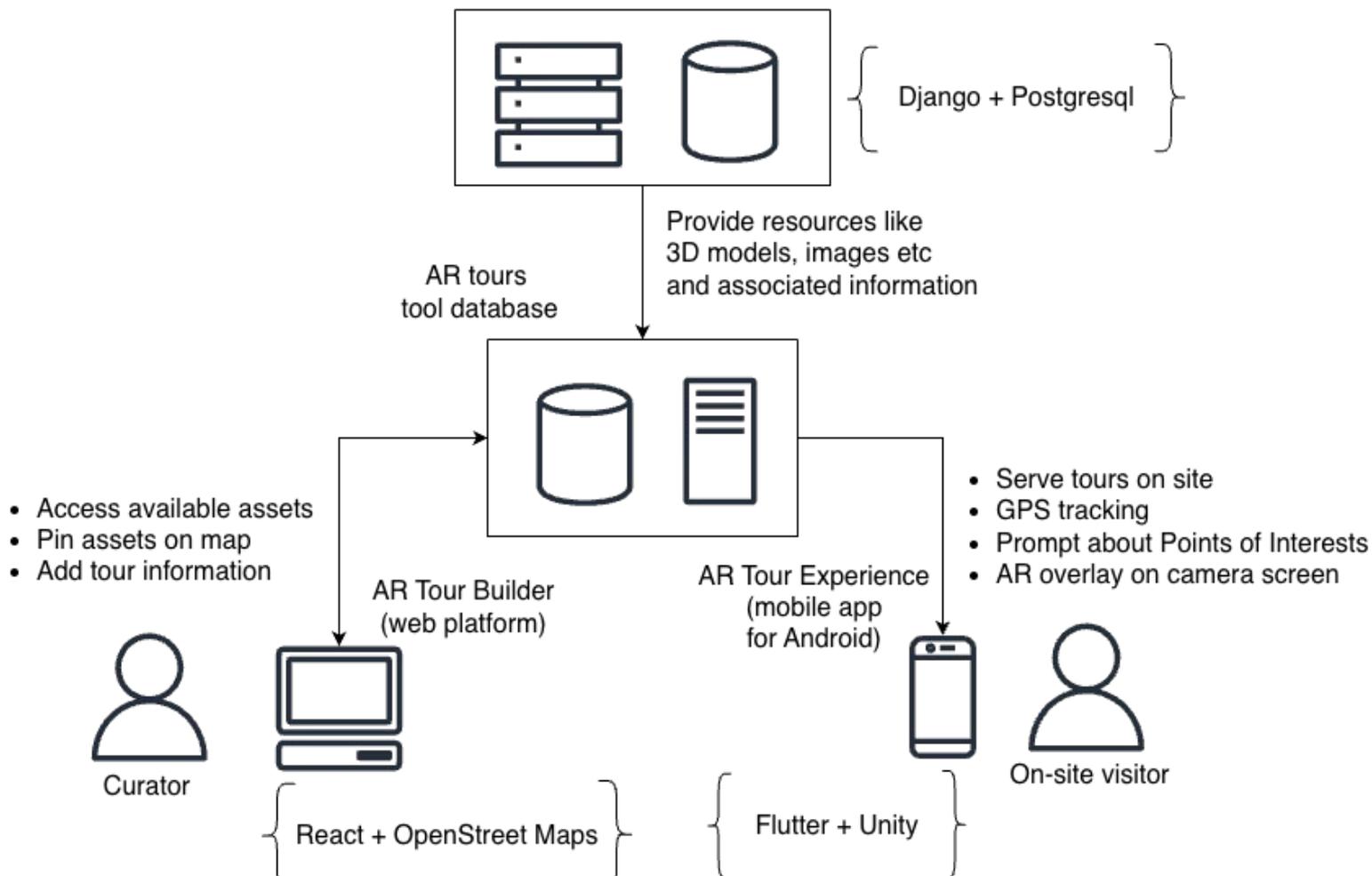
# Objectives

- Enable **cultural heritage professionals** to design tours and AR narratives by contextualising collection items from existing repositories via an *open and reusable web platform*
- Serve carefully curated tours as *lightweight, smartphone-driven AR experiences* to **on-site visitors** based on their geolocation and preferences
- Test and evaluate the technical tools on the Bibracte archaeological site
- Design a tour **scenario** that highlights the potential of the tools, serve as a *case study* for their future users and uses AR to reveal what is no longer visible at the archaeological site today



**TOOLS**

## External Databases and APIs (Europeana, Eureka3D Hub...)



# Tools & Frameworks

## AR Tour Builder - Web Application

- ReactJS
- ThreeJS
- OpenStreetMap + Leaflet

## AR Tour Experience - Mobile Application (Android)

- Flutter (Dart)
- Map package flutter\_map + OpenStreetMap
- Unity - ARCore

## AR Tour Supporting System - Backend

- Django
- PostgreSQL

# AR Tour Builder

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## Settings

Manage your project settings and configurations

⚙️ General **🌐 Supported Languages** 🏷️ Branding 👤 Members

**Note:** You cannot remove languages that already have content associated with them. This is to prevent data loss.

### Supported Languages

Specify the languages your project supports. You can populate content in multiple languages later in the project's settings.

English e.g., English, French, Spanish

💾 Save Changes

- Maintain an asset library
- Library assets act as predefined content, ready to be used when enhancing a tour with information.
- Images, Videos, 3D, Documents

- Each user can participate in multiple projects
- Each project contains tours
- Support for multilingual tours
- Collaboration between members

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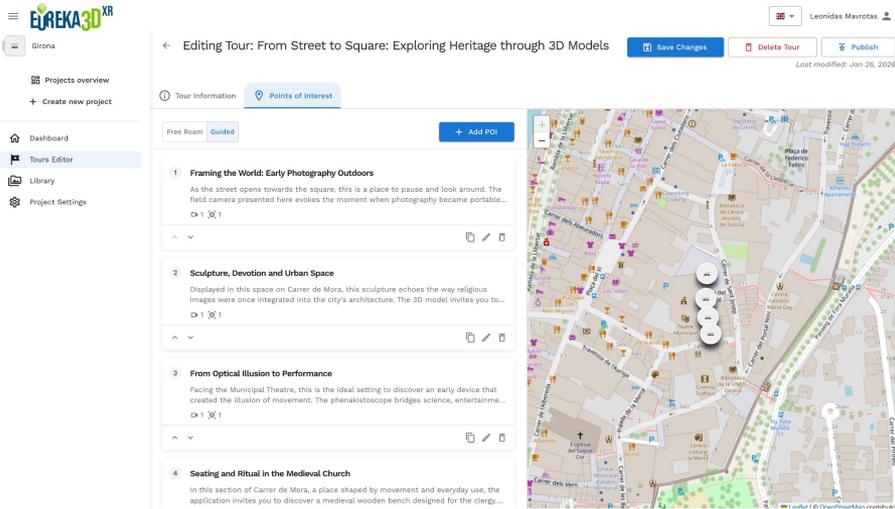
## Asset Library

Manage and organize your project assets

🔍 Search... All Types [+ Add New Asset](#)

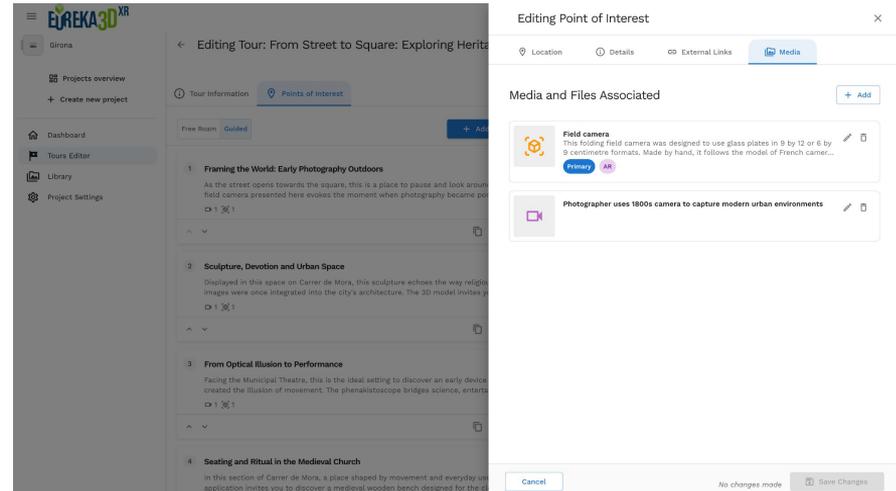
Title	Type	URL	Filename	
1833 Thos. McLean - "Politeness" + "The Desert" (Magical Panorama animations)	Video	<a href="https://www.youtube.com/wat...">https://www.youtube.com/wat...</a>		👁️ ✎ 🗑️
Photographer uses 1800s camera to capture modern urban environments	Video	<a href="https://www.youtube.com/wat...">https://www.youtube.com/wat...</a>		👁️ ✎ 🗑️
	Video	<a href="https://www.youtube.com/wat...">https://www.youtube.com/wat...</a>		👁️ ✎ 🗑️
Journal des Demoiselles phenakistoscope	3D Model	<a href="https://leomav.github.io/demo...">https://leomav.github.io/demo...</a>		👁️ ✎ 🗑️
Field camera	3D Model	<a href="https://leomav.github.io/demo...">https://leomav.github.io/demo...</a>		👁️ ✎ 🗑️
Mother of God sculpture from the Basilica of Santa Maria del Pi	3D Model	<a href="https://leomav.github.io/demo...">https://leomav.github.io/demo...</a>		👁️ ✎ 🗑️
Presbytery bench from Sant Climent de Taüll	3D Model	<a href="https://leomav.github.io/demo...">https://leomav.github.io/demo...</a>		👁️ ✎ 🗑️

# AR Tour Builder



- Enhance a point of interest with media from the project's library or external collections
- Ability to associate external links like quiz and blog posts

- Easy editing and visualizing changes
- Connecting points of interests with actual locations
- Choose between a free roam or guided tour



# AR Tour Builder

### Editing Point of Interest

← Editing Asset

Input Language: English

Title: Field camera

Description: This folding field camera was designed to use glass plates in 9 by 12 or 6 by 9 centimetre formats. Made by hand, it follows the model of French cameras produced for amateur photographers at the end of the 19th century. Lightweight and portable, this type of camera allowed photographers to work outdoors, documenting landscapes, monuments or archaeological sites. Objects like this one played an important role in the development of photography as a tool for documentation and scientific observation, at a time when images were becoming essential for recording and sharing knowledge.

Set as Primary  
Set this asset as the primary one to be displayed more prominently.

Media

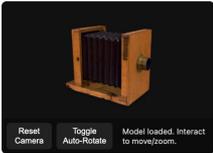
Media Type: 3D Model

Multilingual Media  
Enable this option to provide media content in multiple languages. This allows you to upload different media files for each supported language.

Media URL: <https://leomav.github.io/demo-assets/girona/camera/camera.glb>

GLB

Preview fullscreen



Reset Camera Toggle Auto-Rotate Model loaded. Interact to move/zoom.

Cancel Save Changes

- Easily edit content associated with points of interest
- Choose between different formats

- Add georeference information for 3D models
- Choose if a 3D model should be viewed in AR
- Handle the anchoring of the 3D model
- Accompany their presentation with audio

### Editing Point of Interest

← Editing Asset

3D Model Attributes

Georeference  
Check this box if the 3D model is georeferenced and has specific latitude/longitude coordinates associated with it.



Latitude: 41,98286193935772 Longitude: 2,8256642781068035

View in AR  
Enable this option to allow users to view the 3D model in Augmented Reality (AR) mode on compatible devices.

5 m Spawn Radius  
Specify the radius within which the object can spawn in Augmented Reality (AR) mode.

On Air  On Ground Place model on the ground  
Specify if the object should be positioned on the ground or freely in front of the user in Augmented Reality (AR) mode.

Linked Audio (Optional)  
Upload audio files in multiple languages to accompany this asset. Each language can have its own audio track.

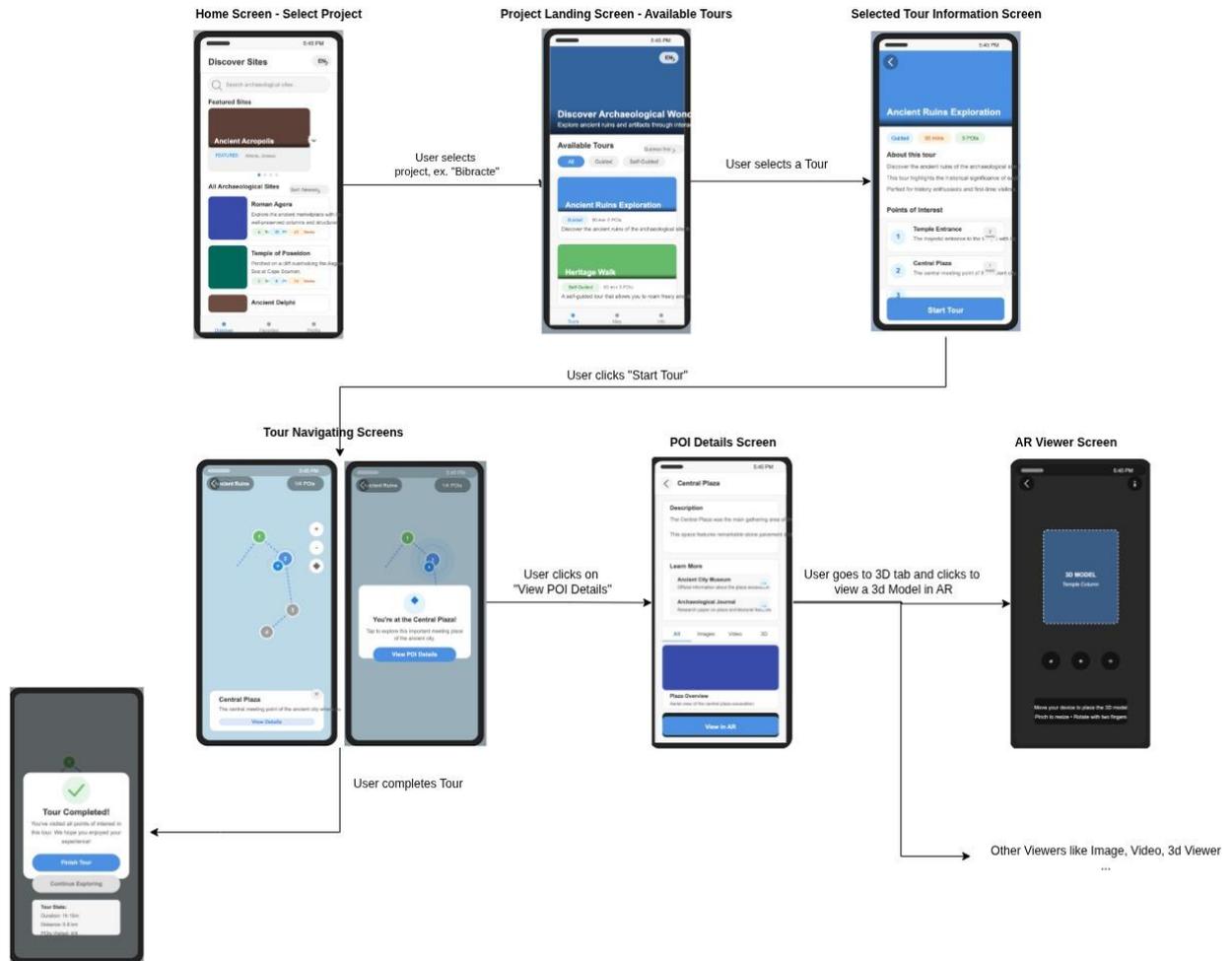
Audio Title: Enter audio title

Audio URL: [https://drive.google.com/uc?export=download&id=1QXdnUKI\\_AVbwDq4xhFpYSH6ztmxCM-](https://drive.google.com/uc?export=download&id=1QXdnUKI_AVbwDq4xhFpYSH6ztmxCM-)

Cancel Save Changes

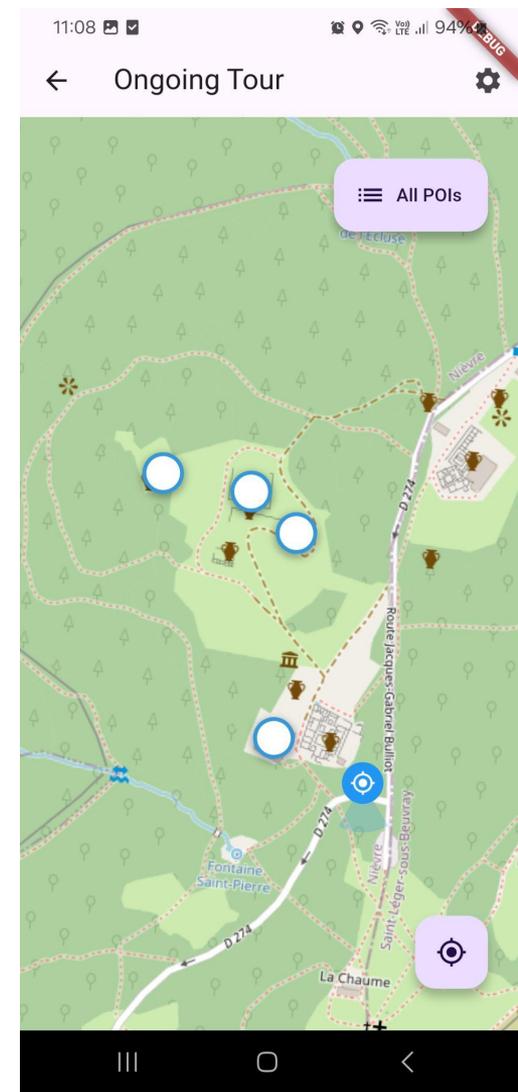
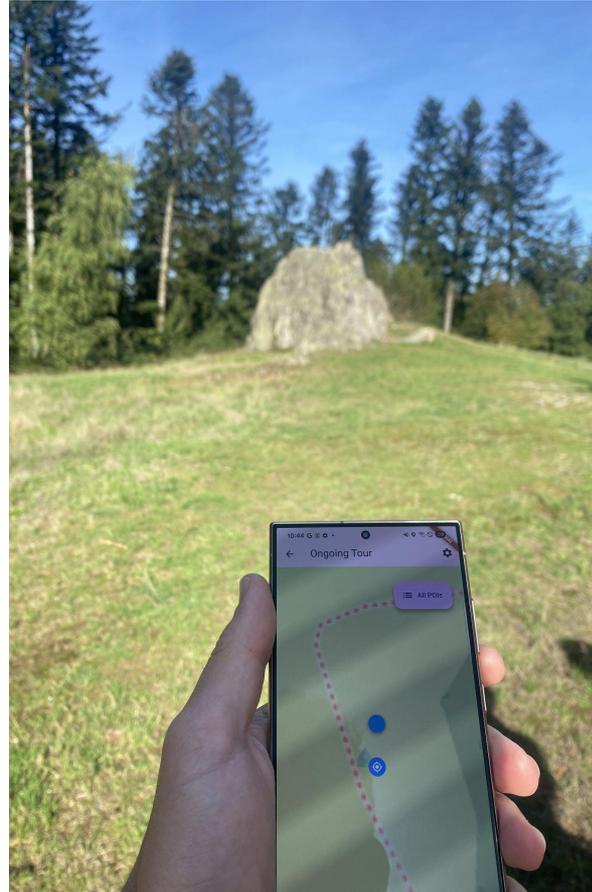
# AR Tour Experience Main steps

- Choose a space
- Start a tour
- Navigate in the real world
- View content in different formats
- Visualize 3D models in real world using AR



# Navigation

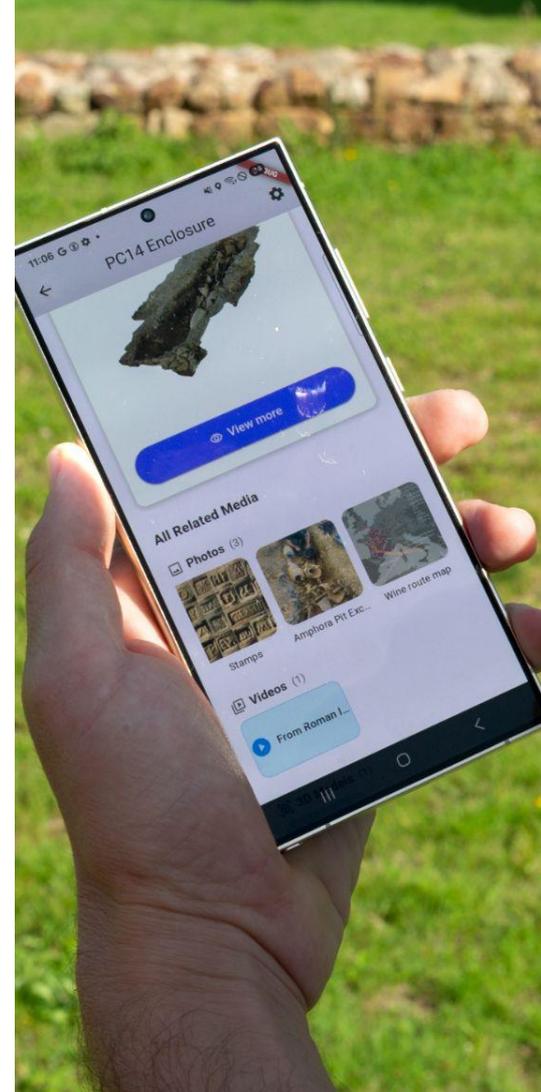
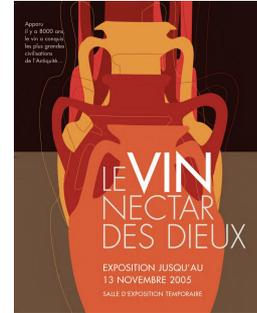
- OpenStreet maps
- GPS & Compass sensors



# Point of Interest

Multiple types of content associated with a certain location

- 3D
- Audio
- Images and videos
- Textual documents
- Links to external content
- Multilingual support



# 3D object visualisation

- Visualisation on 3D viewer (e.g. missing structures, decorations and objects now preserved elsewhere) manipulated via touch screen (zoom, rotation etc)
- Visualisation on AR viewer, i.e. overlay on the physical environment as captured by the mobile camera with view dependent on body motion (distance, angle etc)
  - Fixed anchoring based on georeferencing information for immovable heritage (e.g. backfilled excavations, buildings or structures not existing anymore)
  - Free positioning for movable heritage (e.g. see an artefact in the physical environment where it was discovered)



**Live demo**

# Demo of the AR Tour Experience app

Manipulating the amphora stamp on the 3D viewer



**NEXT STEPS**

# Next steps

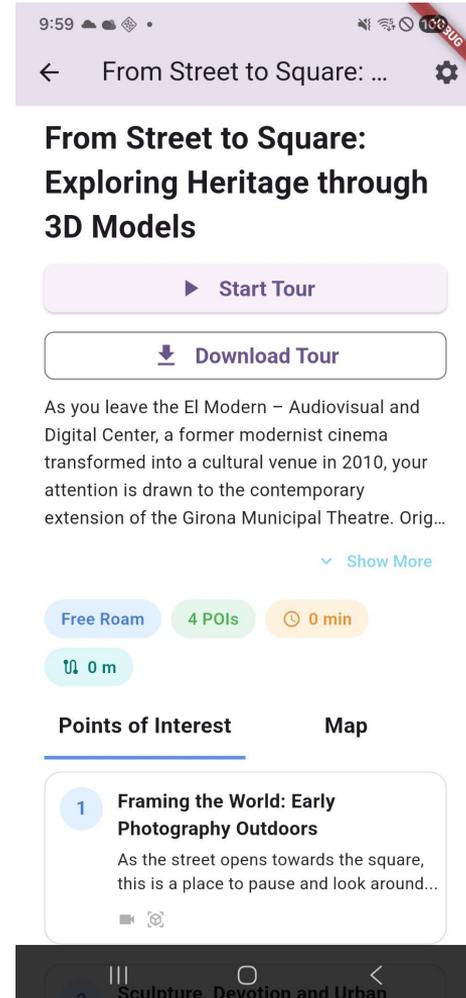
- Achieve accurate georeferencing and give the curators more control over the AR experience
- Implement a smart caching mechanism of heavy content aiming for a smooth user experience
- Integrate external collection APIs in the AR Tour Builder (e.g. Europeana API)



# Girona Demo Installation Guide

# Girona Demo

- A tour around the square
- 4 points of interest with 3D models
- AR ready
- Installation steps in next pages

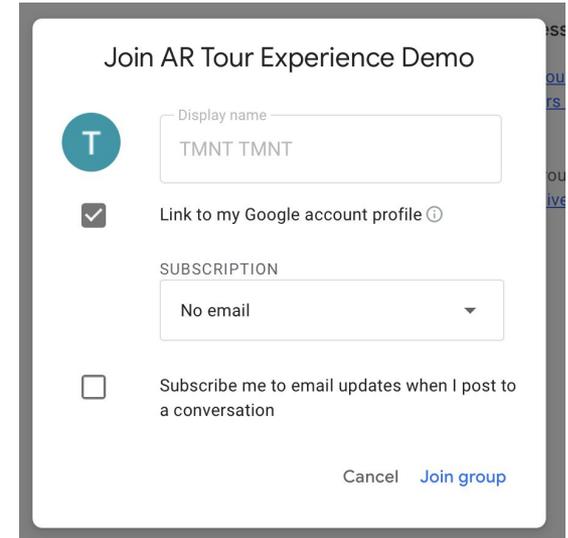
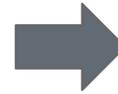
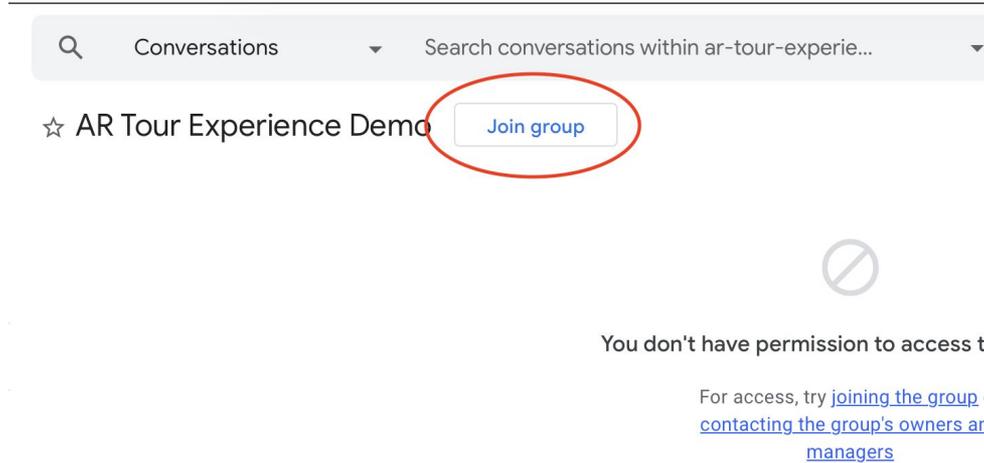


# Step 1: Join Google Group



Scan to join group

# Step 1: Join Google Group



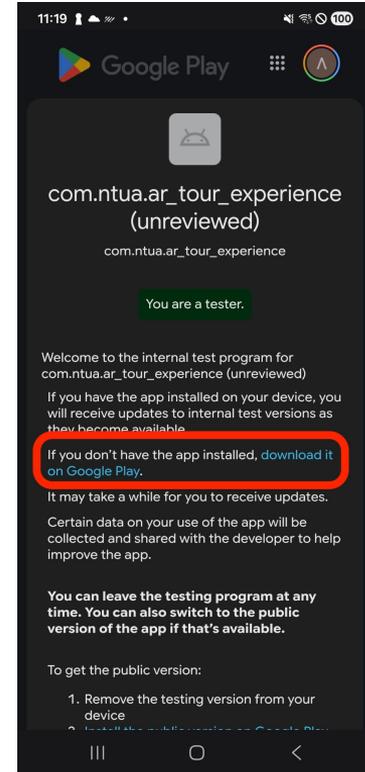
a. Click **Join group**

b. Select **No email**  
c. Click **Join Group**

# Step 2: Download the demo application



Scan to download the app



Click **download it on Google Play**