

# **EUreka3D Final Conference**

**Girona, 13 December 2024**

**Hybrid event: in person and online attendance**

**Public Conference and Workshop**

**13 December 2024**



EUreka3D project developed four use cases to show how 3D digitisation offers new ways to **innovate workflows** in cultural heritage, and to create **more advanced heritage** collections to represent not only cultural objects but also the story and memories associated with them.

Four project partners undertook 3D digitisation of a wide range of objects, from museum objects to archaeological artefacts or sites.

The new 3D assets are made available to Europeana, openly accessible to any user and any purpose.



# The EUreka3D Case Studies

## The stories of a digitisation journey:

- Bibracte (France)
- Cyprus University of Technology (Cyprus)
- CRDI (Catalonia, Spain)
- Museo della Carta (Italy)

## Reflections on the EUreka3D experience:

Impact and sustainability

*John Balean – Photoconsortium*

Reuse of 3D assets in Europeana

*Jolan Wuyts – Europeana*



Case Study

Bibracte

*Vincent Guichard*





# **BIBRACTE case study: 3D technology of archaeologists**

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[www.bibracte.fr](http://www.bibracte.fr)





## **Bibracte**

- ✓ a major archaeological site in modern Burgundy
- ✓ the site of a town of the 1st c. BC
- ✓ since 1984, an integrated site management system and a research project shared by different European universities
- ✓ a huge and diverse set of data collected over 150 years of archaeological activity (e.g. 144,000 image recording cards)

# BIBRACTE : the management of the complete operational archaeological process, from the field to the public [and the scientific community, today and tomorrow]





# 3 COLLECTIONS

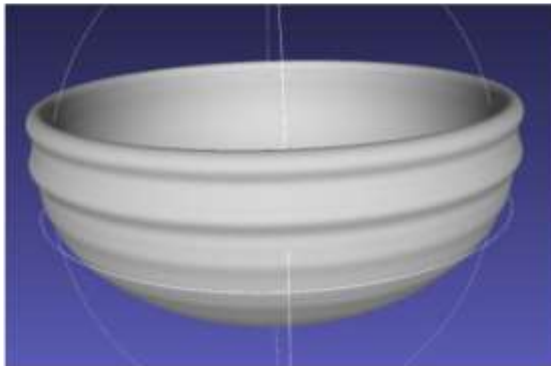
published on EUROPEANA with EUreka3D

## 1 / Objects



➤ 130 3D models

## 2 / Typological models



➤ 134 3D models

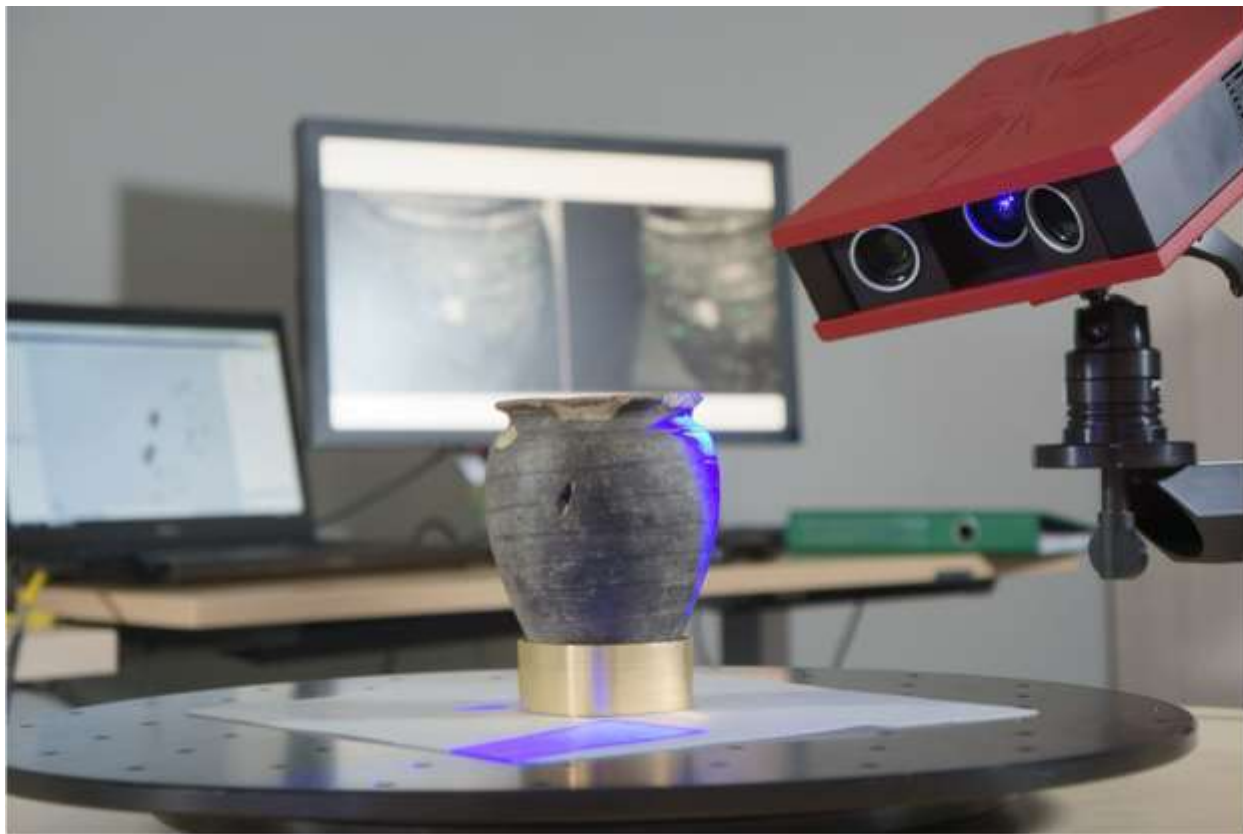
## 3 / field scenes



➤ 12 3D models

➤ 200 Orthophotographs





## 1 / Objects

3D scan of a 1st c. BC pottery using a GOM Atos Core structured light scanner.  
(photo MSHE Ledoux – university of Besançon)

**mshE**  
MAISON DES SCIENCES DE L'HOMME  
ET DE L'ENVIRONNEMENT  
CLAUDE NICOLAS LEDOUX — USR 3124

**EUREKA3D**

# 1 / Objects: 130 3D models of finds on display in Bibracte museum

NB : 5 months for the acquisition and preparation of the models + a lot of time for the preparation of the metadata





## 2 / Typological models: 134 3D files

- ✓ These 3D models are profiles of the different types of pottery identified at Bibracte.
- ✓ Each one is associated with a wealth of metadata that have been compiled as part of a scientific publication.
- ✓ The publication of the 3D models is aimed primarily at specialists. It paves the way for automatic classification using pattern recognition and AI.

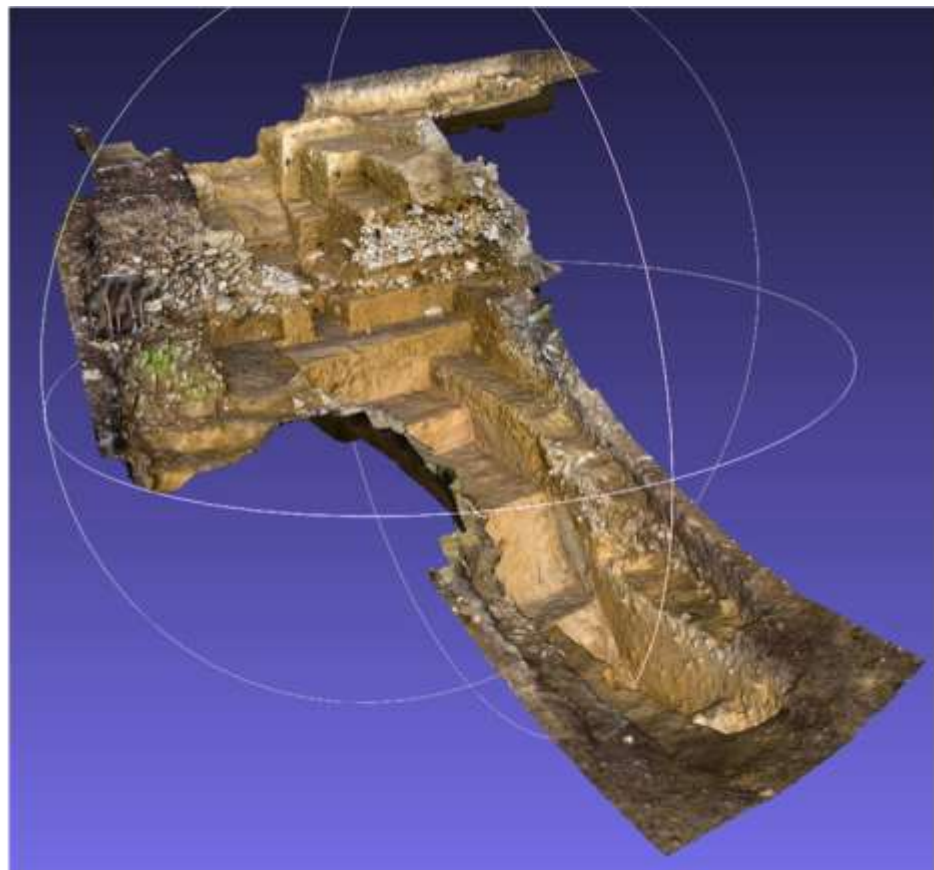
The screenshot shows a digital collection interface. On the left, a list of 3D models is displayed, including items like 'vase à pied', 'vase à anses', and 'bol'. The item 'bol B4b (BARRIER, LUGDUNENSIS, 2021)' is highlighted. On the right, the detailed view for 'bol B4b' is shown, including its title, variant, collection, and various metadata fields such as 'Concept général', 'Concept spécifique', and 'Traduction'. A 2D line drawing of the bowl is also visible in the 'Notes' section.



**3 / Field scenes:  $\geq 200$  2D + orthophotographic models**

**3 / Field scenes: 12 full 3D models**

- photogrammetric restitutions, mainly from scenes recorded with a drone for excavations /remains with a complex geometry





### 3 / Field scenes: $\geq 200$ 2D + orthophotographic models




- photogrammetric restitutions, produced on a daily base during excavations in progress
- The vertical faces are not systematically recorded, which is not a problem in most cases
- The recording of the Z coordinate allows the reconstruction of 'D2+' models
- Georeferencing of the scenes thanks to the GeoTIFF format

## **EUreka3D:**

**an opportunity to develop the 3D ‘literacy’ of Bibracte team  
esp. through the interconnection of digital services**

**CND3D - The French National 3D Data Repository, <https://3d.humanities.science/>**

- 
- ✓ an initiative of the scientific community dated to the mid 2010s through Consortium 3DHN
  - ✓ a backup environment for 3D data produced by archaeologists and human sciences
  - ✓ managed by Archeovision, a platform operated by Archéosciences laboratory, Bordeaux
  - ✓ supported by Huma-Num – CINES repository, [www.huma-num.fr](http://www.huma-num.fr)
  - ✓ using a dedicated archive generator, aLTAG 3D, <https://altag3d.huma-num.fr/>

**Europeana**



## Casque réutilisé en louche de fondeur (Inv. 2001.32.258.1) – Oppidum de Bibracte

### Nature de la ressource

Responsable scientifique

Créateur du dépôt

Description

Programme de recherche

Contexte

Date de début et de fin du projet/programme

Objectifs scientifiques et techniques

Source(s) de financement

Nombre de fichiers

Taille du dépôt

Nombre et formats fichiers

Code du dépôt

Droits

Entité(s) responsable(s)

Version du dépôt

Date de création du dépôt

Langue

Identifiant du dépôt dans le système de gestion du dépôt

code BIDA

Compatibilité avec le CNO3D ou le CINE3D

Dépôt

Guillaumat, Jean-Paul

Guichard, Vincent

Précieux le métal est souvent réutilisé. Ce casque en fer a ainsi trouvé une seconde vie sous la forme d'une louche de fondeur ! Le cadastre porte encore les deux numérations basées du mouleux caractéristiques des casques portés par les légionnaires romains. L'objet a été découvert en 2007 dans un atelier de forgeron de la Côte Chaudron.

Eureka3D et Vitrine numérique 2024

Au cœur du Muséum perché au sommet du mont Beuvray se trouve l'un des plus grands patrimoine romains : Bibracte l'ancienne capitale des Éduens peuplée par les Gaulois qui occupait son site et se révéla avant d'être une vaste territoire entre la Saône et l'Alsace. Bibracte EPCC (Établissement Public de Coopération Culturelle) propose des numérations 3D de modèles et de structures provenant du site archéologique du mont Beuvray. Ces numérations couvrent diverses périodes allant de l'époque gauloise aux occupations plus récentes (comme le couvent des Cordeliers époque moderne). Les recherches scientifiques de l'établissement sont impliquées à toutes les étapes de la production de l'utilisation et de la diffusion de ces numérations 3D pour soutenir la recherche archéologique et enrichir l'expérience des visiteurs sur le site et au musée.

de 2023-01-01 à 2024-12-31  
(Date Vitrine: 2024)

Restitution 3D du patrimoine archéologique de Bibracte

Union Européenne (DIGITAL-2020-CULTURAL-HERITAGE – Eureka3D) et ministère de la Culture Direction Régionale des Affaires Culturelles de Bourgogne-Franche-Comté (Vitrine numérique 2024)

2

105,1 MB

1 fichier 3D (obj) 1 fichier image (png)

3792

CC BY SA

Bibracte

2

2024-01-01

fr

3792\_Bibracte\_2024-10-28

AT038

Compatible avec le CNO3D et le CINE3D



- ✓ archiving Bibracte 3D models on HumaNum repository
- ✓ connecting the CN3D Data Model (aTAG3D) to the Europeana Data Model (EDM)
- ✓ exporting files from CN3D to Europeana thanks to Eureka3D facilities



EUREKA3D

### Casque réutilisé en louche de fondeur (Inv. 2001.32.258.1)

Précieux le métal est souvent réutilisé. Ce casque en fer a ainsi trouvé une seconde vie sous la forme d'une louche de fondeur ! Le cadastre porte encore les deux numérations basées du mouleux caractéristiques des casques portés par les légionnaires romains. L'objet a été découvert en 2007 dans un atelier de forgeron de la Côte Chaudron.

En savoir plus sur ce modèle 3D : [3D Modèles](#)  
 Voir les autres modèles de l'établissement :

En savoir plus sur ce modèle 3D : [3D Modèles](#)  
 Voir les autres modèles de l'établissement :

Type de fichier : [3D Modèles](#)

Titre : [3792\\_Bibracte\\_2024-10-28](#)

Identifiant : [3792\\_Bibracte\\_2024-10-28](#)

Version : [2](#)

Date de début et de fin du projet/programme : [de 2023-01-01 à 2024-12-31](#)

Objectifs scientifiques et techniques : [Restitution 3D du patrimoine archéologique de Bibracte](#)

Source(s) de financement : [Union Européenne \(DIGITAL-2020-CULTURAL-HERITAGE – Eureka3D\) et ministère de la Culture Direction Régionale des Affaires Culturelles de Bourgogne-Franche-Comté \(Vitrine numérique 2024\)](#)

Nombre de fichiers : [2](#)

Taille du dépôt : [105,1 MB](#)

Nombre et formats fichiers : [1 fichier 3D \(obj\) 1 fichier image \(png\)](#)

Code du dépôt : [3792](#)

Droits : [CC BY SA](#)

Entité(s) responsable(s) : [Bibracte](#)

Version du dépôt : [2](#)

Date de création du dépôt : [2024-01-01](#)

Langue : [fr](#)

Identifiant du dépôt dans le système de gestion du dépôt : [3792\\_Bibracte\\_2024-10-28](#)

code BIDA : [AT038](#)

Compatibilité avec le CNO3D ou le CINE3D : [Compatible avec le CNO3D et le CINE3D](#)

Identifiant du dépôt dans le système de gestion du dépôt : [3792\\_Bibracte\\_2024-10-28](#)

code BIDA : [AT038](#)

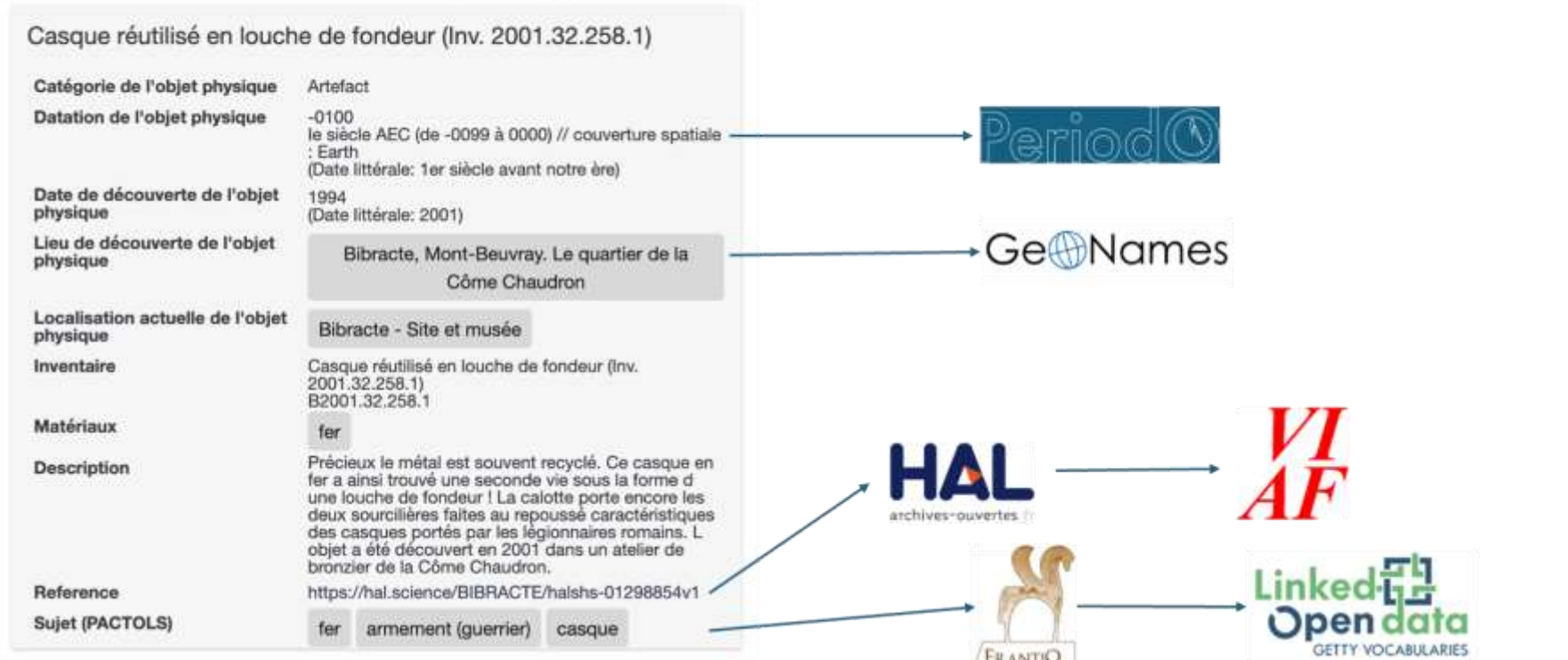
Compatibilité avec le CNO3D ou le CINE3D : [Compatible avec le CNO3D et le CINE3D](#)

Citation : Guillaumat, Jean-Paul (2024). Casque réutilisé en louche de fondeur (Inv. 2001.32.258.1) – Oppidum de Bibracte. [10.34969/CN3D/9342144.6.2024](#)



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# Interconnecting digital services enriches the contents attached to images and creates different ways to get access to them



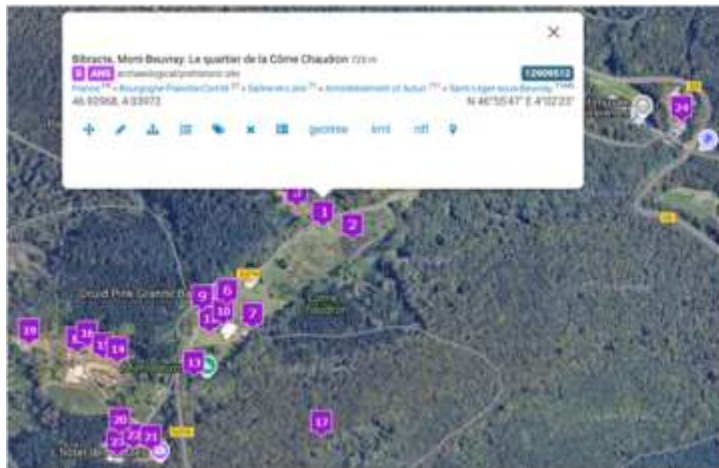


# Interconnect digital services

➤ Use web frameworks as sorting criteria

NB: Europeana research filters can still be enriched!

GeoNames









A propos / Publication **Conservatoire National des Données 3D**

Lieu : Bibracte, Mont-Beuvray. Le quartier de la Côme Chaudron

8 documents - Bibracte, Mont-Beuvray. Le quartier de la Côme Chaudron

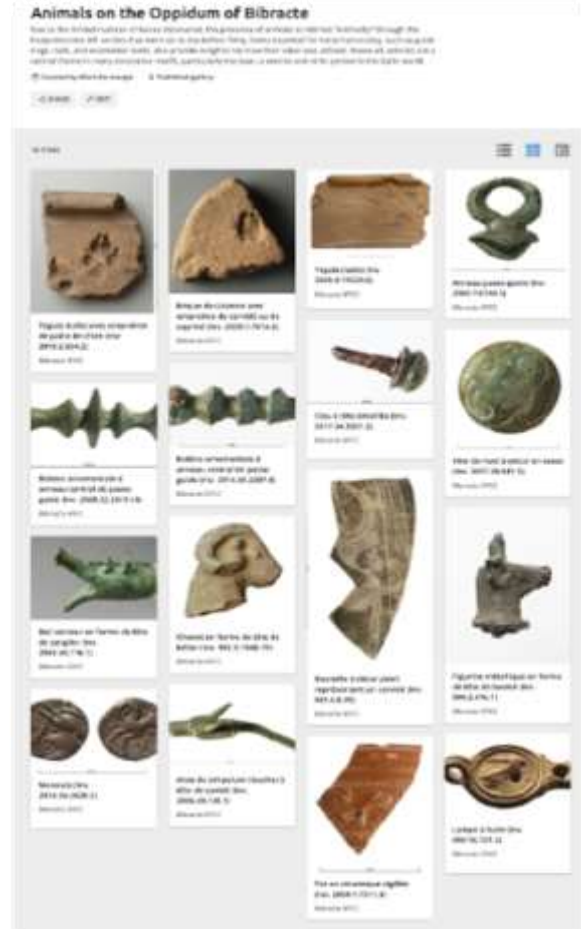
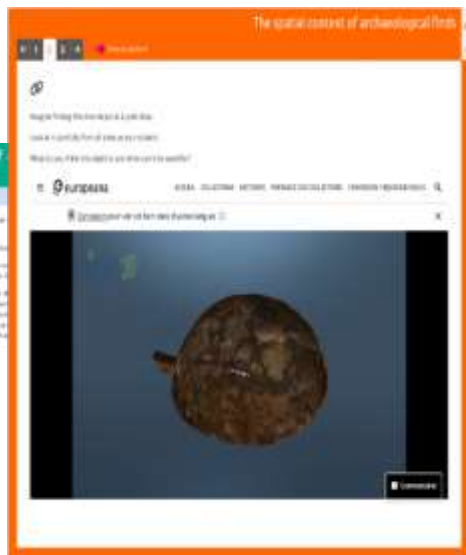
Documents affichés : 10

 <p>Style (Inv. 2000.32.2.13) (Lieu de découverte)</p>	 <p>Casque réutilisé en louche de fondeur (Inv. 2001.32.258.1) (Lieu de découverte)</p>	 <p>Coupe (Inv. 2002.32.287.1) (Lieu de découverte)</p>	 <p>Rouelle (Inv. 2004.32.1192.1) (Lieu de découverte)</p>	 <p>Marteau de forgeron (Inv. 2005.32.2006.1) (Lieu de découverte)</p>
				

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# Edition and dissemination

- Production of EUROPEANA Galleries and Stories
- Use of Europeana resources (including 3D models) for an e-learning activity on HISTORIANA platform on the theme of archaeological looting (Erasmus+ PITCHER project)



# Future Goals for Bibracte

## 1. Metadata Enrichment

- Enrich the metadata of deposited files in real-time for better data management, accessibility and discoverability, including the scientific community.

## 2. Adding New Files to Europeana

- Deposit new files to expand and diversify the available resource collection.

## 3. Machine-driven Shape Recognition

- Work on automatic shape recognition using a collection of reference 3D models, thereby improving object analysis and classification.

## 4. Utilizing Europeana Media

- Use media available in Europeana to create engaging and informative "stories," enhancing user experience and contributing to the discoverability of the digital contents.
- Promote the use of Europeana as a showcase for heritage resources (The *Friends of European Heritage* project)



Case Study

# Cyprus University of Technology

*Panayiotis Panayiotou*





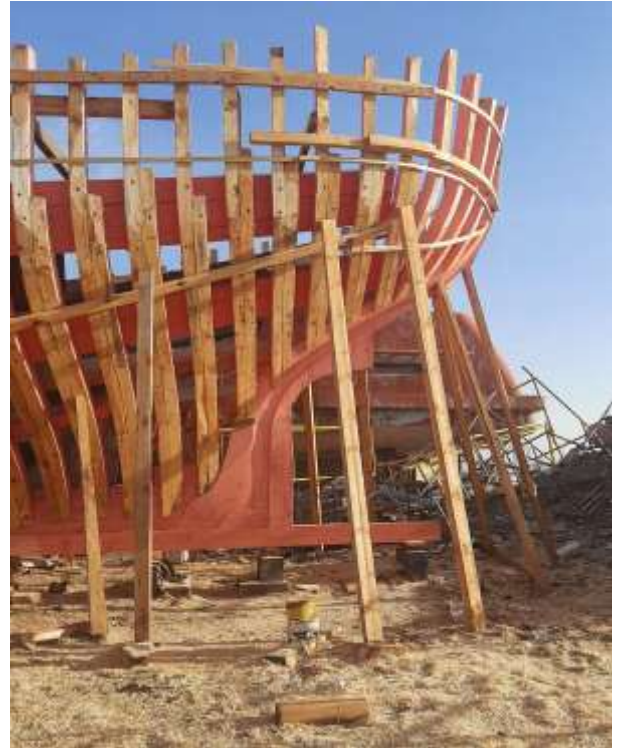
# Cyprus University of Technology

## Lambousa Fishing Trawler, 1955



The trawler in vacant condition before its restoration

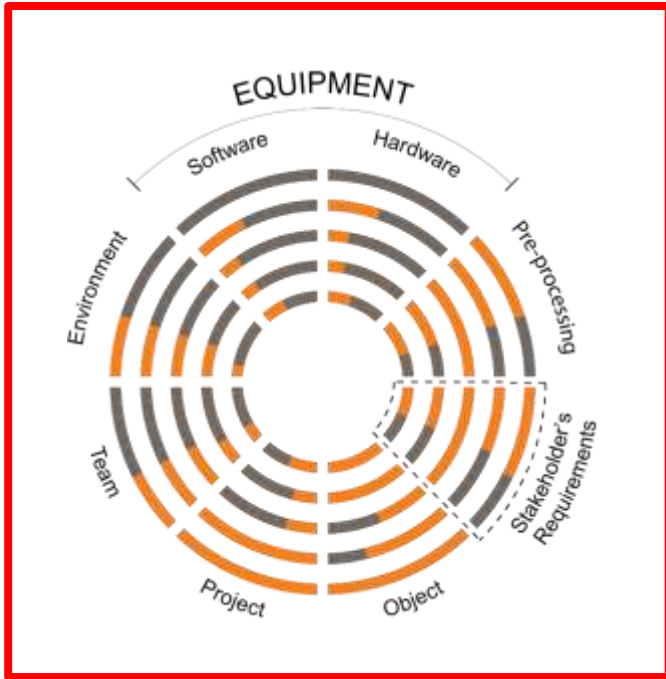
## Restoration Works



## The vessel restored

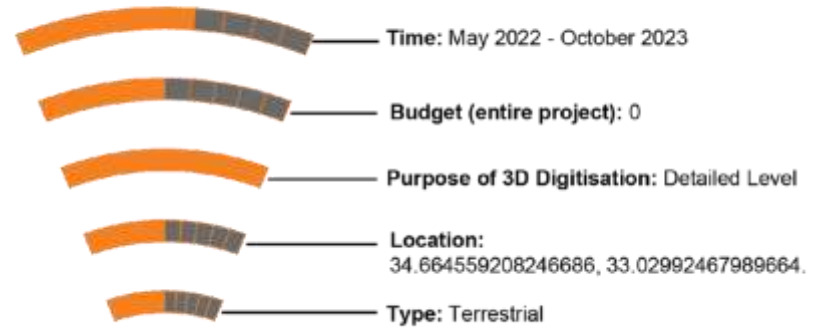


# Paradata - Stakeholder's Requirements



Complexity

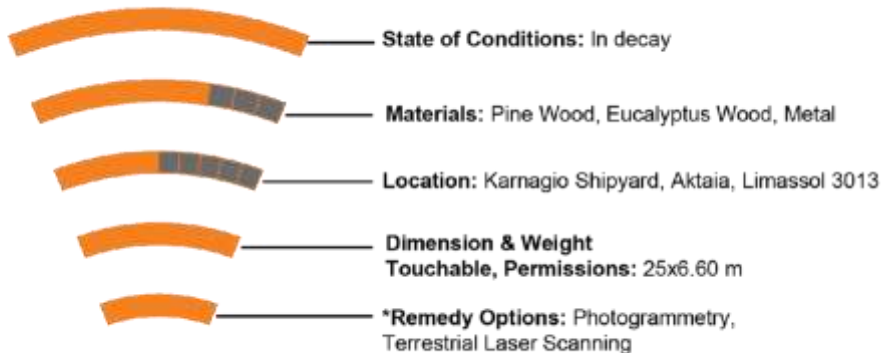
## Stakeholder's Requirements



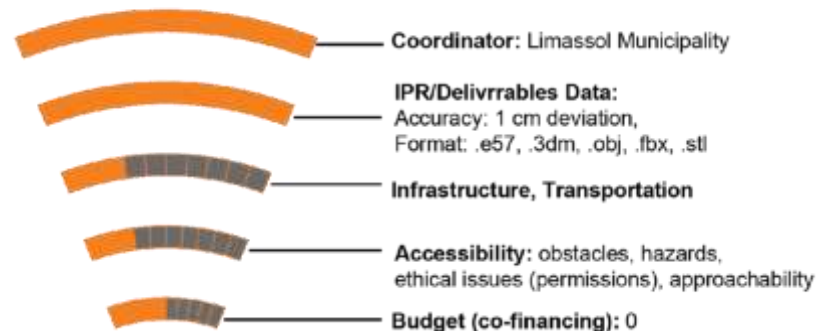


# Paradata - Object and Project

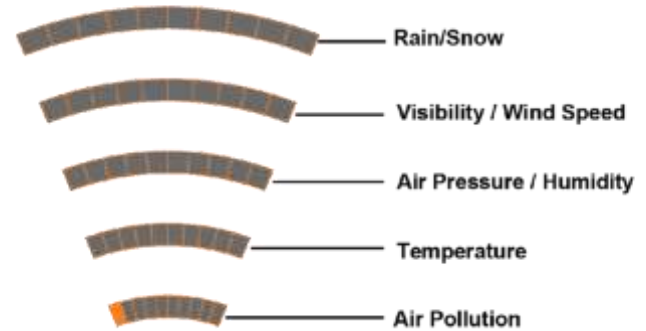
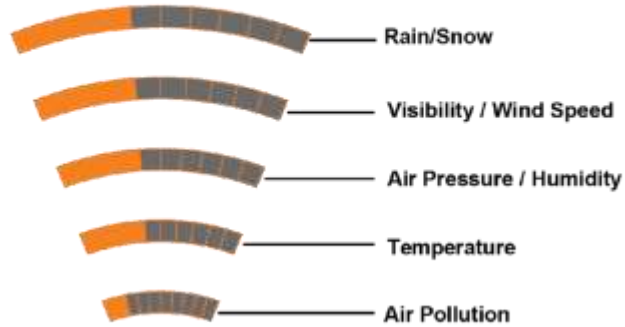
## Object



## Project



## Environment



# Paradata - Environment

## 9-13 January 2023 - UAV Survey

Meteorological Station: Cyprus, Limassol, New Port

Day	Max. Temperature (°C)	Min. Temperature (°C)	Rain (mm)
9	17.6	8.1	0.0
10	18.1	7.0	0.0
11	18.3	10.6	17.8
12	16.5	10.4	39.7
13	15.5	7.1	3.8

## 26 October 2023 - TLS Survey

Meteorological Station: Cyprus, Limassol, New Port

Max. Temperature (°C)	Min. Temperature (°C)	Rain (mm)
28.7	17.8	0.0

## Limassol Traffic Station

Pollutant	Date: 9/1/23 Time: 8:00	Date: 10/1/23 Time: 8:00	Date: 11/1/23 Time: 8:00	Date: 12/1/23 Time: 8:00	Date: 13/1/23 Time: 8:00
PM10	39.9	70	49.4	19.3	19.3
PM2.5	18.3	25.7	17.9	7.4	7.4
O3	4.4	3	13.1	46.1	46.1
NO2	80.7	85.9	81.6	40.2	40.2
SO2	4.5	7.6	3.9	1	1

## 26 October 2023 - TLS Survey

Limassol Traffic Station

Pollutant	Date: 9/1/23, Time: 8:00
PM10	39.9
PM2.5	18.3
O3	4.4
NO2	80.7
SO2	4.5

## Software and Hardware: Photogrammetry Process in vacant condition



**Hardware: Aerial and Terrestrial Photogrammetry**  
DJI Mini 3 pro  
and  
Sony A7 IV Mirrorless Camera

**Software: Reality Capture**  
**1.2.2 Tarasque**  
**Raw data**  
1100 Images  
Image Format: JPG  
Resolution of each image:  
4000 X 2250 px

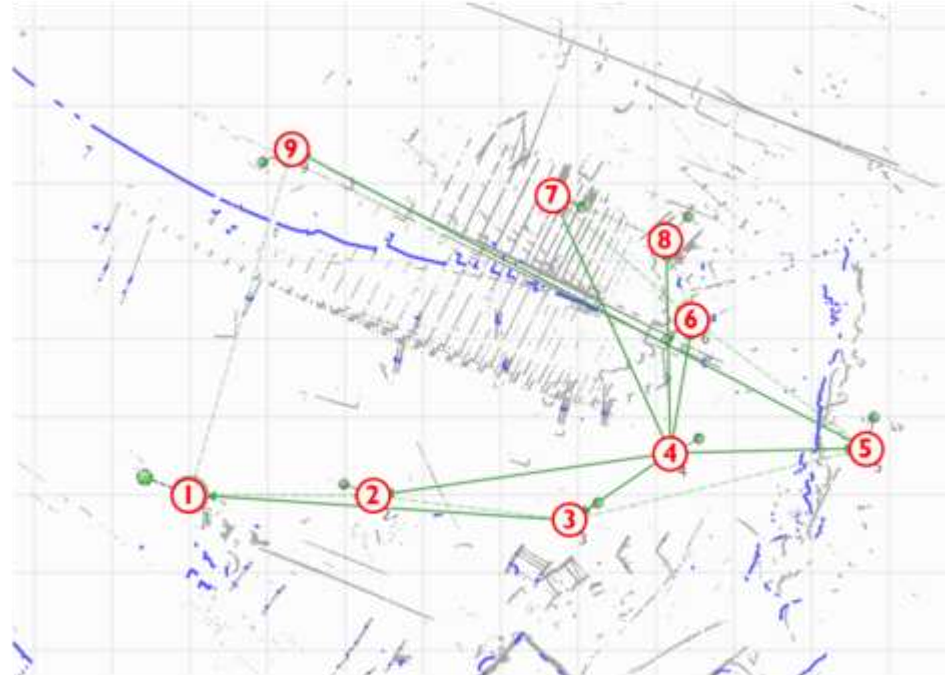


# Software and Hardware: Terrestrial Laser Scanning (TLS) Process during restoration

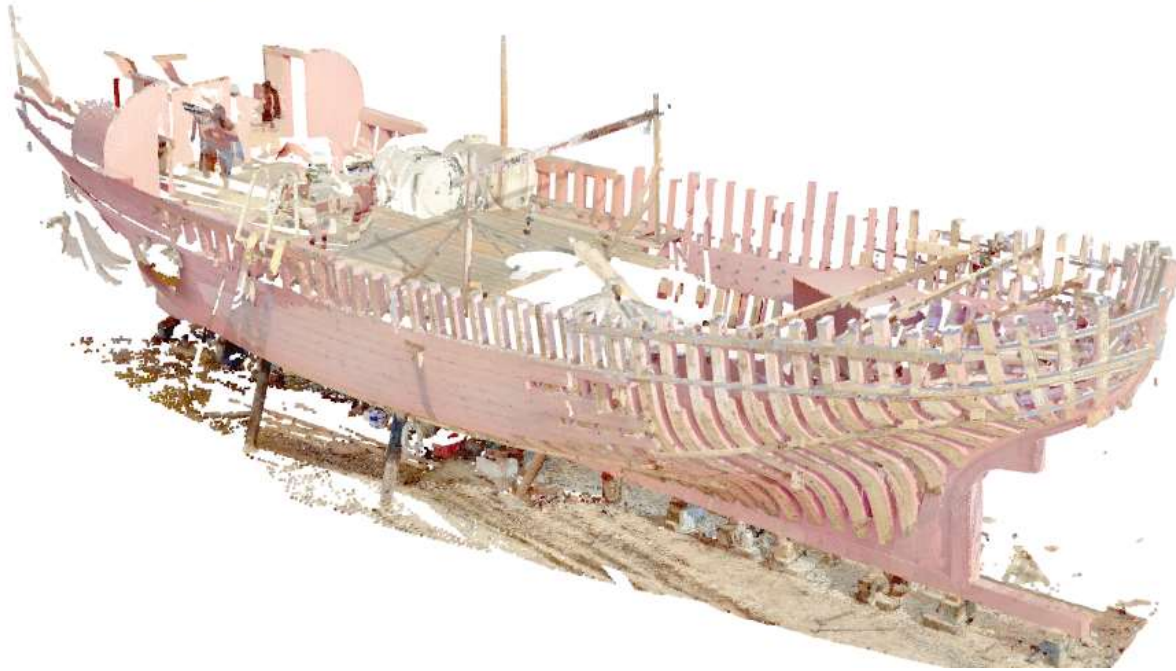


Z+F Imager 5016  
Z+F Laser Scout

High to Medium  
Resolution  
settings 6.3-  
12.6mm (10m)



## TLS Results



## TLS aligned with Photogrammetry Point Cloud



# Point Cloud Processing

**CloudCompare Software**

**Sample points on a mesh**

**Mesh geometry**

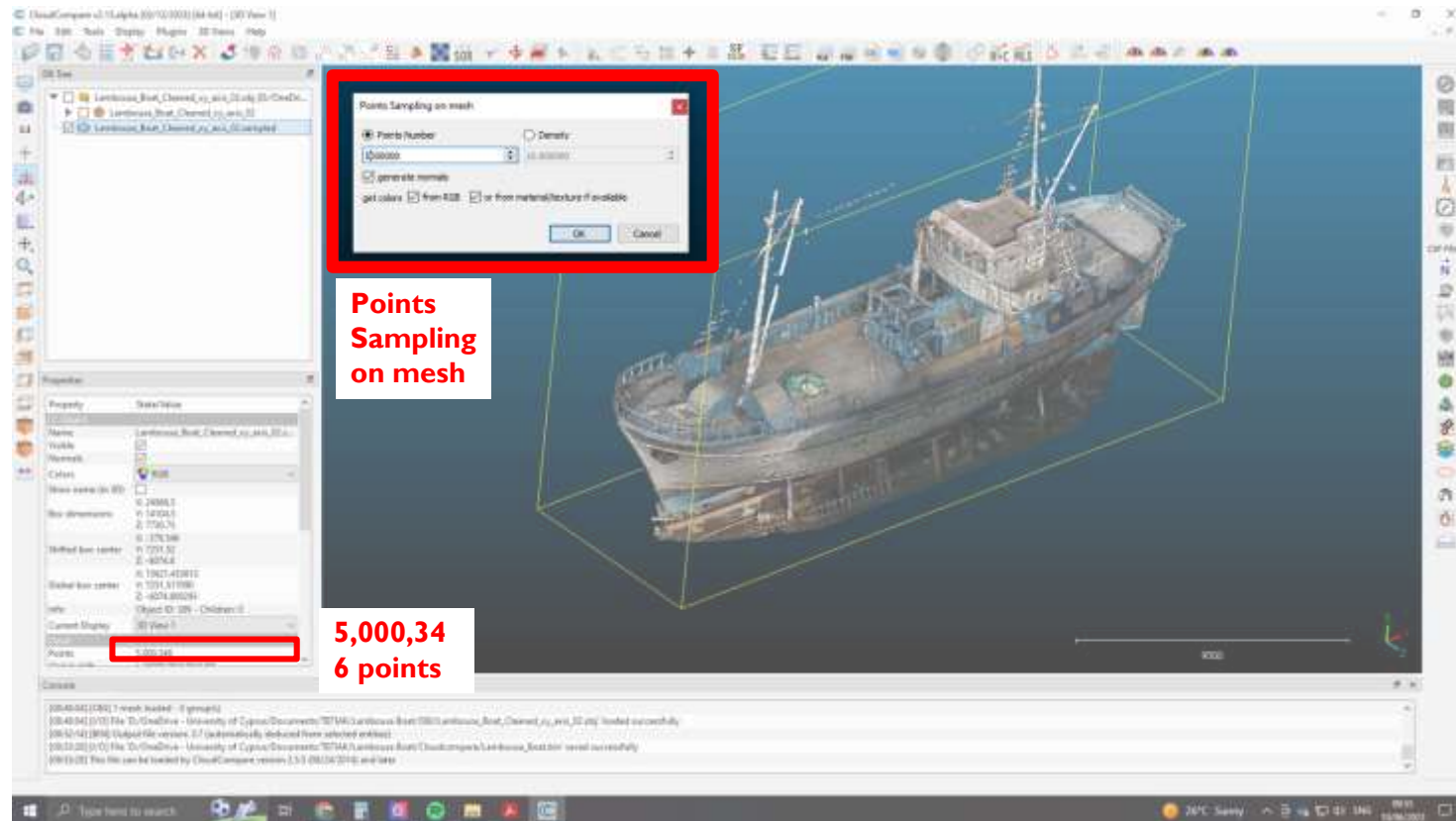
**27,363,867 faces**

**Raw mesh geometry (OBJ file) from UAV photogrammetry**

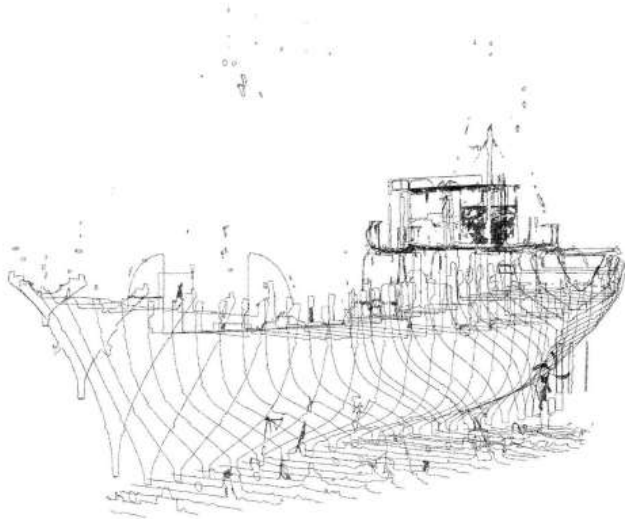
The image shows the CloudCompare software interface. The main 3D view displays a boat model with a point cloud overlay. A red box highlights the 'Sample points on a mesh' area, and another red box highlights the 'Mesh geometry' area. The 'Faces' count is 27,363,867. A red box highlights the file path: 'C:\Users\... \Documents\70744\... \Larionous\_Boat\CloudCompare\Larionous\_Boat.obj'.



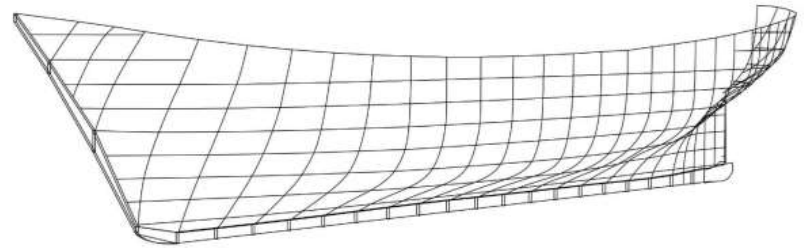
# Point Cloud Processing



## Post-Processing



Vertical Cloud Sections (in the form of 3D set of XYZ coordinates)



Waterline and Vertical NURBS of the Hull from Cloud Sections

# From Point Cloud Data to a clean 3D CAD Model



**1**  
Mesh Geometry from  
photogrammetry



**2**  
Downsampled Point  
Cloud



**3**  
3D geometry produced in Rhino  
compared to point cloud (Shaded view)



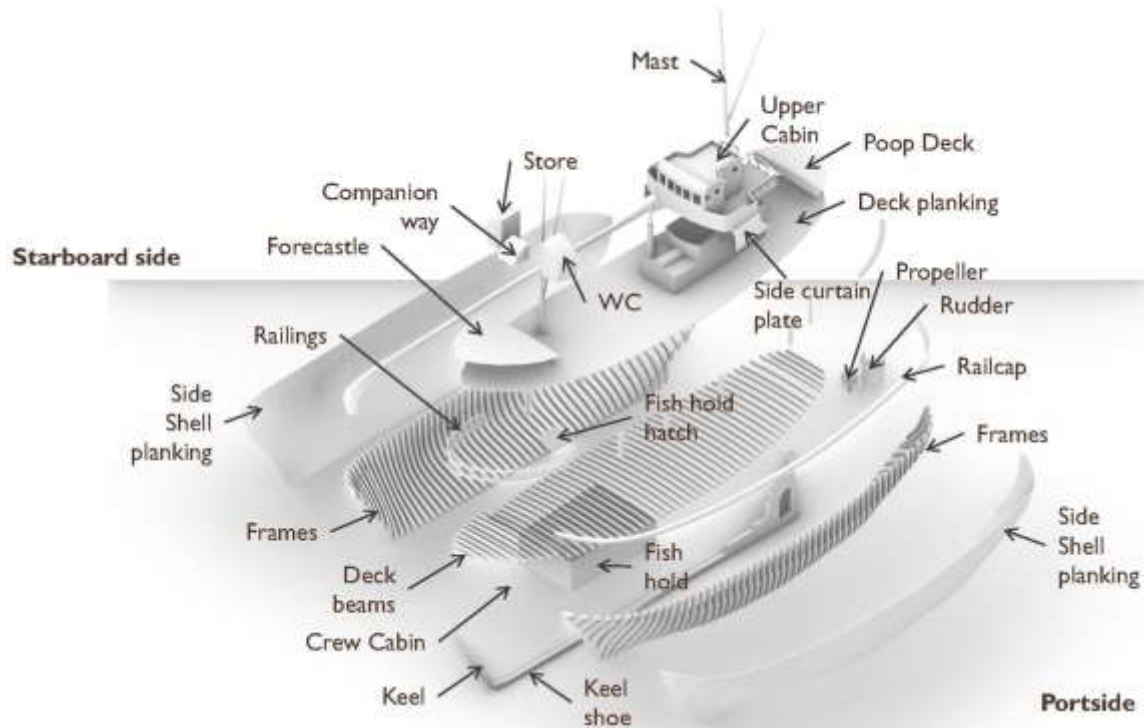
**4**  
3D geometry produced in Rhino compared  
to point cloud (Rendered view)

## 3D Data Processing Table

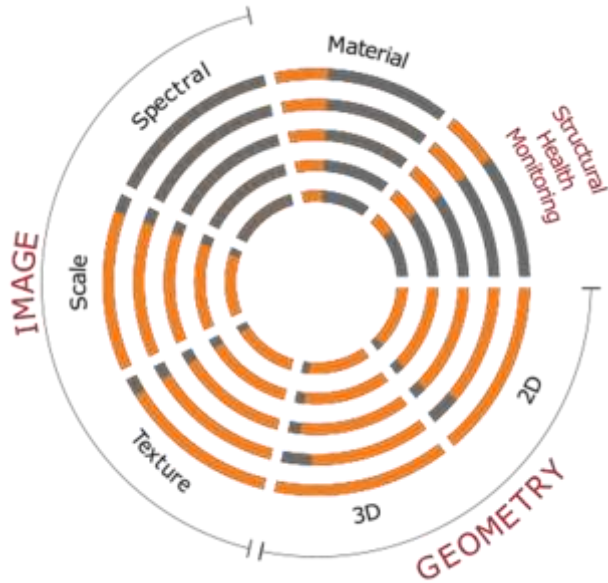
	Geometrical Survey - Raw Data		Geometrical Survey - Post-processed data		3D CAD Model - Raw Data	3D CAD Model - Post-processed data for Web
<b>Type</b>	Photogrammetry	Terrestrial Laser Scanning (TLS)	Downsampled and Aligned Photogrammetry	Downsampled and Aligned TLS		
<b>Time</b>	43 days	4 days	10 days		425 days	16 days
<b>No. of points</b>	26,039,030	54,495,372	5,000,346	14,164,403		
<b>No. of polygons</b>	30,001,378				10,078,258	1,365,772
<b>File Size</b>	6,639,738 KB	1,657,171 KB	132,435 KB	430,734 KB	1,497,417 KB	162,107 KB
<b>Format</b>	OBJ	E57	E57	E57	OBJ	GLB



## 3D NURBS Results - Exploded Axonometric with 440 elements



# Quality Chart and Materials



Quality

Materials	Type	Component
Wood	Pine Timber	Frames, Deck beams, Planking, Keel
	Oak Timber	Keel shoe
Metal	Steel	Side curtain plate, engine, mast, wire ropes, screws, nails
	Bronze	Propeller

## 3D NURBS Results - Axonometric



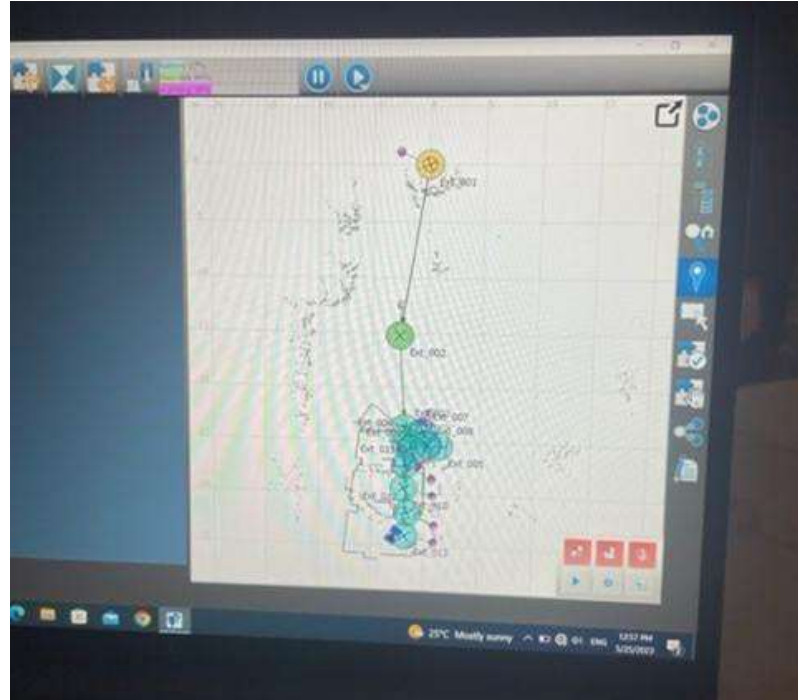
# Cyprus University of Technology

## The Church of Timios Stavros (Holy Cross), 14th Century





## Digitisation - Geometrical Survey



## Aligned Photogrammetry and TLS Point Cloud



## HBIM geometry traced over the point cloud



# HBIM Model - Site Plan



(2) Northwest View





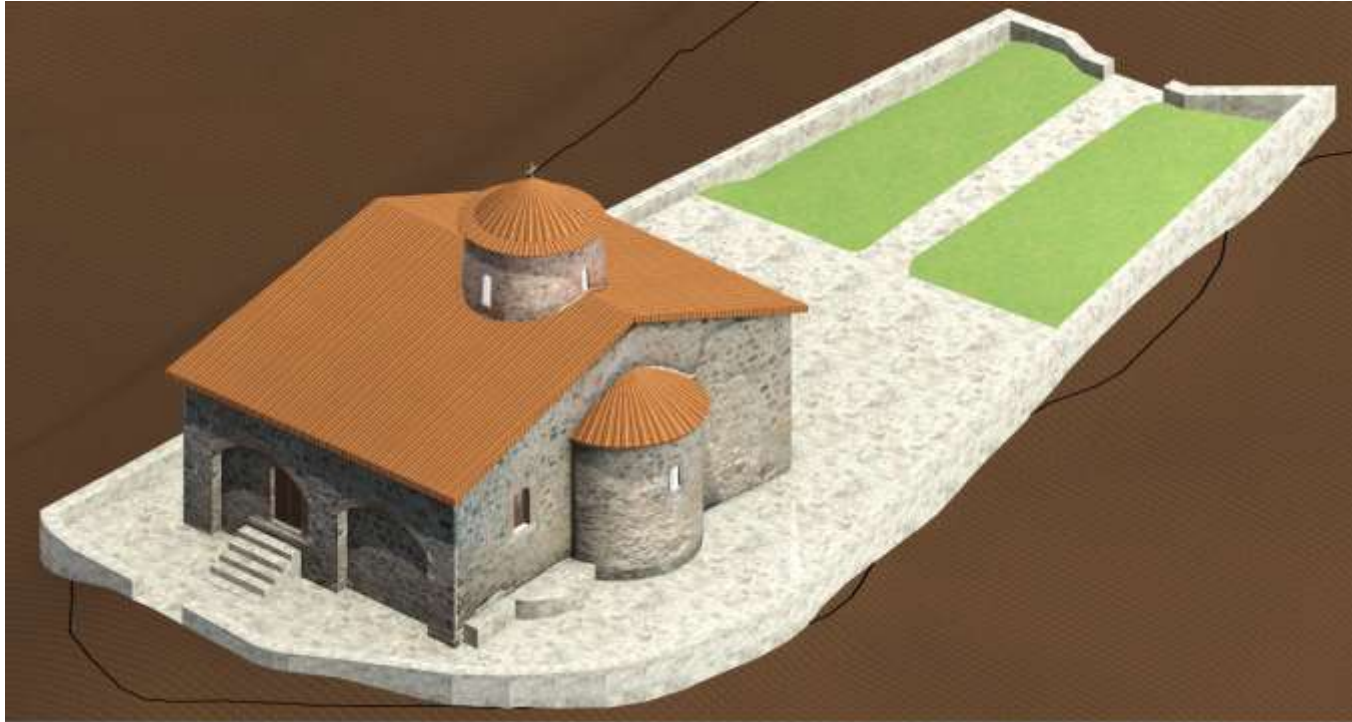
## HBIM Model - Longitudinal Section



## HBIM Model - Cross Section



## HBIM Model - Axonometric



# Cyprus University of Technology

## Panagia Chrysorrogiatissa Monastery, 1770

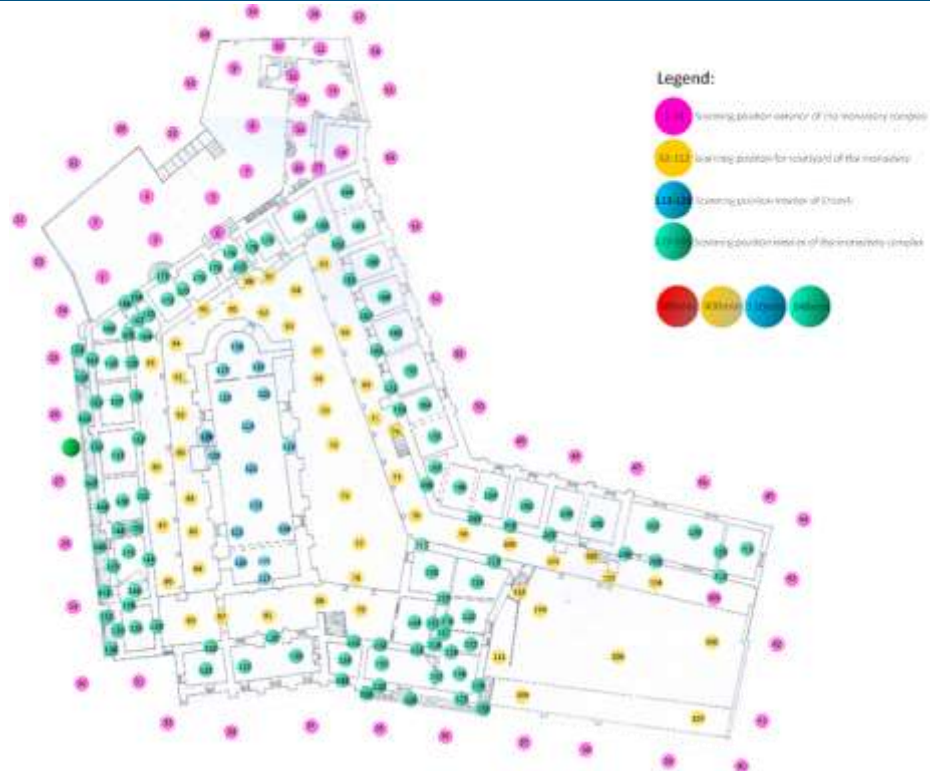


## Digitisation - Geometrical Survey





# Digitisation - Geometrical Survey, Laser Scanner Positions



## Aligned Photogrammetry with TLS Point Cloud results



## Aligned Photogrammetry with TLS Point Cloud Section



## HBIM geometry traced over the point cloud



## HBIM Model





# Cyprus University of Technology

## Cypriot Artefacts from the collection in Medelhavsmuseet, Stockholm, Sweden



Sculpture, Figurine: 700 - 475 BC



Miniature, Ingot: 1450 - 1200 BC

# The Cypriot Artefacts in Europeana

## SHM 17946:0097 :: Sculpture, Figurine

Mould-made. Flat back. Oval face, Prominent nose. Arms along sides. Wearing veil which falls down on the sides and back of the head.

Within the framework of collaboration between Världskulturmuseerna and the UNESCO Chair on Digital Cultural Heritage at Cyprus University of Technology, the digitization of a substantial portion of the Cypriot collection at Stockholm's Medelhavsmuseet Museum has been accomplished.

[Show less](#)

This item is provided and maintained by [The Museum of Mediterranean and Near Eastern Antiquities](#)

[View on the providing institution's website](#)

Good to know [All metadata](#)

Subject	Ceramics
Type of item	Figurines : Figurine
Medium	ceramic (material) : Ceramic
Providing institution	The Museum of Mediterranean and Near Eastern Antiquities
Aggregator	PHOTOCONSORTIUM
Intermediate provider	UNESCO Chair on Digital Cultural Heritage
Rights statement for the media in this item (unless otherwise specified)	<a href="http://creativecommons.org/licenses/by-sa/4.0/">http://creativecommons.org/licenses/by-sa/4.0/</a>
Creation date	CA. 1-II. (700-475 BC)



# The Cypriot Artefacts in Europeana

## MM Acc 0072 :: Miniature, Ingot

Oxhide-shaped ingot. Concave sides; four handles.

Within the framework of collaboration between Världskulturmuseerna and the UNESCO Chair on Digital Cultural Heritage at Cyprus University of Technology, the digitization of a substantial portion of the Cypriot collection at Stockholm's Medelhavsmuseet Museum has been accomplished.

This item is provided and maintained by [The Museum of Mediterranean and Near Eastern Antiquities](#)

[View on the providing institution's website](#) 



Good to know [All metadata](#)

Subject	Miniature Ingot
Type of item	ingot : Ingot
Medium	metal : Metal
Providing institution	The Museum of Mediterranean and Near Eastern Antiquities
Aggregator	PHOTOCONSORTIUM
Intermediate provider	UNESCO Chair on Digital Cultural Heritage
Rights statement for the media in this item (unless otherwise specified)	<a href="http://creativecommons.org/licenses/by-sa/4.0/">http://creativecommons.org/licenses/by-sa/4.0/</a>
Creation date	L.C. II. (1450-1200 BC)
Identifier	<a href="http://hdl.handle.net/21.15123/v1/W0048">http://hdl.handle.net/21.15123/v1/W0048</a>



Case Study

CRDI - Ajuntament de Girona

*David Iglésias Franch*



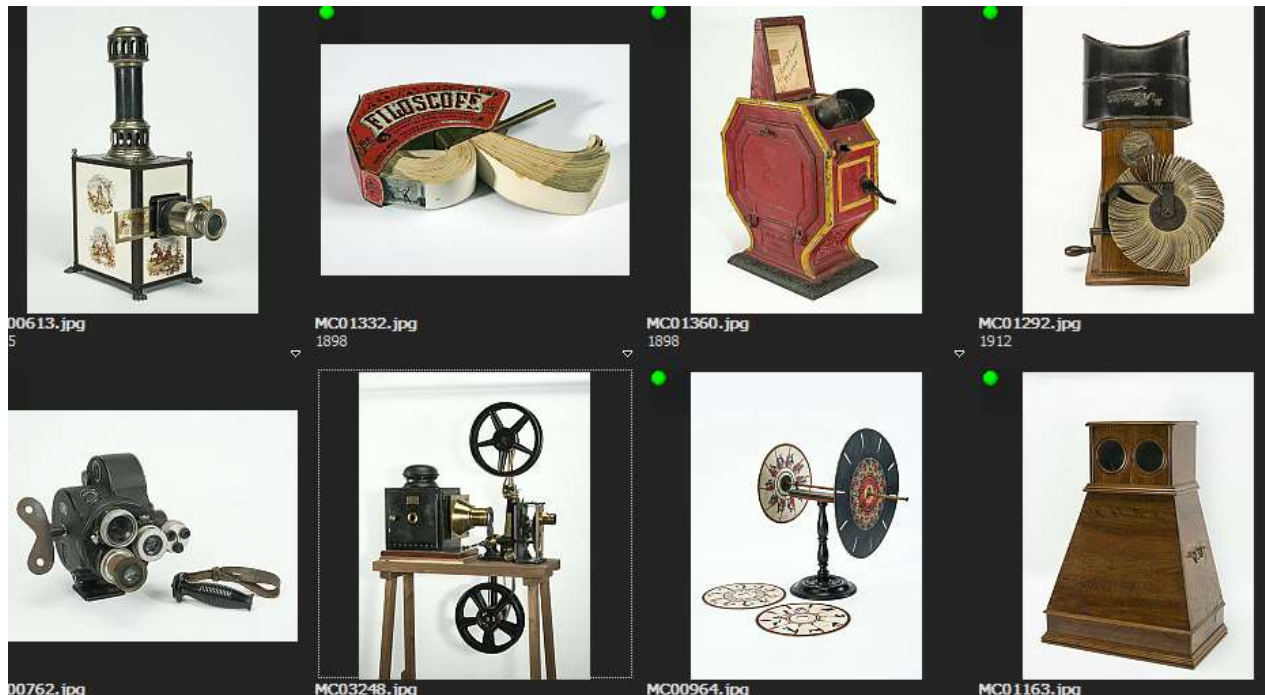
# CRDI Ajuntament de Girona

## Cinema Museum Collection





# Visual culture



## 50 objects from Cinema Museum Collection

- image projection
- capturing
- viewing
- image animation
- optical illusions
- visual tricks
- *amateur* cinema
- ...

## Why 3D digitisation

### Archive is primarily a space for preservation and custody

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- it is also a space for **discovery, knowledge, experimentation, and creation**
- 3D digitisation, allows the representation of volumetric elements to provide a faithful representation for **analysis, research, and entertainment**



- ✓ **Achieving high-quality digital reproduction.** It requires skilled professionals, a working methodology, the ability to analyse the complexity of the objects to be reproduced, and criteria to assess the results.
- ✓ **Making the content accessible,** which requires not only well-documented objects, but also a specific infrastructure.
- ✓ **Preserving the 3D objects.** It requires the adoption of file formats, and paradata.

## Preparatory works Call for tender

- ✓ **Externalize digitisation.** Call for tender
- ✓ Technical requirements written at [Study on Quality in 3D Digitisation of Tangible Cultural Heritage \(VIGIE 2020/654\)](#)
- ✓ The tender was awarded to **La Tempesta Media**. It is a comprehensive digital services company that creates, designs, and develops digital mediation and new media tools for cultural heritage, knowledge, and content-based organizations and their communities.



# Complexity

## Study of the materials composing the objects

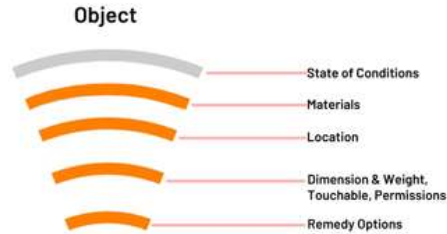
✓ For **wood**: colour, grain, fibre, and texture, with a classification to distinguish between coniferous and leafy types, along with information on finishes.


✓ For **metals**: magnetic or not, the type (iron, steel, copper alloy, etc.), and information on finishes.

✓ For **paper and cardboard**:

...

✓ For **glass**: ...



SHADOW THEATER WITH BAND				
Title: " Fête des Sports " Maker: Attributed to <u>Saussure</u> , Publishers Place: France Chronology: ca. 1920 Registration: 01247 Catalog page: 23				
				
WOOD				
Description	classification	finish (coating)		
Color → Light yellow Vein → not differentiated Fiber → straight Grain → medium	conifer <input type="checkbox"/> leafy <input type="checkbox"/>	Structure: - Frame lined with glued paper. - Dark varnish crossbar.  These mechanisms are not addressed.		
Observations				
Roll mechanism axis and structure.				
METAL				
Magnet test	classification	finish (coating)		
Magnetic <input checked="" type="checkbox"/> 1	Iron/Steel <input checked="" type="checkbox"/> 1			
Non-magnetic <input checked="" type="checkbox"/> 2	Copper alloy <input checked="" type="checkbox"/> 2 Other alloy <input type="checkbox"/>			
Observations				
1. Tooling of the roll mechanism. 2. Electric cable				
PAPER/CARDBOARD				
Description	classification	finish (coating)		
handmade <input type="checkbox"/> industrial <input checked="" type="checkbox"/>	Plastered <input checked="" type="checkbox"/> 4 Carbonic <input type="checkbox"/> Vegetable <input checked="" type="checkbox"/> 3 Drawing <input type="checkbox"/>	Newsprint <input type="checkbox"/> Cardboard <input checked="" type="checkbox"/> 5 photosensitive <input type="checkbox"/>	C. imprint C. Protection polychromy printed manual	3 4 5 Yes Yes Yes Yes
Observations				
3. Roll: scenes printed in black ink. 4. Bonded paper: blue seriate with gold corner and border with seriate flower ribbon. Manual polychrome. 5. Cardboard (thickness 2mm): probably drawing with charcoal and painted with glazes on top. Finally varnished.				
GLASS				
classification	quantity	Observations		
lens <input type="checkbox"/>				
Mirror <input type="checkbox"/>				
Simple glass <input type="checkbox"/>				
OTHERS				
Electrical cord fabric cordage, Bakelite plug.				



## Capturing process

### PHOTOGRAMMETRY TECHNIQUE

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- ✓ Equip the camera with a polarizing filter to minimize light **reflections**.
- ✓ Set appropriate **illumination** for the object.
- ✓ Adjust the manual **camera settings**
- ✓ Place the **scale bar** next to the object for use in digitally scaling the model later.
- ✓ Take photos of the object from all angles, ensuring at least **66% overlap** between consecutive images.
- ✓ For large and highly detailed objects, use the focus **stacking technique**



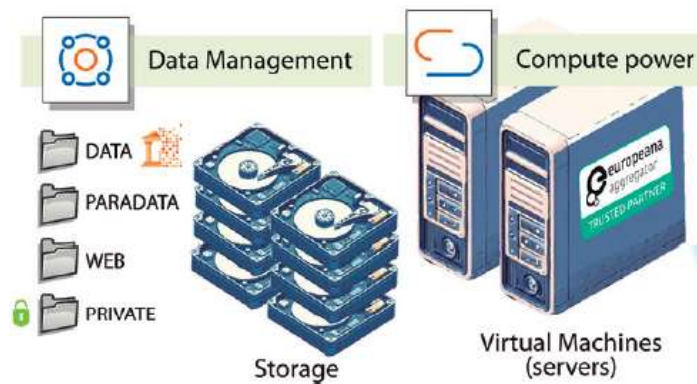
## PHOTGRAMETRY TECHNIQUE

- ✓ Import the RAW image data
- ✓ Convert the colour checker image containing the colour scale into DNG format,
- ✓ Develop the RAW images into JPEG.
- ✓ Process the focus stacking images in Adobe Photoshop.
- ✓ Align the images, build the mesh, and apply the textures (Agisoft Metashape file).
- ✓ Export to the RAW 3D model, called “Master.”, OBJ format.
- ✓ Create the “Low resolution” model, also OBJ.
- ✓ Add PBR material (lens or glass). Export the in GLB format.
- ✓ Video rendering, using Blender. MP4 file.



# Storage

1,5 Tb (46,182 files)



Graphic by Ignacio Lamata (EGI Foundation)

The screenshot shows the Eureka3D data management interface. The left sidebar contains navigation options: Overview, Files, Shared, Open Data, Transfers, Datasets, Archives, Providers, and Members. The main area displays a search bar and a list of files provided by 'pig-cyfronet-02'. The file list is as follows:

Files	Size
CameraObscura_02122	106 MiB
Daguerreotype_044161	90.9 MiB
Daguerreotype_044162	49 MiB
Daguerreotype_044163	42.9 MiB

## XML – EDM (RDF)

## Art and Architecture Thesaurus

Source: <http://vocab.getty.edu/aat/>

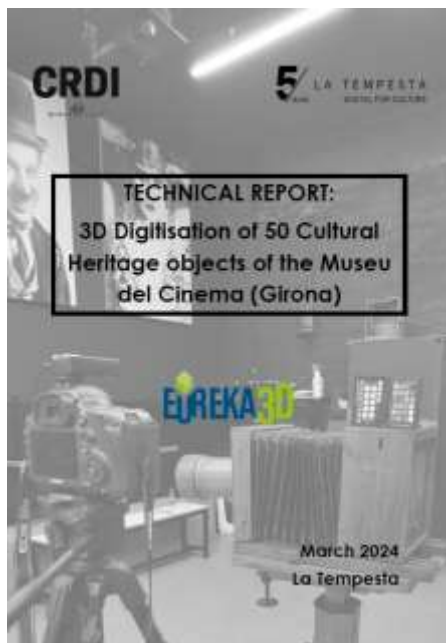
```

</Concept>
- <Concept>
  <Term><b>Objectes</b></Term>
</Concept>
- <Concept>
  <Term><b>Llanternes màgiques</b></Term>
  <URL><a href="http://vocab.getty.edu/aat/300211124">http://vocab.getty.edu/aat/300211124</a></URL>
</Concept>
- <Concept>
  <Term/>
</Concept>
</Subject_Concept_Temes_>
<Organismes/>
<Llocs/>
<Llocs_de_Girona/>
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<Link_Metadata><a href="https://sgdap.girona.cat/lotoweb/archives/5002-Fotografia/FOTOGRAFIA/Col-leccio_MuseuCinema/Eureka3D/MC00613.jpg">https://sgdap.girona.cat/lotoweb/archives/5002-Fotografia/FOTOGRAFIA/Col-leccio_MuseuCinema/Eureka3D/MC00613.jpg</a> info
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<CC><a href="http://creativecommons.org/publicdomain/mark/1.0/">http://creativecommons.org/publicdomain/mark/1.0/</a></CC>
<Description><b>Magic lantern for 5 cm wide plates for domestic use. Includes and oil lamp for the illumination. It has a ceramic body and beautiful illustrations of children playing, and it's an example of the preponderance of design over the technical quality of the projection. Lanterns of this type, which today are very scarce and highly sought after by collectors, were sold in seven different sizes and three models of finishes. They were characterised by not having a clear mark embedded in the body of the device, which is why the manufacture was initially attributed to the Nuremberg company Johann Falk, but recent research has discovered that it was patented in 1903 by David Benda, from the German city of Fürth. Some of the lanterns, such as the one in the photograph, have an additional mark: "Patented in USA". Simon Hamburger, of New York, also registered the patent in the United States in 1903 on behalf of the company Hamburger & Co. It is likely, therefore, that some of these lanterns manufactured in Germany were exported to the United States.</b></Description>
<Descripcio_detallada><b>Magic lantern for domestic use, with a ceramic body and beautiful illustrations of children playing, is an example of the preponderance of design over the technical quality of the projection. Lanterns of this type, which today are very scarce and highly sought after by collectors, were sold in seven different sizes and three models of finishes. They were characterised by not having a clear mark embedded in the body of the device, which is why the manufacture was initially attributed to the Nuremberg company Johann Falk, but recent research has discovered that it was patented in 1903 by David Benda, from the German city of Fürth. Some of the lanterns, such as the one in the photograph, have an additional mark: "Patented in USA". Simon Hamburger, of New York, also registered the patent in the United States in 1903 on behalf of the company Hamburger & Co. It is likely, therefore, that some of these lanterns manufactured in Germany were exported to the United States.</b></Descripcio_detallada>
<Related_works/>
- <Photografic_practice>
  - <Concept>
    <Term><b>Col·lecció Museu del Cinema - Tomàs Mallol</b></Term>
  </Concept>
</Photografic_practice>
</Item>
<item>
  <_Reg_General><b>MC00762</b></_Reg_General>
  <Subclasse>
    - <Concept>

```

WOOD	
mahogany ( wood )	<a href="http://vocab.getty.edu/page/aat/300012221">http://vocab.getty.edu/page/aat/300012221</a>
chestnut ( wood )	<a href="http://vocab.getty.edu/page/aat/300012039">http://vocab.getty.edu/page/aat/300012039</a>
color ( perceived attribute )	<a href="http://vocab.getty.edu/page/aat/300056130">http://vocab.getty.edu/page/aat/300056130</a>
coniferophyta ( division )	<a href="http://vocab.getty.edu/page/aat/300265702">http://vocab.getty.edu/page/aat/300265702</a>
plant fiber	<a href="http://vocab.getty.edu/page/aat/300014031">http://vocab.getty.edu/page/aat/300014031</a>
Angiospermae (division)	<a href="http://vocab.getty.edu/page/aat/300265706">http://vocab.getty.edu/page/aat/300265706</a>
wood (plant material)	<a href="http://vocab.getty.edu/page/aat/300011914">http://vocab.getty.edu/page/aat/300011914</a>
grain ( structure )	<a href="http://vocab.getty.edu/page/aat/300219467">http://vocab.getty.edu/page/aat/300219467</a>
coarse-grain material	<a href="http://vocab.getty.edu/page/aat/300014650">http://vocab.getty.edu/page/aat/300014650</a>
fine-grain material	<a href="http://vocab.getty.edu/page/aat/300014645">http://vocab.getty.edu/page/aat/300014645</a>
medium-grain material	<a href="http://vocab.getty.edu/page/aat/300014648">http://vocab.getty.edu/page/aat/300014648</a>
laminated	<a href="http://vocab.getty.edu/page/aat/300250554">http://vocab.getty.edu/page/aat/300250554</a>
marquetry ( process or technique )	<a href="http://vocab.getty.edu/page/aat/300053853">http://vocab.getty.edu/page/aat/300053853</a>
walnut ( wood )	<a href="http://vocab.getty.edu/page/aat/300012476">http://vocab.getty.edu/page/aat/300012476</a>
pine	<a href="http://vocab.getty.edu/page/aat/300012620">http://vocab.getty.edu/page/aat/300012620</a>
dendrochronology	<a href="http://vocab.getty.edu/page/aat/300054715">http://vocab.getty.edu/page/aat/300054715</a>

## From a technical report to a standardised Paradata Report



### Report on Paradata

Project: Toy projector  
Project Reference Number in Metadata: 04702  
Date of Digitization: March 2024  
Digitization by: La Tempesta Media  
Owner: Museu del Cinema (Girona)  
Stakeholder: Museu del Cinema (Girona)

#### Binding

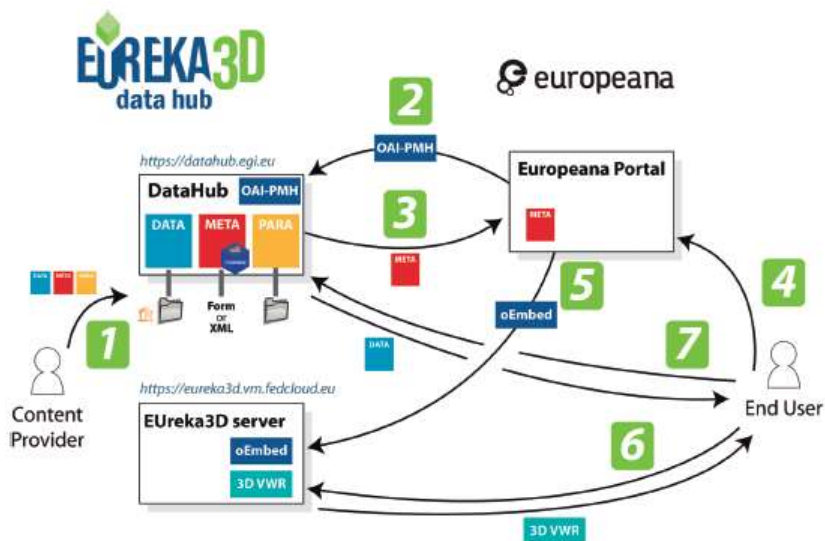
The project consisted in the 3D digitization of 50 items of the Colleccion Tempesta Media of the Museu del Cinema using digital photogrammetry. As outlined in the requirements, after taking as main technical reference the IFLA 2020/2019 Final Study Report, the research premises of refining and transparent materials (such as metals, glasses, and resins) implied the lack of reconstructing the mesh and features in the postprocessing phase, so the final dissemination publishing model has the most accurate appearance and material behaviour as possible. To overcome these difficulties and challenges, La Tempesta had to design an accurate workflow and workflows, and select specific equipment.

Reference images of the object: 04702





## From Datahub to Europeana



Public Domain

SHARE

### Aubert, buddha

Lantern for glass plates of maximum width 11 cm. A rare example of a magic lantern for family use. It depicts a polychromed Chinese Mandarin (red, gold, black), with a flue in the form of a wavy cap crowned with a golden crescent. It is the first three-piece version made by the French house Aubert of this lantern model. The manufacturer and metalworker, Louis Aubert opened his business in Paris in...

# CONCLUSION

## Lessons learnt from CRDI experience in 3D digitisation

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**1. Scientific Approach to 3D Digitisation**



**2. Understanding of the heritage objects**



**3. Reusability of 3D Digital Objects**

Case Study

# Museo della Carta

## *Massimiliano Bini*



# Museo della Carta di Pescia - Italy

The 3D Digitisation of two Watermarked Paper Moulds and the 2D Digitisation of the documents of Magnani Historical Archive



The Pescia Paper Museum holds a rich heritage of paper goods consisting of watermarked paper moulds, watermark waxes, punches, watermarked metal sheets, for a total of about 7 thousand pieces. These goods, which became part of the Museum's collections thanks to a private donation, document the relationships that the 'Antiche Cartiere Magnani di Pescia' had with companies, famous people, banks, insurance companies, foreign states in over three centuries of activity from the mid-eighteenth century to the 2000s.

# Museo della Carta di Pescia - Italy

## The 3D Digitisation of two Watermarked Paper Moulds and the 2D Digitisation of the documents of Magnani Historical Archive

In 2008, in agreement with the superintendency of Florence and the Central Institute for the Catalog and Documentation of Rome, we started a pilot project, the first in Italy, for the inventory and cataloging of these goods, with the experimentation of the PST Card. This was followed by in-depth study projects on some of these goods, in particular the watermarked paper moulds, which today constitute the first part of our online catalog.





# Museo della Carta di Pescia - Italy

The 3D Digitisation of two Watermarked Paper Moulds and the 2D Digitisation of the documents of Magnani Historical Archive



The watermarked paper moulds are very special objects and were used in the past to produce handmade watermarked paper, as we still do today in the Pescia Paper Museum which is located in a completely intact and original eighteenth-century paper mill. The moulds are made of a wooden frame and a metal sheet on which the watermark was sewn with silvered copper wire.

# Museo della Carta di Pescia - Italy

## The 3D Digitisation of two Watermarked Paper Moulds and the 2D Digitisation of the documents of Magnani Historical Archive

The Pescia Paper Museum was the first, as mentioned, to have inventoried and catalogued these assets, but had never before created 3D models of its collections and therefore had no previous experience to use. The Eureka 3D project was therefore an experimental path for us that allowed us to create two 3D models of two watermarked paper moulds and in this way allowed the Pescia Paper Museum to acquire skills and evaluate all the positive aspects of digital models.



# Museo della Carta di Pescia - Italy

The 3D Digitisation of two Watermarked Paper Moulds and the 2D Digitisation of the documents of Magnani Historical Archive



The Pescia Paper Museum also received as a gift the Historical Archive of the Magnani Paper Mills of Pescia, which was placed under constraint by the superintendence in 1979. The documents are now located inside the Museum in a wing of the Le Carte Paper Mill built specifically for this purpose.

It is one of the most important Italian company archives and is made up of approximately 700 linear meters of documentation.



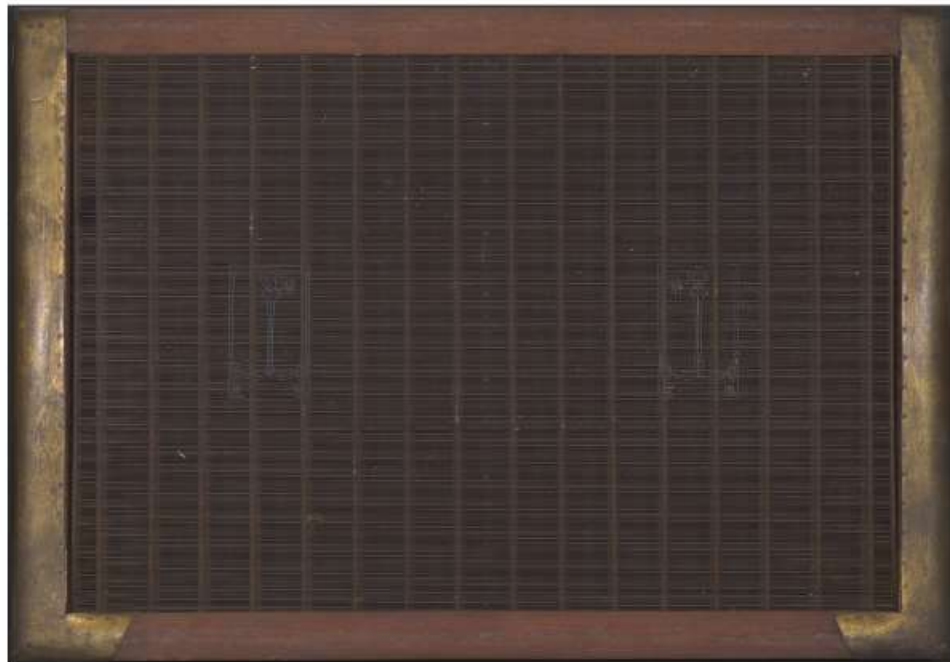
## The 3D Digitisation of two Watermarked Paper Moulds

The choice fell on the watermarked paper mould with the images of Napoleon and Maria Luisa of Austria, made in 1812, and the watermarked paper mould with the image of an anchor and the letters “E” and “S”, made specifically for Ettore Serra in 1923 and which was used to create paper for the first edition of *Porto Sepolto* by Giuseppe Ungaretti.



# Museo della Carta di Pescia - Italy

## The 3D Digitisation of two Watermarked Paper Moulds





## The 3D Digitisation of two Watermarked Paper Moulds



We proceeded with the digitization of the two paper moulds through photogrammetric shooting, for which a photographic set was set up consisting of light boxes of suitable size, equipped with supports and rotating plates, lighting systems and digital cameras.

# Museo della Carta di Pescia - Italy

## The 3D Digitisation of two Watermarked Paper Moulds: from the museum website to the Europeana portal

La Carta La Carte | Archivio Donica Magnani | Carta Magnani Pescia



Visita Le Collezioni Eventi Contatti Impresa Amica

DONA 5X1.000

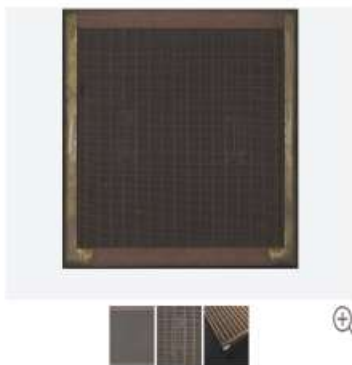
## Ettore Serra

1923

La forma da carta presenta su entrambe le metà della tela la filigrana con un'ancora stilizzata, affiancata, in basso, dalle lettere "E" e "S". Si tratta delle iniziali di Ettore Serra (1890-1960), poeta, critico, antiquario, nonché esperto in recuperi subacquei, intellettuale poliedrico e cosmopolita, fondatore, nel 1923, nella natia La Spezia, della Stamperia Apuana. Proprio qui, nello stesso anno, vide la luce la seconda, accresciuta, edizione della raccolta di poesie di Giuseppe Ungaretti *Il Porto sepolto* (prima edizione: 1916), stampata a Livorno da Belforte & C, su carta appositamente fabbricata dalle cartiere Magnani utilizzando la coppia di forme conservate presso il Museo.

Con una tiratura di 500 esemplari, l'edizione curata dal Serra costituisce una delle più raffinate del Novecento italiano, impreziosita dalle xilografie di Francesco Gamba e con una introduzione di Benito Mussolini, conosciuto da Ungaretti nel 1915.

Essendo ciascun esemplare fregiato da una dedica personalizzata, se ne rileva un elenco di nomi formidabile, testimonianza del milieu culturale internazionale e di altissimo livello cui Ungaretti volle rivolgersi (tra gli altri, Carrà, Breton, Viani, De Chirico, Soffici, Apollinaire).



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Condividi in stampa

CONDIVIDI

Ettore Serra

Feedback

# Museo della Carta di Pescia - Italy

## The documents of the Magnani Historical Archive



The digitization activity involved a very high quality digital copy of historical documentation, through the production of 4,000 files from archive papers and was acquired exclusively with a planetary scanner. Regarding the optical resolution, three images of different formats were created for each digitized page.

## The documents of the Magnani Historical Archive

In particular:

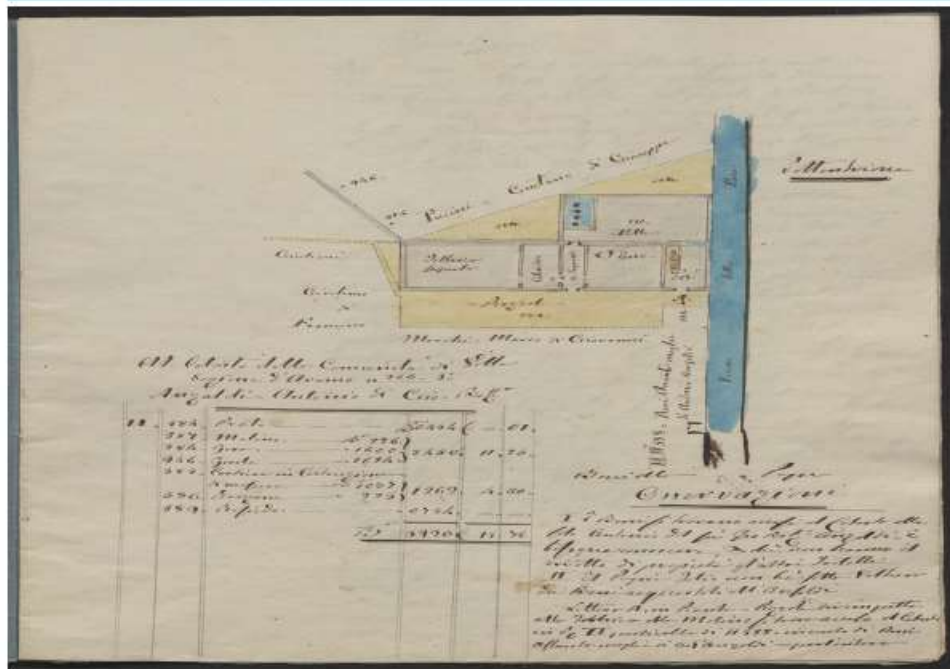
- Tiff 6.0, with a resolution of 400 optical dpi, color depth 24 bit RGB -> Image intended for digital preservation;
- High resolution compressed JPEG (300 dpi or as indicated) and color depth 24 bit RGB;
- Low resolution compressed JPEG (150 dpi or as indicated) and color depth 24 bit RGB.





# Museo della Carta di Pescia - Italy

## The documents of the Magnani Historical Archive



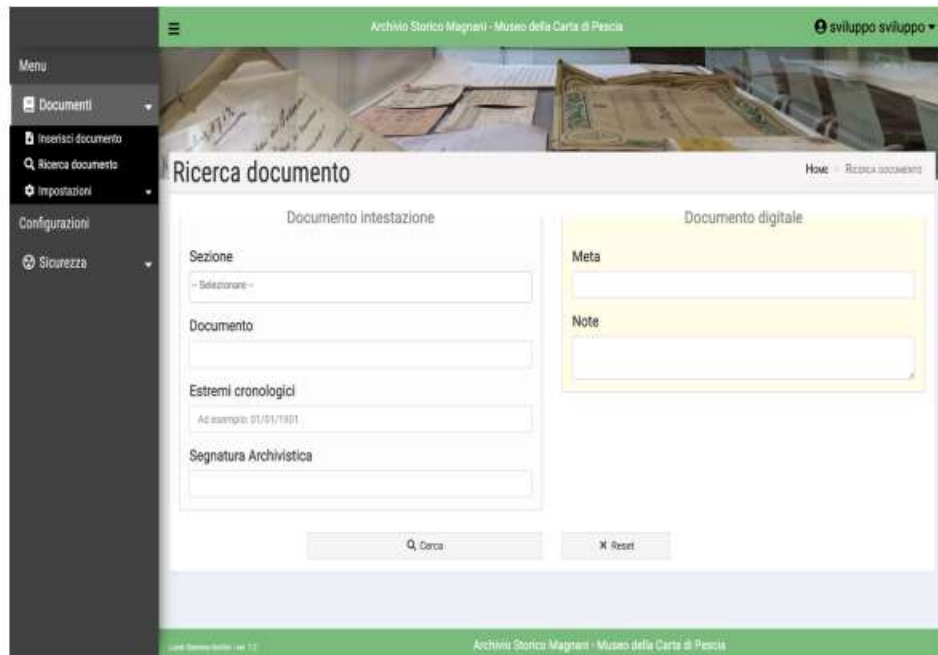
The digitization activity was carried out respecting, both in the equipment and in the procedure, the quality standards required for the preservation of the paper originals.



# Museo della Carta di Pescia - Italy

## The documents of the Magnani Historical Archive

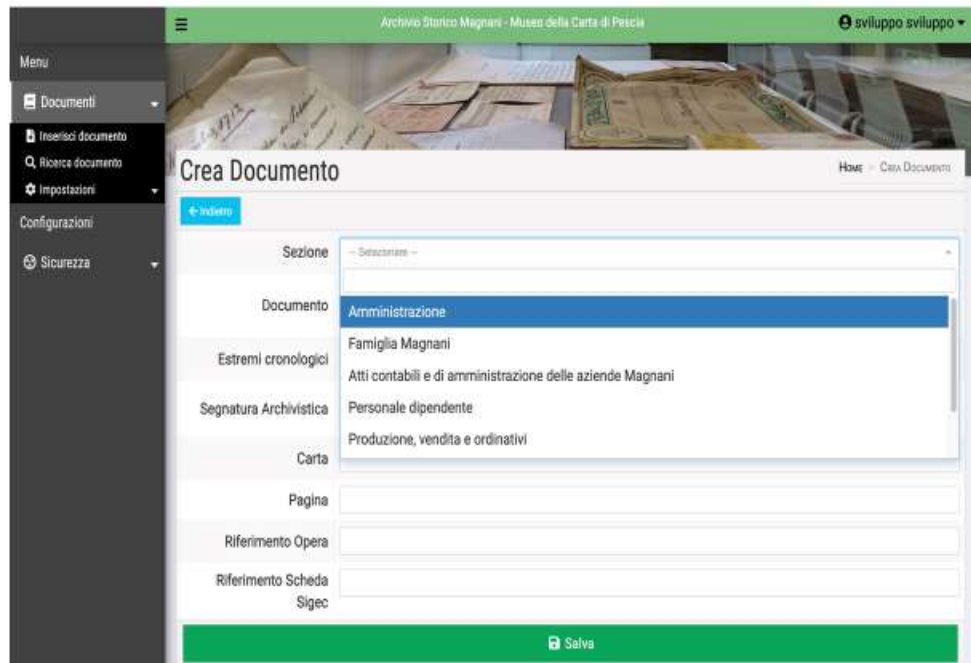
The Pescia Paper Museum has created with public and private funds a specific platform for remote consultation of the documentation that was developed in the years 2022-23 by the company Lunet di Lucense.



The screenshot shows a web application interface for the Magnani Historical Archive. The top navigation bar is green and contains the text "Archivio Storico Magnani - Museo della Carta di Pescia" and a user profile icon labeled "sviluppo sviluppo". A dark grey sidebar on the left contains a "Menu" section with options: "Documenti", "Inserisci documento", "Ricerca documento", "Impostazioni", "Configurazioni", and "Sicurezza". The main content area is titled "Ricerca documento" and features a search form. The form is divided into two columns: "Documento intestazione" and "Documento digitale". The "Documento intestazione" column includes fields for "Sezione" (with a dropdown menu), "Documento", "Estremi cronologici" (with an example "01/01/1981"), and "Segnatura Archivistica". The "Documento digitale" column includes fields for "Meta" and "Note". At the bottom of the form are "Cerca" and "Reset" buttons. The footer of the page is green and contains the text "Archivio Storico Magnani - Museo della Carta di Pescia".

# Museo della Carta di Pescia - Italy

## The documents of the Magnani Historical Archive



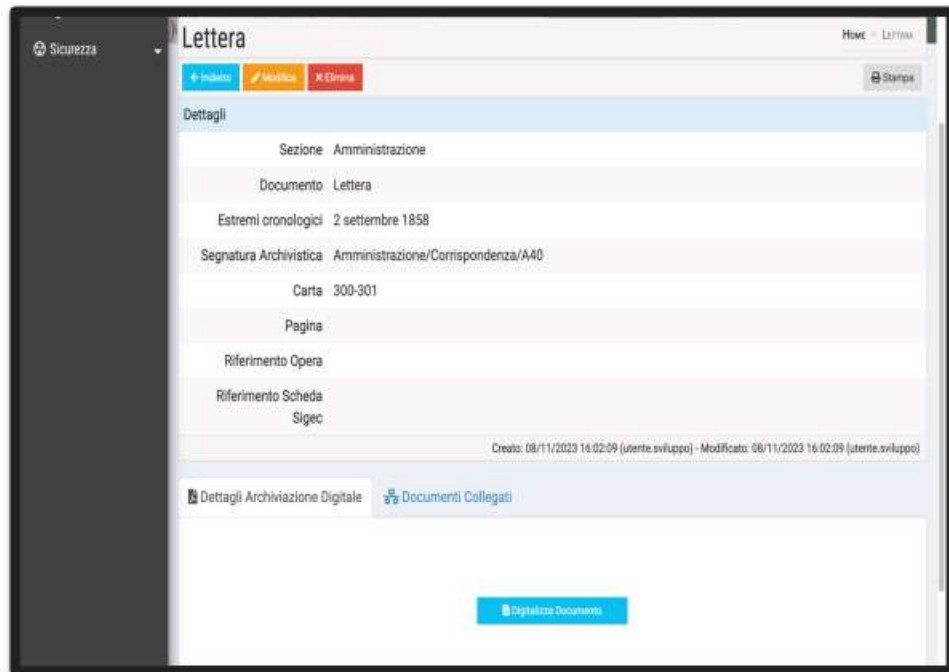
The screenshot shows a web interface for creating a document. The header is green and contains the text 'Archivio Storico Magnani - Museo della Carta di Pescia' and a 'sviluppo sviluppo' dropdown. A dark sidebar on the left contains a 'Menu' section with options: 'Documenti', 'Inserisci documento', 'Ricerca documento', 'Impostazioni', 'Configurazioni', and 'Sicurezza'. The main content area is titled 'Crea Documento' and features a 'Indietro' button. The form includes several fields: 'Sezione' (dropdown menu), 'Documento' (dropdown menu with 'Amministrazione' selected), 'Estremi cronologici' (text input with 'Famiglia Magnani' and 'Atti contabili e di amministrazione delle aziende Magnani'), 'Segnatura Archivistica' (text input with 'Personale dipendente'), 'Carta' (text input with 'Produzione, vendita e ordinativi'), 'Pagina' (text input), 'Riferimento Opera' (text input), and 'Riferimento Scheda Sigec' (text input). A green 'Salva' button is at the bottom.

From a more careful analysis of the platform, in relation to the needs of transferring to Europeana and the needs of interoperability with the SAN (National Archive System) of the Italian Ministry of Culture, the need to make significant changes to the platform itself also emerged.

# Museo della Carta di Pescia - Italy

## The documents of the Magnani Historical Archive

Thanks to other public and private funds it was possible to review and update our platform following the indications given by the support of Europeana and by the officials of the Italian Ministry of Culture, and thus obtain full interoperability of our system.





# Museo della Carta di Pescia - Italy

## The documents of the Magnani Historical Archive: from the museum platform to Europeana

The screenshot shows the Europeana search results for the collection '1011\_Museo della Carta di Pescia'. The page displays 5,286 results. The top row shows five document thumbnails, each with a caption: 'Documento dell'Archivio Storico della cartiera Magnani di Pescia'. The captions also include the status 'sconosciuto' and the source 'Museo della Carta di Pescia'. The interface includes the Europeana logo, navigation links (HOME, COLLEZIONI, STORIE, CONDIVIDI), and search filters.

A virtuous path therefore that has allowed, on the basis of significant funding from the European Commission, to activate further collaborations and find other forms of funding so as to obtain the best possible result.





# Museo della Carta di Pescia - Italy

## Goals achieved by the Eureka3D project



- sharing an innovative experience
- 3D models of watermarked paper moulds created for the first time
- international visibility of the museum's collections
- dissemination of museum cultural heritage thanks to the European platform

# Museo della Carta di Pescia - Italy

## CONCLUSION



A short video created thanks to Eureka3D allows us to better explain the results obtained from the project.

Many thanks  
for your attention!



www.eureka3d.eu



YouTube



valentina.bachi@photoconsortium.net



@EUREKA\_3D



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