

3D Digitisation of the Collections of the Museum of the First Piasts at Lednica

A SMARTTECH service delivery case study



The Museum of the First Piasts at Lednica and a panoramic view of Ostrów Lednicki.

Forty-nine archaeological artefacts were digitally recorded in 3D, capturing their shape and faithful colour. The models created by SMARTTECH3D were used in the permanent exhibition “The Mysteries of Poland’s Origins - Ostrów Lednicki” and made available in the museum’s online collection. The project shows how 3D documentation can support both the study of collections and their presentation to the public.

The museum’s needs

The project “Digitisation and Access to the Most Valuable Archaeological Resources of the Museum of the First Piasts at Lednica” covered a selection of 49 artefacts. Its aim was to record information about the objects and broaden access to the collection associated with Ostrów Lednicki and the surrounding area.

In its project materials, the museum notes that even with ongoing conservation care, artefacts remain vulnerable to damage during research access, examination and loans. Three-dimensional documentation enables work with digital representations whenever renewed access to the original is unnecessary. It also makes an object’s form accessible beyond the researcher’s study and the museum display case.

Diverse objects and documentation requirements

The selection included swords, inlaid spearheads and stirrups, a nasal helmet, precious-metal objects, religious artefacts and wooden items, including scoops, a bucket and a trough. Documenting such a collection requires the capture of both complex three-dimensional forms and small surface details.

One example is an ivory liturgical comb, dated by the museum to the second half of the 10th to the first half of the 11th century. Its two sides have different ornamental compositions. Documentation combining geometry and colour conveys the three-dimensional character of the decoration and the surface appearance, both important for describing and interpreting the object.



Liturgical comb

RELIGIOUS ARTEFACTS

CATALOGUE NO.
MPPL-MPP-A-5-289_63

Object: **liturgical comb**
Maker: **unknown**
Material: **ivory**
Technique: **cutting, carving**
Place of production: **unknown**
Date: **2nd half of 10th - 1st half of 11th c.**



Ivory liturgical comb in the museum's digital collection. One side of the model.

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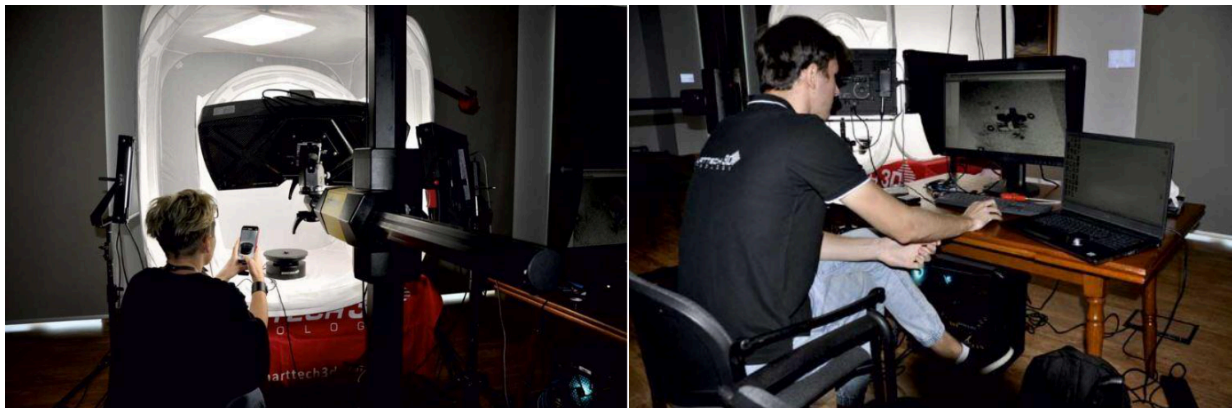


The same comb model viewed from the other side. The different ornament is visible without handling the original.

Recording shape and faithful colour

SMARTTECH scanned all 49 objects covered by the service using a MICRON3D color optical scanner, which captures both geometry and colour. The resulting 3D models combine information about the artefacts' spatial form with a faithful record of their colour.

Non-contact optical measurement does not require a measuring probe to touch the artefact's surface. The scope of the documentation is equally important to the museum: geometry records the object's form and proportions, while colour captures its appearance at the time of digitisation. Both types of information support the subsequent presentation of the collection.



The SMARTTECH team digitising artefacts at the museum.

The collection beyond the exhibition gallery

Another outcome is the website eksponaty.lednicamuzeum.pl. Object records combine the presentation of 3D models with catalogue information, including material, dating, dimensions, findspot, condition and distinguishing features. Users therefore receive a digital representation together with the context needed to understand it.

Wooden bucket

EVERYDAY OBJECTS

CATALOGUE NO.
MPPL-MPP-A-35-45_85

Object: **wooden bucket**
Maker: **unknown**
Material: **pine wood, iron**
Technique: **stave construction, cutting, forging, grinding**
Place of production: **unknown**
Date: **2nd half of 10th - 1st half of 11th c.**

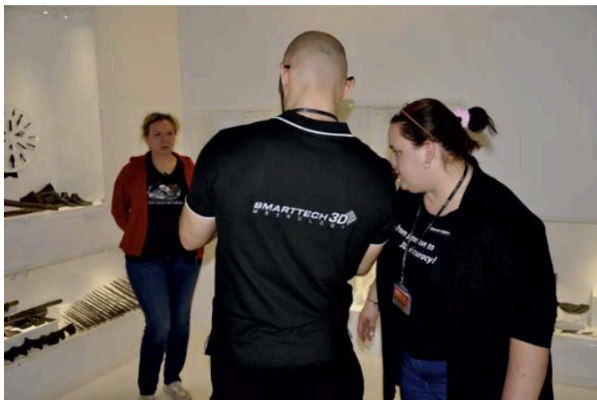


Wooden bucket in the online collection of the Museum of the First Piasts at Lednica.

This form of access allows visitors to revisit the collection after their visit, prepare lessons and explore objects before a research visit. It also broadens access for people who cannot travel to the museum.

A documentary on digitisation and the use of 3D models

The service also included a documentary showing both the artefact scanning process and the museum's various uses of the resulting 3D models. The film offers a behind-the-scenes view of documenting the collection and shows how digital representations enrich the presentation of archaeological heritage. It is also an excellent invitation to visit this modern museum, where original artefacts and contemporary technology together bring the story of Poland's origins to life.



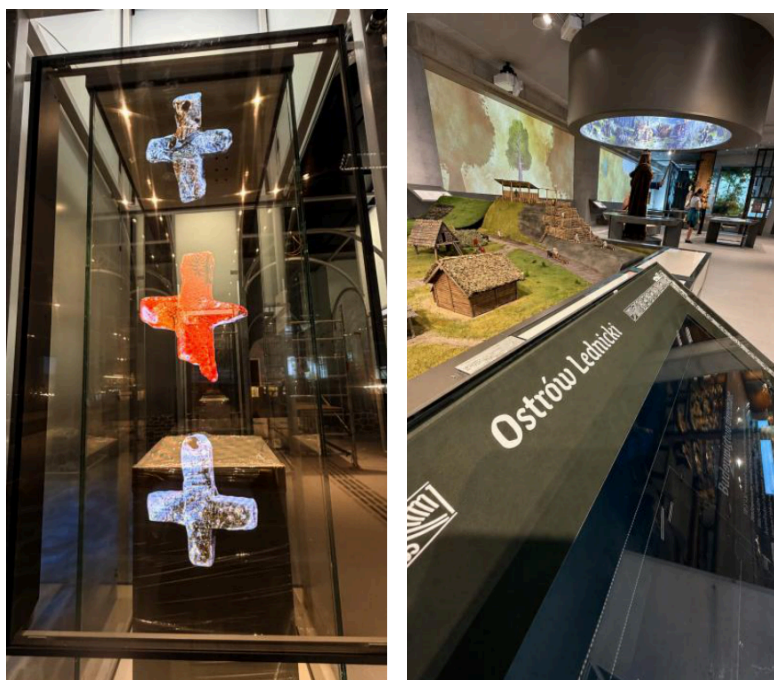
Filming the documentary (left); watch the finished film: <https://www.youtube.com/watch?v=ixAIEzW5hDM&t=257s>

Digitisation results in the permanent exhibition

The models produced as part of the service were used in the permanent exhibition “The Mysteries of Poland’s Origins - Ostrów Lednicki”, which opened on 28 August 2026 at the museum in Dziekanowice. Digital documentation thus became part of making the collection accessible and interpreting it for visitors.

According to the museum, the exhibition covers around 1,000 m² and includes more than a thousand original artefacts, alongside reconstructions, dioramas and multimedia. Incorporating the 3D models from this project into the exhibition demonstrates the service’s practical value: measurement data became part of the narrative of the beginnings of the Polish state.

For museum professionals, this means that the same documentation can be reused in different forms of presentation. For visitors, a digital representation provides an additional way to explore an artefact, complementing the original object and its description.



Left: digital models of cross pendants presented in the permanent exhibition. Right: a view of “The Mysteries of Poland’s Origins - Ostrów Lednicki”.

Documentation for future work with the collections

The models are already used to present the collection in the permanent exhibition and online. The resulting data also provide a basis for further museum activities, depending on the documentation's scope, technical parameters and the institution's needs.

For archaeologists, 3D models can support comparisons of form, analysis of proportions and the creation of cross-sections. Working with shared digital data facilitates consultation between specialists at different institutions and allows some analyses to be prepared without handling the original again. It does not replace material analysis or direct examination where these are necessary.

For conservators, documentation of geometry and surface appearance can record an object's condition at a particular moment. Assessing later changes requires comparable measurements and consideration of their accuracy. In exhibitions and education, the models can also support new presentations, teaching materials and, following suitable preparation, physical replicas.

The value of the service to the museum

The project for the Museum of the First Piasts at Lednica combined documentation of a selected collection with its actual public use. Digital representations of 49 artefacts were used in the exhibition and online collection, while the museum gained data it can return to for future tasks.

The key benefit is the ability to use information about the objects' shape and colour in different contexts, from collections work to narratives for visitors. The value of digitisation lies both in the quality of the representation and in how its results are used in the institution's everyday work.

Museum resources

The 3D artefact collection

Project photographs and presentation

Reopening of the museum and the new permanent exhibition

The project was delivered under the Ministry of Culture and National Heritage's Digital Culture programme, with financial support from the regional government of Wielkopolska.

Prepared by SMARTTECH Sp. z o.o. based on materials provided by the museum.

More about the technology and service provider: www.smarttech3d.com