Report from the Swedish Presidency Europeana Conference

Accelerating 3D in the common European data space for cultural heritage: Why 3D matters

Revision	*Version 1.0*
Last updated	*17 May 2023*
Author(s)	*Shadi Ardalan* *The Swedish Presidency Europeana Conference Team*
Contributor(s)	
Dissemination Level	*Public*
Estimated reading time	*40 minutes on average reading speed*

Table of Content

Executive summary

This report presents findings and outcomes of the discussions from the Europeana Conference *'Accelerating 3D in the common European data space for cultural heritage: Why 3D matters'*[1] under the Swedish Presidency on 18 April 2023. This hybrid conference was made possible thanks to the Swedish Ministry of Culture and the Swedish National Heritage Board[2]. It was held under the auspices of the Swedish Presidency, and hosted by the Museum of Ethnography[3] in Stockholm.

A renewed focus on digital skills (as a top priority) and an accelerated twin digital green transition were among the digital priorities of the Swedish Presidency in the first half of 2023. The digital ambitions and priorities of the Swedish Presidency[4] aimed to move forward two major pieces of EU legislation on digital - AI and Data Acts that support innovation, and a Cyber Resilience Act.

The Europeana conference involved 322 online participants and 60 onsite attendees from 50 countries across the sector. The event brought together policymakers from European ministries of culture, the CEDCHE Expert Group[5], representatives of the European Commission, experts in 3D and professionals from cultural heritage institutions. The conference aimed to contribute to a greater understanding of the EU ambition for 3D, and why it is relevant to the sector and cultural heritage institutions. It intended to stimulate reflection and dialogue around 3D content in the common European data space for cultural heritage and the sector – the needs, the key challenges, the aspirations and the collective efforts that are needed. The conference looked at some of the aspects of the European Commission's Recommendation[6] of November 2021 on a

---

1 https://pro.europeana.eu/event/the-europeana-conference-under-the-swedish-presidency-of-the-council-of-the-eu

2 https://www.raa.se/in-english/swedish-national-heritage-board/

3 https://www.etnografiskamuseet.se/

4 https://swedish-presidency.consilium.europa.eu/

5 https://digital-strategy.ec.europa.eu/en/news/expert-group-common-european-data-space-cultural-heritage

6 https://digital-strategy.ec.europa.eu/en/news/commission-proposes-common-european-data-space-cultural-heritage

common European data space for cultural heritage related to 3D. The Recommendation encourages Member States to digitise in 3D all buildings, monuments and sites deemed at risk, and 50% of the most physically visited monuments and heritage sites, by 2030. The speakers discussed the process of 3D digitisation and documentation

As part of its work at the heart of the data space, the Europeana Initiative, alongside its partners, aims to contribute to a significant and sustained increase of high quality, usable and accessible data in the common European data space for cultural heritage, with a focus on 3D content. To that end, the Europeana Initiative will work with the cultural heritage sector to determine high-value 3D data, and to support its availability through the data space.

Meeting the Recommendations' targets for 3D will not be an easy task for the Member States. All actors and stakeholders need to work collaboratively towards these targets. It requires the entire sector to be motivated, invested and active.

With this aim in mind, the conference shed light on some of the important aspects, needs and challenges ahead:

- Why 3D matters and is relevant to the cultural heritage sector
- Diversity of 3D content
- Support mechanisms and instruments
- Data space supporting projects on 3D
- 3D complementing the merits of other technologies
- 3D targets for 2030: a collective ambition and responsibility
- The need for:
    - A shared understanding of 3D objectives, standards and harmonised rules to direct, optimise and guide efforts for 3D digitisation, storage, accessibility and long term preservation
    - Motivation of cultural heritage institutions
    - Collaboration among stakeholders and actors
    - Standards and frameworks
    - Shared understanding of what constitutes heritage at risk
    - Policies on 3D digitisation, access and storage
    - Technology and infrastructure

    - Training on 3D digitisation, access, storage and preservation workflows
    - 3D data governance and sovereignty
- The importance of:
    - 3D aggregation and Europeana Aggregators' Forum
    - 3D data quality
    - Sustainability and longevity of 3D data
    - 3D documentation and metadata
- The challenges:
    - Getting started
    - Lack of in-house 3D expertise and technical equipment
    - 3D storage
    - Ethics of 3D practices in cultural heritage

For this report, we summarised the keynotes, speeches, presentations and panel discussions held on 18 April. The summary stays loyal and honest to what emerged from the discussions, but some reorganisation and synthesis has been applied to encapsulate the ideas that stood out so that they become useful concepts for further deliberation and discussion.

The Swedish Presidency conference set the scene for 3D and initiated the conversation with relevant stakeholders. The reflections by the speakers and participants alongside the online audience engagement shaped a very informative picture of the challenges and opportunities ahead for the sector. This conference was a starting point for further conversations about accelerating 3D in the context of the European Commission's Recommendation.

The Europeana Initiative will continue to facilitate conversations on 3D in the common European data space for cultural heritage and for the sector, building on the outcomes of this meeting. Together with stakeholders and members of the Europeana Aggregators' Forum and Europeana Network Association, the Europeana Foundation will explore where the Europeana Initiative can be most effective and support 3D efforts.

Under the upcoming Spanish and Belgian presidencies, the Europeana Initiative will build on the reflections it took home from Stockholm. The Europeana conference under the Spanish Presidency will explore aspects

of building the capacities of heritage professionals in creating and making available high-quality 3D data in the common European data space for cultural heritage and in our sector. The conference will contribute to 'Twin it! 3D for Europe's culture'[7], to boost and collect 3D content in the data space, and to support the Member States in their efforts to digitise and make available 3D content.

'Twin it! 3D for Europe's culture' is a campaign by the European Commission and the Europeana Initiative, under the auspices of the Swedish and Spanish Presidencies, culminating during the Belgian Presidency. Under Twin it!, the Ministries of Culture of the EU Member States are invited to liaise with their national cultural institutions to submit one 3D digitised heritage asset to the common European data space for cultural heritage. The goal of the campaign is to collect and showcase emblematic and high-quality samples of Europe's cultural assets in 3D, while supporting Member States in their 3D digitisation efforts. Twin it! will contribute to creating a shared understanding of the need for 3D, raising awareness of its opportunities and benefits and building capacity among EU Member States and their cultural heritage institutions.

Europeana Foundation

[7] https://pro.europeana.eu/page/twin-it-3d-for-europe-s-culture

Context and background to the theme of 3D

Making cultural heritage available for future generations to enjoy and be inspired by is a major public policy goal in the EU. The 3D digitisation of cultural heritage is important for the protection, conservation, restoration, research, dissemination and promotion of cultural assets coming from museums, galleries, libraries, archives, monuments and sites. 3D technology, artificial intelligence and virtual and augmented reality are all being used to not only ensure preservation but also capture the imagination, enhance public engagement and foster reuse within the cultural sector and beyond from education and research to tourism.

27 European countries signed a declaration of cooperation[8] on advancing digitisation of cultural heritage in 2019. They committed to work more closely together to better use state-of-the-art digital technologies in addressing the risks that Europe's rich cultural heritage is facing, enhancing its use and visibility, improving citizen engagement, and supporting impact in other sectors. One of the three pillars of the declaration points to '*a pan-European initiative for 3D digitisation of cultural heritage artefacts, monuments and sites*'.

The European Commission's Recommendation of November 2021 on a common European data space for cultural heritage invites Member States to set or update comprehensive and forward-looking digital strategies and take measures to support the uptake of advanced technologies by heritage institutions, including 3D, extended reality, artificial intelligence, and data technologies. The Recommendation sets ambitious 3D targets for the Member States: *'By 2030, Member States should digitise in 3D all monuments and sites deemed cultural heritage at risk, and 50 % of the most physically visited cultural and heritage monuments, buildings and sites'*. The European Commission invites Member States to make use of the EU and national funding streams and facilities to support activities around 3D.

To deploy the data space, the Europeana Initiative and its partners aim to contribute to a significant and sustained increase of high quality, usable and accessible 3D content in the data space, supporting EU Member

[8] https://digital-strategy.ec.europa.eu/en/news/eu-member-states-sign-cooperate-digitising-cultural-heritage

States and their heritage institutions to fully harness the potential of 3D for the benefit of Europe's culture.

Highlights from the conference

The conference addressed a variety of topics:

- Why 3D matters and what it consists of
- Use cases of 3D that illustrate its relevance to some of the challenges our society and sector are facing
- 3D in the the European Commission's Recommendation on the data space for cultural heritage
- Diversity of content suitable for 3D digitisation
- Reuse of 3D content
- Key concepts in 3D digitisation
- The need for capacity building for 3D

Speakers and attendees discussed:

- Widening access to culture through immersive and tailored experiences
- Digital preservation of cultural heritage through 3D replicas
- Quality of 3D content determined by use and reuse
- 2D content and audio for conceptualising, enriching and accessing 3D

We heard about inspiring 3D projects:

- 3D for special needs and for young students
- Save the Ukrainian Monuments (SUM) Initiative
- Photogrammetry of ancient images
- The Asinou Church
- Interactive experiences with 3D objects at The Hunt Museum
- Arctur's 3D campaign for Slovenian tourism projects

Carare[9], DARKLab[10], Eureka3D[11], and Amsterdam Time Machine for the Jewish neighbourhood[12] talked about some of their work around 3D.

[9] https://pro.carare.eu/en/training-hub/3d-and-virtual-reality/
[10] https://www.darklab.lu.se/
[11] https://pro.europeana.eu/project/eureka3d-european-union-s-rekonstructed-content-in-3d
[12] https://www.amsterdamtimemachine.nl/amsterdam-time-machine-for-the-jewish-neighborhood/

In this report we present a set of summarised highlights from these discussions and presentations:

Sweden's digital cultural heritage journey and the emphasis on 3D

Sweden is one of the largest providers of content to Europeana.eu and has high ambitions in its national digital strategy. The Swedish National Heritage Board has made digital transformation its top priority in recent years and going forward. The host of the event, the Museum of Ethnography (National Museums of World Culture) is utilising the potential of 3D digitisation to develop existing and new relationships with the global communities from which the museum's collections are sourced.

Why 3D is important

Preservation - Monuments, sites and artefacts are increasingly exposed to natural and man-made risks such as climate change, natural disasters, war and destruction. Not only do we need to preserve our cultural heritage physically but to accelerate its preservation digitally. Currently, only a small portion of the collections in museums, archives, galleries and libraries are digitised, and even less sites and monuments, despite being at risk. It is all important to ensure that our cultural heritage is preserved and made available to future generations to appreciate and learn from.

Reach and access - 3D content has the potential to provide new ways of accessing cultural heritage, such as tactile experiences for the visually impaired, and to bridge geographical and institutional distances between collections, communities and citizens, as well as reach distant audiences.

Relevance - To stay relevant, the cultural heritage sector has to think hard and fast about immersive experiences and new

methods of making data available in virtual and augmented environments such as the Metaverse and Mirror Worlds.

Reuse - 3D can enhance reuse of cultural heritage content through innovative and creative experiences. It also provides opportunities for the cultural heritage sector to collaborate with diverse and new actors in other fields and sectors such as creative industries, tourism, education, research, media, entertainment, gaming, architecture, civil engineering, the Metaverse and the like.

Connection to and collaboration with other data spaces - 3D offers new opportunities for interoperable connection and collaboration with other data spaces, in particular: Data Space for Tourism, Data Space for Education, and Data Space for Research.

Decolonisation - In the process of decolonisation, when returning objects to countries of origin, 3D enables the host institutions to keep a digital copy to reuse and recreate heritage and knowledge.

Diversity of cultural heritage 3D content

Monuments, historical buildings, landscapes, archive materials, books, works of art and artefacts are some examples of heritage assets that can be digitised in 3D.

Some of the EU support instruments and mechanisms

The Competence Centre on Conservation of Cultural Heritage - The EU-funded 4CH[13] project will design and develop the structure, functioning and services of a European Competence Centre on Conservation of Cultural Heritage. It will operate as a virtual infrastructure with a focus on 3D technology to provide expertise, advice and services. 4CH aims to substantially improve the quality of digitised sites, documents and monuments.

[13] https://www.4ch-project.eu/

Guidelines on 3D digitisation of cultural heritage - The former Expert Group on Digital Cultural Heritage and Europeana (DCHE Expert Group) contributed to the development of a set of guidelines[14] for a harmonised approach to 3D and recommended categories for digitisation. These guidelines introduce basic principles for 3D digitisation of tangible cultural heritage:

1) Consider the value of and need for 3D digitisation;
2) Select what to digitise and for what use cases or user groups;
3) Decide whether to digitise in-house or outsource;
4) Clarify copyright aspects and plan for open and broad access;
5) Determine the minimum quality needed, but aim for the highest affordable;
6) Identify the different versions and formats needed for the different use cases targeted;
7) Plan for long-term preservation of all data acquired;
8) Use the right equipment, methods and workflows;
9) Protect the assets both during and after digitisation;
10) Invest in knowledge of 3D technologies, processes and content.

A study on quality in 3D digitisation of tangible cultural heritage - A unique study[15] on 3D digitisation led by Cyprus University of Technology underlines that complexity and quality are fundamental considerations in determining the necessary effort for a 3D digitisation project to achieve the required value of the output.

Bilateral European Commission–Member States meetings on 3D and the *CEDCHE Subgroup's work around the 'Framework for 3D and XR'* are among other policy and support mechanisms.

Data space support projects on 3D

[14] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021H1970
[15] https://pro.europeana.eu/post/eu-funded-study-sheds-light-on-3d-digitisation-of-tangible-cultural-heritage

Over €4.4 million has been granted to four projects to enhance the common European data space for cultural heritage, two of which support 3D:

> *EUreka3D* – European Union's REKonstructed content in 3D[16] – aims to build the capacity of small cultural heritage institutions by creating the Eureka 3D platform, a knowledge hub based on a smart technical infrastructure. The platform will allow institutions to store, manage, model and enrich 3D assets. It will have a knowledge base with holistic information to strengthen the creation and reuse of 3D content and 3D technologies within the sector.
>
> *5DCulture* – Deploying and demonstrating a 3D cultural heritage space[17] – aims to enrich the offer and management of 3D digital cultural heritage assets in the common European data space for cultural heritage on topics such as fashion, architecture and archaeology. The project will explore specific scenarios for the reuse in domains such as education, tourism and the wider cultural and creative sector

3D complements the merits of other technologies

3D creates significant added value for digitisation and digital preservation for enhanced access and reuse. Examples of this could include adding narratives and stories about heritage with 3D models; applying artificial intelligence to enrich and support multilingualism in 3D model descriptions and metadata; using 3D models to construct a cultural virtual world in the same way that the Metaverse enhances 2D content.

3D targets for 2030: a collective ambition and responsibility

[16] https://pro.europeana.eu/project/eureka3d-european-union-s-rekonstructed-content-in-3d
[17] https://pro.europeana.eu/project/5dculture-deploying-and-demonstrating-a-3d-cultural-heritage-space

The data space and its targets are an ambitious vision and they are so by definition. Meeting the 3D targets set out in the annex[18] to the European Commission's Recommendation on a common European data space for cultural heritage is one of the most challenging aspects of the data space. Achieving the targets requires a vision, resources, dedication and commitment of all actors in 3D digitisation, access, storage and reuse. These targets lead the way for the longer term vision and cross sectoral impact which shape the future. To that end, the sector needs to be invested and active in an ongoing effort.

Opportunity in disguise

3D challenges the way the sector thinks about access to culture and heritage. It provides an opportunity to think about how we can reach audiences in new ways, but also consider new audience groups. 3D models are not really the end product, rather a means to conceive new ways of engaging with audiences and making our rich cultural heritage accessible.

The needs of the cultural heritage sector for 3D

Shared understanding

Clarity and a shared understanding among all stakeholders and actors is needed around 3D objectives, standards and harmonised rules to direct, optimise and guide 3D digitisation efforts across EU Member States and their institutions.

Motivation of cultural heritage institutions

18 https://digital-strategy.ec.europa.eu/en/news/commission-proposes-common-european-data-space-cultural-heritage

Member States' ministries and policymakers make policies and encourage institutions to digitise in 3D and contribute to the data space. It should be clear to the institutions why 3D matters and is relevant to them, and which value propositions they will benefit from.

Collaboration is key

The challenges of 3D cannot be addressed alone. Dialogue and collaboration between ministries responsible for policy, digitisation, cultural heritage, funding, as well as regions and municipalities have a central role to play. Networks and communities need to be strengthened and nurtured to support institutions, and share expertise and best practices in 3D digitisation, access, storage and reuse. Only if all actors and stakeholders work together, inspire each other, share experiences and learn from each other, can we bring the richness of our heritage to a thriving data space so that it can be accessed, enjoyed and used.

Standards and frameworks for 3D

While the need for standards for 3D digitisation, access, storage and reuse is widely recognised, the development of 3D data creation processes and the evolving usage of content present questions about how to ensure the durability of 3D datasets. Shared guidelines, practices, frameworks and standards are essential for the success and longevity of 3D content in the data space. The ability of standards to adapt as 3D technology evolves and updating them regularly to keep pace with the advancing technology should be a priority.

Defining what constitutes heritage at risk

It is essential to define, categorise and prioritise heritage assets, monuments and sites at risk for 3D digitisation. The Competence Centre on Conservation of Cultural Heritage - the EU-funded 4CH

project - will provide expertise, advice and services to help Member States to define, categorise and prioritise their heritage at risk for 3D digitisation.

Technology and infrastructure

A technical infrastructure to support the functions of ingesting, storing, managing, preserving and providing access to 3D content provided by European actors is needed.

Training on 3D digitisation, access, storage and preservation workflows

The 3D efforts in our sector face challenges such as 3D skills gaps and talent shortage. To overcome these obstacles and take advantage of the opportunities that 3D offers to the cultural heritage sector, institutions and other actors should assess their needs, train staff and develop learning materials on 3D workflows, possibly hire new talent, outsource projects, collaborate with partners, share learnings, and stay up to date and informed.

3D data governance and sovereignty

There is a need for a framework and guidance on digital and intellectual rights of 3D content held by heritage institutions and on 3D data sovereignty in the data space for cultural heritage.

3D datasets: aggregation and the aggregators' community

Aggregation and the Europeana Aggregators' Forum are vital to provide and improve 3D data and to develop standards for that. They also bring along the technological expertise to support storage, access and interoperable reuse of data with other data spaces.

Looking at 3D data from the aggregation viewpoint brings new perspectives to the discussion.

Quality of 3D data

Quality in 3D digitisation of cultural heritage can be defined as capture accuracy and resolution, historical accuracy, range of data and metadata generated and collected and fitness for purpose. The quality of 3D data must be embraced in a broader sense as there is no unique quality fit for all purposes. The desired quality is determined by the necessary minimum quality for the target users and the use case or purpose. The 3D digitisation budget and timescale, the digitisation equipment and technology, access to the site or object have a direct impact on the quality. It's also noteworthy that high-accuracy and high-resolution raw data may be used to generate new and higher quality 3D models in the future. How data is going to be used defines the required quality level.

The basic principles in the European Commission's Guidelines on 3D digitisation of cultural heritage advise that institutions should aim for the highest affordable quality. As with the advancement of technology digitised content becomes obsolete quite quickly, considerations need to be thought about ahead of a digitisation project.

The Europeana Initiative will review and refine the Europeana Data Model[19] and Publishing Framework[20] to better accommodate 3D content and support higher metadata quality. The tier system and the Europeana Licensing Framework[21] will also be expanded to ensure that the 3D content produced can be shared and reused.

Quality documentation of 3D content is essential and of utmost importance for preservation and research.

[19] https://pro.europeana.eu/page/edm-documentation
[20] https://pro.europeana.eu/post/publishing-framework
[21] https://pro.europeana.eu/page/europeana-licensing-framework

Sustainability and longevity of 3D data

3D technologies are fast advancing. A common framework for creating, managing and storing 3D data should be based on sustainability and longevity of data. The infrastructure should support long term preservation and storage of 3D data.

The importance of documentation and metadata

WIthout good metadata, provenance data or documentation, 3D content cannot be reused for many purposes. With smart solutions and technology, an integrated workflow can capture documents of the 3D model while it is generated, processed and versioned.

2D objects to conceptualise 3D

Enriching the 3D model with related documents and relevant 2D content and other information is fundamental for understanding the 3D model. This will also offer the opportunity and new ways of using and assessing the 2D content.

The challenges the sector faces

Besides a number of needs and crucial considerations noted above, a number of challenges emerged from the discussions and presentations.

The hardest step is getting started

There are many difficult questions to address: what to digitise in 3D? How to make that choice/decision? Should it be the most intricate? Or the most beloved and visited? Each and every site/monument/artefact is a challenge in itself. How do we overcome the difficulty? Probably the most difficult question is the first one.

Lack of in-house 3D expertise and technical equipment

The successful implementation of 3D projects requires expert staff and 3D equipment. A key challenge for institutions is to assess the 3D expertise gaps and invest in staff training and 3D technologies or outsource them.

3D storage

Institutions need data storage solutions, standards and frameworks for their 3D content. To enable professionals and users to work with and use 3D content we digitise today in 50 years, all images and raw files related to the 3D content must be stored, not just the final 3D model. Institutions must also distinguish between storage and showcase or communication platforms. Institutions are most suited to store 3D data like they store physical collections.

Ethics of 3D practices in cultural heritage

Many ethical principles have to be considered in a 3D workflow. Some of these principles are:

- Environmental impact of 3D technologies and practices
- Reconciling digital sobriety and 3D digitisation efforts
- Accessibility for diverse and all-inclusive audiences
- FAIR and CARE principles for 3D data to be findable, accessible, interoperable, reusable and reused ethically
- Sustainable long term preservation of 3D content

Use cases presented at the conference

Iberian Archeology - 3D for visually challenged and special needs

The advent of 3D technology has undeniably reshaped numerous sectors, with cultural heritage and education being no exception. However, the true potential of 3D content remains unrealised until it becomes universally accessible. 3D models help include and integrate audiences with disabilities and students or children with special needs. 3D recreation of some of the historical pieces of the Iberian Archeology has brought art closer to visually disabled people. An initiative that together with similar projects[22] improve inclusive accessibility to archaeological pieces and artworks through 3D models. These models are available via Europeana.eu [23]. Audio files accompany 3D models to enrich them with storytelling for visually challenged, young children and people with autism.

Save the Ukraine Monuments (SUM)

Save the Ukraine Monuments (SUM)[24] is a joint initiative of European institutions and research infrastructures: 4CH competence centre, OPERAS, Centre for Contemporary and Digital History at the University of Luxembourg, Institute of Literary Research of the Polish Academy of Sciences, Poznan Supercomputing and Networking Center, ZBW – Leibniz Information Centre for Economics, backed by European Open Science Cloud Association (EOSC-A). The initiative supports Ukrainian cultural heritage institutions and organisations (but also the wider research community). It provides infrastructure, documentation, workflows, and support. 4CH competence centre is developing new tools for 3D models, documentation of monuments, cost evaluation and forecasting hazards. Documentation is of paramount importance for restoration, reconstruction, research and education.

[22] The exhibition "Hoy Toca el Prado" showcased relief reproductions of some of the most representative paintings of Prado Museum to help the visually impaired to discover them

[23] https://www.europeana.eu/en/collections/organisation/1482250000004505002-university-institute-for-research-in-iberian-archeology

[24] https://www.4ch-project.eu/sum/

Revealing the past with photogrammetry, Ancient Images 2.0

Ancient Images 2.0[25] is a project by the University of Stockholm and Gotland's Museum in Visby, to create an accurate digital edition of Gotland's picture stones. The rich imagery of the Gotlandic picture stones, dating to ca. 400 to 1100 AD, offers a unique source for studies of Late Iron Age material culture – in particular male and female dress, architecture, ship technology as well as carriages, weapons and combat, hunting and fishing. The 3D models are a unique source for information on pre-Christian religion, depicting ritual and cultic acts like horse fights, drinking ceremonies, human sacrifices and funeral rites. It is even possible to interpret some of the depictions based on 2D content such as written medieval sources and manuscripts. The project applies the most advanced 2.5D and 3D recording methods currently available, combining different technical approaches.

Church of Panagia of Asinou, Marinos Ioannides, Cyprus University of Technology

The church of Panagia of Asinou, in the foothills of the Troodos Mountains in Cyprus, is an 11th century shrine and a UNESCO World Heritage Site with some of the finest Byzantine wall paintings dating back to the 12th-17th century. A 3D model of the church is one of the first 3D objects in Europeana.eu. Under the Inception[26] project, the documentation of the 3D model of the Asinou Church and innovative digital techniques for data acquisition and methodologies for data processing were examined. Different techniques, such as photogrammetry, laser scanning, drones, video and photographs were used to obtain data on all features of the church. The data was then processed to create a 3D model and document the church using Building Information Modeling (BIM[27]). The church was

[25] https://www.ancientimages.se/

[26] https://pro.europeana.eu/post/3d-models-to-explore-our-built-cultural-heritage-the-inception-technologies

[27] BIM is a process for creating and managing information on a construction project, throughout the project's life cycle. As part of this process, a coordinated digital description of every aspect of the built asset is developed, using a set of appropriate technology. It is likely that this digital description includes a combination of information-rich 3D models and associated structured data such as product, execution and handover

digitally reconstructed in a 3D BIM model, where it was then processed to produce a Heritage building Information Model (H-BIM) in order to create an information database for further study.

A study on quality in 3D digitisation of tangible cultural heritage [28], led by Cyprus University of Technology and published in 2022, identified key and relevant elements for successful 3D digitisation of cultural heritage. The study provides a definition and criteria for quality in a 3D digitisation project and makes an inventory of existing formats, standards, guidelines and methodologies used in the industry. It collects a number of past digitisation projects, existing 3D models and success stories as benchmarks for 3D digitisation of tangible cultural heritage. This study demonstrates that complexity and quality are fundamental considerations in determining the necessary effort for a 3D digitisation project to achieve the desired value of the output.

3D digitisation of museum objects at The Hunt Museum

Despite cultural heritage institutions' tight budgets and lack of expert resources and advanced 3D equipment, a 3D project can be simple and inexpensive. The Hunt Museum makes the most of a volunteer workforce (students, interns, researchers and community members) for 3D scanning and digitisation. While contributing to the 3D workflow, the volunteers gain transferable skills and research. Simple, open source and free equipment is used to digitise objects, process and edit models: mobile scanning applications, Meshlab[29] – an open source system for processing and editing 3D meshes – and Blender[30] – a free and open-source 3D computer graphics software tool set for 3D-printed models and interactive 3D applications. The museum uses Sketchfab[31], a 3D modelling platform website

information. Internationally, the BIM process and associated data structures are best defined in the ISO 19650 and 12006 series of standards.

[28] https://digital-strategy.ec.europa.eu/en/library/study-quality-3d-digitisation-tangible-cultural-heritage

[29] https://www.meshlab.net/

[30] https://www.blender.org/about/

[31] https://sketchfab.com/

which offers affordable premium plans to publish and share 3D content.

2D objects to conceptualise 3D, The INCEPTION project

The INCEPTION project creates 3D models of buildings, monuments and sites, enriched digitally by contextual technical and historical information. The project takes an inclusive approach to time-dynamic 3D reconstruction of artefacts, built and social environments. The INCEPTION web platform for BIM models allows users to search for models using different devices and apps, navigate 3D models and enrich and populate the models with related information including 2D content, and to enrich models in real-time. The project results contribute to creative industries, research, education, tourism and restoration. The project aims to connect 3D content in its platform to all the relevant resources available on the web.

Slovenia's Tourism 3D campaign, Arctur

Arctur[32], a research and development oriented SME, is an ICT company and the 3D expert behind Slovenia's initiative: national portal of digital innovation of cultural heritage - DIKD[33]. The technologically advanced portal showcases 3D models of leading tourist destinations and cultural heritage in Slovenia, short films, 360-degree photos and videos, and other multimedia material. It enables easy insight into 3D models using ordinary computers or mobile devices. The portal enables the storage, viewing of rich collections with detailed metadata, and management of large 3D models. The 3D models are available for reuse in tourism and creative industries. DIKD promotes use of 3D models for promotional, research, educational and other purposes. Some of the 3D models are available in Europeana.eu[34].

[32] https://www.arctur.si/

[33] https://www.dikd.si/en/

[34] https://www.europeana.eu/en/search?page=1&qf=TYPE%3A%223D%22&qf=COUNTRY%3A%22Slovenia%22&qf=DATA_PROVIDER%3A%22Arctur%22&query=%2A%3A%2A&view=grid

The initiative has helped Slovenia to create unique tourist experiences. Thanks to the initiative, the Ministry of Economic Development and Technology of Slovenia received the ECTN award[35] for the project of digital innovation of cultural heritage at the 14th European Conference in Athens: Regenerating European Tourism through Culture, Heritage and Creativity. The Ministry was awarded the second-best place in the category 'Digitalisation in Sustainable Cultural Tourism, towards Smart Destinations'.

Next steps

This conference was conceived to be part of the Europeana Initiative's efforts to support collective reflection and efforts for 3D digitisation, access, storage and reuse. In broad outlines, the Europeana Initiative will continue to facilitate conversations on 3D in the common European data space for cultural heritage, building on the outcomes of this meeting.

'Twin it! 3D for Europe's culture[36]', a campaign by the European Commission and the Europeana Initiative, under the auspices of the Swedish and Spanish Presidencies of the Council of the EU, culminating during the Belgian Presidency will contribute to the Member States' 3D efforts. The campaign will help create a shared understanding of the need for 3D, raise awareness of its opportunities and benefits, collect high quality 3D data and build capacity among EU Member States and their cultural heritage institutions.

The EuropeanaTech 2023 conference[37], taking place from 10-12 October in The Hague and online, will address 3D in dedicated sessions throughout the conference.

The Spanish Presidency Europeana conference 'Accelerating 3D in the common European data space for cultural heritage: Building capacity for 3D' on 18 October 2023 in Pamplona will explore aspects of building the

[35] https://www.culturaltourism-network.eu/awards.html
[36] https://pro.europeana.eu/page/twin-it-3d-for-europe-s-culture
[37] https://pro.europeana.eu/page/conference

capacities of heritage professionals in creating and making high-quality 3D available in the common European data space for cultural heritage which start with ‘the Europeana Initiative’ and in our sector.

The Europeana Initiative will actively reach out to new data partners owning 3D content to bring new 3D data to the data space.

The Europeana Initiative will review the Europeana Publishing Framework, the Europeana Data Model, and the Europeana Licensing Framework to better accommodate and represent 3D models.

The Europeana Initiative will help build capacity for 3D by gathering and making available guidelines, recommendations, documentation on 3D; organising symposiums, conferences, webinars and workshops and training; and disseminating best practices and knowledge from 3D initiatives and projects.

The Europeana Initiative will support the Member States’ institutions in accelerating practices around 3D. It will do that in collaboration with the data space consortium partners, national and domain aggregators and the wealth of expertise in the Europeana Network Association.

The Europeana Initiative will work hand-in-hand with the European Commission, the Swedish Presidency of the Council of the EU, the upcoming Spanish and Belgian Presidencies, and with all EU Member States to address the challenge of 3D.

And more!

The Swedish Presidency Europeana conference was only the beginning of a joint, concerted and sustained effort around 3D, for which the support of Member States is vital.

Digital cultural heritage professionals and experts working with and around 3D projects are invited to reflect on the discussions from this conference in their own contexts, set concrete goals, skill up, take a pragmatic approach to 3D efforts, collaborate and share.

Acknowledgements

The Europeana Foundation would like to thank the Ministry of Culture of Sweden, the Swedish National Heritage Board, the Museum of Ethnography, the European Commission DG CONNECT, and all the speakers and participants for their time, efforts, contributions to the discussion and sharing of knowledge and expertise throughout the process of this conference.

Europeana Foundation

References

- Europe's Digital Decade: digital targets for 2030
- Digital sovereignty for Europe
- Shaping Europe's digital future - a European Strategy for data
- Digital Europe Programme
- Digital Europe Work Programme November 2021
- European Commission's Recommendation 2021/1970 of 10 November 2021 on a common European data space for cultural heritage
- European Declaration of digital rights and principles January 2022
- Programme of the Swedish Presidency Europeana conference
- Recording of the Swedish Presidency Europeana conference