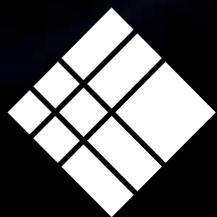


Join us on a journey through time



Time  
Machine

Growing network

Fill gaps

Vision

# Big Data of the Past

Density of information

Ambition Digital system  
Large-scale research initiative

Raise European scientific profile

5,000 years of history  
Unique alliances

Link knowledge

Radical change

Bold questions  
European leadership  
Highly curated information

Archives

Joint platform  
Reliable and scientifically proven data

Extensive data

Scale research methods

Future

Scientific reputation

## Step aboard the Time Machine!

### What if

... you could travel through time as easily as we travel through space?

... freely roaming the kaleidoscope of global cultural heritage would be just a mouse click away?

... you could navigate the big data of the past like Google Earth and plunge right into our common cultural DNA?

... we could re-visit the past as a common resource for shaping our joint future?

**What if “what if” turned into “Come on board and see for yourself!”?**

The Time Machine will be this decisive turning point – turning a vision into (virtual) reality. The Time Machine plans to build a large-scale simulator capable to map 5,000 years of European history. This big data of the past, a common resource for the future, will trigger pioneering and momentous cultural, economic and social shifts.

#### **Joining forces to reinvigorate the past**

Understanding the past undoubtedly is a prerequisite for understanding present-day

societal challenges and contributes to more inclusive, innovative and reflective societies. Researchers from all over the world are spearheading joint forces within the Time Machine project to reinvigorate the past through one of the most ambitious projects ever on European culture and identity.

#### **The basics of building a time machine**

The fundamental idea of this project is based on Europe’s truly unique asset: its long history, its multilingualism and inter-

culturalism. We aim to engage not only scholars but also European citizens, connecting millions of participants with millions of documents, massively participating to a unique endeavour: building a time machine to negotiate a common history of Europe. A time machine to explore the information of the past to learn who we are, where we came from, and how we want our future to look like.

#### **Interdisciplinary teamwork**

Today, science and technology can profoundly transform the conservation and experience of cultural heritage impacting research, education, new applications and, as a result, the European or global economy and society at large.

Computer and data sciences, physics and chemistry, material sciences and robotics; these scientific disciplines must join forces with the Humanities to get a new paradigm for historical sciences off the ground.

#### **The project consortium**

To this end, a consortium comprised of the leading European institutions in Computer Science, Digital Humanities, Archival and Historical Sciences and Cultural Studies is aiming at becoming a future European large-scale research initiative.

It seeks to effectively join forces with as many partners as possible who are willing to offer input from various professional backgrounds (science, technology, industry, content owners).



## Turning a vision into (virtual) reality

The Time Machine is structured around the development of a large-scale digitization and computing infrastructure mapping millennia of European historical and geographical evolution and transforming kilometres of archival fonds, abundant museum collections and further geo-historical data sets into a distributed digital information system.

### Forming unprecedented alliances

By forming a unique alliance between the best European players in the humanities,

sciences and technologies, this project does not only imply a series of fundamental breakthroughs in artificial intelligence, robotics and ICT for social interaction but also targets advances in neighbouring disciplines like physics, chemistry and material sciences. Massive digitization infrastructures and high-performance computing needs to be coupled with machine learning and 4D technologies to produce a multiscale simulation of more than 5,000 years of history.

### Launching a new era of open access to sources

The Time Machine aims at transforming research methods and practices in the humanities by launching a new era of open access to sources, making past and on-going research open science, allowing to ask bolder questions, to reach new kinds of understanding and fostering large-scale collaboration between scholars and citizens.

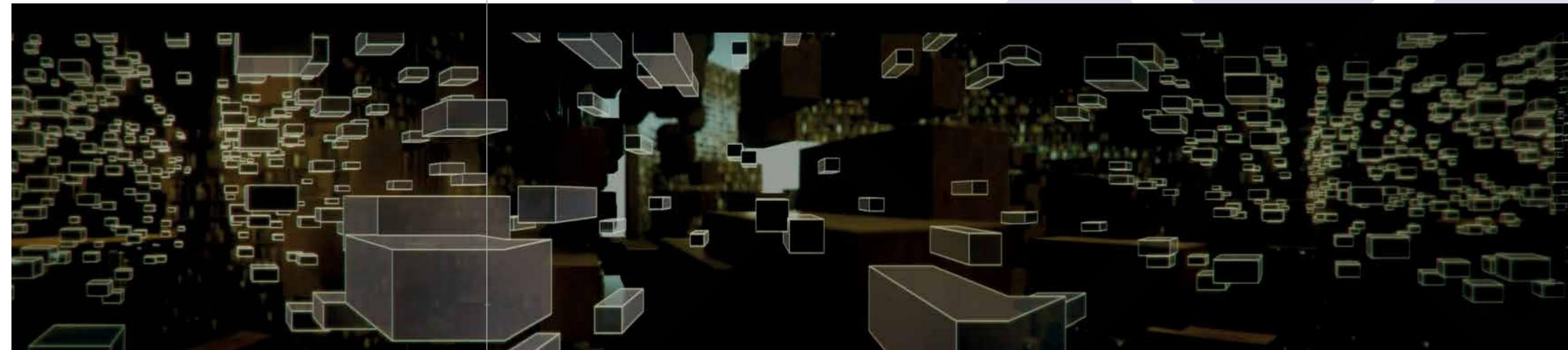
### Intellectual transparency

To assess the complex interplay between automatic process and human interpretation, the project puts intellectual transparency as a core feature of all its components. Based on this unique ambition and design, the project will make Europe the leader in the extraction and analysis of big data of the past a unique precious resource to envision the future. This shared patrimony will have an important impact not only on tourism and culture economic and societal modelling.

### Mass digitization to unfold space and time

This type of complexity and scale is unseen to date for a project in the humanities. To obtain the necessary data for such a reconstruction, the Time Machine Flagship must develop new technologies for a scanning infrastructure able to digitize massive amounts of fragile records that document European heritage. These digital copies will form the basis of the largest database ever created for European archival documents. Meanwhile, high performance computing clusters are used to process this mass of

documents, using increasingly accurate machine vision algorithms, segmenting, indexing and transcribing their content and ultimately making them searchable like any other document we search for on the web. The information networks extracted from the documents constitute a massive semantic graph of linked data – probably the largest ever created about the past – unfolding in space and time as part of an historical geographical information system.

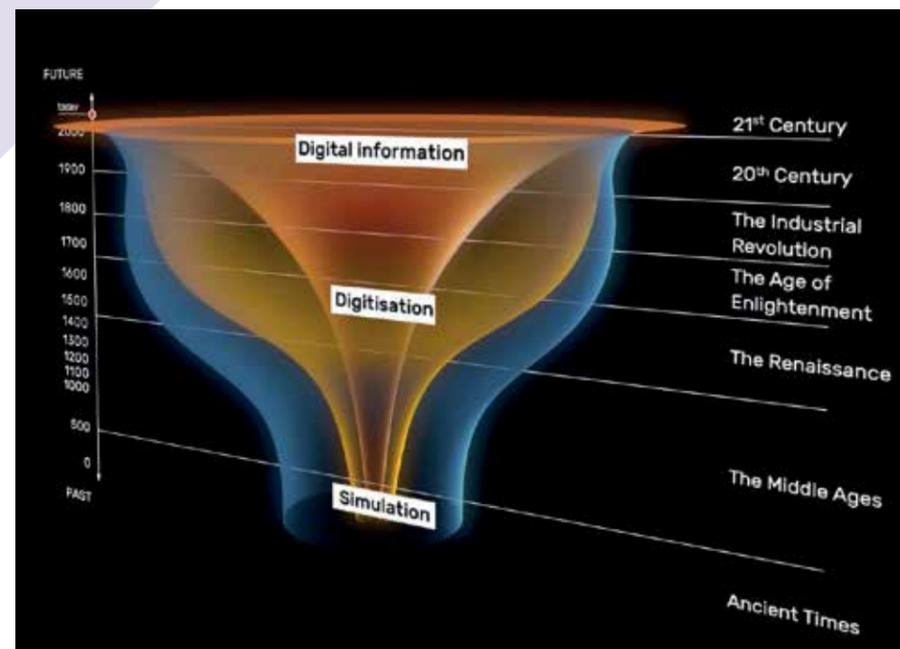


## Key points

- ◆ The project has a large European coverage with already 233 partners in 33 countries.
- ◆ It pushes the research in the most advanced Artificial Intelligence and Machine Learning technologies to extend the realm of Big Data to the past.
- ◆ The project develops a unique 4D IT technology enabling navigation through time as easily as we navigate through space.
- ◆ The Time Machine project is based on Europe's unique asset: its long history, its multi-linguism and multiculturalism.
- ◆ The project has a large expected impact on the sector of tourism (600 million tourists per year), media industries (new forms of virtual reality) and for the development of start-ups exploiting long data series analysis for making prediction using Artificial Intelligence techniques. It is not unlikely that the next Google will emerge out of these technologies.

## Simulation: Big Data of the Past

The further we go into the past, the less digital information we have. Massive digitisation of historical sources permits to extract more data. Simulation based on this data permits to infer additional data and generate new hypotheses.



## The project consortium: A unique European alliance



## Austrian founding members

- ◆ ICARUS – International Centre for Archival Research
- ◆ Österreichische Nationalbibliothek (Austrian National Library)
- ◆ Technische Universität Wien (Vienna University of Technology)

## How to get involved

### The Time Machine Ecosystem

The Time Machine ecosystem comprises **233 organisations from 33 countries**. Extremely prestigious European research centers, cultural institutions and large industrial companies support the Time Machine project.

In total, the Time Machine ecosystem includes 95 academic and research institutions, 71 galleries, libraries, archives or museums, more than 30 large businesses and innovative small and medium-sized enterprises and 18 government bodies as well as associations of the civil society involved in cultural heritage.

The Time Machine is now arguably the largest and most ambitious project ever created at the intersection of culture heritage and information sciences.

### Founding Institution Partners

Founding institutional partners from academia or industry collectively finance the operation for writing the final project proposal as well as structuring the Time Machine community and ultimately define a common strategy.

### Associated Institutional Partners

Associated institutional partners do not contribute directly to the financial collective effort but can nevertheless benefit from all the open source, open hardware and open data development of the project. These partners can participate in meetings, discussions and the proposal writing process. They should furthermore act as multipliers and contribute to the development of the Time Machine technology.

### Associated Programmes

Associated programmes such as DARIAH, EUROPEANA, etc. articulate synergies between their actions, their programme members and the implementation of the Time Machine.

### Cultural Institutions

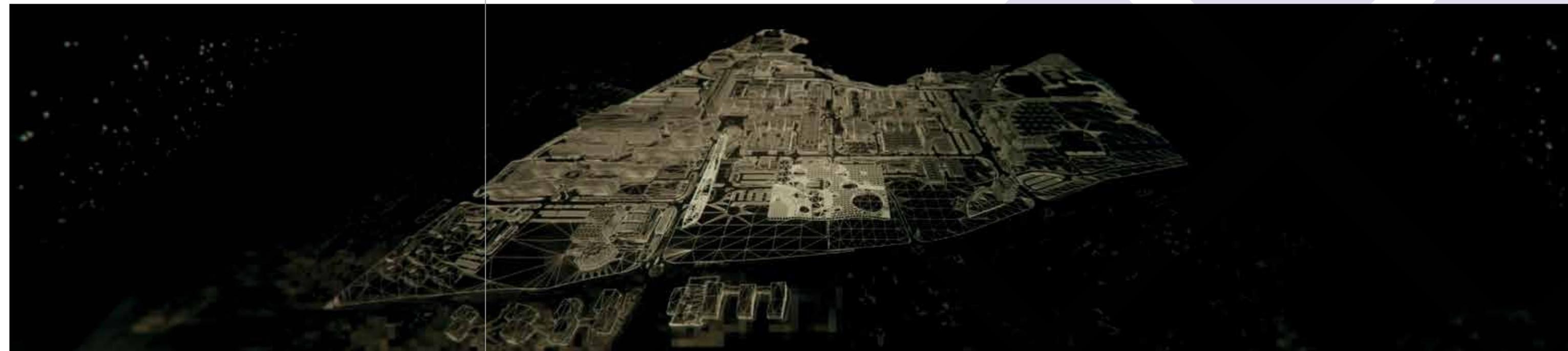
Cultural institutions such as archives, libraries, museums and galleries providing cultural, historical and geographic material and expertise to the Time Machine.

### Territorial Players

Territorial players are for instance national geographic agencies, municipalities and further players that provide data, expertise and use cases for the Time Machine.

### Industrial Partners

Industrial partners are for example start-ups and industrial players that could contribute to the implementation of the Time Machine infrastructure or the development of services around the Time Machine project. A portion of these industrial partners can also be composed from founding institutional partners.



# Welcome to our future!



For further information on the project,  
please visit the Time Machine **website**:

[www.timemachine.eu](http://www.timemachine.eu)

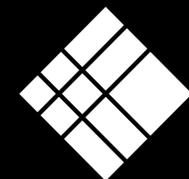
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Time  
Machine