

Project Number	250445	Project acronym	CARARE
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PROJECT PROFILE

Project acronym: **CARARE**

Project full title: **Connecting ARchaeology and ARchitecture in Europeana**

Information on the Best Practice Network

Objectives

CARARE will directly support the chief objectives of Best Practice Networks for digital libraries under the ICT PSP 2009 work programme, by increasing the quantity and quality of digital content available from the archaeology and architectural heritage domain to users of Europeana. CARARE's main objective is to establish an aggregation service for the domain and create the best conditions for Europe's network of heritage agencies, non-governmental heritage bodies, archaeological museums, research institutions and specialist digital archives to contribute to the achievement of Europeana's i2010 content targets. It will develop services to improve interoperability with Europeana of existing digital content for heritage sites and related objects, including unique archaeological monuments, architecturally important buildings, historic town centres and industrial monuments, many of which are recognised as being of World heritage, European heritage and National heritage importance.

A further objective of the CARARE network is to make a positive contribution to the development of Europeana through involvement in the Europeana Project Group, and by addressing practical issues relating to the harvesting of 3D/VR formats, content relating to the archaeology/architecture domain and the handling of geographic information. CARARE aims to enable 2D and 3D content for heritage places to be brought together and linked up in Europeana. The objective is to establish a critical mass of highly interesting content about heritage places and create the potential for new commercial and public services for tourism, education and research to be set up in future.

It is also an important objective of CARARE to define a sustainable business model and to achieve a viable and extensible aggregation service after the end of the project funding. It will investigate the economic and organisational aspects of sustainability in the context of parallel developments of regional, national and domain aggregators and the long-term development of a Digital Research Infrastructure for the Arts and Humanities (DARIAH).

Activities and Outcomes:

The activities of CARARE include:

- Preparing and enabling the network for content harvesting and aggregation. The technical approach for the project will be established; the metadata, terminology resources and IPR for the content to be harvested reviewed; a programme of work on SKOS, controlled vocabularies and place name gazetteers planned; mappings completed between Europeana's schemas and the CIDOC CRM; and recommendations made on any IPR issues specific to CARARE's domain.
- Testing and prototyping tools and services in the Europeana development environment to enable the aggregation of digital content from the archaeology/architecture domain to Europeana. Aggregation of content from each provider will be tested, the aggregation service established including the provision of metadata mapping tools for content providers to use. The potential for archaeology/architecture content to enrich GIS services for Europeana will also be evaluated and Europeana's APIs tested.
- Harvesting and aggregating will establish the live service for the CARARE network and aggregate content to Europeana. Content providers will adapt or enrich their metadata and existing content to improve its presentation in Europeana, prepare vocabularies and implement harvesting supported by the CARARE community, training and guidance offered by the network
- 3D and virtual reality will establish the methodology for Europeana to provide a point of access to

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3D/VR and for 3D content providers to prepare their content for harvesting. The workflow will be documented in case studies and training materials. A road map will be prepared outlining potential future services for professional users of 3D/VR content.

- Dissemination activities will be carried out to raise awareness of CARARE and Europeana amongst archaeology/architecture content providers and decision makers.
- Sustainability. Sustainable business models for the continued provision of services and the framework for extension of the network will be established.

The project outcomes will include establishing the methodology and services needed to aggregate content from the heritage to Europeana, including 3D and Virtual Reality models, and establishing a sustainable business model to enable continuation of services and a widespread knowledge of the CARARE network and its activities amongst the professional community and policy makers.

Consortium

The CARARE consortium includes content providers, aggregators/country coordinators and suppliers of technical or other specialist expertise from 20 countries:

The Danish Heritage Agency is financial coordinator working together with MDR Partners as project manager and leading on dissemination. The Stichting European Digital Library, Digital Curation Unit and the National Technical University of Athens contribute key technical expertise in interoperability. Cross Czech and N303 bring business expertise. Visual Dimension contributes specialised competence in 3D. The Archaeology Data Service, Cyprus Research and Educational Foundation, Swedish National Heritage Board, German Archaeological Institute and the Institute for the Protection of the Cultural Heritage of Slovenia bring content and technical expertise in culture portals and GIS. Heritage Malta, the National Heritage Board for Poland, Centro Andaluz de Arqueología Ibérica and Scuola Normale Superiore di Pisa provide 3D content and professional expertise. The Cultural Heritage Agency for the Netherlands, Erfgoed Nederland, Direction des Monuments et des Sites for the Brussels region, the Ministry of Culture for Estonia, the National Monuments Institute (Czech Republic), National Heritage Board (Slovak Republic), the Directorate of the National Archive of Monuments (Hellenic Ministry of Culture), Vilnius University, Institutul de Memorie Culturala, National Archaeological Institute with Museum (Bulgaria) all contribute content and professional expertise. Data Archiving and Networked Services provides a connection with DARIAH research network and expertise in historical GIS. All partners make an important contribution to the International networking capacity of the consortium.

Impact

The expected impact of CARARE over its three-year duration is to create:

- An established aggregation service for the archaeological and architectural domain which uses innovative technical solutions to create the best conditions for making content from this domain accessible to Europeana;
- A widespread and operational network of OAI-PMH repositories managed by archaeology and architectural heritage content providers serving metadata and content consistent with Europeana's needs;
- A suite of tools available for content providers to use and enable archaeology/architecture content to be integrated in Europeana and its semantic richness maintained and enhanced;
- A positive contribution to the development of Europeana by enabling the inclusion of 3D/VR content and GI data for Europeana GIS services.
- A critical mass of high quality content for Heritage sites of national, European and International importance from all across Europe available to Europeana users.
- Access for Europeana users to highly engaging 3D and VR content.

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Glossary

3D-Coform	A 7 th framework programme project to establish tools and expertise for 3D collection formation.
ARENA2	Archaeological Records of Europe - Networked Access, Phase 2 sites and monuments, musical instruments and furniture.
APENET	Archive Portal of Europe, a best practice network of European national archives.
Aquarelle	The 1996 Aquarelle project aimed at designing and developing a distributed multimedia information system, offering access to the cultural heritage.
ATHENA	Access to cultural heritage networks across Europe, a best practice network focussing on museums.
BHL-Europe	Biodiversity Heritage Library Europe is a 3 year project, involving 28 major natural history museums, botanical gardens and other institutions.
BRICKS	Building Resources for Integrated Cultural Knowledge Services, a research and development project on digital libraries and semantic web technologies for the European cultural heritage.
CENL	Conference for European National Libraries
CIDOC	The International Committee for Documentation of ICOM, the International Council of Museums.
DARIAH	Digital Research Infrastructure for the Arts and Humanities
EDL	European Digital Library, a targeted project funded by the European Commission under the eContentPlus programme.
EFG	European Film Gateway, a 3-year project to develop an online portal providing direct access to films and related materials.
EPOCH	EPOCH is a network of excellence in the field of the digital Cultural Heritage.
EuropeanaLocal	A best practice network designed to involve and help local and regional libraries, museums, archives and audio-visual archives make contents accessible to Europeana.
EUScreen	A best practice network providing access to the audio-visual cultural heritage.
HEREIN	The European Heritage Network is a permanent information system gathering governmental services in charge of heritage protection within the Council of Europe.
ICOM	International Council of Museums
MACs	Multilingual Access to Subjects is a CENL project is primarily concerned with the problem of multilingual access to bibliographic databases.
MICHAEL	Multilingual Inventory of Cultural Heritage in Europe, a project to support discovery of digital collections across Europe.
MINERVA	a Thematic Network in the area of cultural, scientific information and scholarly content.
MULTIMATCH	Multilingual/Multimedia Access to Cultural Heritage project carried out research in the field of information access.
PULMAN	A network of excellence which was funded to stimulate and promote sharing of policies and practices for the digital era, in public libraries and cultural organisations which operate at local and regional level.
SCULPTEUR	Semantic and content-based multimedia exploitation for European benefit, a three-year European project that started in May 2002.
TEL	The European Library, information about the national libraries of Europe.
UNESCO	United Nations Educational Scientific and Cultural Heritage Organisations.

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3D	Three dimensional
2D	Two dimensional
API	Application Program Interface
CIDOC-CRM	The Conceptual Reference Model developed by ICOM's committee on museum documentation (CIDOC).
CMS	Content Management System
DAMS	Digital Asset Management System
Dublin Core	Metadata Element set established by the Dublin Core metadata initiative.
EDM	Europeana Data Model
ESE	Europeana Semantic Elements
GIS	Geographic Information System
OAI-PMH	Open Archives Initiative Protocol for Metadata Harvesting
OAI-ORE	Open Archives Initiative protocol for Object Exchange and Re-use
OPAC	Online Public Access Catalogue, an online bibliography of a library collection.
OWL	Web Ontology Language
RDF	Rich Description Framework
REST	A simple web service implemented using HTTP.
SKOS	Simple Knowledge Organisation System
SOAP	Simple Object Access Protocol, a specification for exchanging structured information in computer networks.
SPARQL	Sparql Protocol and RDF Query Language
VR	Virtual Reality
XML	eXtensible Markup Language

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SECTION B1. RELEVANCE

B1.1. Project objectives

This is a project to establish a Best Practice Network for the Archaeological and Architectural heritage domain under objective 2.2 of the ICT Policy Support Programme under the European Commission's Competitiveness and Innovation Programme, called CARARE.

The objective of CARARE is to increase the quantity and quality of digital content available to users of Europeana. There is a need, not least in order to contribute to the achievement of Europeana's i2010 content targets, to provide the best conditions for cultural institutions across Europe to make already digitized content accessible to Europeana. By acting as an aggregator for the archaeology/architecture domain, CARARE will make a major contribution to creating these conditions for this domain and also contribute to the expansion of Europeana's base of content providers by involving Europe's network of heritage agencies, non-governmental heritage bodies, archaeological museums, research institutions and specialist digital archives. CARARE will develop services that improve interoperability of this network's existing digital content for heritage sites and related objects, including unique archaeological monuments, architecturally important buildings, historic town centres and industrial monuments, many of which are recognised as being of World heritage, European heritage and National heritage importance. These subjects and the time periods they cover are currently under-represented in Europeana and thus the content aggregated by CARARE will play a key role in broadening the scope of Europeana and in attracting new users.

The archaeology/architecture heritage is particularly relevant for inclusion in Europeana as it crosses national borders. There are connections between monuments, buildings and the related collections which are situated today in different countries as a result of long ago boundary changes. Achieving the full picture involves drawing together information from different institutions in different countries. As a result there is a long history of heritage organisations working together across borders. Since the 1980s CIDOC working groups have established core data for historic buildings and archaeological sites. The European Heritage network (HEREIN) was established, following a 1996 Ministerial recommendation, as an information service to monitor heritage policies and exchange information exchange in line with the principles of the Granada convention on the architectural heritage and the Valetta convention on the archaeological heritage. Heritage institutions have been active in publishing digital resources online and have collaborated in a number of other European initiatives to bring together information and resources such as the Aquarelle, ARENA, EPOCH, BRICKS and SCULPTEUR projects.

CARARE will have a special focus on 3D and virtual reality models (3D/VR), created by archaeologists and architectural historians to record, analyse and present heritage sites and objects, with the objective of solving issues concerning the harvesting and presentation of these formats for Europeana and for other domains. CARARE will enable heterogeneously sourced 2D and 3D content for heritage places to be brought together and linked up in Europeana using the geographic information available from heritage organisations. The process of linking content for heritage places, coming on stream through CARARE and also other aggregators, will enable integrated services of great richness to be established by Europeana. A critical mass of highly interesting content about heritage places established through CARARE will also create the potential for new commercial and public services for tourism, education and research to be set up in future.

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The work of CARARE will directly support the chief objectives of Best Practice Networks for digital libraries under the ICT PSP 2009 work programme, by addressing the aggregation of existing digital content, contributing to greatly improving the interoperability of the content held by archaeology/architecture heritage institutions across Europe and thus increasing the quantity of quality of digital content that is searchable and accessible through Europeana. By working closely with Europeana v1.0 and EuropeanaConnect, and the network of experts in the Europeana Project Group, CARARE will contribute to the developing infrastructures and standards for Europeana, addressing practical issues relating to the aggregation of 3D and Virtual Reality models, of the digital content relating to the archaeology/architecture domain and the handling of geographic information. In this way, CARARE will contribute positively to the growth of Europeana and to understanding and addressing the practical issues relating to standards-based interoperability between digital objects and search portals by:

- making use of the development environment and sand-boxes set up by Europeana to experiment, test and evaluate tools to handle contents from the archaeology/architecture domain in a large-scale data harvesting environment;
- implementing the production standards, specifications and tools which will enable heritage institutions in all member states to adapt existing digital content, improve metadata and interoperability and enabling search , retrieval and use of the digital content through Europeana;
- establishing and promoting straightforward methods by which heritage institutions may provide their digital content to Europeana and by
- making recommendations to Europeana and other domain aggregators on the handling of 3D content, Geographic Information and temporal coverage from early historic and prehistoric periods.

By bringing together representatives of all the stakeholders concerned with the archaeology/architecture domain from 20 countries across Europe, CARARE is well positioned to define a sustainable model and achieve a viable and extensible network and aggregation service after the end of the project funding. It will investigate the economic and organisational aspects of sustainability of the proposed aggregation service in the context of parallel developments of regional, national and domain aggregators and the long-term development of a Digital Research Infrastructure for the Arts and Humanities (DARIAH). Expansion of the network is foreseen with organisations in a number of countries (including France and Portugal) already having expressed interest in joining in the future.

In this way CARARE will continue to contribute to and support Europeana's coverage of archaeology, architecture and historic towns/places and its overall coverage of the European cultural heritage.

B1.2 Contribution to the European Digital Library initiative

The broad context of the proposed work of CARARE is the i2010 initiative and the objective to build a European Digital Library (www.europeana.eu), as a multilingual common access point to millions of objects for all European citizens.

At its launch in November 2008, Europeana provided access to more than two million books, maps, recordings, photographs, archival documents, paintings and films from all kinds of cultural institutions (libraries, archives, museums and other organisations). This was just the beginning; the quantities of

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digital content available and the numbers of institutions involved in the European Digital Library initiative have been steadily gaining in momentum through the activities of the Europeana Office and those of projects such as these recently funded through Community programmes: APENET (archives), EFG (film), ATHENA (museums), EuropeanaLocal (regional and local institutions), EUScreen (audiovisual archives), Biodiversity Heritage Library Europe (libraries), Europeana Travel (libraries) and Judaica Europeana (cross domain). To continue this expansion, Europeana needs to involve more scientific and cultural institutions of all kinds in supplying further digital objects.

CARARE will contribute to this expansion by involving content providers from across the archaeology/architecture domain in Europe. There is a rich variety of digital content in all media formats (including images, texts, multimedia resources, 3D and virtual reality models) available for heritage sites. More than 2 million digital objects have been identified in the initial survey by partners. The actual content that these partners will make available to Europeana via CARARE includes:

- archive items created by local citizens, visitors, scholars and scientists who have explored, described and depicted heritage sites since the earliest times, and also the
- photographs, measurements, drawings, reports, plans, maps, 3D and virtual reality models created by heritage agencies in support of their mission to manage and promote understanding of the heritage sites within their area.

3D and virtual reality

3D and virtual reality models are increasingly used in the archaeology/architecture domain to record, analyse and present complex monuments and buildings. Models such as the one of the Roman forum at Pompeii are highly interesting for education and tourism as well as for professional users. Such models are not yet represented in Europeana. The initial focus of the European Digital Library Initiative was on building a critical mass of textual and image based content with moving image and audio content being added through projects such as EFG, EUScreen and Europeana Connect. The Europeana first prototype (www.europeana.eu) was designed around these four major content types: images, text, audio, moving image. CARARE will add the 3D and Virtual Reality dimension to Europeana and in turn add high-quality and high-interest value content for Europeana users to explore and enjoy.

The initial content to be made available through CARARE includes 3D and virtual reality models of sites that are of high heritage interest at international, European, national and local level and feature most prominently:

- Virtual reality model of the Pompeii civic forum
- Virtual reality model of Ta' Hagraat Temple, Malta
- 3D scan of the fortifications at Gdańsk, Poland
- SVG plan of Silchester Roman town, UK
- 3D models and virtual reality reconstructions of the Paphos theatre, Cyprus

It is worth noting that the preparation of detailed 3D models of large built structures, such as the reconstruction of the theatre at Paphos, involves weeks of work on site, capturing accurate measurements of the structure and photographing the different parts, followed by further work in the laboratory to research, analyse and construct the model itself. The fieldwork archive consists of both 2D and 3D data that will also be made accessible to Europeana through the CARARE aggregator.

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The content to be made available through CARARE also features collections of 3D scans of archaeological objects including, for example, the 3D reconstructions of ceramic vessels from Andalucía in Spain.

CARARE will establish the framework for adding a critical mass of 3D/VR content to Europeana by defining the methodology for creating, harvesting and aggregating this content type, and contribute to the development of the Europeana Data Model. Building on work to develop the Europeana prototype, CARARE will test and evaluate a search facet for 3D and virtual reality for deployment in the Europeana portal. As well as harvesting 3D and virtual reality content from the archaeology/architecture domain, CARARE will analyse, implement and document the framework for integrating and presenting these formats in the Europeana.eu platform and establish a methodology for other domains and aggregation services in future. CARARE will actively seek new 3D/VR content providers as part of the expansion of the network.

Place and geographic information

The digital content that will actually be harvested by CARARE includes a large quantity of 2D content with metadata rich in geographic information. Archaeological monuments and historic buildings are places in the landscape and geographic information provides an important starting point for research and enquiry. Heritage agencies make widespread use of spatial metadata to provide map-based search services (GIS) and have developed standards, vocabularies and systems to support GI functionality.

CARARE will build on work carried out in the FP6 funded EPOCH project and work by the wider community on the CIDOC CRM to test, evaluate and document tools to support the mapping of rich heritage metadata to the metadata element set in use in the Europeana platform. CARARE will make an active contribution to the Europeana expert group and to work on the Europeana Object Model and on the Europeana Semantic Layer. It will contribute to the development of a repository of semantic resources for Europeana.eu by harvesting vocabularies, classification schemes and gazetteers.

Linkages and complementary content

The content harvested by CARARE will complement other content that is becoming accessible to Europeana through other aggregators. For example, television documentaries about landmark buildings and excavations of archaeological monuments are coming on-stream through the Video Active project, scholarly publications (through TEL, EDL and CENL) and local archives (through EuropeanaLocal) all complement the images, plans, drawings and 3D models accessible through heritage organisations. Place provides the linkage and the basis to connect together a wide range of cultural content in Europeana and to offer users a rich-integrated service.

The added value of the consortium

CARARE brings together a consortium that is willing and able to contribute experience and specific expertise to the development of Europeana. The coordinator, Kulturarvsstyrelsen (the Heritage Agency of Denmark) has wide experience through UNESCO, ICOM, CIDOC and HEREIN of heritage documentation and multilingual vocabularies, and of establishing aggregation services through its involvement in the ARENA2 project, has the experience and the professional profile to lead this project. MDR Partners have strong project management skills and wide experience of bringing European projects to successful conclusions. The EDL

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Foundation is a key partner in CARARE ensuring interoperability of content and technologies and in aligning the outcomes from Europeana v1.0, CARARE and other projects in the Europeana Project Group.

The consortium includes the Archaeology Data Service, possibly the organization in Europe with the greatest experience of aggregating digital content for archaeology and architecture through its UK operations and through European projects such as ARENA and DARIAH. Experience of the Aquarelle project and the CIDOC Conceptual Reference Model is brought to the consortium by the Digital Curation Unit, whilst the Science and Technology in Archaeology Research Center of Cyprus brings its experience of the EPOCH network of excellence, the CRM and the FP7-funded 3D-COFORM project (which is working on the production of 3D models of museum objects). Visual Dimension provides experience of the uses of 3D and virtual reality on heritage sites, standards and systems. While the National Technical University of Athens brings its experience of the Europeana.eu development environment, semantic analysis and the development of metadata mapping tools in the ATHENA project. The national heritage agencies and non-governmental organizations in the consortium bring their experience of heritage policy at national, European and international level (through the European Heritage Network, Europa Nostra and ICOM) and of national aggregation services (such as the Swedish Open Cultural Heritage Service). Archaeology museums, site museums and research institutions (such as the German Archaeological Institute) are also members of their consortium bringing experience of end-users and their uses of digital content from the archeology/architecture domain.

The consortium will have the ability to network within every European country through its professional and policy contacts, and through domain conferences. There will be a continuous effort to approach and involve more heritage institutions holding digital content for the duration of the project.

The quantity of heritage content will greatly increase as the network extends to include all heritage institutions in Europe and taking into account planned programmes to digitise heritage sites and related archival content in the years to come. CARARE will put in place the infrastructure needed to enable this network of institutions to contribute their content to Europeana.

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SECTION B2. IMPACT

B2.1a. Target outcomes and expected impact

The expected impact of this project over its three-year duration will be to:

- Establish a harvesting and aggregation service for the archaeological and architectural heritage which solves the issues surrounding making content from this domain accessible via Europeana and
- Make available to Europeana high quality content for Heritage sites from the heritage agencies and other content providers and thereby boosting significantly the total content accessible through the European Digital Library.
- Make recommendations on how to deal with the aggregation of 3D and virtual reality content and, in turn, make such content accessible via Europeana thereby enhancing the value of the service for users.
- Promote and support the establishment of a widespread and operational network of OAI-PMH repositories for the archaeological and architectural heritage consistent with the requirements of Europeana to aggregate content.
- Provide geospatial information on the locations of archaeological and architectural sites and the context for their discovery with related content potentially through map-based services.
- Work with the Europeana office and EuropeanaLabs to test, evaluate and implement services (e.g. metadata mapping tools, gazetteers, APIs) which enable the integration and reuse of archaeology/architecture content via Europeana for professional, research and commercial purposes.
- Establishing a Best Practice Network for the archaeological and architectural heritage which represents all the stakeholders including ministries of culture, heritage agencies, digital archives, aggregation services, museums, research institutions and SMEs and which can maximise the benefits and work together in developing an exploitation plan to sustain the activity in future.

The content which CARARE will aggregate for Europeana includes:

2003945	Images
1200	Video
3305	3D/VR
1128	CAD
4	Movies
1	DTM
20730	Text
1000	Maps
2030112	Total objects
268607	Monument inventory records

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B.2.1b. Underlying content

i) Content

This table lists the digital objects which the consortium undertakes to make available, identifying the quality and quantity of the digital content (and related metadata) to be contributed to the project by each content provider.

¹ Short name of the participant who provides the content

² E.g. Text, image, movie, sound, music etc.

³ E.g. 1,000 film clips, 2 million pages, 20,000 books etc.

⁴ E.g. Format - JPEG, MPEG, Quicktime, HTML, PDF etc., Quality – Resolution, sampling rate, colour/greyscale etc.

⁵ Access rights to use the content in the proposed project e.g. public domain or license

⁶ Describe current users of the content, including the number (e.g. registered users)

⁷ Describe fields, languages and structure of the metadata

Quantity and Quality of the Content								
Provider ³	Type ⁴	Quantity & Definition ⁵	Format & Quality ⁶	IPR ⁷	Current Use ⁸	Existing Metadata ⁹	Language	Additional Comments
KUAS	GIS, image	65,000 images representing 300+ sites	MapInfo & Microstati on GIS, jpg, tiff	Public domain © KUAS & The National Museum of Denmark	Currently only KUAS internal use	No URL available yet	Danish	Ruins from medieval and historical periods. Data from some of the sites useful for 3D reconstruction
KUAS	GIS, image, text	1000+ images representing C. 100 sites	MapInfo, jpg, tiff, html	Public domain © KUAS & The National Museum of Denmark	Currently only KUAS internal use	No URL available yet	Danish	Megalithic monuments. Data from some of the sites useful for 3D reconstruction
KUAS & The National Museum of Denmark	Image	500+ images	jpg	Public domain © The National Museum of Denmark	Used on line at The National Sites and Monuments record	Monument, artist, date. URL available	Danish	19 th century watercolours/drawings of ancient monuments in the landscape

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KUAS, Danish municipalities	Database, image	50,000+ images, 350,000+ records	Csv, html, jpg, GIS	Public domain © KUAS	Accessible on line on Danish Heritage Agency web site	Location, description, preservation value, construction date. URL available	Danish	Listed and protected buildings
KUAS	Database	190,000+ records	Html, csv, dbf, GIS	Public domain © KUAS	Accessible on line at The National Sites and Monuments record	Site type, description, date, location. URL available	Danish	National Sites and Monument Record – all sites
KUAS	Database, images	100,000+ images, 30,000+ records	Html, csv, dbf, GIS (GPS)	Public domain © KUAS	Accessible on line at The National Sites and Monuments record	Site type, description, date, location. URL available	Danish	National Sites and Monument Record – protected sites
KUAS	Web, database, image	5000+ images, 1001 sites	Html, jpg,	Public domain © KUAS	Accessible online 2010	URL available shortly	Danish, English, German	1001 heritage sites of national importance from ancient to historical times
KUAS	Web (Google Maps), database, GIS	c. 3,000 monuments	Html, GIS	Public domain © KUAS	Accessible on line on Danish Heritage Agency web site	Monument type, description, date, location. URL available	Danish	Commemorative monuments
KUAS	GIS (interpolation from field recorded data)	50+ sites represented	MapInfo & Microstati on GIS	Public domain © KUAS	Currently only KUAS internal use	No formal metadata – no URL available yet	Danish	Ancient, medieval and historical fortified sites. Data useful for 3D reconstruction
ADS	Video	c.50	.mov,.avi,.mpg	ADS deposit licence. (open access for non-	http://ahds.ads.ac.uk/ All ADS collections together receive	Metadata is based on the MIDAS	English	Scottish sculpted stones, African-Eurasian hominid

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				commercial use and free open distribution of resource discovery metadata). Copyright retained by the depositor.	around 800k page request per calendar month.	standard (based on and mapable to DC)		dispersal, Cypriot bronze age, English medieval.
ADS	3D	1	.vrl (vrmf)	ADS deposit licence.	As above	MIDAS standard	English	Scottish sculpted stones
ADS	3D	c.100	.vtk	ADS deposit licence.	As above	MIDAS standard	English	English Rock art.
ADS	3D	c.300	xyz (ascii)	ADS deposit licence.	As above	MIDAS standard	English	English Rock art.
ADS	CAD	c.500	.dxf	ADS deposit licence.	As above	MIDAS standard	English	Various (mainly UK excavation)
ADS	Image	c.2500	.tiff	ADS deposit licence.	As above	Subset of the MIDAS standard	English	Archaeology Image Bank e.g. Stonehenge
ADS	Image	15	.svg	ADS deposit licence.	As above	MIDAS standard	English	Silchester Roman town.
ADS	Text /Images	2019	PDF	ADS deposit licence.	As above	Subset of the MIDAS standard	As above	Various (mainly UK excavation) – Berkshire Archaeological Society
ADS	Text /Image	98	PDF	ADS deposit licence.	As above	Subset of the MIDAS standard	As above	Various (mainly UK excavation) – Discovery and Excavation Scotland
ADS	Text /Image	963	PDF	ADS deposit licence.	As above	Subset of the MIDAS standard	As above	Various (mainly UK excavation) – Medieval Archaeology.

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ADS: RCAHMS	Text,	270,000	XML	Public domain	http://canmore.rcahms.gov.uk Site is freely accessible and used by a wide range of users from professional, academic to the general public. There are about 50,000 users conducting around 130,000 searches conducted each year.	MIDAS Standard: Unique identifier, site name, location –Grid reference and Lat/Long. Admin areas, Classification (Subject, Period). Long text description, Associated bibliographic references	English	270,000 site location records for the National Monuments Record for Scotland and related Scottish material (including indexes to prints and drawings held in the RCAHMS collections.
ADS: RCAHMS	Images	115,000+ and growing	Two formats: 72 dpi 400dpi	RCAHMS copyright, Users may (1) download 72 dpi images (2) purchase High resolution images under licence	As above	Image ID Caption Date Collection name Associated people	English	Over 79,000 scanned images of material from the RCAHMS collections and 36,000 born digital images.
SNS	Image Movie (3D model)	Consists of: - Digital Terrain Model (DTM) - 13 Large structures - 322 findings	VRML 2.0 (for the geometrical model). JPG for the texture files	Creator of 3D: Politecnico of Milan (Dept. Staff of Prof. G. Guidi) Funding: ARCUS S.p.a. Owner and copyright holder:	The 3D model is used for research and is not yet available to the public.	In preparation	Italian	The Pompeii Civil Forum. The Forum is reproduced as is – the model documents the present state of the buildings without any reconstruction.

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		grouped in 209 files		Special Superintendence of Naples and Pompeii				
SNS	Text, Image	c. 1800 records describing ancient prints and drawings of Pompeii; c. 50 books on Pompeii	JPEG formats: Master (300 dpi) and a lower resolution for the web.	Database right: Scuola Normale Superiore. Copyright on the images is held by various bodies	http://pompei.sns.it Users are mainly scholars and researchers; the website is also visited by those interested in Pompeii.	Dublin Core metadata in an OAI repository.	Italian	Database and images on ancient representations of Pompeii and of its ruins.
STARC	3D model	15	various	Licensed	Research use – restricted access	In preparation	English	3D models of various archaeological components of the Paphos theatre. VR reconstructions of the theatre in different periods.
STARC	3D model	10	various	Licensed	Research use – restricted access	In preparation	English	3D models of the Famagusta Gate, Nicosia. Virtual reconstructions in different periods.
STARC	3D model	5	various	Licensed	Research use – restricted access	In preparation	English	3D models of a fountain in Paphos
STARC	3D model	10	various	Licensed	Research use – restricted access	In preparation	English	3D models of the church of Asinou.
STARC	3D model	15	various	Licensed	Research use – restricted access	In preparation	English	3D models of the burial archaeological site of Kouklia
STARC	3D model	500	various	Licensed (through agreement with	Research use – restricted access	In preparation	French	Gallo-Roman statues

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				C2RMF)				
STARC	3D model	200	various	Licensed (through agreement with C2RMF)	Research use – restricted access	In preparation	French	Greek and Roman vases
STARC	Images	100	various	Licensed	Research use – restricted access	Dublin Core	English	Archaeological excavations in Nicosia district
STARC	Images	120	various	Licensed	Research use – restricted access	Dublin Core	English	Archaeological excavations in Paphos district
STARC	Images	80	various	Licensed	Research use – restricted access	Dublin Core	English	Archaeological excavations in Larnaca district
HM	3D model	8 3D models	Wrl, x3d, mdl, dxf, 3ds, obj	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Virtual reality model of Ta' Hagraat Temple
HM	3D model	8 3D models	Wrl, x3d, mdl, dxf, 3ds, obj	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Virtual reality model (including georeferenced point clouds) of Ta' Skorba Temple
HM	3D model	10 3D models	Mdl, .mpg	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Mapped and mesh models (.mdl) and georeferenced point clouds of Ggantija temples (WHS)
HM	3D model	10 3D models	Mdl, .mpg	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Mapped and mesh models (.mdl) and georeferenced point clouds of Hagar Qim and Mnajdra temples (WHS)
HM	3D model	c. 100 3D	.wd	Pubic domain	Archaeologists,	In preparation	English /	Prehistoric artefacts

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		models			documentation specialists, web developers, HM CIO		Maltese	from World Heritage Sites (such as Fat Lady, Venus etc)
HM	3D model	Currently being produced	Wrl, x3d, mdl, dxf, 3ds, obj	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Virtual reality model (including georeferenced point clouds) of Hal Saflieni Hypogeum (WHS) – Still being scanned
HM	3D model	Currently being produced	Wrl, x3d, mdl, dxf, 3ds, obj	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Virtual reality model (including georeferenced point clouds) of Tarxien Temples (WHS) – Still being scanned
HM	3D model	Currently being produced	Wrl, x3d, mdl, dxf, 3ds, obj	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Virtual reality model (including georeferenced point clouds) of St. Paul's Catacombs – Still being scanned
HM	2D images	2000 - 3000	Jpg, TIFF	Pubic domain	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Digital Asset Management system to tag metadata with photos
HM	3D model	8 - 3D models	Wrl, x3d, mdl, dxf, 3ds, obj	Heritage Malta	Archaeologists, documentation specialists, web developers, HM CIO	In preparation	English / Maltese	Virtual reality model of Ta' Hagraat Temple
DCU: CETI	3D Scan and Model	3 models	VRML for 3D model JPG & PNG for textures	Licensed	Public - Non commercial usage	No formal metadata - URL available		Historical urban areas in the region of Eastern-Macedonia and Thrace, Greece. Under enhancement

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								and expansion
DCU: CETI	3D Scan and Model	1 model	VRML for 3D model JPG & PNG for textures	Licensed	Public - Non commercial usage	No formal metadata - URL available	Greek, English	The Byzantine Castle of Kavala, Greece
DCU: CETI	3D Scan and Model	1 model	VRML for 3D model JPG & PNG for textures	Licensed	Public - Non commercial usage	No formal metadata – No URL available		The Byzantine Church of the Asenovgrad Castle, Bulgaria
DCU: CETI	3D Scan and Model	2 models	VRML for 3D model JPG & PNG for textures	Licensed	Public - Non commercial usage	No formal metadata - URL available		Internal and external 3D reconstruction of two Byzantine Churches of Mani, Greece
DCU: CETI	3D Scan and Model	5 models	VRML for 3D model JPG & PNG for textures	Licensed	Public - Non commercial usage	CIDOC CRM	Greek, English	Virtual reality models of religious objects
DCU: CETI	Images	3000+ photos	JPEG, PNG, TIFF	Licensed	Public - Non commercial usage	No formal metadata – No URL available		Photographs regarding culture and nature from the Eastern-Macadonia and Thrace region of Greece
DCU: CETI	Images	1000+ photos	JPEG, PNG, TIFF	Licensed	Public - Non commercial usage	No formal metadata – URL		Images of cultural objects from private collections of

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						available		Emigrants from Eastern Thrace
Sw NHB	Historical Landscape Images	77 000	JPEG, max 768 px, 72 dpi	Licensed	http://www.kms.raa.se/cocoon/bild/about.html Wide range, researchers, students, individuals	See separate example XML file. We harvest a lot of data ourselves and will provide any subset required.	Swedish	Images from 1860s and onwards, landscapes, ancient monuments and historical buildings. Links to “Ancient Monuments” and “Historical Buildings”.
Sw NHB	Ancient monuments	1 700 000 (in 600 000 places)	text, GIS-data (point, vertex, polygone) for each item	Licensed	Professionals, researchers, students, occasional individuals	See separate example XML file. We harvest a lot of data ourselves and will provide any subset required.	Swedish	Text and high definition geographic data. Some 4-5000 also described by images. http://www.raa.se/cms/fornsok/about_fornsok.html
Sw NHB	Historical Buildings	60 000 (100 000 in a year).	text, GIS-data (point, vertex, polygone) for each item	Licensed	Professionals	See separate example XML file. We harvest a lot of data ourselves and will provide any subset required.	Swedish	Text and images on historical and modern “protected” buildings. Images of most of the objects. http://www.bebyggelseregistret.raa.se/cocoon/bbr/welcome.html
EN: Watwaswar	Images, Archival material Maps	918, 113		Public domain			Dutch	
EN:	Maps, text			Public domain			Dutch	

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HISGIS								
EN: Nai Archief C. Weeber	Image, 3D	28 project files	CAD	Public domain		ISAD; CDWA		Original CAD-design documents for architectural projects by Carel Weeber (1937)
EN: Nai _ archief DUIKER	Image	6200 images	TIFF	Public domain		ISAD; CDWA	Dutch	Archive of the architect Jan Duiker (1890-1935); contains 2450 drawings and 3750 written documents, available July 2010
EN: Nai _ tentoonstellingenraad	Image	1211 images	TIFF	Public domain		CDWA	Dutch	1211 photos of buildings, available December 2009
Nai _ maquetteverzameling	Image	1181 images	JPG	Public domain		CDWA	Dutch	Photos of the models in the NAI collection
CHA	Text and geospatial information	13,000 records	ESRI shape format (GIS)	Public domain with use restrictions	* Public authorities: * Organisations involved in heritage management, education and research * Landowners * The private sector:	Monument number, archaeological value, type, location, complex-type, period	Dutch	Archaeological sites in the Netherlands, some of them protected by law
CHA	Text and geospatial information	61,000 records	ESRI shape format (GIS)	Public domain with use restrictions	See above	Monument number, name, former function, type, location, description	Dutch	Registered monuments (built heritage) , protected by law, in the Netherlands

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CHA	Image	100,000 pictures (photographs)	TIF, JPEG	CHA domain with use restrictions	Private and public sector users: number thousands	ID, name, year, description	Dutch	Buildings, especially registered built monuments in the Netherlands
CHA	Image	50,000 drawings	TIF, JPEG	CHA domain with use restrictions	Private and public sector users: number thousands	ID, name, year, description	Dutch	Architectural drawings of buildings, especially registered built monuments in the Netherlands
KOBiDZ: Heritage Survey Unit	Images, Point clouds, 3D models, 2D plans.	JPEG: 2500-3000 PDF: 200 TIFF: 150 IMP: 50 VRML: 50 DWG: 50 The number of files per monument is approx: 500 jpeg, 20 pdf, 30 tiff, 1-2 imp files, 20 3D models. There is a list of 169 monuments, selected for scanning in near future.	JPEG (300 dpi) PDF (300 dpi) TIFF (300 dpi) IMP (20 mln points per scan) 3DS, DXF, VRML: 64000-300000 faces	KOBiDZ license	KOBiDZ archive	Polish geodetic network transferable to GPS coordinates, Date, Place, monument, city, community, district, province, Monument type	Polish	Sites include: Binarowa – church, Człuchów – castle, Dębno – church, Dobra Nowogardzka – castle, Frombork – cathedral interior, Gdańsk – fortifications, Gnojewo – church, Lipnica Murowana – church, Maleniec – metallurgic factory, Miękiśz Stary – Orthodox church, Olsztyn – viaduct, Sękowa – church, Stara kuźnica – forge, Warszawa - hermitage at Łazienki Królewskie (scan of façade), Warszawa – Markiewicza viaduct, Wilanów – palace, retaining wall,

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								Żarnów – church, Żółkiew – castle façade.
KOBiDZ - Section for Heritage Protection Policy	Text, image	150 pages, 300 photos	PDF, HTML JPEG,	KOBiDZ license	KOBIDZ staff	none	Polish	30 castles
KOBiDZ - Section for Heritage Protection Policy	Text, image	500 images, 2000 text pages, 1 book	JPEG, PDF, HTML	KOBiDZ license	KOBIDZ staff and network users	none	Polish	35 Historic Monuments (the highest rank of heritage designation in Poland) currently.
KOBiDZ - Section for Rescue Archaeology	Text; Image; Movie; Visualisations	c 200 text pages, c 1000 pictures, c 3 movies, c 15 3D visualisations	pdf, jpg, tiff, mov, avi, mpeg dwg, dxf	KOBiDZ license	KOBiDZ, archaeological museums and other institutions.	None Free text description of the site, its location, chronology, cultural attribution and the characteristic of finds and objects discovered.	Polish + English (summary)	Archaeological sites 50 archaeological sites will be chosen for the database. This will be fully excavated well- known sites, representative for Polish prehistoric and historic material culture. Pictures include: general views, aerial photography, finds and objects. Movies include documentaries and popular materials. Computer

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								reconstructions or visualisations of the sites and 3D models of archaeological objects are also to be included in the database.
DAI	Image	120.000 images (40.000 from FA, 80.000 from DAI-EMAGINES)	TIF, high resolution, greyscale	Public domain	Arachne	ARACHNE Metadata: Short description, dating, preservation, location, bibliography, category etc. Scan / File metadata Image metadata: DAI-Corefields: Administrative information DAI-IPTC-Concordance	German	Image Images are integrated in relational database – this means all the metadata is stored in fields of related object data sets.
MRBC	Image	c. 14,000 photos (actual and historical), plans and postcards	Jpeg	Cfr. www.irismonument.be	Research, administration, general public (± 30.000/month)	To be verified	French / Dutch	Remarkable buildings in the Brussels Capital Region: Bibliotheca Wittockiana etc.

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MRBC	Images	8,000 photos	Jpeg, tiff	Public domain	Research, administration, general public	None at present	French / Dutch	Protected buildings and sites in the Brussels Capital Region: e.g. Palais Stocklet, Grand Place, Botanical Garden, Maison Cauchie, ...
MRBC	Image	c. 15,000 photos	Jpeg, tiff, dng, thumbnail	Public domain	Research, general public	None at present	French / Dutch	Buildings in the Brussels Capital Region (photographs 1991-2007)
MRBC	Image	c. 25,000 photos	Jpeg, tiff, dng, thumbnail	Public and license	Research, general public	None at present	French / Dutch	Buildings in the Brussels Capital Region (photographs prior to 1991)
MRBC	Image	3,500 slides	Jpeg, tiff, dng, thumbnail	To be verified	Research, general public	None at present	French / Dutch	Heritage in the Brussels Capital Region (Fund Bastin-Evrard), e.g. the festival Hall Aegidium
MRBC	Image	20,000 postcards	Jpeg, tiff, dng, thumbnail	To be verified	Research, general public	None at present	French / Dutch	Heritage (buildings, city sights) in the Brussels Capital Region (Fund Dexia), e.g. the place De Brouckère, the Royal Parc
MRBC	Image	c. 5,000 photos	Jpeg	Public domain (website coming shortly)	Research, administration, general public	To be verified	French / Dutch	Remarkable trees in the Brussels Capital Region, e.g. the chestnut-tree (<i>Castanea sativa</i>) in the Drève des

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								Vendanges in the commune of Forest, an Oriental plane (<i>Platanus orientalis</i>) in the Parc Léopold
MRBC	Image	1500 photos and drawings	Jpeg, ai, dwg, dxf	Public domain	Research, general public	None at present	French / Dutch	Pictures and drawings of the archaeological excavations in the Brussels Capital Region (mainly rescue excavations)
MRBC	Image	5000 photos and drawings	Jpeg, tiff	Public domain	Research, general public	None at present	French / Dutch	Archaeological objects from the excavations in the Brussels Capital Region, dating from prehistoric till modern times (mainly rescue excavations)
MRBC	Image / GIS / Text	3600 GIS-related photos, postcards, maps, text	Jpeg, tiff	Public domain	Research, general public	None at present	French / Dutch	900 known archaeological sites (prehistoric times till 18 th century AD) in the Brussels Capital Region in GIS-context (text + image)
MRBC	Ortho photography	500 corrected photos	PDF / jpeg	licensed	general public	To be verified	French	Orthophotographic model of the Museum Van Buuren (www.alicelab.be/vanbuuren)
EVKM	Images, text	8600	JPEG	licence	Specialists, public users	Date, Description of	Estonian	4337 heritage sites including Tallinn Old

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						object, photographer/author, file name, access rights		Town, Tartu Old Town; Palmse Manor, Sagadi Manor, Kuressaare Castle, Narva Castle, Sangaste Castle and other sites.
NPU	Images	c 23 000 photographs, approx 60,000 by 31.12.2012	JPEG, PNG, TIFF, colour, b/w 200 – 600 Dpi	for non-commercial use unrestricted access	<u>non-public system:</u> staff of NPU and cooperating offices, cca 290 registered users, <u>public system:</u> unregistered internet users	own structure based on MS SQL database	Czech	photographs of cultural monuments, protected areas and other objects of interest in the Czech Republic
NPU	Image	currently 240, approx. 1000 scans by 31.12.2012	JPEG, PNG, TIFF, colour, b/w various resolutions	for non-commercial use unrestricted access	<u>non-public system:</u> staff of NPU and cooperating offices, cca 290 registered users, <u>public system:</u> unregistered internet users	own structure	Czech	Scanned historical pictures, maps, drawings of cultural monuments, protected areas and other objects of interest in the Czech Republic
NPU	semi text-image	currently 1240 files, approx. 3000 by 31.12.2012	PDF	for non-commercial use unrestricted access	<u>non-public system:</u> staff of NPU and cooperating offices, cca 290 registered users, <u>public system:</u> unregistered internet users	own structure	Czech	Professional documentation of cultural monuments, protected areas and other objects of interest in the Czech Republic
PUSR	Images	8,000	JPG, TIFF	Public domain	Students, staff, owners, public 2000 registered www – 500/month	CCO modified, Slovak,	Slovak	13,952 immovable objects – cultural monuments

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PUSR	Images	6,000	JPG, TIFF	Public domain	Students, staff, owners, church 2000 registered www – 500/month	CCO modified, Slovak	Slovak	31,220 movable objects - cultural monuments
PUSR	Images and maps in GIS	1,000	Images and maps in GIS	Public domain	Students, staff, owners, public 2000 registered www – 500/month	CCO modified,, Slovak	Slovak	28 Preservation area, 5 archaeological sites, 89 WHC
PUSR	Text			Public domain	Students, staff, owners, public 2000 registered www – 500/month		English	www.heritage.sk
PUSR	Images	27 609		Public domain	Students, staff, owners, public 2000 registered www – 11.000/month		Slovak	308,920 cultural monuments, sites www.pamiatky.sk
HMC-DNAM HMC Central and Regional Services	Text/ Images	c. 20,000 digital items	JPEG	Public and Licensed	Internal databases and cataloguing systems. No URL available yet.	Local data schemes.	Greek and English in a few cases.	National, cultural immovable archaeological monuments, architecturally important buildings and historic town centres.
HMC-DNAM	3D/VR	c.5	VRML	Public and licenced	Public use.	Local scheme	Greek, a few in English and German	Virtual tours of sites such as Dion in Macedonia, etc.
HMC-	Video	c.10		Licenced	Internal use	None	Greek and	Excavation videos

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DNAM							English	
IPCHS	Images	7,000	JPEG	Licence	open to public	Core Data		Cultural monuments of Slovenia
IPCHS	Multimedia object	700	Vrml, mpeg	Licence	open to public	Core Data		Key Cultural monuments of Slovenia
AHAI	Text, images	200 files	HTML, JPEG, KMZ	public domain	open to public	In-house metadata standards. DC metadata available	Icelandic - English translation planned.	Excavations in Iceland 2001-2009.
AHAI: NAHB	Text, images	406 files	JPEG, HTML	public domain	open to public	In-house metadata standards. DC metadata available	Icelandic - English translation planned.	Listed buildings in Iceland.
VUFC	Images	21,000 digitised photographic negatives	TIFF / JPEG	Public domain	Academic community mainly (currently access is restricted to library users)	Image metadata: Type of image, Type of object depicted; Author; Date of image; Site; when unpublished; when published; IPR to the object; IPR in the image; Links with persons; Links with	Lithuanian.	Photo archive of archaeological and architectural research in Lithuania in 1948–1969. It covers classical archaeological sites (of Stone, Bronze and Iron Ages), the Lithuanian Middle Ages (13 th –16 th) and major sites: Grand Duke's Palace Site and Lower Castle Site in Vilnius, Residential Castles in Trakai, etc.

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						other sites; Links with the sound entries; Links with other images; Collection		
NAIM	Images			© NAIM For professional and public needs	Part of the NAIM archive (used mainly by specialists and the authorities) www.naim.bg		Bulgarian. English	The black and white photos of the excavations and objects (1905- 1989)
NAIM	Images	1200		© NAIM For professional and public needs	As above		Bulgarian. English	The Treasure collection of the NAIM. 3D of 5 objects
NAIM	Images	850		© NAIM For professional and public needs	As above		Bulgarian. English	The Bronze statuettes in the collection of NIAM 3D of 5 objects
NAIM	Books, Images, virtual reconstruction	Books- 3000 copies 1		State property and NAIM rights	www.pop.bg ; www.cherga.bg		Bulgarian. English	Emporion Pistiros. National Reserve Pistiros. Virtual tour The excavations are in progress. Local museum
NAIM	Books, Images, virtual reconstruction	Books- 3000 copies		State property and NAIM rights	Public authorities: * Organisations involved in heritage management, education and research. www.sboryanovo.cl . bas.bg		Bulgarian. English	The Thracian Getic capital in Sboryanovo National reserve. A complex of sanctuaries, Hellenistic town, over 120 tumuli, Early Medieval

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					www.sic.mfa.government.bg			residence. A virtual tour
NAIM	Images, virtual reconstruction and 3D model	1		State property and NAIM rights	Opened for visitors. Public authorities: * Organisations involved in heritage management, education and research <i>natcomunesco.mfa.government.bg</i> www.sbornovovo.clbas.bg www.sic.mfa.government.bg		Bulgarian. English	The Getic capital in Sbornovovo reserve. 3D model of three Thracian royal tombs(The Sveshtari tomb- UNESCO monument and tumuli 13 and 30)
NAIM	Images, book – 3000 copies, 3D model	Books- 3000 copies		State property and NAIM rights	Public authorities: * Organisations involved in heritage management, education and research <i>www.visitbulgari.net/bg/pliska</i>		Bulgarian. English	Pliska - The Great Basilica. Pliska National Reserve. Virtual and 3d reconstruction
NAIM	Images, book – 3000 copies, 3D model	Books- 3000 copies		State property and NAIM rights	Public authorities: * Organisations involved in heritage management, education and research <i>www.museum-preslav.com</i>		Bulgarian. English	Great Preslav – the Second Bulgarian capital. Great Preslav National Reserve. Virtual reconstruction and 3D model of the central part of the city.
CAAI	Images	c.1200	JPG	Public domain	Accessible online	No metadata	Spanish	Black and white images of archaeological drawings of pottery

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								vessels
CAAI	Images	c.1200	JPG	Public domain (coming soon)	Personnel of CAAI, coming soon accessible online	No metadata	Spanish	Color images of archaeological drawings of pottery vessels
CAAI	Images	c.1200	PNG	Public domain	Accessible online	No metadata	Spanish	Black and white images of archaeological drawings of profiles
CAAI	3D models	c.1200	3DSMax	Public domain (coming soon)	Personnel of CAAI, coming soon accessible online	No metadata	Spanish	3D models of pottery vessels
CAAI	Videos	c.1200	AVI and FLV	Public domain (coming soon)	Personnel of CAAI, coming soon accessible online	No metadata	Spanish	Videos of pottery vessels
KNAW-DANS: EDNA	35,000 Datasets (with in total over 200,000 archival files)	7,000 database tables	Databases = csv	Public and restricted (free distribution within the Dutch archaeological community)	Researchers (archaeologists) Approx. 100 registered users	Qualified Dublin Core fields	Dutch and some English	Publications and primary data of archaeological research in the Netherlands or research by Dutch archaeologists abroad.
KNAW-DANS	Texts	13,000 texts	PDF	Public and restricted	Potential primary audience is the entire archaeological community in the Netherlands (1000 researchers) And all other researchers	Metadata for each individual file, variable and attribute is also available	Dutch	Archaeological research in the Netherlands
KNAW-DANS	GIS	40.000 GIS layers	GIS = mif/mid	Public and restricted	As above		Dutch	
KNAW-DANS	CAD	1,000 files	DXF	Public and restricted	As above		Dutch	
KNAW-	Images	150,000	TIFF	Public and	As above		Dutch	

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DANS		photos and scans		restricted				
KNAW-DANS	Images	2,000 images	SVG	Public and restricted	As above		Dutch	

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i) IPR issues

The clear expression of rights in digital content is needed to enable citizens to access and re-use the material discovered through Europeana, and is an important requirement for CARARE. It is important even though the objective of Europeana is to allow open access and much of the content provided by CARARE is in the public domain or with rights cleared, describing the rights attached to the content, as part of its metadata, is essential to assure users of which uses are permitted.

Much of the content identified by CARARE partners is made available to users under the terms of a licencing policy. Appropriate licencing policies create trust on the side of both producers and consumers; they define clear terms and conditions of use for the material, which is important even for freely accessible online content. The Creative Commons licence framework has been widely discussed for the clarity with which it allows copyright holders to describe to users the conditions under which they may use content. For example, a Creative Commons Attribution Non-Commercial Share Alike licence lets people use content as long as they credit the copyright holder and license any new material under the same terms. Individual content providers within the CARARE consortium have developed licences to permit re-use of their data, for example the Archaeology Data Service's Common Access agreement:

“asks that users be fair and reasonable in their use of the data supplied through the ADS. The ADS levies no charges, there are no documents to sign, and none will be applied retrospectively. We do not hold information on specific users. In return we ask that you acknowledge the source and copyright of the data you use, that you tell us of any errors you find in it, and that if you undertake any work based substantially upon it, that you tell us about it and send us a copy of any subsequent publication. The data must not be sold or supplied to a third party.

The data should only be used for teaching, learning, and research purposes. By teaching, we mean directed teaching undertaken with a designated tutor in a formal setting. By learning we mean self-directed study, whether or not attached to an educational institution, including the educational activities undertaken in museums, libraries and cognate institutions. By research we mean any work undertaken for the advancement of archaeological knowledge and/or the understanding of the historic environment. Such work may be commercially sponsored or it may be funded by academic bodies or learned societies, or it may be unsupported: but it is a condition of use that the results are placed in the public domain and are made freely available for others to use according to the normal principles of professional and academic practice.”

Other CARARE content providers have similar licences in place. There is a common wish to acknowledge the years of scholarship by many different people (archaeologists, architects, collectors, analysts, field workers and laboratory scientists) involved in advancing knowledge about sites which is expressed in analytic reports and visualised in 3D/VR models etc. There may be a complex mesh of moral rights and copyrights attached to the output from a major programme of research, but researchers and content providers wish to make these materials available for people to use.

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There is a need for a Licencing Framework for Europeana and a set of tools to address licencing issues and implement clear declarations of the rights status and permissions associated with Europeana content. In the longer term, it may be necessary for Europeana to introduce remuneration processes to enable access to charged-for content (e.g. publishers, high-resolution images, etc).

CARARE will support work by the Europeana IPR cluster to establish the IPR framework for Europeana content. It will identify any gaps relating to IPR in the archaeology/architecture domain or complex multimedia objects such as 3D/VR models and will contribute to testing, evaluating and promoting the outcomes of work undertaken by the Europeana Project Group on licencing frameworks and IPR tools.

iii) Multilingual and/or multicultural aspects

Europeana brings together digital content from institutions all across Europe and its services operate in a highly multilingual environment. CARARE will contribute to this by bringing content created in 20 original languages (Danish, English, Italian, French, Maltese, Swedish, Dutch, Polish, German, Estonian, Czech, Slovak, Slovenian, Icelandic, Lithuanian, Romanian, Hungarian, Spanish, Bulgarian and Greek). Both Europeana and its content providers wish all content to have the same level of discoverability to users regardless of language.

Achieving multilingual and multicultural interoperability is an important underlying principle of the Europeana service. This is not an insignificant task given the number of languages involved but it is one that can be approached on different levels and to which each project can make a valuable contribution.

Europeana has identified four aspects to multilingualism:

- User interfaces
- Browsing of the content using multilingual controlled vocabularies
- Translation of free text searches using multilingual lexica
- Translation of the search results using multilingual lexica

The main focus of work on multilingual information access in digital libraries has been on the language resources needed to support query translation. Several projects have worked on increasing the availability of multilingual terminology resources, for example the MACs project mapped subject vocabularies in different languages to support multilingual access to library catalogues, while the European Heritage network produced the multilingual HEREIN thesaurus or national policies dealing with architectural and archaeological heritage. Within the Europeana Project Group the EuropeanaConnect project plans to create a repository of language resources for Europeana which will gather together:

- Bilingual word lists
- Mappings between subject headings in different languages
- Multilingual controlled vocabularies

Such language resources may then be used within Europeana services to support cross-language information retrieval as demonstrated by research projects such as MULTIMATCH and TEL. There is a need for an ongoing effort to build up the available terminology

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resources to ensure the breadth and subject range needed to cover the linguistic and cultural diversity represented in Europeana's content.

CARARE will support work to build Europeana as a diverse and inclusive digital library that facilitates access to the cultural heritage by:

- supplying multilingual content representing the archaeology/architectural heritage of 20 countries and the diverse regions of Europe on which applications and services can be developed and tested; the language of each metadata record (metadata elements and will be registered to enable recognition in the Europeana interface.
- supporting the development of semantic approaches by contributing to the development and implementation of the Europeana Data Model;
- contributing to efforts to develop language resources for Europeana by converting multilingual vocabularies through SKOS to contribute to the development of query translation and other tools and in this way assist in providing multilingual access to Europeana;
- promoting and disseminating news and guidance of Europeana's policies, guidelines and services among holders of archaeology/architecture domain content, decision makers and other stakeholders at that level.

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B2.2. Long term viability

The aggregation service outlined in this project is a progression from work that has already been carried out on a smaller scale between countries and on national level. Its value is in bringing together efforts and stakeholders into a European Best Practice Network where ideas and expertise can be shared, relationships built, and a sustainable model for long term development established.

CARARE brings together the diverse range of stakeholders involved with the archaeology/architectural heritage including content-holders situated in national and regional administration, museums, Higher Education institutions and SME service providers. They represent many different funding channels and as many different models for maintaining services. This diversity presents both challenges and opportunities. There is no equivalent to the Conference for European National Libraries (CENL) for the archaeology/architecture domain able to establish a single channel for funding. But there is a rich mix of experience within the consortium of different funding environments and business models that means it is well positioned to establish a sustainable business model for CARARE.

2.2.1 Market analysis

CARARE proposes to carry out a broad analysis and review of viability and sustainability issues. It will look at its services in the wider context of digital curation and access to heritage data, and relationships with aggregation services being established at regional, national and domain level, the developing Digital Research Infrastructure for the Arts and Humanities (DARIAH) and with Europeana itself.

DARIAH's vision to facilitate long-term access to digital information on the European cultural heritage and the arts and humanities data for researchers is particularly relevant to both CARARE and Europeana. Part of the European Strategy Forum on Research Infrastructures (ESFRI) roadmap, DARIAH has been funded by the FP7 programme, to investigate the technical infrastructure and the business model needed to support its vision. Although the DARIAH business model is not yet established, from the outset the project has linked the provision of access to aggregated datasets with services to ensure long-term digital preservation. This approach is similar to the business models of national data centres, such as the UK's Archaeology Data Service and DANS in the Netherlands, where free access at the point-of-use is made possible by charging for the deposit of data for long-term digital preservation.

The evolving relationships between pan-European initiatives and national initiatives are also relevant to the context in which CARARE is establishing its services. Both DARIAH and Europeana are establishing links with initiatives at national level. DARIAH is beginning to be embedded into the national roadmaps for research infrastructures established by Ministries of Science. Europeana is building relationships with national culture portals being established by Ministries of Culture, such as those in France and Italy, and aggregating content from cultural institutions.

The underlying assumptions driving the development of these services include:

- Memory institutions are keen to make their digital information known to as wide an audience as possible.

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- End-users want to find and use digital content from across Europe and access tools to re-use and interpret this content.
- End-users want to exchange ideas and knowledge, and also to seek advice.
- Institutions are increasingly keen to collaborate with each other.
- Content creators have a desire to work to accepted standards and best practices.
- Content creators want to get help and advice on digitization, interoperability and preservation of data,
- Content creators/providers want to ensure the long-term preservation of data.

Target audience

The target audience of CARARE is the archaeology/architecture domain and all those who are interested in archaeology monuments and historic buildings. It addresses professionals working in heritage conservation and management, museum curators, researchers, amateurs with a specialist interest in archaeology/architecture, tourists interested in visiting heritage sites, teachers, students and general public audiences.

A segment of CARARE's target audience - researchers in field of the arts and humanities – is also served by DARIAH. Europeana's target audience is broadly defined and global in its reach and thus incorporates CARARE's target audience.

By acting as a Europeana aggregator for the archaeology/architecture domain CARARE will reach new audiences for its content providers.

2.2.2 Business model

CARARE proposes to investigate these complimentary areas:

Costs

Providing an aggregation services is not cost neutral to run, maintain or expand. Defining a cost model that clearly identifies the costs involved will be an important in defining the overall business model. There are costs involved in both providing content (making content available to the aggregator, initially and on an ongoing basis) and of maintaining the aggregation service. The cost model also needs to take into consideration, as far as possible, potential future developments such as expansion of the network to include new targets and technological changes.

Service models

CARARE has made no final assumptions about the mode in which its services will continue after the end of project funding. It will investigate a range of options for continuing the aggregation services in future including:

- CARARE develops as an independent service generating revenue from its user community.
- CARARE becomes an aggregation service integrated within Europeana generating revenue in tandem with Europeana.
- CARARE becomes embedded into DARIAH providing a bridge between the research infrastructure and Europeana for the arts and humanities.
- CARARE becomes embedded into national aggregators providing a channel for the archaeology/architecture heritage community to offer their content at both national and European level.

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Sustainable funding and exploitation planning

CARARE will investigate how the various service models might be facilitated by contributions from local, regional, national and international funding organisations and ministries, direct and in-kind funding from content providers and others, sponsorship, partnership with cultural heritage information infrastructure projects in the Higher Education, museum, library and archive domains, and through revenue generation from value-added services.

CARARE will investigate services that add value for its network of content providers and its target audience, and which may have the potential to either generate revenue or to attract revenue funding from sponsors. Areas to be investigated include:

- A GIS service that enriches metadata provided by an institution with the addition of spatial coordinates and in this way increasing its potential for re-use in tourism systems.
- Specialist services enabling the reuse of 3D/VR content by professional users.
- Community tagging tools that enable end-users to carry out local history research projects.

Supporting evidence

There is a great deal of evidence for the importance of heritage sites for tourism. For example, the EU's Tourism strategy notes the growing demand for tourism relating to the cultural and natural heritage. Information about heritage sites has great potential to increase the diversity of European tourist destinations and an important role to play in sustainable tourism by promoting understanding and the visibility of the less-known sites.

As well as being important for tourism, there is also strong evidence of interest in research into the history of their local area by citizens. Raising awareness and increasing understanding of heritage sites amongst the people living in an area has become an important aspect of conservation policy for national agencies and a driver for the publication of information about sites on the Internet.

The CARARE consortium is confident that, given the supporting evidence for the importance of data about heritage sites to the tourism industry and for heritage conservation and education there is good potential to develop a viable, sustainable service after the end of the project funding.

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B.2.3. Wider deployment and use

Networking capacity of the consortium

The EDL Foundation (EDLF) may be seen as the key to ‘clustering’ activity in the current context of Europeana as it brings together the projects, networks, associations, consortia, councils and federations with a stake in Europeana. The Foundation is a key partner in CARARE and will ensure good communications are in place between the experts working in Europeana v1.0, CARARE and the other projects in the Europeana Group (see figure below). This comprises a number of projects run by different cultural heritage institutions, which are all part-funded by the European Commission. Over the next 3 years these projects will contribute content and core technology solutions to Europeana.eu

As described throughout this document, CARARE aims to play an important role in contributing to the definition of standards, infrastructure, technology, recommendations and guidelines for Europeana and interoperability within the European Digital Library environment.

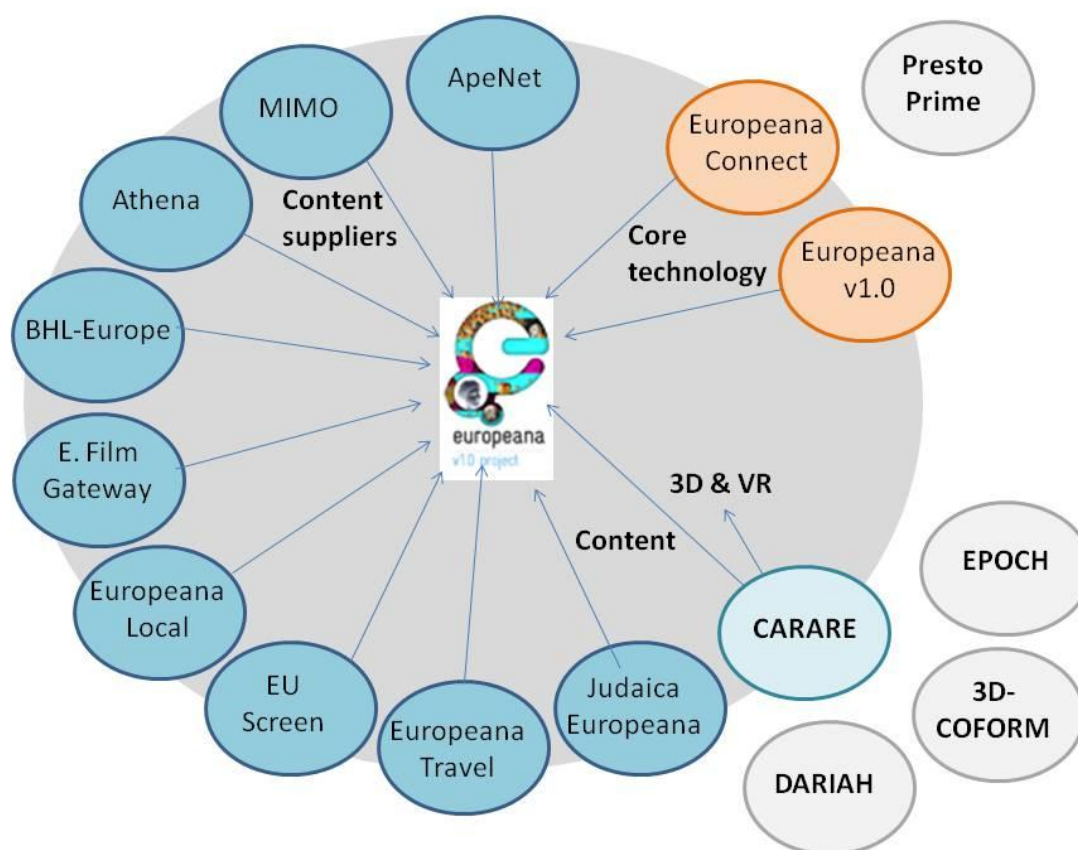


Figure: The Europeana Group of projects

A major part of the raison d’etre for CARARE is to enable the inclusion of the network of organisations responsible for archaeology, architecture and historic environment content (including 3D and virtual reality content) within the framework of Europeana. CARARE will contribute the expertise of the consortium to that of the projects within the Europeana Group, sharing, developing and documenting tools to enable them to be implemented and exploited by heritage institutions with the support of the CARARE network. It is proposed that

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CARARE's technical developers test and prototype tools within the Europeana Lab environment thus enabling the knowledge and experience of the archaeology/architectural heritage domain to be shared with other developers in the Europeana project group. CARARE will contribute to Europeana's user interface design and to the User Testing Panel and focus groups which operate to gather feedback on user needs. The project will also collaborate with the EDLF office and the project group on disseminating news about Europeana developments to the wider heritage community.

The coordinator, Kulturarvsstyrelsen (the Heritage Agency of Denmark) is a relatively new organisation (established 2002). During its existence it has been engaged in a number of international organisations like UNESCO, ICOM, CIDOC and HEREIN as well as in the EU projects LANCEWAD (Interreg III), ARENA (Culture 2000) and its successor project ARENA2. Members of the staff have a long record of international and national collaboration within the field of cultural heritage and information technology. The Agency is the national aggregator on digital information concerning archaeology, architecture and museum collections (art, and cultural history) and has been among the pioneers in Europe in opening up the databases to the general public using the Internet.

The partners Data Archiving and Networked Services, Archaeology Data Service and Digital Curation Unit participate in the Digital Research Infrastructure for the Arts and Humanities (DARIAH), which is part of the European Strategy Forum on Research Infrastructures (ESFRI) roadmap and funded through FP7. DARIAH's mission is to facilitate long-term access to and use of humanities and cultural heritage digital information in Europe for research. Currently in its preparatory phase, DARIAH is investigating both the technical infrastructure and sustainable business models to support long term provision of services. It is likely to contribute research data for the Arts and Humanities to Europeana.eu in future. The Archaeology Data Service and Digital Curation Unit bring their knowledge and expertise in research infrastructures and sustainability to the CARARE network. CARARE wishes to bring this experience (and research capability) to the Europeana clustering fora.

Members of the project consortium have participated in other leading EU networks (including EuropeanaLocal, Europeana v1.0, PULMAN/CALIMERA, MICHAEL, MINERVA, Athena, Europa Nostra) which maintain contacts at national and/or regional level.

Dissemination & awareness activities

CARARE will work in very close collaboration with EDL Foundation in its dissemination activities. The brand which CARARE and other projects in the Europeana project group will mainly promote will be that of Europeana itself. The CARARE dissemination team will participate in the "Europeana Communications Working Group" coordinated by Europeana v1.0, which will make sure there is good communication between the projects and avoid duplication or confusion. CARARE will have its own work plan and deliverables.

A dissemination plan will be established to raise awareness amongst archaeology/architecture content holders of the positive conditions for contributing content to Europeana and to give a persuasive demonstration of best practice thus ensuring optional use of the project results beyond the participants in the project. The objectives of CARARE's dissemination activities will be:

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- To raise awareness among the archaeology/architectural heritage stakeholder community in Europe of the issues and new developments relating to interoperability, the delivery of content and access and user services with the aim of extending the network;
- To disseminate news about the project's activities to the archaeology/architectural heritage stakeholder community through the network of content providers to institutions in their own country and also through related projects and initiatives (such as Europa Nostra, the European Heritage Network etc) to institutions in related areas;
- To achieve widespread and high quality access to CARARE's results and related developments (such as news about the Europeana.eu platform and from other projects working in the same field) through the project's dissemination website, news and distribution facilities to a high proportion of archaeology/architectural heritage content owning institutions and their sponsoring authorities in Europe;
- To raise awareness of CARARE's activities through relevant professional journals;
- To create a conference and workshop plan.

The CARARE website will become available from Month 2 of the project. It will be closely linked with Europeana.eu, EDL Foundation, Europeana v1.0, Europeana Connect and those of other projects in the Europeana cluster. The website will:

- Enable partners and stakeholders to communicate with each other through on-line forums, email lists and remote conference broadcasts, and to access documents, such as deliverables, reports, agendas, meeting minutes, comments etc.
- Support the needs of the external archaeology/architecture community audience enabling users to access guidelines, briefing papers, reports, video and audio files and to register with the site to receive newsletters and updates.
- Allows for the creation of RSS feeds to enable content to be syndicated.
- Have a highly scalable technical architecture based on Open Standards and Open Source technologies that provide document management and content management features and stores content in XML to allow for re-purposing for mobile devices etc.
- Support version control and provide mechanisms for auditing additions and changes.
- Support multilingual sub-sites enabling easy creation and consistent management of other language versions of content using the UTF-8 character sets.
- Support the W3C WAI specification for accessibility.

The CARARE coordinator will actively support the creation of reflector web pages, hosted for example by partners in the Best Practice Network, especially where dissemination can be enhanced through the provision of key information in national languages.

An attractively designed newsletter will be produced and distributed to the stakeholder database by email three times a year in English and translated into other major languages where necessary. The newsletter will provide updates on progress and interesting news in the CARARE interest area. Each issue will showcase important developments in individual countries and regions. Progress reports will be published and distributed to stakeholders at the end of each year and at the end of the project.

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The results of the project (tools and practical guidance on interoperability with Europeana.eu) will be open for adoption by other organisations wishing to join the CARARE network. The precise timing of opening the CARARE execution environment to other content providers will be determined during the second year of the project.

CARARE will have a standard template for partners to use when giving presentations about the project.

Events and meetings

CARARE will organise a programme of activities including:

- CARARE partners from each country will organise a national workshop in conjunction with appropriate partners in the archaeology/architecture domains, e.g. national heritage agencies, nongovernmental heritage conservation bodies and research institutions. Other providers of archaeology/architectural digital content in their country will be invited, together with content aggregators and other strategic players. The main purpose of the meeting will be to advocate the contribution of content/metadata to Europeana, explaining the benefits and how this can be done, and to discuss sustainability of the network taking into account national, regional and domain level aggregation and business models.
- CARARE will coordinate presentations, poster sessions and workshops at relevant conferences, such as the international Computer Applications in Archaeology (CAA) conference, the European Archaeology Association Conference, the Virtual Systems and Multimedia Conference (VSM) and the VAST conference with the purpose of promoting the results of the CARARE project, contribution of content to Europeana and exploitation of its services.
- CARARE will be represented at events organised by related projects and at clustering events organised by the Commission.

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SECTION B3. IMPLEMENTATION

B3.1. Consortium and key personnel

The consortium includes content providers, aggregators/country coordinators and suppliers of technical or other specialist expertise.

P.1 Kulturarvsstyrelsen (Heritage Agency of Denmark), Denmark (Coordinator)

The Heritage Agency of Denmark (Kulturarvsstyrelsen) is a body under the Ministry of Culture. The Agency, which was established 2002, has the regulatory responsibility for archaeological sites and monuments, listed buildings, state-subsidised museums and national databases on museum collections, archaeological sites and listed buildings. The Heritage Agency participates in national and international projects for the mapping, preservation and dissemination of Denmark's cultural heritage.

The Heritage Agency holds the overall responsibility for the protection of ancient sites and monuments (including submarine sites and ancient shipwrecks), and for the archaeological excavations undertaken by Danish museums. It is also in charge of the care and restoration of prehistoric and historic monuments and ruins. The Agency is responsible for listing buildings of national significance; it must grant permission for any construction work on listed buildings, offers advice and information on maintenance of buildings, and also contributes to funding the restoration of listed properties. The Agency administers state subsidies for approximately 140 Danish museums and offers advice on museum activities and coordinates and assesses the quality of the museums' work.

Spatial planning and experience economy are areas of special focus for the Agency during the present contract period with the Ministry of Culture (2008-2011). The work includes close contact to the local and regional administrative bodies in Denmark on strategies and planning works concerning the cultural heritage. Projects on cultural heritage and tourism as well as internationally aimed storytelling related to sites of prehistoric and historic importance also have a special focus. The Agency is the official contact for the UNESCO listed World Heritage Sites in Denmark and Greenland.

The Heritage Agency operates a number of major national databases of sites and monuments, archaeological finds, listed buildings and buildings worthy of preservation, as well as the Danish museums' collections of art and cultural history. The Agency has been among the pioneers in Europe in opening up the databases to the general public using the internet. The strategy also includes the use of open source and web services.

During the last years the Agency has been the lead partner in national collaboration among archives, museums and libraries (ALM) including works on standards, metadata and the specification of a common ALM standard (called dkabm) based on Dublin Core.

The Agency has also been actively involved in the preparation of the newly published report from the Ministry of Culture on digitisation of the Danish cultural heritage (2009).

During its relatively short period of existence the Heritage Agency has been engaged in a number of international organisations like UNESCO, ICOM, CIDOC and HEREIN as well as in the EU financed projects LANCEWAD (Interreg III), ARENA (Culture 2000) and its successor ARENA2.

Key personnel

Henrik Jarl Hansen is head of Documentation, Archaeology and System Development at the Heritage Agency of Denmark. He has a degree in prehistoric Archaeology from the University of Copenhagen and courses from The Danish School of Public Administration. Henrik has worked for more than 20 years in the fields of archaeology, heritage management and information technology.

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This includes positions as curator at the Danish National Museum and as head of the National Record of Sites and Monument. He has a long record of international collaboration including membership of Documentation Committee (CIDOC) within the International Council of Museums (ICOM). Here he has served as editor and chair of the Archaeological Sites Working Group and has also been program coordinator for more international conferences. Henrik has written many publications within the field of Archaeology, Cultural Heritage, Information Technology and their combination. In CIDOC he contributed to the Core Data Standard for Archaeological Sites and Monuments and the Multilingual Thesaurus on Bronze Age Monuments (in collaboration with the Council of Europe). He was the national coordinator for the EU Culture 2000 project ARENA and he has also been sub-project coordinator for the Danish research projects “Changing Landscapes” and “Agrar 2000”. At present he is chair of a group of experts working on collaboration among archives, museums and libraries and has been part of working groups within the Ministry of Culture on long term preservation of digital data and digitisation of the cultural heritage.

Christian Ertmann-Christiansen is Head of Development at the Heritage Agency of Denmark, where he has worked since 2002, focusing on modernising the agency’s IT systems and services and bringing them into a service-oriented architecture. From 1998 to 2001 he worked as an IT consultant at the Danish IT Centre for Education and Research with diverse tasks that included project management, systems development and usability studies. He holds a B.Sc. in Computer Science and Mathematics from the University of Copenhagen, did 2 years of Ph.D. studies at the Georgia Institute of Technology, and has studied Political Science at the University of Aarhus.

Kristine Hoff Meyer is a Project Manager and has an MSc degree in Information Science from City University in London (1999) and an MA degree in Art History from Aarhus University (2000). She has worked for a number of years in the telecom industry as an IT project manager, before joining the Danish National Heritage Agency in 2007. Kristine is skilled in project management, requirement specification, user interface design and usability testing. At the Danish National Heritage Agency she is responsible for the management and development of the two web based IT systems, which holds the national registers of protected building and archaeological sites and monuments.

Claus Dam, System development and GIS expert. Claus has a degree in Archaeology from the University of Århus plus a degree in Computer Science. He has mainly worked with GIS and database issues related to national heritage management at the National Museum and later The Heritage Agency. Claus has been involved in a number of large national and international projects with a focus on research/heritage management/dissemination of heritage information: “Changing Landscapes” (a multidisciplinary nature/cultural history project), “Nordic Handscape” (dissemination of location based heritage data using mobile phones), ARENA (Archaeological Records of Europe – Networked Access), “DigDag” (Digital Historical Atlas of Administrative Divisions). He has authored or co authored a number of papers in national and international peer-reviewed publications and on a national scale he is active in a number of networks. His present work at the Danish Heritage Agency continues to have a GIS, systems development and database focus, but with a growing bias towards the use of historical maps and historical and modern aerial photography.

Erling Soby is Head of the Economic Section at the Heritage Agency of Denmark and holds an MSc in Public Administration from Roskilde University. He has been employed in the former County of West Zealand working with the Planning Act. In the Command of Stores under the Naval Defence he worked with building planning and financial management. In the former State Information and IT- and Telecommunication Agency ES worked with financial management. Erling works with budgets; follow up on economics, reporting and submission of accounts, and has on several occasions participated in project management. Since 2007 he has been at the Heritage Agency of Denmark as head of the economic section. He has here participated in the Agencies handling of the EU financed project LancewadPlan (Mapping the Landscape and Cultural Heritage in the Wadden Sea Region).

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Anders P. Simonsen has 19 years of practical experience in the field of economics budgets and accounting. He has been employed in the now closed State Information & IT and Telecommunication Agency with financial management and accountant. He has a BCom in accounting and a diploma examination in state accounting; budgets and appropriations. He has also taken different training programs within economy and accounting. Anders P. Simonsen has participated in the Agencies handling of the EU financed project LancewadPlan (Mapping the Landscape and Cultural Heritage in the Wadden Sea Region).

P.2 MDR Partners, UK (Project Manager)

MDR will carry out day-to-day project management and will also lead the CARARE dissemination work. It will lead WP 1 and 6.

MDR is an SME which since its formation in 2000 been centrally involved in developments to establish a strong presence for Europe's local cultural institutions and their content and new services in the digital environment. It has in particular been the scientific co-ordinator/project manager of important networking and best practice promotion activities under IST which have involved partners from every member and candidate country. These have included CALIMERA (Cultural Applications: Local Institutions Mediating Electronic Resource Access) under FP6, PULMAN and PULMAN-XT (FP5). MDR is co-ordinator of the EuropeanaLocal is a Best Practice Network project under eContentplus, which is designed to help local and regional libraries, museums, archives and audio-visual archives to make content available through Europeana and deliver new services. MDR is also co-ordinator of the ePSIplus Thematic Network under the eContentplus programme, which is supporting development of the European Agenda on the re-use of Public Sector Information, following transposition of the related European Directive into member state's legislation. Each of the actions described above has involved the creation of extensive and well-used web dissemination and content management facilities, the organisation of conferences and other high impact dissemination activities, most of which have been co-ordinated and implemented by MDR.

MDR was also a leading participant in the SEAX-DAMAS take-up trials project (FP5) to demonstrate enhanced access to the digital content of local and municipal archives Outside the CH sector, MDR has also participated as a number of research projects including the DIP Integrated Project (FP6) the objective of which has been to develop and extend Semantic Web and Web Service technologies in order to produce a new technology infrastructure for Semantic Web Services (SWS). Working with Essex County Council in the UK, MDR played a leading role in assessing requirements, developing an Emergency Planning prototype within eGovernment, using SWS which following MDR's work on dissemination was short listed for the Semantic Web Challenge at ISCW 2006. MDR was also a partner in eMapps.com, a technology enhanced learning project under IST FP6 which addressed the needs of the schools and informal (libraries, museums) sector for access to cultural content in the context of games-based learning.

Key personnel

Robert Davies is an experienced leader and manager of European IST projects and networks in the CH sector since 1994 and spanning IST FP3 to FP7. He initiated and led European projects and actions such as DECIDE (FP3), PubLiCA-CEE (FP4) PULMAN (FP5) and CALIMERA (FP6), and is the co-ordinator of ePSIplus I (eContentPlus) and EuropeanaLocal (eContentPlus) as well as participating in a number of projects. He has a first degree in European literature and history and a master's degree in library and information science.

Kate Fernie has extensive experience of ICT and digital resources for the historic environment and cultural sectors and with EU-funded projects. She brings her experience of managing European IST projects for the Museums, Libraries and Archives Council (MLA) in actions such as CALIMERA (FP6), MINERVA (FP5), BRICKS (FP6), MICHAEL (eTen) and MICHAEL Plus (eTen) as acting as expert advisor on standards, documentation and training. She has a first degree in archaeology and anthropology and Masters degrees in museum studies and landscape archaeology.

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Sheena Bassett has over 18 years experience of managing and participating in European funded research projects relating to IT, publishing and the Internet. She was the project manager for the original QUATRO project and continues in this role for the follow-on project QUATRO Plus. Her professional experience covers content and rights management, public sector information, electronic publishing technologies and content labelling as well as editing websites and newsletters. Her qualifications are BSc General Science, HC Optoelectronics and a MBA from City University, London.

Luc Chase has over 18 years IT experience including business systems analysis and design, technical architecture, and development. He brings a broad range of experience and knowledge with a balanced approach to the use of technology, including open source solutions for use on the web. He has previously worked on web-based facilities for the European Bank for Reconstruction and Development, Office of the Deputy Prime Minister (UK) and several European projects including ePSIplus (eContentPlus) and the LIGHT Operation (Intereg IIIC) to promote Cultural Heritage applications.

Carol Usher has worked as a member of the project administration team for MDR since its inception, recently working on CALIMERA and is currently working on ePSIplus. Carol's qualifications and experience lie within the fields of website design, graphic design and templates for EC network projects and industrial product design. She has been responsible for the design and technical aspects for a succession of MDR Partners' websites and has created visual designs for large EC Network projects including reporting templates, PowerPoint presentations, newsletters, and other project communication templates.

P.3. Stichting European Digital Library (EDL Foundation), NL

The EDL Foundation is a cross domain foundation under Dutch law founded in 2007. The aim of the foundation is to foster collaboration between Museums, Archives, Libraries and Audiovisual collections in Europe. It aims to provide access to Europe's cultural heritage by facilitating formal agreement across museums, archives, libraries and audiovisual collections on how to cooperate in the delivery and sustainability of a joint portal, europeana.eu. It also provides a legal framework for use by EU funded projects to bring their research and or content into Europeana.

Its current Board of Participants is made up of pan-European Associations from the 4 domains able to represent and mobilise their members to contribute and form part of EU funded projects aimed at creating an operational service and sustainable business model for Europeana.eu. These associations are EURBICA, FIAT, ACE, EMF, ICOM Europe, CENL, CERL, LIBER, MICHAEL, the Koninklijke Bibliotheek from the Netherlands, INA, the Bundesarchiv and Bibliothèque National de France. The Board of Participants has elected an Executive Committee which is responsible for making decisions on behalf of the Board of Participants and for the legal and financial running of the Foundation.

The EDL Foundation is the coordinator of the Europeana v1.0 project and a partner in the European Film Gateway (EFG), EuropeanaLocal, APENet, Athena, BHL, Europeana Travel, Europeana Connect, EU Screen, Judaica and PrestoPrime. The EDL Foundation also works closely with other EU funded projects.

Key personnel

Jill Cousins – Executive Director EDL Foundation

Jill Cousins is the Executive Director of the EDL Foundation and the Director of The European Library. Successes to date include the creation of the operational service of The European Library (www.theeuropeanlibrary.org) and the prototype of the European Digital Library (www.europeana.eu)

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Jill Cousins has a strong web publishing background, having worked for VNU as their European Business Development Director and then translated the lessons learnt from commercial business-to-business publishing to scholarly publishing working for Blackwell Publishing and several other academic publishers in the UK. Prior to her publishing career, she worked in the online environment for many years, first as researcher with her own company specialising in providing business information to large corporate companies. The company still exists 20 years later, owned by Thomson Financial and known as Thomson First Contact. After selling this company Jill worked as the Marketing Director for Online Information. She has been involved in several international publishing industry bodies, such as CrossRef and COUNTER.

Now combining the skills of web publishing, marketing, research knowledge and business development she heads the growing European Library and Europeana. Jill holds a Geography degree and a PhD in 16th Century Arabic and Turkish Sea Charts.

Karin Heijink – Business Development Director

Karin Heijink is the Business Development Director for Europeana and is responsible for developing a sustainable business model for the service. This will include securing funding from Member States and the Commission and also developing commercial revenue streams. Karin directs the marketing, communications and PR strategies, focusing on delivering Europeana's key objectives. Critical to achievement of these is the maintenance of strong relationships with stakeholders in the Commission and Member States and with technical and contributing partners.

For nine years prior to joining the Europeana core team in November 2008, Karin worked for the Discovery Channel, becoming Channel Director for Emerging Markets in 2005. She directed all product aspects of the networks, including programming, on air, marketing and PR. She developed new channel concepts and through the years has launched channels all over Europe. Most recently she was responsible for launching the dedicated Russian channel in 2008 and the Discovery Channel, Animal Planet and Travel & Living in Turkey in 2007, which have consistently outperformed the market and competitors in channel performance, revenue and viewing figures.

Karin took her MA in Art & Cultural Studies at the Erasmus Universiteit, Rotterdam, and wrote her dissertation on the influence of EU competition laws on the television industry. She is also a qualified teacher of art and art history.

Bram van der Werf – Technical Director

Bram van der Werf is Technical Director at Europeana responsible for the development and build of the Europeana prototype and the operational service under Europeana v1.0. Bram brings with him a wealth of experience in managing software development projects. Prior to his appointment at Europeana he was a management consultant expert/advisor on Software Development Best Practices for Open Source and Collaborative Technologies. He has many years experience managing large scale projects and organizations on the edge of users, technology practitioners and implementing state of the art technologies.

Over the years he held several Director and Senior Management positions in Software and Services Industry with companies such as Rational Software, Progress Software and IBM Application Management Services. His focal points of knowledge and business experience are Quality and Risk Management.

Julie Verleyen – Scientific Coordinator

Julie Verleyen is the Scientific coordinator for Europeana v1.0 and related projects. She plays a key role in aligning all projects related to Europeana with regards to the development and data requirements, understanding and communicating where new technologies developed in projects are of use to Europeana and vice versa and the development and communication of environments, workflows and processes for projects to deliver content to Europeana

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She studied in France at the universities of Lille and Grenoble where she graduated in cell biology and physiology in 2001. She focused her interest on bioinformatics and took a degree in computer science in 2002. After a work experience in software development and molecular modelling in the biotechnology industry (2003), she moved to the Netherlands and started at The European Library office as programmer and technical assistant. Since the beginning of The European Library as a service Julie was involved in all technical and managerial processes aiming at specifying, building and testing the portal, incorporating the collections, developing and maintaining the central index and providing support to partners for the technical areas. She took part in all projects associated with The European Library: TEL-ME-MOR, TELplus. and played in key role in the EDLNet the project that delivered the prototype for Europeana.eu

P.4 Archaeology Data Service, UK (Technical expertise and content provider)

The Archaeology Data Service (ADS) is situated in the Department of Archaeology at the University of York in the UK and is funded partly by the UK Arts and Humanities Research Council and partly by project based funding drawn from academia, the European Union, National and Local Government archaeology services and commercial archaeology. The core objective of the ADS is to support research, learning and teaching with high quality and dependable digital resources. It does this by preserving digital data in the long term, and by promoting and disseminating a broad range of data in archaeology. The ADS promotes good practice in the use of digital data in archaeology, it provides technical advice to the research community, and supports the deployment of digital technologies.

The ADS archives and provides access to many thousands of files comprising a broad range of archaeological material in the form of excavation and fieldwork project archives, digital versions of archaeological journals (including the *Proceedings of the Society of Antiquaries of Scotland* and the *Journal of Medieval Archaeology*) as well as numerous resources designed for reference or for teaching and learning in archaeology. The ADS created and hosts a series of *Guides to Good Practice* for the archaeological practitioners on topics ranging from geophysical prospection to Virtual Reality modelling. A core ADS resource is the ArchSearch search engine that allows the discovery of not only all ADS resources, but also from the national monuments records of Scotland, England and Wales and a number of other national and local archaeological databases.

All material hosted by the ADS is freely available to all for *bona fide* research, teaching and learning purposes and is covered by our terms and conditions of use.

The ADS is actively involved in a number of research and development projects. These projects currently include the EU funded VENUS: Virtual ExploratioN of Underwater Sites project and the DARIAH: Digital Research Infrastructure for the Arts and Humanities project. The VENUS project involves us in work with a number of European partners and centres on research into the particular problems of data management in large scale marine archaeology and VR projects. The DARIAH project aims to create large scale integration in the sphere of digital research output preservation. Our role in this project is to bring to service a trans-national archaeological data-aggregation service based on the ARENA: Archaeological Records of Europe Networked Access demonstrator project originally completed by the ADS with six European partners in 2004. The ADS contribution to the ACE project will be wide ranging, concerned mainly with the development of international standards and best practice; it may also include an exemplar digital archive for one of the proposed project excavations. We will be centrally involved with both the assessment of recommendations on European wide archaeological data management and access as well as taking a lead role in disseminating best practice in digital publication and preservation. It is also under the auspices of the ACE project that the ADS will be developing and hosting a Universal Description, Discovery and Integration (UDDI) registry service to allow broader and richer access to archaeological resources via web services. This complements the work that the ADS is proposing for the DARIAH project.

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Key personnel

Prof Julian D. Richards MA, PhD, FSA, MIFA

Professor Richards is an internationally renowned authority on the uses of information technology in archaeology, having worked in archaeological computing for more than 20 years. He is professor of Archaeology at the University of York and maintains an active research interest in Viking Archaeology. As co-founder and co-director of the electronic journal Internet Archaeology, and founder and director of the Archaeology Data Service he has been at the forefront of web-based publication in archaeology for more than a decade. His publications include a number of practical guides in the digital preservation for archaeology, such as 'Excavation and Fieldwork: a guide to Good practice' and 'Creating and Using Virtual Reality: a guide for the Arts and Humanities'. He has acted as an advisor on digital preservation to numerous archaeological partners across Europe, North America and Australia, and led the successful ARENA (Archaeological Records of Europe Network Access) Project funded by the EC (Culture 2000) which explored and implemented digital archive in 6 different countries. He is a graduate of the University of Cambridge and North Staffordshire Polytechnic.

Dr Stuart Jeffrey BSc, PhD, FSA Scot.

Dr Jeffrey is User Services Manager at the ADS and is responsible for the usage of its online catalogue and promoting its digital resources amongst various user communities. He also manages on a day to day basis a number of projects for the ADS, including the EU funded ACE, DARIAH (ARENA2) and VENUS projects. He is a graduate of the University of Glasgow where he researched three dimensional modelling of early medieval sculpted stones. He maintains a special interest in archaeological applications of three dimensional modelling and has contributed to 'Creating and Using Virtual Reality: a guide for the Arts and Humanities' as well as number of publications on digital preservation and reuse in archaeology. Previous roles include posts with the West of Scotland Archaeology Service developing their Sites and Monuments Record database and archaeological GIS, and leading projects on the development of data standards and data aggregation with a national scope.

Ms Catherine Hardman BA MA

Ms Hardman is Collections Development Manager at the ADS overseeing the development of collections and advising researchers on the preparation of collections for long term preservation. Inter alia she has led the influential 'OASIS' project for ADS which provided a metadata pipeline from producer to consumer that both improves access to data and facilitates the archiving of 'grey literature'. She is the principal advisor on technical matters to the Arts and Humanities Research Council panel on Classics Archaeology and Ancient History. She is also overseeing the digital archiving of large infrastructure projects such as the Channel Tunnel Rail Link project, one of the largest and most complicated archaeological projects in Europe, and archives from British Airport Authority funded excavations at Heathrow and Stanstead by Framework Archaeology.

Mr Tony Austin BA MSc

Mr Austin is Systems Manager for the ADS, overseeing day to day functioning of our infrastructure and overseeing preservation of collections. He has particular experience in the maintenance of distributed systems and emerging technologies for machine to machine interoperation, having designed and built HEIRPORT. In doing this he has developed specific skills in network protocols and metadata standards, as well as maintaining an active involvement in archaeological fieldwork. He was the principal architect of the ARENA Portal, and is currently overseeing the 'Big Data' project – a project to study the archiving of data sets from emerging technologies like laser scanning and sonar – and is preparing an authoritative study on the archiving of vector image data for the Digital Image Archive Study.

Mr Stewart Waller BA MSc

Stewart Waller is the ADS's senior application developer. He has extensive experience in creating archaeological applications for the ADS utilising the most appropriate and up to date development frameworks and environments. He has taken the lead in the development of a number of key ADS

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resources covering technologies as diverse as WebGIS, faceted classification engines, web services and databases. His core competencies include the Java programming language, technology integration and practical experience of OAI PMH. These competencies have been deployed most recently in projects such as the Java Universal Discovery Description and Integration (JUDDI) registry for HEIRNET and the ACE project, the ARENA2 Web Services Data Aggregation Portal, for the DARIAH project and extensive web development, including the development of the England's Rock Art project (ERA) database and website.

P.5. Scuola Normale Superiore di Pisa, IT (content provider)

The Scuola Normale Superiore in Pisa was founded by Napoleon in 1810 as a branch of the École Normale Supérieure in Paris. SNS is a centre of excellence for teaching and research, with specialized laboratories. Academic activity is carried out in two divisions, the Faculty of Arts and the Faculty of Sciences, and at two levels, the undergraduate and the doctoral.

The LARTTE Laboratory (Interdisciplinary centre for the Research, Planning and Management of Cultural Heritage) began operating in the Faculty of Arts in 2004. It developed in response to transformations taking place on both a national and international level. It joins various competences in the SNS in the field of IT applied to Cultural Heritage. SNS started such research in 1978, under the direction of Paola Barocchi, when a partnership with The Harvard University Centre for Italian Renaissance Studies, the University of Siena Art History Department and the CNUCE Institute of CNR originated the "First International Conference on Automatic Processing of Art-History Data and Documents". Collaboration with the Accademia della Crusca and J. Paul Getty Trust resulted in research in the lexicographical field Automatic Processing of Art-History Data and Documents. Now the LARTTE Laboratory collaborates with museums, superintendences, archives, libraries from all over the world, using IT for indexing, cataloguing and management of linguistic, lexical and iconographical data.

SNS participated in the European projects META-E; CHANCE; I-MASS and, as a member of Consorzio FORMA: HELP ("Culture 2000", FP 5) BRICKS, DELOS (IST, FP 6). SNS is presently involved in the CALLAS project (IST, FP 6).

In 2005 SNS developed the scientific and technical project for the Portal "CulturaItalia" for the Italian Ministry of Culture (MiBAC), and continues to support MiBAC in the maintenance of the Portal and as consultant in other projects, such as MICHAEL, MINERVA and ATHENA, for the expertise developed by SNS on descriptive metadata standards, thesauri and ontologies in the field of Cultural Heritage.

The staff of the LARTTE Laboratory are also involved in other national projects, such as the ARCUS-SAP-SNS project (2005-2009), which developed the new information system for the Special Superintendence of Naples and Pompeii, a 3D prototype of the Pompeii Civil Forum and a website on Vesuvian archaeology (under construction); and the PRIN 2006 project co-funded by the Italian Ministry of University (MIUR), which produced a system comprising of a database structured CDWA standard, an annotation system and a Digital Library, for the study and management of researches conducted on ancient texts: the travel guides of Rome and the inventories of the Borghese Gallery. More information on the experiences of the LARTTE Laboratory can be found at: <http://lartte.sns.it/>.

Key personnel

Benedetto Bendetti is a Researcher in Greek History at the SNS and, since 1985, a researcher in Ancient History and Classical Philology at Scuola Normale Superiore di Pisa, Director of FORMA Consortium (CF). Member of the Scientific Board of the editorial policies and the annual academic periodical "Annali" of the Humanities Section of the SNS and the Scientific Board of the Research Centre of SNS: "Computer Research Centre in Ancient Languages and Thesauri Processing". Scientific Director of the project, supported by the European Union, "Research and Development in

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Cultural Heritage", with an organized program, since 1997, of Master and Courses of Advanced Professional Specializations in Conservation, Management and Communication of Cultural Heritage.

Director of the master of High Education for management, preservation, and communication for Cultural Heritage funded by European Union and Regione Toscana; director of the Master in CH Management in Catania, of the master in CH management of SNS - Provincia di Pisa - Comune di Volterra and of the project ECUBA, coordinated by SNS and Camigliati School. Member of the scientific committee of Foreign Affairs Ministry for the relationships with World Bank in Cultural Heritage; president of the scientific committee of the project PARNASO – VIRARTIS; scientific director of the Action Line Education in ICT Technologies on Cultural Heritage in the Framework MEDICI, supported by EC and led by Mc Luhan Institut in Maastricht; scientific director of the European project HELP; scientific director of the national project DICE; coordinator of the technical-scientific project of SNS for the portal of Italian Culture for the Italian Ministry of Cultural Heritage and Activities.

As director of CF he participated in the European projects, BRICKS and DELOS, leads the research projects "Numismatica", supported by SNS, "La fortuna visiva di Pompei", carried out with CF and the Archaeological Superintendence of Pompeii, "ARCUS-SAP-SNS" project on Pompeii and others.

Irene Buonazia Degree in 1997 in Art History, Master of Arts in 2001 in History of Contemporary Art. Her main research areas are history of art criticism and art historiography, Italian contemporary art; in such fields she published books and papers. Since 2003 she has worked for Scuola Normale Superiore di Pisa and Consorzio Forma. Currently she has a research grant at SNS for research on metadata standards for description of Cultural Heritage digital resources. AT SNS she has been in charge of research and management of national and European projects (such as BRICKS, DELOS and CALLAS); she participated to the technical and scientific project for the Italian Culture Portal for Italian Ministry for Cultural Heritage and Activities, as expert in Digital libraries and metadata. She contributes as consultant for MiBAC to the MINERVA and MICHAEL projects. For SNS, she assists in the organization of higher education courses in Cultural Heritage Research, Management and Enhancement; she gives lectures in Higher education masters (SNS, Catania).

Maria Emilia Masci has a PHD degree in "Archaeology of the Magna Grecia", is currently employed in the SNS with a Research Grant on: "Analysis and definition of descriptive metadata standards and mapping into the metadata schema adopted by the Portal of the National Department of Cultural and Environmental Heritage of the resources pertaining to the General and Regional Directions, with reference to the technical and scientific project of the Italian Culture Portal, for the treatment and structuring of cultural resources, specially of the archaeological ones, on the basis of the ongoing agreement with the National Department of Cultural and Environmental Heritage". Since 2002 she has worked as a researcher in the SNS and in the FORMA Consortium (CF) in research and developing projects on Cultural Heritage and Archaeology with the use of Information Technology and Multimedia tools. She cooperates as a consultant with the MiBAC and with other National Departments.

She was scientific coordinator of the projects: "The 'Fortuna Visiva' of Pompeii"); "Travellers' Itineraries in Rome before the Grand Tour" (SNS – CF – Deutsches Archäologisches Institut in Rom); "ARCHEOTEC, Definition of innovative methodologies for the exploitation of the archaeological resources in Sibari's area" (Calabria Region – Sviluppo Italia S.p.a., CF); and scientific consultant for SNS and CF in the National Project DICE (Distributed Infrastructure for Cultural Heritage - website: <http://www.progettodice.it/>), and in the EU Projects DELOS, BRICKS and CALLAS; and consultant for SNS in the "Pompeii" Project (ARCUS s.p.a.- Archaeological Superintendence of Pompeii – SNS); in the technical-scientific Project for the Italian Portal of the Culture, under commitment of the MiBAC and, as expert in Digital libraries and metadata standards for Cultural Heritage, consultant for the SNS in the EU Projects MINERVA, MICHAEL and ATHENA coordinated by MiBAC.

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P.6 The Cyprus Research and Educational Foundation, CY (Technical expertise and content provider)

The Cyprus Institute (CyI) is a novel, non-profit, technology-oriented, interdisciplinary research and educational institution meeting world-class standards of excellence. It is designed to serve the needs of the Eastern Mediterranean region, while addressing issues of both regional and global significance. The new Institute is being developed under the stewardship of the Cyprus Research and Educational Foundation (CREF) the Board of which comprises of prominent international academic, political and entrepreneurial personalities. The honorary chair of the Board is the President of the Republic; its current chair is Prof. E. Brezin, former President of the French Academy of Sciences. CyI comprise different Centres of Research: the one involved in CARARE is STARC, the Science and Technology in Archaeology Research Center. STARC is active in:

- the development and applications of modern biological, chemical and physical analytical methods relevant to the studies of archaeological remains and sites – particularly in relation to provenance and dating issues. Such analyses produce a large quantity of digital data.
- the development of underwater exploration techniques and the exploration of the marine culture of the peoples of the Mediterranean basin. Also underwater archaeology produces a vast amount of digital data, such as those concerning photogrammetry and survey.
- the development and introduction of modern and novel restoration and documentation techniques for the preservation of archaeological artefacts, to be included in the related digital documentation.
- in general, the application of information and communication technology to cultural heritage, including such activities as 3D processing, imaging and visualization, and the storage of and access to Digital Heritage.

STARC activity started in late 2007 in the Digital Heritage area, with the recruitment of senior and experienced faculty and post-doc researchers. Nevertheless, STARC is already engaged as partner or coordinator in a number of EU- funded projects, such as ATHENA and EDLocal on digital libraries; 3D-COFORM on 3D collection formation; TIEM, on the creation of a digital archive of medieval architecture; and STACHEM, a survey of heritage research infrastructures in the Eastern Mediterranean. STARLAB, a project for the creation a mobile laboratory including instruments for the acquisition of data from physical analyses, geophysics and 3D data capture and their integrated management, has been awarded to STARC.

The number of research staff is expected to reach 12 by the end of 2009, plus visiting professors and junior fellows.

Franco Niccolucci, a former professor at the Faculty of Architecture of the University of Florence and head of the VAST-Lab research laboratory at PIN, is currently full professor at CyI and Chair of STARC. He maintains a part-time presence at PIN, where he started work on Cultural Heritage applications in 1996. He was the scientific coordinator of the FP6 projects CHIRON and COINS, both on IT applications to CH, and Executive Director of the EPOCH FP6 NoE. He has been a member of the CAA International Steering Committee since 2001. He has chaired the International Conferences VAST2000, 2003, 2004, 2006 and 2007. He has published a large number of papers in scientific journals and authored several books on IT applications to CH.

Loukas Kalisperis is a professor of Architecture at the Univ. of Pensilvania, USA, and professor at STARC. He is an expert in the applications of computer visualization technology to architecture and directs a visualization lab at Penn-State. His most recent publications include a special issue of the International Journal of Architectural Computing on computer-based design aids and cultural heritage.

Sorin Hermon is research coordinator at STARC. With a PhD in Prehistory, he has worked since 2002 on digital heritage within national and EU projects, notably EPOCH and CHIRON.

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P.7 Heritage Malta, MT (Content provider)

Heritage Malta is the national agency for museums, conservation practice and cultural heritage. Created by the Cultural Heritage Act which was enacted in 2002, the national agency replaced the former Malta Museums Department. Its mission is to ensure that those elements of cultural heritage entrusted to it are protected and made accessible to the public. The agency also operates a conservation division for the training of conservators and conservation scientists.

Originally Heritage Malta was entrusted with the management of museums, sites and their collections but in 2005, the agency was also charged with the takeover of the former Malta Centre for Restoration to become the national agency responsible for conservation.

Heritage Malta seeks to provide its various audiences with an enhanced experience during visits to the various sites and museums managed by the national agency. Cultural heritage can act as a catalyst for Malta's tourism potential and consequently contribute significantly to the economy. Furthermore, the agency operates the Institute of Conservation and Management of Cultural Heritage which runs undergraduate and postgraduate academic courses in the field of conservation together with the University of Malta and vocational courses organised in conjunction with MCAST. In addition, the Institute also offers a number of short courses available to the general public.

Heritage Malta is also committed to bring culture closer to the people through facilitating interpretation and accessibility both physical and intellectual. It strives to do this through temporary exhibitions, public lectures, heritage trails or other specialised events. Another way is through general and public dissemination of information especially digital content of the material Heritage Malta has already in its possession. Such projects like this help Heritage Malta to continue on this mission in order to facilitate such searches and continue to enrich digital content servers.

Key personnel

Noel Zammit is the ICT Manager at Heritage Malta. His roles include the normal day-to-day running of the ICT team and office. His responsibilities also include the design and co-ordination of all software development related projects for Heritage Malta, database design and websites, and other ICT related projects, namely, web site functional and technical specifications for RDF based web sites implementation and back-end design. Noel obtained a first class degree in Mathematics and Computer Science from the University of Southampton. His previous experience is made up of a number of different roles and responsibilities, all related to Information Communication Technology and Knowledge Management, the main areas being software engineering, systems development project management, systems design and implementation and knowledge databases and management. He worked at various local and international companies, some of which are Safeway PLC, Woolworths, Securicor (UK), Global Software (Germany), Vodafone PLC, Magus International/Crimson Wing and MITTS in Malta. During the past ten years he was involved in a number of medium to large-scale database systems of which the Malta Public Registry, Common Database and Inland Revenue department, delivered with a local government-owned company dedicated to reform the public sector into information based society. He managed a number of project teams to deliver high-end commercial projects in Germany and the UK, including multi-tiered mainframe systems for Safeway UK, and Oracle based systems in Germany. With Heritage Malta, he is managing a number of projects in the cultural heritage sector, requiring knowledge acquisition and management through the use of international standards of Museum documentation and digitization. He is an Oracle™ certified professional and also a DSDM practitioner. Noel is currently taking a degree in Management and Information Systems with the London School of Economics and will be proceeding to a Masters in Knowledge Management.

Martin Spiteri is the Collections Manager at Heritage Malta. In this newly assigned role he is responsible for coordinating the inventories of the various collections as well as other aspects of collections management. He is a part-time lecturer at the Institute of Conservation and Cultural

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Heritage Management and at the University of Malta. Up until a few months ago, he was mainly responsible for Heritage Malta's Capital Projects. Prior to that, he was involved for a number of years in the setting up of the Malta Centre for Restoration, mainly as its Conservation Projects Director.

Martin holds a first degree from the University of Malta in Art History and Communication Studies. He then received a graduate diploma in Museology from the *Universita' Internazionale dell'Arte* of Florence, where among other things he worked as assistant to the Chief Curator of the Collections at the *Istituto e Museo di Storia della Scienza*. Martin also holds a Masters Degree in Museum Studies from University College London.

P.8 Visual Dimension bvba, BE (technical expertise)

Visual Dimension bvba is a SME, specialised in the use of ICT in cultural heritage and in architecture. The company is specialised in 3D reconstruction of historical buildings and landscapes that have disappeared or changed, in 3D digitisation of museum objects and historical buildings and landscapes that are still present, and in consulting on the sustainable implementation of ICT in cultural heritage and tourism.

Visual Dimension has 12 years of experience in this domain and has realised many ICT projects in Flanders, Wallonia and Europe (Netherlands, Germany, France, Spain, Greece, Israel). It has been at the forefront of developing innovative ICT applications for cultural heritage such as the TimeScope, which received the Flemish 'Best Monument Award' and the Dutch 'Golden Scarab' in 1998, and the TimeFrame3, which received the Dutch 'VGI ICT Innovation Award' in 2004.

Visual Dimension focuses on 3D digitisation based on photography through normal digital cameras, using the EPOCH tools ARC3D and Meshlab. This technique allows 3D digitisation significantly more efficient and easy. Visual Dimension has been working with photographers and cultural heritage experts to fine tune the workflow for several cultural heritage applications and improve the quality and fitness for use of the 3D models, both for outdoor and indoor settings and museum objects. The technique is being taken up by cultural heritage institutions and experts in several domains, demonstrating its tremendous potential for creating swiftly high quality 3D models without major investments or complex technology.

Visual Dimension also has major experience in virtual reconstruction of historical buildings and landscapes. Together with other experts in virtual reconstruction, Visual Dimension has contributed significantly to the Charter of London (<http://www.londoncharter.org/>) that creates an international methodological framework and guidelines for 3D visualisation. The InMan methodology, developed by Visual Dimension, based on the experience gained in several virtual reconstruction projects, has been proposed as a first implementation of this Charter.

Visual Dimension has been instrumental in optimising workflows for many ICT technologies in cultural heritage and tourism, and disseminating this knowledge through publications such as the EPOCH knowhow books (<http://www.tii.se/knowhow/>). Daniel Pletinckx has international experience in organising workshops and courses and in lecturing at cultural heritage conferences. He has been part of the International Programme Committee of the VAST, CAA and VSMM conferences for many years, is member of the Board of Directors of the VSMM Society, and relies on a vast network of experts in ICT and cultural heritage for his consulting activities.

Key personnel

Daniel Pletinckx was trained as a civil engineer, with specialisation in information technology. He gained extensive experience in system design, quality assurance, digital image processing and synthesis, 3D and virtual reality through a career of 15 years in private industry. He is the author of several articles on computer graphics and cultural heritage presentation and has lectured extensively at major computer graphics and cultural heritage conferences. He organised many workshops

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concerning the use of ICT in cultural heritage and was Conference Chair of the international conferences VAST2004 (Brussels) and VSMM2005 (Ghent).

Daniel was chief consultant to the Ename 974 project, a major heritage project in the historical village of Ename, Belgium, and founded the international Ename Center for Public Archaeology and Heritage Presentation, together with Dirk Callebaut and Neil Silberman in 1998. Currently, he is director of Visual Dimension bvba, a SME dealing with consulting on and designing of new systems for cultural heritage and tourism. Visual Dimension consults major European heritage organisations on innovating and optimising the use of ICT technology in tangible and intangible cultural heritage and tourism. Visual Dimension also specialises in new, efficient ways to digitise existing cultural heritage objects and monuments, and in virtual reconstruction of historical buildings and landscapes.

Several multimedia systems designed by Daniel Pletinckx have received major awards. The TimeScope system at the Ename archaeological park, Belgium received the Dutch Golden Scarab (1998) and the Flemish Monument Award (1998). The TimeFrame system at the Saint Laurentius church in Ename, Belgium received the ICT Innovation Award from the VGI organisation in the Netherlands. In Seville in June 2009, Daniel will receive the Tartessos Award for his international contribution to virtual archaeology.

Daniel Pletinckx is also co-founder of the European 6FP IST EPOCH Network of Excellence, that dealt with optimising the use of ICT in Cultural Heritage, for which he acted as Coordinator for Integration Activities.

P.9. Digital Curation Unit, GR (Technical expertise and content provider)

The “Athena” Research and Innovation Centre in Information, Communication and Knowledge Technologies is the first research centre in Greece specializing in the area of the information society (<http://www.athena-innovation.gr>). The Centre will participate in the present project through its Digital Curation Unit and with content provided by its Cultural and Educational Technology Institute.

The **Digital Curation Unit** (DCU) also participates in the ESFRI project “DARIAH”, and the Cultural and Educational Technology Institute. The Unit (<http://www.dcu.gr>) was launched in 2007 with the mission of conducting research, developing technologies and applications, providing services and training, and acting as a national focus in the field of digital curation. It was formed by an initial group of scientists with rich experience and high recognition for practical and theoretical work in key areas for digital curation. The DCU is the only specialized unit of its kind in Greece and one of relatively few such centres internationally.

The DCU takes an interdisciplinary approach, taking into account the full lifecycle of digital assets, such as records, digital surrogates and scholarly/scientific datasets. This approach favours a multi-faceted analysis of issues and the combined use of methods, techniques and tools from the fields of informatics (especially areas such as knowledge representation and management, knowledge extraction, ontologies, multimedia data management, Web technologies, digital libraries, workflow management); management and decision sciences (especially areas such as workflow analysis, reliability analysis and cost-benefit analysis); library science and archives management; material culture studies, museology and communications; epistemology; and law.

Serving the needs of a wide constituency of organisations and communities in various fields (e-government, organizational archives management, scientific data repositories and cultural heritage), the DCU focuses on developing and supporting standards and methodologies, environments for digital archiving and long-term preservation, semantically enhanced information and communication services that exploit curated data collections, and mentoring and “incubating” good practices. The research areas of the DCU include: domain knowledge representation; use of natural language processing techniques in digital curation; new approaches to database preservation; ensuring metadata interoperability; user models and communities; and work flow models for the ingestion and

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preservation of data. The DCU also works on the development of the following technologies, infrastructures and services: digital preservation and curation platform; tools and services for the management, preservation, semantic annotation and integration of digital resources; services for the creation, preservation, access and delivery of knowledge resources; and dissemination of digital curation good practices. A digital library service for very small libraries, called “MOPSEUS”, has been made available as open source software. The DCU collaborates with centres for digital curation in the UK, the US and Canada.

In addition to DARIAH, the DCU is involved in a series of projects aimed at creating an archive of Greek Web sites of cultural content and interest; developing a repository system supporting the curation of digital resources; database preservation and curation; curating digital resources for e-government; and ontology-based curation.

The **Cultural and Educational Technology Institute (CETI)** (www.ceti.gr) was founded in 1998 in Xanthi as an independent research institute under the auspices of the General Secretariat for Research and Technology (Ministry of Development). It is now part of the Athena Research and Innovation Centre. CETI currently has 35 staff members, including 15 postgraduate researchers, CETI maintains a state-of-the art digitisation centre (clepsydra.ceti.gr), an archaeometry lab and several collaborating units (cultural heritage, multimedia, educational technology and computational systems), making it a multi-disciplinary research organisation offering its services on applied innovative technologies for culture and education. In particular, the digitisation centre “Clepsydra” focuses on 3D technologies and their applicability to Cultural Sector, including activities on 3D scanning, archiving, retrieval and presentation of cultural objects. Other R&D activities, relevant to the current project, include: Study of archaeological sites, ancient pottery and monuments of art, Innovative software for complete documentation and presentation of archaeological excavations and sites, Cultural databases (compliant with MPEG7 CIDOC, Dublin Core, etc.), Development of intelligent computing methods and systems, data mining, knowledge administration with applications to the domain of cultural heritage by the processing, understanding, interpretation and promotion of objects and content.

Key personnel

Panos Constantopoulos is the Director of DCU and the “Athena” Research Centre and Professor and Director of the Information Systems and Databases Laboratory at the Department of Informatics, Athens University of Economics and Business. He was previously Professor at the Department of Computer Science, University of Crete, where he has also served as Department Chairman and Director of Graduate Studies. He has founded and led for twelve years the Information Systems Laboratory and the Centre for Cultural Informatics at the Institute of Computer Science, Foundation for Research and Technology - Hellas. He holds a Diploma in Electrical and Mechanical Engineering from the National Technical University of Athens, a Master of Science in Electrical Engineering from Carnegie-Mellon University, and a Doctor of Science in Operations Research from the Massachusetts Institute of Technology. His research interests are in information systems, knowledge representation and conceptual modeling, ontology engineering, semantic information access, information design, decision support and knowledge management systems, cultural informatics and digital libraries. He has been principal investigator in 35 national and international competitive research projects, in 3 of which he was project coordinator. He has about 90 articles published in scientific journals, the proceedings of international scientific conferences, or as chapters in books.

Costis Dallas is a Research Fellow of DCU and the “Athena” Research Centre and an Assistant Professor of Cultural Heritage Management and Advanced Technologies in the Department of Communication, Media and Culture of Panteion University, Athens, and Associate Professor of Cultural Heritage Informatics, Faculty of Information, University of Toronto. He holds a Diploma in History from the University of Ioannina, and Master of Philosophy and Doctor of Philosophy degrees from the University of Oxford, working in the field of theoretical and computational archaeology. His current research interests lie in the field of digital curation, in particular as it concerns cultural heritage knowledge and public communication practices in museums; he also researches information work in

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arts and humanities scholarship, and cultural practices related to creativity and reception. He held senior management positions in communications and technology consulting firms PRC Group SA (2004-2009) and Critical Publics SA (2000-2004), and previously served as Special Advisor of the Greek Foreign Minister on information and cultural affairs (1996-2000), Special Secretary for libraries and archives in the Greek Ministry of Education (1996), General Director of the Foundation of the Hellenic World (1994-1996), and Head of Documentation and Systems of the Benaki Museum. Also, he was co-founder and Chair of the Multimedia Working Group of the International Council of Museums (CIDOC/ICOM), participated in the development of the CIDOC Conceptual Reference Model, and was involved in major EU projects in digital heritage and semantic technologies, such as Digicult Forum, ERPANET, CALIMERA and NEPOMUK. He has over 30 papers published in scientific journals, the proceedings of international conferences, or as chapters in books.

Ion Androutsopoulos is Research Fellow of DCU and the "Athena" Research Centre and an Assistant Professor in the Department of Informatics of the Athens University of Economics and Business (AUEB). He was previously a researcher at the Institute of Informatics and Telecommunications, "Democritus" Research Centre, and at the Language Technology Group of Microsoft Research Institute, Macquarie University, Australia. He holds a Diploma in Electrical Engineering from the National Technical University of Athens, and a M.Sc. and a Ph.D. in Artificial Intelligence from the University of Edinburgh. His research interests focus on natural language processing, especially on text generation from ontologies and databases, question answering systems and oral natural language dialogues, document classification, automatic summarization, and using machine learning techniques on natural language processing problems. He has participated in 9 national and international research projects. He has over 40 publications in journals and conferences and has served on the programme committee of several established conferences.

Agiatis Benardou is a Researcher at DCU and the "Athena" Research Centre. She completed a BA and MA in Ancient History in King's College London, where she was later awarded a PhD in Ancient History/Archaeology. She also holds an MA in Cultural Management and Communication from Panteion University, Athens. She has participated in various Greek and foreign archaeological excavations and surveys. Before joining the DCU staff, where she works for the Preparing DARIAH project, she worked for the Directorate of Prehistoric and Classical Antiquities, Hellenic Ministry of Culture and for the Encyclopedia of the Hellenic World. In 2008 she worked for PRC Group - The Management House, on the documentation and information management side of the project on the digitization and digital documentation of the collections of the Hellenic Ministry of Culture.

Dimitris Gavrillis is a Researcher at DCU and the "Athena" Research Centre. He holds a PhD, with a dissertation on intrusion detection, and a Diploma (2002) from the Electrical & Computer Engineering Department, University of Patras, Greece. His research interests include intrusion detection using pattern recognition, feature extraction-selection-construction for pattern recognition problems, digital library architectures, interoperability between digital library systems, digital library services development and cultural heritage preservation systems. He has also done extensive work in evolutionary neural networks. The results of his research can be found on his homepage along with the relevant published code. Dimitris worked as a consultant for over 9 years in various projects. His expertise as a software engineer includes mostly design & implementation of information systems in Java & PHP (both desktop and web based). As a systems administrator, he has worked mostly with Linux & Solaris (and is a unix user for over 17 years) using various services (Web, Mail, DNS, Radius, Mysql, Backup etc). His published work includes 6 journal papers and 19 conference papers.

Christos Papatheodorou is a Research Fellow of DCU and the "Athena" Research Centre, and an Assistant Professor in the Department of Archive and Library Science, at the Ionian University. He received his B.Sc. and Ph.D. in Computer Science, both from the Department of Informatics, Athens University of Economics and Business. Before joining the Ionian University, he was in charge of the development of Digital Library and Information Services at the Library of the National Centre for Scientific Research "Demokritos" in Athens, Greece. He participated to the joint research tasks of

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Semantic Interoperability, and Digital Library Evaluation of the DELOS Network of Excellence on Digital Libraries, and was project proposal evaluator for the Information Society Technologies program, 5th EU R&D Program-Framework, Action Line: Digital Collections - Cultural Heritage. His research interests include (1) Metadata interoperability and especially ontology-based interoperability of cultural heritage and e-government metadata schemas; (2) Evaluation of Digital Libraries and Information Services, focusing on user-based evaluation and user behavior analysis; (3) User Modeling, Personalized access to Digital Libraries and Internet, Information Filtering and Web Mining focusing on the discovery of user communities and stereotypes; and (4) Web 2.0 technologies, such as social tagging system, folksonomies, etc. focusing on the integration and interoperability of such technologies with knowledge organization systems and metadata standards.

Yannis Kotidis is a Research Fellow of DCU and the "Athena" Research Centre and an Assistant Professor in the Department of Informatics of the Athens University of Economics and Business (AUEB). He received his M.Sc. and Ph.D. in Computer Science from the University of Maryland at College Park. He is currently an assistant professor in the Computer Science Department of the Athens University of Economics and Business (AUEB). Previously, he was a member of the Database Research Department of AT&T Labs-Research in Florham Park, New Jersey where he worked as a Senior Technical Specialist until January 2006. His research interests evolve around systems, applications and tools that manage massive amounts of data. These include, among others, data warehouses, integration systems and distributed and pervasive applications. Recently he has been exploring database preservation practices that will not only allow us to maintain the content of databases but also their utility and functionality over long periods of time. He is interested in developing advanced classification, compression, summarization, indexing, auditing and cataloguing techniques that can scale to handle hundreds of multi-gigabyte datasets.

Prof. Christodoulos Chamzas is the Director of the Cultural and Educational Technology Institute. He was an Assistant Professor of Electrical Engineering at Polytechnic Institute of New York (1979-1982), member of the Visual Communications Research Department of AT&T Bell Laboratories, Holmdel, NJ (1982-1990), Professor of the Electrical Engineering Department at Democritus University of Thrace (1990-), Director of the Electric Circuits Analysis Lab. and Department Head (2001-2003). He has been a major player in the definition, design and implementation of the CCITT/ISO (JBIG, JPEG, etc), standards for coding, storage and retrieval of images (color & bilevel) an area where he holds six (6) international patents. His primary interests are in digital signal processing, image coding, multimedia and communications systems. He is currently interested in the application of 3D technology in the area of culture and education. Dr. Chamzas is a member of the Technical Chamber of Greece, Sigma Xi, an Editor in the IEEE Transactions of Communications (1989-1996) and a Senior Member of IEEE.

Dr George Pavlidis is a Researcher at CETI/ATHENA R.C., and the Head of Research of "Clepsydra" Digitization Centre. He received his Diploma Degree (1995) and his PhD (2004) in Electrical and Computer Engineering from Democritus University of Thrace, earning the distinction of the Ericsson Awards of Excellence in Telecommunications in 2005. His current research interests involve, from one side, technologies for analysis, segmentation, compression and transmission of digital 2D/3D images, and from another side, multimedia technologies, production of multimedia applications, interactive 3D representations, 3D-GIS and virtual reality. Dr Pavlidis is a member of the Technical Chamber of Greece, IEEE and ACM.

Dr. Despoina Tsiafakis is a Senior Researcher at the CETI/ATHENA R.C. and the Head of the Cultural Heritage Unit. She is an Archaeologist specialized in ancient Greek pottery. During 1996-1999 she was Curatorial Assistant in the J. Paul Getty Museum and she has collaborated with the Archaeological Institute of Bern, the University of Groningen and the Sopridendenza of Sibari in Italy. She has participated in international and national projects regarding the Cultural Heritage and papers of hers have been published in international volumes and journals. Her current research involves ancient ceramics, archaeology, application of new technologies in archaeological sites, museums and

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art objects with emphasis on the development of cultural databases, multimedia applications and guides in Museums, 3D reconstruction, and archaeological GIS.

Dr. Vassilios Tsioukas is an Assistant Professor at the Architectural Engineering of the Democritus University of Thrace and a Researcher at CETI. He holds a Diploma of Electrical and Computer Engineering and a Ph.D. from the Faculty of Rural and Surveying Engineering both from the Aristotle University of Thessaloniki. He is teaching among others the digital photogrammetric techniques and new technologies (laser scanning-3D modelling) for the creation of three-dimensional models of buildings and sites. His main research interests are in the above areas.

P.10 Swedish National Heritage Board, Sweden (Content Provider)

The Swedish National Heritage Board serves as Sweden's central administrative agency in the area of heritage and the historic environment. The Board is under the auspices of the Ministry of Culture. The Cabinet's objectives for the Board include encouraging: 1) preservation and protection of the historic environment; 2) respect for the heritages of different groups; 3) appreciation of, commitment to, and the assumption of responsibility for one's own heritage.

SOCH (Swedish Open Cultural Heritage) is the beta-version of a web service online at <http://www.kulturarvsdata.se/english.html> and <http://www.kulturarvsdata.se/demo/demostart.html>. It represents some 2 million objects, consisting mainly of photographs (historical and documentation), ancient monuments, historic buildings and archaeological collections. The SOCH project is a coordinating initiative which is strongly supported by the central museum institutions in Sweden and by many regional and local institutions. By the end of 2009 some 30 different content sources are expected to have been harvested. The work in developing the service is performed in close cooperation with the National Library and the National Archive and by the end of 2009 a first version will of the service be released. The project aims to release version 2.0 of the service in 2010.

The Board is responsible for the SOCH development project and has an established and sustainable organization for management and administration of the SOCH web service. The aim is to collect data from participating museums in order to a) enable portals like Europeana to harvest data, b) make it a lot easier to build (web)applications using cultural heritage data.

SOCH participates in the national Europeana group administered by the Royal Library.

Key personnel

Börje Lewin is the technical project leader for SOCH. He has an MSc in Computer Science and a Secondary School Teaching Degree, and long experience of system development.

Johan Carlström is the project leader for SOCH. He has an MA in archaeology and experience of developing and managing web 2.0 sites.

Lars Lundqvist is the project owner for SOCH and Head of Unit, information development (web). He has a Ph D in archaeology, and has worked as a researcher and consultant within contract archaeology, and has also been responsible for communicating cultural heritage issues in large projects (Environmental Code).

P.11. Erfgoed Nederland, NL (Content provider)

The Netherlands Institute for Heritage – *Erfgoed Nederland* in Dutch – is a non-governmental organisation (NGO) that acts as a coordinating and central body for heritage matters. Its mission is to help realise the potential of our cultural heritage in contemporary society and to build bridges between science, policy and practical application. About forty employees of the Institute work together with professionals on aspects such as archaeology, archives, museums, historic buildings and landscape.

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Heritage represents identity of people and communities. Acknowledgement of this value enhances the position of cultural heritage in all parts of society. Therefore, heritage requires support. The Institute provides this support through information, publications, expert meetings and inspiring networks.

Support for culture is an integral part of governmental international policy. It helps to raise the profile of the Netherlands and stimulates a rich cultural life through cooperation and exchange. At the same time, there is a tradition of private initiatives and public participation. Consequently, people at various levels of government and society feel responsible for their heritage. The Institute facilitates them.

The Institute is the national heritage sector institute and mainly funded by the Ministry of Education, Culture and Science.

Key personnel

Astrid Weij is programme manager at the Netherlands Institute for Heritage. In this position she is responsible for international affairs within the institute. The main issues within this programme are heritage and Europe and common cultural heritage on a global scale. Furthermore, because Astrid is member of the management team of the Netherlands Institute for Heritage she has a wide scope on heritage issues.

From March 2006 to December 2006, Astrid was the personal assistant (PA) of the Director General for Culture and Media at the Netherlands Ministry of Education, Culture and Science. Before she became PA, Astrid was Advisor on International Affairs at the Directorate of Cultural Heritage at the same Ministry where she worked since 2001. She dealt with mobility of collections in a national and European context, digitisation of heritage on a European level, amongst other subjects. From 1996 till 2001 Astrid had a position at the Netherlands Museums Association as a co-ordinator for Central and Eastern Europe, where she managed bilateral projects concerning museum management and was responsible for an international visitors program.

Astrid Weij has a Bachelor and Master of Arts in museology, the topics of graduation were museology and ethics and museum accreditation.

Frans Hoving is programme manager at the Netherlands Institute for Heritage. He is responsible for the activities concerning digitization of cultural heritage, heritage education and cultural diversity. The main issues within this programme are the changing role of heritage institutions as a result of our changing society (digitization, migration) and the role of cultural heritage in our educational system. Frans is a member of the management team of the Netherlands Institute for Heritage.

From 1999 till 2006, Frans worked at the branch-office of the Dutch Archives (DIVA), where he set up management development programmes focusing on strategies on digitization. Before that he worked at the Netherlands Institute of Architecture in Rotterdam.

Frans has a Bachelor in Medieval History, with a specialisation on the reflection of popular culture in clerical sources.

Eric Dil is a programme manager and a member of the management team at the Netherlands Institute for Heritage since April 1st, 2009. He is responsible for the activities concerning the position of cultural heritage in the context of spatial planning. Cultural heritage in this context covers a range of subject areas such as monuments, monument complexes, archaeological artefacts, and landscapes. From 1989 to 2009, Eric worked in different capacities at the Ministry of Housing, Spatial Planning and the Environment. During the last eight years he was an Interim Manager facilitating transitions within organisations; he worked for different governmental clients including the Ministry of Culture. Eric was trained as an art historian and biologist at the University of Amsterdam and has had extensive professional management training.

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P.12 Ministry of Education, Culture and Science - Cultural Heritage Agency of the Netherlands, NL (Content provider)

The Cultural Heritage Agency of the Netherlands (formerly RACM) is - in conjunction with other stakeholders - responsible for the management of Dutch heritage above ground, below the ground and under water from the Middle Palaeolithic (350,000 years ago) to the post-war period of reconstruction. Whenever historic, archaeological or cultural landscape values are at stake, the Cultural Heritage Agency takes the lead in ensuring the conservation, statutory protection, conservation, investigation of the country's heritage and public involvement. The keywords are quality and sustainability.

As part of the Ministry of Education, Culture and Science the Cultural Heritage Agency operates under the direct responsibility of the Minister. In our role as a government agency, we maintain an overview of the cultural heritage throughout the country, including the legislation governing it. We tell the stories behind our cultural heritage and advise national, regional and local authorities in their decision-making. We also make a valuable contribution to international cooperation in this field through the exchange of knowledge and information.

To manage the heritage properly, you need to know what you are dealing with. The Cultural Heritage Agency ensures that others have access to the heritage and are aware of its significance in the broadest sense of the word, both virtual and physical. It provides access to information on sites and structures, to what we know about their current condition and their history. It is our job to make the value of our heritage visible, understandable and, where possible, enjoyable.

The Cultural Heritage agency operates at the interface between policy, science and practice. This enables us to renew, enhance and share knowledge. In making knowledge and information accessible, we are led by society's demands regarding heritage management. We act as a partner in the design and implementation of land use plans, and help develop policy, conduct research, and issue grants for activities in the field of archaeology, cultural landscape and built heritage management. The heritage is often vulnerable to external influences, and we cannot expect it to be cared for as a matter of course. We are also charged with implementing and enforcing the Monuments and Historic Buildings Act, taking action where necessary when the heritage is threatened.

The significance and value we attach to the heritage change as different trends take hold in society. We are therefore engaged in a continuous debate with society, working with different partners and listening to different views. This allows us to produce inspiring plans and carefully weigh up interests whenever changes are made to the historic environment. We work with:

- public authorities: local authorities, provincial authorities, other government ministries, water boards,
- organisations involved in heritage management, education and research,
- owners and managers of buildings, sites and landscapes (both private and institutional),
- the private sector: contractors, architects, construction companies, property developers, archaeological consultancies.

The Cultural Heritage Agency is, as a government body, well known in the European field of cultural heritage. It has played and still plays its role in several EU initiatives like the EAC, the European Heritage Heads Forum and advisers on EU-directives regarding cultural heritage. The Agency (and its predecessors: ROB, RdMz, RACM) have been involved in several projects financed by the European Union through the Culture 2000 programme, Interreg and the different Framework programmes (5th, 6th and 7th) including PlanArch (1&2), NAVIS (1 & 2), MoSS, BACPOLES, Transformation and MACHU. It was the leading organizer for the MACHU project. The Cultural Heritage Agency has knowledge and experience in making information and data accessible to a broader public, e.g. KICH (www.kich.nl), a knowledge infrastructure for cultural historical information.

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Mission: 'As a government service working in interaction with society we seek to highlight the value of the archaeological, built and landscape heritage and to make it accessible to others. Our aim is to conserve and sustainably develop this heritage so as to deepen our understanding of the human environment. With our combined role in research, policy and practice, we are perfectly placed to renew, enhance and share knowledge and to play a unique role in fulfilling our task.'

Key personnel

ir. Dirk Houtgraaf is Director of Public Engagement and Information Services. The focus of his team is in 'networking the institute and its knowledge systems' into a joint national eCulture information system with and for professionals and amateurs alike. Born in Bangkok and raised in Holland he studied at Wageningen University. His background is in behavioral biology and strategic marketing. His particular interests are in strategic marketing innovation, business models, and behavioral sciences. In his former job at Naturalis, The Dutch National Museum of Natural History, Dirk built alliances with all Dutch nature groups which resulted, among others, in the Dutch species network information system connected to the Encyclopedia of Life initiative.

drs. Henk Alkemade is Head of the e-knowledge Systems Department and is responsible for development and management of information and knowledge systems of the Cultural Heritage Agency often in cooperation with other organisations. Henk was born and raised in the Netherlands, studied physical geography (and currently geo-archaeology) in Amsterdam. He has worked in IT as a software developer, information analyst/system designer, project manager and head of IT department, before his current position.

drs. Gerard de Wit is Head of the Department of Cultural Historical Information, is responsible for the acquisition, management and distribution of cultural historical information and the development of information and knowledge products/services. Gerard was born and raised in the Netherlands, and studied modern history in Utrecht. He worked previously as ICT-manager and manager in retail organisations.

P.13 N303BV management, consultancy, concept development

N303bv is a business providing services in programs and projects focused on organisations and activities in the domain of cultural heritage, specialising in archaeology, buildings and historic towns. The company has extensive experience in concept development, organisational development and projects providing digital solutions in complex heritage situations.

Key personnel

Drs. J.A. de Haan

Hans de Haan is founder and director of N303BV. He has a degree in art history, specialised in architectural history, and a bachelor's degree in classical archaeology at the University of Amsterdam. He worked for the State service for Archaeology in the Netherlands as head of the department of Western Netherlands, head of archaeology in great infrastructural works in the Netherlands and program manager for the digital Knowledge Infrastructure for the Cultural History (KiCH); an ambitious program to make archaeology, registered built monuments and historical landscapes available to planning professionals in an integrated digital system by means of web services. De Haan was country representative for the Netherlands working on EU programs for the presentation of European cultural history, working with France as coordinator of the sustainability work package for the MICHAEL Plus project.

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P.14 Krajowy Ośrodek Badań i Dokumentacji Zabytków (National Heritage Board of Poland), PL (Content Provider)

The National Heritage Board of Poland is an institution of culture established by the Minister of Culture and National Heritage. It was set up as essential background for state services responsible for the protection of monuments and coordinates the activities focused on the protection of cultural heritage in Poland.

The Board was created in 2007 by merging the National Centre for Historical Studies and Documentation and the Centre for Protection of Archaeological Heritage. The purpose of the Board is to implement state policies relating to the protection of Poland's cultural heritage. The main goals are fulfilled in the Head Office in Warsaw and in Regional Offices in province capital towns. The Board, implementing its objectives, cooperates with the state administration, territorial self-government units, non-governmental organisations, national and international institutions of culture, research centres, churches and religious unions as well as owners and administrators of historical objects.

Particular sections and expert teams of the National Heritage Board of Poland:

- create opinions and expert studies on the protection of monuments for the Conservator General and the province State Conservators,
- prepare the documentation and conservation principles for the most valuable threatened heritage sites,
- cooperate with the Police and Border Guard in the field of counteracting crimes against heritage,
- participate in the promotion of Polish heritage in Poland and abroad,
- promote knowledge on the cultural heritage and undertake educational activities aimed at heritage protection,
- issue the quarterly „Ochrona Zabytków” and a yearbook „Muzealnictwo”,
- organise trainings in the area of studies, protection, conservation and management of heritage,
- administer a specialist library (the biggest of its type in Poland), conservation record archives and photo collection,
- conduct the National Heritage Inventory,
- create and elaborate digital database on the material cultural heritage in Poland,
- support state services responsible for the protection of monuments in the supervision of archaeological rescue excavations carried out on the routes of motorways' construction,
- work out the new techniques of scientific record and research of monuments,
- coordinate and participate in the works on periodical reports concerning the Polish sites registered on the UNESCO World Heritage List,
- coordinate the procedures of filing motions about the recognition of the President of the Republic of Poland of various sites and properties as the Monuments of History,
- coordinate European Heritage Days in Poland

Key personnel

Marcin Gawlicki is Director of National Heritage Board of Poland. A PhD Architect he graduated his studies at the Department of Architecture of Gdansk Technical University. Since 1976 he has been professionally engaged in the Department of Architecture History and Monument Preservation, recently as a senior lecturer. He has also finished post-graduate studies on “Research on architecture monuments” at Department of Architecture of Warsaw Technical University. A recognized researcher of history of architecture, Marcin is particularly interested in Gdansk's monumental architecture and in palatial-park residential of north Poland. He is author of many executed conservatory projects, studies, research projects and publications upon monument protection issues. From 1991-2003 Marcin has held the position of the state heritage conservator for the province of Gdansk. He was responsible for supervision of many complex conservatory projects such as City Town Hall, Artus Court, Royal Chapel and others. Since 2007 Director of National Heritage Board of Poland. Member of Professional

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Associations: Association of Polish Architects, Association of Monument Conservators and member of Presidium of Polish National Committee of International Council on Monuments and Sites (ICOMOS).

Anetta Kępczyńska-Walczak has, since 2008, been a Chief Advisor to the Director of National Heritage Board of Poland. 1991-1997, she studied for her MSc at the Institute of Architecture and Urban Planning at the Technical University of Łódź, Poland and graduated with excellence in 1997. Between 1995 and 1996 she studied at the University of Strathclyde in Glasgow: Computer Aided Building Design Course at the Department of Architecture and Building Science; graduated in 1996 with Postgraduate Diploma in CABD. 2001-2004, PhD research at the Department of Architecture and Building Science, University of Strathclyde, Glasgow; graduated in 2004, thesis: *A model proposal for digitisation and recording data on architectural heritage in Poland based on European guidelines and best practices*, awarded by the Polish Ministry of Infrastructure in 2005. Since 1997 she has worked at the Institute of Architecture and Urban Planning at the Technical University of Łódź and since 2005 has been an assistant Professor and the Head of the CAD unit.

Agnieszka Oniszczyk-Rakowska. After having completed MA studies at the Institute of Archaeology of Warsaw University in 2001 she worked as a field archaeologist on excavations in Gdańsk Main Town and in the palace gardens in Wilanów, Warsaw, she also took part in salvage excavations on prehistoric sites. Since 2008 Oniszczyk-Rakowska has been an employee of the Section of Rescue Archaeology of the National Heritage Board of Poland taking part in shaping of the policy concerning protection of archaeological heritage. She deals with assessing archaeological research programmes financed within one of operational programmes of the Ministry of Culture and National Heritage, which gives her up-to-date information on recently excavated sites. Oniszczyk-Rakowska specializes in archaeology of historic towns and cities and garden archaeology, the former being her main field of professional activity. She is currently working on her doctoral thesis on 17th - 19th century ceramics in Gdańsk.

Karol Czajkowski has been with KOBiDZ since 2003 and has an MA in archaeology, graduated at University of Warsaw. Karol works on digital documentation of archaeology and architecture (laser scanning, close range photogrammetry).

Iga Malawska is an ethnologist. Iga works in the Section for Heritage Protection Policy, National Heritage Board of Poland.

Anna Hanaka is an Art historian who has worked in the Section for Heritage Protection Policy, National Heritage Board of Poland since 2005.

Hubert Galka is a landscape architect graduated from Szkoła Główna Gospodarstwa Wiejskiego in Warsaw. Hubert works in KOBiDZ on digital documentation of archaeology and architecture. He also specializes in digital graphics and design.

P.15 Deutsches Archäologische Institut, DE (Content Provider)

On April 21, 1829 a group of scholars, artists and diplomats founded the »Istituto di Corrispondenza Archeologica« in order to research and make better known monuments of ancient art, epigraphy and topography. The Prussian Crown Prince and later King Friedrich Wilhelm IV became patron, and in 1832 when Eduard Gerhard, the initiator of the Institute, moved to Berlin, the management of the existing facility in Rome was transferred as well. From 1859, Prussia supported the financing of the Institute on a regular basis. In 1871, it became a Prussian State Institute and in 1874 an Imperial Institute. In the same year the Athens Section was founded and in the following century, sections in Cairo, Istanbul, Madrid, Baghdad, and Tehran, as well as two commissions in Germany (Frankfurt and Munich) were founded or affiliated. In 1979, the Commission for General and Comparative Archaeology, which is responsible for archaeological research outside of Europe and the Old World, was established in Bonn. Finally, stations in Sanaa and Damascus, in addition to branch offices in Lisbon, Ankara and Ingolstadt were set up. In 1995, the Eurasian Section for archaeological research

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in the Non-Allied Countries and in neighbouring areas was founded incorporating the Teheran Section within it. The Near East Section was created in 1996 by joining together the Baghdad Section with the stations at Damascus and Sanaa. A new section in Beijing will open this year. Today, the German Archaeological Institute is a federal agency that is within the area of responsibility of the ministry of foreign affairs. The institute employs around 120 scientists.

The institute is headed by a president, who, in accordance with the articles of the institute, is bound to the decisions of central management. The president's deputy is his secretary general, who in particular deals with matters of scientific organisation and policy. The individual branches (departments and committees) are headed by directors. The directors together with the president and the secretary general form the board of directors (Direktorium), whose tasks are set forth in the articles.

The staff of the Deutsches Archäologisches Institut carries out research in the area of archaeology and in related fields which includes domestic, but especially international excavations, expeditions, and other projects.

Research results are presented in numerous publications (to date more than 60 volumes per year). The Institute maintains libraries and photo archives which are at the disposal of international scholars. It maintains relations with international scholars, including numerous important specialists from associated fields who are regular and corresponding members, and also promotes the next generation of scholars. Furthermore, it organizes congresses, colloquia and tours, and informs the public through the media about its work.

Key personnel

Prof. Dr. Ortwin Dally studied Classical Archaeology, Ancient History and Classical Literature in Bonn, Basel, Freiburg and Heidelberg. In Heidelberg he obtained his PhD and received the travel scholarship from the German Archaeological Institute. He was then working at the Institute of Classical archaeology, Free University (Berlin). In 2004 he obtained the position of the secretary general of the German Archaeological Institute (Berlin). He is deputy president and responsible for the IT-politics of the German Archaeological Institute. He is a corresponding member of the Archaeological Institute of America. Ortwin Dally deals mainly with problems of cultural contacts, Greek colonization and the construction of identities in antiquity. The regional focus of his work is southern Russia (especially Taganrog and the surrounding area) and southern Italy.

Prof. Dr. Henner von Hesberg studied Classical Archaeology, Ancient History, Classical Literature and art history in Bonn, Marburg and Wuerzburg. In Marburg he obtained his PhD and received the travel scholarship from the German Archaeological Institute. He was then working at the DAI in Berlin and Rome. In 1987 he obtained the chair for Classical Archaeology at the University of Cologne, where he was a speaker of a Graduate School and from 1995 to 1997 Dean of the Philosophical Faculty. Since 2006 he is the first director of DAI's department in Rome. He is a full member of the Academy of Sciences in Mainz. Henner von Hesberg deals mainly with Hellenistic and Roman architecture, town planning. The regional focus of his work is the ancient Italy, especially Rome and the surrounding area.

Prof. Dr. Reinhard Foertsch has done his PHD in Goettingen University in 1989, obtained the one-year travelling scholarship of DAI in 1989, worked since 1989 at the Cologne Archaeological Institute as an Assistant Professor where he received the Venia Legendi after his habilitation in 1995. He has been the Director of FA since 1996. He has been a member of the CLAROSnet-consortium since 2000, an official consortial partner of DAI for the digitalization of its photographic archives since 2004. He has been a member of the CLAROSnet-consortium since 2000 and of the DAI-GIS-working-group since 2005 and a corresponding member of DAI since 2008. He has been responsible for a lot of national and international projects and recently has participated in an EU-project UBI ERAT LUPA. In the area of digitization Foertsch today is working closely with the University of Cologne's Chair for Humanities Computing (HKI), and both are teaching and building digital concepts for Classical

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Archaeology in Germany in the field of object-databases, 3-D-VR-models and Semantic Web Technologies, in which FA/HKI and DAI are implementing a CIDOC-CRM-interface between ARACHNE and the Perseus Digital Library.

P.16 Directie Monumenten en Landschappen, Ministerie van het Brussels Hoofdstedelijk Gewest - Direction des Monuments et des Sites, Ministère de la Région de Bruxelles-Capitale, BE (Content Provider)

The mission of the Direction of Monuments and Landscapes of the Brussels Capital Region is:

- to identify and study the Region's heritage by realising and updating inventories and atlases;
- legally protect the Region's heritage;
- restore and manage this heritage;
- conduct archaeological excavations and guarantee the conservation of the archaeological heritage.

The Direction consists of seven departments: Archaeology, Heritage Protection, Heritage Inventory, Landscapes and Trees, Documentation, Restoration of Protected Buildings and General Politics (publication and communication) (www.monument.irisnet.be).

The protection of the Brussels' heritage relates to buildings/archaeological sites of various historical periods, regardless of style or age. 1626 buildings, landscapes, trees, archaeological sites benefit from a degree of protection. Special attention is given to 20th century especially post-war buildings, and to trees, parks and semi-natural environments. The Brussels Capital Region manages the World Heritage sites of the Grand Place and the architectural works by architect Victor Horta. It has placed the following monuments on the Tentative List of World Heritage sites: the Palais de Justice, the architectural works by Henry van de Velde and the Galeries Royales Saint-Hubert.

The inventories of the remarkable buildings and trees in the Brussels Capital Region (www.irismonument.be) constitute precious tools for surveying, describing and promoting the heritage. The Atlases of the archaeological underground in the Brussels Capital Region give a GIS-based survey of all known archaeological sites from prehistoric till modern times. These atlases constitute a powerful tool in town planning management and urbanisation projects.

The Direction has participated in various European projects including: "Septentrion – From fortified town to sustainable town" (Interreg IIIb – NEW-ENO) and the "Reseau Art Nouveau Network. It also takes part in the European Heritage network organised by the Council of Europe.

Key personnel

Dr. Ann Degraeve is senior archaeologist at the Archaeology Department. Trained in Near Eastern Archaeology at the Gent University, she excavated in Iraq, Armenia and Jordan. She collaborated with the Royal Museums of Art and History on archaeological excavations in Vietnam. Since 2000 she has been senior archaeologist at the Direction of Monuments and Sites of the Brussels Capital Region, responsible for the archaeological specifications communication with third parties excavating within the Region and the natural sciences analysis management. She is responsible for database development within the Archaeology Department (development and maintenance of a multi-usage database for storage management and scientific research) and the archaeological sites GIS-development. She is member of the European Archaeological Council – Archives Working Group.

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Dr. Cecilia Paredes is Head of the Documentation Department (photographs, archives, postcard collections, library). She trained as architect and as art historian. She specialised in art history and architecture of the 16th century, landscape and garden history. She is a member of the Administration Council for the Documentation of the Commune of Watermael-Boitsfort in the Brussels Region. She has numerous qualifications in the domain of art history and its documentation (e.g. Metropolitan Museum of Art, New York).

Tom Verhofstadt is Head of the Inventories Department (remarkable buildings). He obtained his MA in Art Sciences and Archaeology at the Free University of Brussels (VUB) with a monograph on the realisations of architect Alexis Dumont. He joined the Direction of Monuments and Landscapes in 2003.

Muriel Muret is Head of the Protection Department (legal protection of remarkable buildings). She trained as art historian at the Free University of Brussels (ULB) and the Victor Horta Institute (the Art of Building: the restoration and conservation of the architectural heritage). She is Project Leader of the Réseau Art Nouveau Network and Conference-guide at the Museum of Ixelles,

Thierry Wauters is head of the Landscapes Department (legal protection and inventories of remarkable trees and landscapes). He obtained his MSc in Botanical Sciences at the Free University of Brussels (ULB). He is administrator of the Bibliothèque René Pechère (www.bvrp.net) and member of the Superior Council for Nature in the Brussels Capital Region. He is also Director of the cultural centre Les Halles Saint-Géry and has organised various exhibitions on Brussels' heritage (www.hallessaintgery.be).

P.17 Eesti Vabariigi Kultuuriministeerium – Ministry of Culture, Republic of Estonia (Content Provider)

Within the Estonian Government, the Ministry of Culture is responsible for organizing and coordinating state cultural policy. The task of the Ministry of Culture is to make sure that necessary and favourable conditions, both legislative and financial, are created for the functioning of culture, heritage and sports from the culture professionals' as well as the general public's point of view.

The mission of the Ministry of Culture is to support the maintaining of the Estonian national identity by valuing, preserving, developing, acknowledging and spreading Estonian fine arts, cultural heritage and sport in Estonia and abroad supporting both the professional and amateur activities in creativity and sport.

Ministry of Culture has participated in MichaelPLUS, MinervaEC and MICHAEL Plus projects and currently is participating in ATHENA project.

Key personnel

Indrek Eensaar is Head of Information Technology Division at the Ministry of Culture. His fields of responsibility include coordinating the development of information technology in the administrative area of the ministry, managing the development-plans of state priority IT-systems (the IT systems of the museums and libraries) and coordinating the IT-related fields of activities (digitisation). Before joining the Ministry of Culture Indrek was a Senior Specialist with the Harju County Government. He graduated in public administration from Tallinn Technical University (MPA).

Anton Pärn is the Deputy Secretary General of the Ministry of Culture with responsibility for the cultural heritage. Anton graduated with an MA in archaeology from the University of Tartu and went on to join the National Heritage Board with responsibility for archaeology. From 1993 to 2001 he was Deputy Director General of the National Heritage Board.

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P.18 Narodni pamatkovy ustav (National Heritage Institute), Czech Republic (Content Provider)

Narodni pamatkovy ustav (NPU) is the statutory national organization funded by the Ministry of Culture of the Czech Republic. Its power and basic responsibilities are set out in the Act No. 20/1987 Coll., on the State Care of Monuments, as amended. The central office serves for the institute as a whole, coordinates and performs major tasks. Regional offices meet responsibilities and professional activities within the regions.

NPU keeps a Central Register of Cultural Monuments, draw up expert opinions and background materials for designation of objects as cultural monuments and for regional authorities, which exercise state administration in the sphere of the state care of monuments, provides free professional assistance to the owners of cultural monuments in ensuring the appropriate care of cultural monuments, elaborates analyses of the condition and development of the state care of monuments and supporting documents for forecast, strategies and long-term outlooks of the development of the state care of monuments, performs the tasks of a methodological, documentation and information workplace for the sector of the state care of monuments and maintains survey, research and documentation of cultural monuments, monument reservations and monument zones.

NPU takes care of more than 100 important historic properties which are open to the public. Since 2003 NPU has been building the Integrated Information System of the Care of Monuments (IISCM), which works on the principle of interdependency of all information sources in the NPU. The IISCM contains basic applications - GIS (Geographical Information System with essential geodatabase of objects in the Czech Republic and specialized thematic layers), MIS (Meta Information System for storing, describing and making available digital or digitized documents relating to the objects of interest, or the preservation of heritage in general professional activities NPU), SAR (State Archaeological Register) and CRCM (Central Register of Cultural Monuments of the Czech Republic).

Key personnel

Ing. Dalibor Bursik, a civil engineer, worked in both state and private project offices as a designer of overground structures, in this field received authorization CKAIT. He has worked at NPU since 2002 in the Department of Documentation in scanning and archiving of documents. Since 2004 he has participated in the development of the IISCM (GIS, MIS) mainly in the creation of the data base (GIS) and inserting documents into MIS. He also provides training activities.

Ing. Irena Blazkova, a civil engineer, worked in the sphere of construction administration. Since 1995 she has worked at NPU as a head of the Department of the Care of Immovable Cultural Monuments and a head of the Department of Documentation and Information. She participates in implementing the IISCM at regional offices of the NPU. She has experience in drawing up expert opinions for owners changing their cultural monuments, keeping regional registers of cultural monuments and elaborating materials for designation of cultural monuments. She also researches on the protection of conservation areas.

Ing. Alena Stovickova works at NPU as GIS specialist. Her latest working experience includes managing projects, processing and updating spatial data and mastering the ESRI technology. She has experience in creating and realization projects as Project EC „Provision of services and procurement of territorial and environmental datasets for the corridor Dresden (D) – Prague (CZ)” (ref.N. AJ/17/2000), Joint Research Centre, European Commission, Space Applications Institute, Ispra, Italy and Project EC - Premathmod - Precision Farming – process model (Data-Information-Knowledge/2001-2003).

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P.19 Pamiatkový úrad Slovenskej republiky (The Monuments Board of the Slovak Republic), Slovak Republic (Content Provider)

The Monuments Board of the Slovak Republic is a state budgetary organisation established for state administration in the field of the protection of monuments and historic sites, and is a legal entity based in Bratislava.

The Monuments Board:

- a) executes state administration as the authority in the field of the protection of monuments and historic sites.
- b) resolves and co-ordinates professional and research tasks, developing theories and methodologies for the protection of monuments and historic sites;
- c) monitors the status of monuments and historic sites and conditions for their protection;
- d) acts as administrator for the General Inventory - the state information system;
- e) keeps an archive in the field of the protection of monuments and historic sites;
- f) ensures the development of theories and methodologies for restoration,
- g) ensures research and restoration works as special-purpose State aid for cultural heritage monuments in danger,
- h) takes part in international projects on the protection and renovation of cultural heritage monuments and historic sites and co-operates with international organisations and partner institutions abroad.

The Monuments Board of the Slovak Republic closely co-operates with the Ministry of Culture of the Slovak Republic.

The Monuments Board is responsible for the development of the General Inventory of cultural monuments – an Information System of the preservation monuments of Slovak Republic.

Key personnel

PhDr. Katarína Kosová has been general director of Monuments Board of the Slovak Republic since 2002. Between 1998 and 2002 she was general director of the Slovak Institute of Monuments Preservation, the advisory body of the state executive in the field of protection of monuments.

Katarína worked as an expert in the working group for conservation of artistic crafts at the Committee for Cultural Heritage of the Council of Europe (1991-1995). She participates in the working group for the entry of Slovak sites into the List of World Cultural and Natural Heritage of UNESCO and takes part in sessions of the Committee for the World Heritage of UNESCO. Katarína is a member of the National Committee ICOMOS and ensures the activity of its Secretariat in the premises of the Monuments Board of the Slovak Republic. It was due to Katarína that the Slovak Republic joined the International Educational Conservation Institution in Rome – ICCEOM.

Katarína participates in the HEREIN project of the European Foundation for Cultural Heritage at the Council of Europe. She co-operates with foreign funds at UNESCO, the Visegrad Fund, with foreign foundations including the World Monument Fund, the Kress Foundation, the European Preservation Programme, Stiftung Messerschmidt, and the accession programmes of the European Union – Raphael, Leonardo and others. Katarína successfully established co-operation with the Hungarian Office for the Cultural Heritage, the Federal Monuments Board in Austria, the Bavarian Federal Monuments Board and institutions in Prague, Brno, and with the Transylvanian National Trust in Romania.

Katarína is a member of the Scientific Collegium for Social-historical Sciences of the Slovak Academy of Sciences, the Inter-governmental American- Slovak Committee for Cultural Monuments

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abroad, the Curatorium of the Slovak National Museum, and also the Art-historical Society, the Editorial Council of Revue for Cultural Heritage Monuments and Museums, the Executive Council of Atlas of the Landscape of the Slovak Republic, the Supervisory Board of the National Trust of Slovakia.

Internationally, Katarína is a member of the National Committee of ICOMOS and ICCROM – it was due to her that the Slovak Republic joined ICCROM. Nationally, she is a member of the Scientific Collegiums for Social-historical Sciences of the Slovak Academy of Sciences, the Slovak Art Historian Society, the Slovak Ethnological Society, the American-Slovak intergovernmental experts group for American heritage abroad, the Curatorial Council of the Slovak National Museum, the Editorial Council of Revue of Revue for Cultural Heritage – Monuments and Museums, the Executive Council of Atlas of the Landscape of the Slovak Republic and the Supervisory Board of the National Trust of Slovakia.

RNDr. Ľuboslav Škoviera is the chief of the Department General Inventory of the Cultural Monuments at the Institute of the Monuments and has been with the Institute since 1985. In 1992 he participated in the European colloquy on the Architectural Heritage (Inventory and documentation methods) organised by the Council of Europe in Nantes, France, where he gave a report on the state of a General Inventory of the Cultural Monuments in Slovakia. This study continues to the present day and he has since taken part in two other seminars in the France and in the Belgium (Paris - Poitiers, Namur). Ľuboslav was a member of the Council of Europe experts group for skills and crafts in cultural heritage from 1991-1995. Since 2002 he has been the national correspondent for the HEREIN project of the European Foundation for Cultural Heritage at the Council of Europe. Ľuboslav created a website for the Monuments of Slovakia www.pamiatky.sk and www.heritage.sk (English version). He has been a member of the KIRK – MKSR (the commission for IT) since 1998, a member of the grant commission of the MKSR (for cultural heritage) since 2007 and in 2008 was an expert in a project with the Czech Science Foundation (IT, cultural heritage).

P.20 Cross Czech a.s., CZ (Business expertise)

Cross Czech a.s. co-operates intensively with Czech cultural institutions, helping them to promote and present their activities on the European level, to take part in EU funded projects and to handle the managerial and technical side of the work in the area of ICT in relation to culture, education and social policies. Cross Czech closely co-operates with the Ministry of Culture of the Czech Republic and of Slovakia, being the consulting company for harmonization of EU strategic development in this area as well as digitisation and long-term preservation of cultural heritage in both countries and sharing digital repositories from libraries, museums, galleries and archives based on OAI-PMH. Cross Czech a.s. is also involved in development of the Digital Information System for cultural heritage institutions established by the Ministry of Culture of Slovak Republic.

Cross Czech also closely co-operates with several other ministries in the Czech Republic in the area of Technical Assistance related to implementation of Structural Funds implementation in the Czech Republic. It has experience with preparation of strategic documents, studies, evaluations, preparation of programming documents, etc.

Cross Czech a.s. has also signed a Framework Agreement with the Brussels office for the Financial Mechanism of EEA/Norway. The contract includes services as Appraisal agent and Monitoring agent for all NMS as well as elaboration of national baseline studies on regional development.

Cross Czech a.s. is also a prime contractor and, in a partnership with Ernst & Young Slovakia, signed a contract with the Office of the Government of the Slovak Republic for elaborating the Feasibility Study on projects of priority axis 2 of the Operational Programme Information of Society “Development and renewal of the national infrastructure of repository institutions”. The feasibility study provides backgrounds for distribution of 192 M€ from Structural Funds on preservation of cultural heritage in Slovakia.

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Cross Czech a.s. has participated in numerous EU funded cultural projects such as CHIMER (FP5 IST), eMapps.com (FP6 IST), KEEP (FP7 ICT), ENRICH (eContent+), EUROPEANALocal (eContent+), ATHENA (eContent+) as well as other ICT projects such as FINANCE-NMS-IST, CEEC IST NET, TransferEast, etc.

Key personnel

Mgr. Romana Křížová is the owner and CEO of Cross Czech a.s. and has experience in creating and realization of projects in pre-structural funds programs (PHARE), the 5th, the 6th and the 7th Framework Programme, Culture 2000, eContent, eContent+, eTen, eLearning, EQUAL, Structural Funds and other financial mechanisms. She intensively co-operates with the Ministry of Culture of the Czech Republic and Slovakia and cultural organizations established by the Ministries. She was an external expert on the MINERVAPlus and MICHAELPlus projects. Romana Křížová also works in partnership with the Office of the Government of the Slovak Republic for elaborating the Feasibility Study on “Development and renewal of the national infrastructure of repository institutions”.

Mgr. Ivana Haladová worked in both state and privately owned TV companies as script editor, Head of the Departments of Acquisition Strategies and Dubbing, Dramaturgy and Programming and Scheduling Manager. In 2003 she joined Cross Czech a.s. as Head of Department for Culture, Education and Social Policies. She is competent to develop international activities in cultural and educational sectors and enables co-operation of Czech organizations with relevant European partners. She also provides training activities in the area of fundraising for cultural and other companies and institutions. Ivana Haladová took part in projects CHIMER, EUROPEANALocal and ATHENA.

P.21 Directorate of the National Archive of Monuments - Hellenic Ministry of Culture, GR (Content Provider)

The Directorate of the National Archive of Monuments (DNAM) is governed by the General Directorate of Antiquities of the Hellenic Ministry of Culture (HMC). The Directorate has undertaken the electronic recording, documentation and management of material that is related to Greek cultural heritage, to ensure its safeguarding and its creative utilization. Through the use of cutting edge technology, it actively supports research and the distribution of knowledge in a wide spectrum of cultural and archaeological fields promoting at the same time scientific study.

The Directorate coordinates digital actions across Central and Regional Services of HMC and is responsible for:

- the **Historic Archive of the Hellenic Archaeological Service**, that concerns the historical monuments and archaeological sites, as well as the administrative development and history of the Service. It is also responsible for the collection, indexing, study and digitalisation of the archival material including documents, photographs, maps and plans,
- the **National Archive of Monuments**, in which all necessary identification information for each monument are recorded electronically,
- the **Permanent Catalogue of Registered Archaeological Sites and Monuments of Greece**, which gathers designations for the protection of monuments, archaeological sites and historic locations of the country since 1921.

The Directorate plays a vital role in the contemporary knowledge environment. Placing advanced technologies in the service of cultural heritage it contributes significantly in the national digitisation endeavour of Greek culture, while it harmonises digitisation practices and electronic documentation with the view to achieve the integrated management of collections and monuments at a national level. Furthermore, the Directorate facilitates the exchange of scientific knowledge, through publications, conferences and numerous presentations.

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In order to meet contemporary challenges set within the cultural sector, the Directorate of the National Archive of Monuments makes the most of the development perspectives offered by European Union programmes and projects, such as the following:

- “Digitisation and Digital Documentation of Monuments Collections of the Ministry of Culture” (3rd Community Support Framework - Measure 1.3)
- “Archives of European Archaeology - AREA” (Culture 2000)
- “Multilingual Inventory of Cultural Heritage in Europe - MICHAEL Plus” (E-ten)
- “Access to Cultural Heritage networks across Europe - ATHENA” (e-Contentplus)

The Hellenic Ministry of Culture manages the national cultural heritage, while the Directorate of the National Archive of Monuments coordinates the Central and Regional Services of HMC within the context of its aforementioned responsibilities.

The Directorate has therefore both the scientific and the institutional adequacy which validates its indispensable participation in the proposed network. Finally, the team of the experienced and capable researchers, who will be charged by the Directorate to meet the needs of the proposed programme, will ensure the successful outcomes of the Hellenic Research Network for the Humanity Studies specifically in the field of Archaeology.

Key personnel

Dr Metaxia Tsipopoulou is Director, Directorate of the National Archive of Monuments. She graduated from the Department of History and Archaeology, Faculty of Philosophy of the University of Athens, where she obtained her Doctoral degree on the subject “Geometric and Orientalising ceramic of Eteocretan region”. Metaxia continued her postdoctoral research at the University of Bristol and, as a NATO scholar, at the National Foundation of Research in Italy and later, as a Fulbright scholar at the State University of New York. Her career in the Archaeological Service of the Ministry of Culture began in 1975, with service in Crete. Since 2007 Metaxia has directed the National Archive of Monuments.

Metaxia’s scientific work includes co-ordination of many excavations (such as the systematic excavations at Petra - Sitia, at Halasmenos, at Ierapetra Isthmos and Pahia Ammos of Ierapetra), systematic research, national representation at the excavations of Foreign Archaeological Schools, surface surveys, geographic registration of archaeological sites, organisation of archaeological museum exhibitions and international scientific conferences, and developing collaborations with Local government and local institutions for archaeological programs. She has given numerous lectures and seminars in scientific institutions of Greece and abroad, and at international archaeological conferences, and she has published widely (Monographs, Articles, Book critics). Metaxia has been recognised in awards and other distinctions for her contribution to Archaeological science and research and is one of the most notable archeologists of contemporary Greece.

Dr Maria Antoniou – Archaeologist, Directorate of the National Archive of Monuments - was born in 1971 in Athens. She graduated from the Department of History and Archaeology, Faculty of Philosophy of the University of Athens (Greece) with postgraduate studies in the Archaeology and the Prehistory (MA) in the University of Sheffield, (UK), as a scholar of the “Lilian Boudouri” institution. She obtained her Doctoral degree entitled: “the relations of Western and South-western Peloponnese with Minoan Crete during the LHI – LHIIA period: the ceramic indications” at the University of Athens.

Maria has participated in surface surveys and excavations in Boeotia, Kos, Achaia and for many years in Messinia, where she lead the scientific activity. She serves as an Archaeologist in the Directorate of the National Archive of Monuments of the Hellenic Ministry of Culture. Her publications include

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scientific articles and participation in the authors' team of the exhibition catalogue titled: "...I reported in writing..." – Treasures of the Historic Archive of the Hellenic Archaeological Service, published by the Directorate of the National Archive of Monuments.

Effie Patsatzi, MA – Archaeologist-Museologist, Directorate of the National Archive of Monuments - graduated from the Department of History and Archaeology, Faculty of Philosophy of the University of Thessaloniki, (Greece) and holds a Masters degree in Museum Studies from the University of Leicester, (UK).

Effie has developed professional activity in Museums and Cultural Institutions of Greece and UK as well as European Programmes of Research and Development (Museum Documentation Association - MDA, European Museums' Information Institute - EMII, National Maritime Museum – UK, The British Museum - Compass Project, Museum of Sports - Thessaloniki, PRC Group, The Management House - Cultural Projects).

Since 2006 she has worked in the Directorate of the National Archive of Monuments of the Hellenic Ministry of Culture for programmes and projects related with the digitisation and promotion of Greek cultural content: "Digitisation of Moveable Monuments Collections of the Ministry of Culture" (3rd Community Support Framework - Measure 1.3), "Multilingual Inventory of Cultural Heritage in Europe - MICHAEL Plus" (E-ten) and "Access to Cultural Heritage networks across Europe – ATHENA" (e-Contentplus).

Effie has extensive experience in digitisation programmes and terminology thesauri development at both implementation and coordination levels. She specialises in collections management, recording and communication of cultural information, and particularly in the application of museum documentation standards as well as the use of electronic collections management systems and the creation of online learning resources.

Stavroula Masouridi, MA – Archaeologist, Directorate of the National Archive of Monuments

Ms Stavroula Masouridi graduated from the Department of History and Archaeology, Faculty of Philosophy of the University of Athens (Greece) and - as a scholar of the Pierides Foundation- she obtained a Masters degree in Field and Analytical Techniques (computers, statistics, archaeometry) in Archaeology from the Institute of Archaeology, University College London, University of London (UK).

Since 1997 Stavroula has been working as an Archaeologist in the Directorate of the National Archive of Monuments of the Hellenic Ministry of Culture. From 2001 to 2005 she was also working for the Greek archaeological magazine "Corpus: Archaeology - History of Civilizations" where she published numerous articles. She has participated in surface surveys and excavations in Crete (Monastiraki, Gortyna), Cyprus (Kourion) and UK (Bignor Roman Villa, Glynde Hill, Windover Hill, etc) and in several seminars in relation to Aegean and Cypriot archaeology, field techniques and the organization and management of historical –cultural archives.

P.22 The Institute for Protection of Cultural Heritage of Slovenia (Content Provider)

The Institute for the Protection of Cultural Heritage of Slovenia (IPCHS) is a public body performing a public service for the protection of cultural heritage defined by the Cultural Heritage Act. IPCHS covers a variety of administrative and professional duties relating to the protection of immovable cultural heritage and of the movable and living cultural heritage associated with it. IPCHS was founded in 1999 by the state and is superintended by the Slovenian government.

IPCHS's principle objective is developing, coordinating and executing projects and procedures such as the documentation and valorisation of the cultural heritage linked to the conservation of heritage and the prevention of damage, as well as the incorporation of heritage into modern life and its promotion,

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accompanied by presentation and the development of public awareness of heritage value. The Institute comprises two main organisational units: the Cultural Heritage Service and the Conservation Centre. The Conservation Centre is partitioned into the Restoration Centre and the Preventive Archaeology Centre.

IPCHS's legally specified tasks include protection and integrated conservation of cultural heritage in diversified domains including architecture, landscape, art history and archaeology. The results of IPCHS projects are reflected in various scientific publications and also popular publications, managed by IPCHS itself or other institutes.

The Cultural Heritage Register is the core database of the information system. The Register is official database on immovable cultural heritage in the geographical area of Slovenia. In the Register all units of immovable cultural heritage regardless of their type, size, ownership, or legal protection status are registered. Register maintains the basic data (including geo-location) for each cultural heritage unit and assigns them unique Heritage Reference Number on national level.

Key personnel

Franc J. Zakrajsek is a senior researcher, mathematician and independent consultant on the areas of geographic information systems, GIS portals, GIS web services, 3D modelling, data modelling, digital cultural content, registering movable and immovable cultural heritage and building the national and cross-national interoperability frameworks.

Franc is the main developer of the Register of the Cultural Heritage and Geographic Information System of cultural heritage in Slovenia, which operate on state level. At the present time he acts for Slovenia as a member of Member's states expert group on digitalization and digital preservation, national representative for digital cultural content concerns libraries, museums, archives, audiovisual and other cultural institutions. He coordinates the preparation of the strategy and action plan for e-culture and digitalization in Slovenia. He is also a project leader and main developer of the several Web II projects concerning digital cultural content.

Ksenija Kovačec Naglič was first employed at the Urban Planning Institute of the Republic of Slovenia (1989-1994). She has been working at the Directorate for Cultural Heritage within the Ministry of Culture of the Republic of Slovenia (former Cultural Heritage Administration) since 1994 and has been the head of the Information and Documentation Centre since 1998. She is responsible for the management of the cultural heritage information system, including Cultural Heritage Register of the immovable cultural heritage and Geographical Information System. Ksenija is active as a member of the ad hoc expert group for inventory and documentation within the Technical Assistance and Consultancy Programme of the Council of Europe (2000).

P.23 Archaeological Heritage Agency, Iceland (Content Provider)

The Archaeological Heritage Agency of Iceland will be taking part in the CARARE project in cooperation with the National Architectural Heritage Board.

The **Archaeological Heritage Agency of Iceland**, established in 2001, is the central authority for protection and management of archaeological monuments and sites in Iceland. The mission of the Agency, in accordance with the Cultural Heritage Act (no. 107/2001), is to safeguard the Icelandic cultural heritage and pass it on intact to future generations. To achieve this mission the main focus of the Agency is on in-situ preservation of archaeological monuments and sites, on the increasing of public awareness and access to the cultural heritage, and on promoting research. The Minister of Culture appoints the director of the Archaeological Heritage Agency for a five-year term. The Archaeological Heritage Agency maintains offices in six locations around the country. The regional offices are responsible for the archaeological heritage in each region and for communication with regional authorities, e.g. regarding planning issues.

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The **National Architectural Heritage Board** is the central authority for the preservation of the Icelandic architectural heritage and is subject to the provisions of the Architectural Heritage Act (no. 104/2001). The board formulates policy in the field of architectural conservation and assesses which buildings should be listed as conserved structures, and submits proposals in this regard to the Minister of Education and Culture. The National Architectural Heritage Board administers the Architectural Heritage Fund, whose role is to provide grants for maintenance and renovation of listed buildings and structures, and of other buildings deemed by the National Architectural Heritage Board to be of historical/cultural value.

According to article 6 of the Architectural Heritage Act no. 104/2001 all buildings in Iceland that were constructed before 1850 are listed and all churches erected before 1918. In addition, the owners of buildings that were constructed before 1918 are obligated to seek opinion of the National Heritage Board well beforehand if they are going to modify their house, move it or tear it down. In April 2009 there are 404 listed buildings in Iceland, including 207 churches.

Key personnel

Sólborg Una Pálsdóttir is the Head of the department of registration for the Archaeological Heritage Agency. Sólborg has worked for the Agency since 2005. She has an MSc in Archaeological Information Systems from University of York and a BA in History from University of Iceland.

Guðlaug Vilbogadóttir is Project manager for the National Architectural Heritage Board. She worked part time for the Heritage Board from 2005 and full time from 2008. Guðlaug has a BA in Archaeology from University of Iceland.

P.24 Vilniaus universitetas, Komunikacijos fakultetas (Vilnius University, Faculty of Communication), Lithuania (Content Provider)

Vilnius University Faculty of Communication is the leading Higher Education establishment working in the broad field of information and communication professions in Lithuania. Established in 1991, VUFC has an integrated approach towards information and communication, looking at libraries, museums, archives, media, publishing enterprises, information agencies and information businesses as parts of the information infrastructure of the society. Today, the Faculty of Communication has as its main purpose to strengthen interdisciplinary studies and research in order to promote competitive and high quality education in the field. Its mission is realized through communication and information study programs, basic and applied research, and continuing professional development opportunities, and particularly through interdisciplinary and international cooperation. The Faculty has contributed to several international and European Union funded projects including CALIMERA, PubliCA, Pulman and Cultivate-CEE, DPE (Digital Preservation Europe), Europeana and NORSLIS (Nordic Research School in Library and Information Science).

The Faculty has 4 departments: Department of Information and Communication, Institute of Documentation and Book Science, Institute of Journalism, Institute of Library and Information Science. Its research includes mass media transformations, development and integration of memory institutions, book and cultural heritage studies, heritage communication studies, information management, information resources and information retrieval, analyzing political, mass media, political, organizational, international and other contexts of communication. Research is directed by interdisciplinary approach and collaborative attitude. Currently, VUFC offers five BA and ten MA study programmes, has 44 FTE. employees, ca. 1200 BA and MA students and 26 PhD students. International cooperation and participation in EC and other international projects is a strategic priority for VUFC, enabling the institution to create a critical mass of intellectual capacity for education and research in the knowledge-based society.

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Key personnel

Dr. Vykintas Vaitkevičius is a Senior Researcher at the Institute of Baltic Sea Region History and Archaeology of Klaipėda University and head of the CARARE team for VUFC. Vaitkevičius was a State inspector from 1992–1994 with the State’s Cultural Heritage Inspection Department of Archaeology and went on to become a researcher at the Lithuanian Institute of History, Department of Archaeology. His research projects have included *The Culture of Society in Lithuania in the 11th–17th centuries*, *Regional Models of Baltic Culture: Dynamic of the Processes in the Late Iron Age (9th–12th c.)* and his current research interests include the Balts’ religion and mythology, landscape archaeology, digital archaeology. Vaitkevičius has 17 years experience of archaeological fieldwork and complex research: fields of study include burials, barrows, unfortified settlements, hill forts, villages, natural holy places, etc. He has 13 years experience in research of cultural heritage in Lithuania’s protected areas (national and regional parks) and 4 years experience of digitising cultural heritage resources. Since 2005 he has been a member of the Council of Lithuanian Cultural Heritage and, since 2006, a member of the Editorial Board of *Lietuvos archeologija*.

Dr. Rimvydas Laužikas has been a lecturer and assistant Professor for Vilnius University since 2005. From 1998 - 2008 he was Chief Curator of Collections and archaeologist for the Lithuanian Museum of Ethnocosmology. He graduated from the Faculty of History, Vilnius Pedagogical University and went on to complete doctoral studies at the Faculty of Communication, Vilnius University. His research interests include the archaeology of churches in Lithuania (13-18th centuries), digitisation of the cultural heritage, digital technologies for scientific research and museology.

dr. Zinaida Manžuch studied Library and information science and library and information centres management at the Faculty of Communication, Vilnius University. In 2007 she defended a doctoral thesis “Communication of memory in archives, libraries and museums: analysis of the EU strategic approach”, based on an empirical analysis of the EU strategies and programmes (Information society technologies, eTEN, eContent, and Culture 2000) related to libraries, museums and archives and the application of ICT to their core functions.

Zinaida currently works at the Institute of Library and Information Science, Faculty of Communication at Vilnius University. She is actively involved in initiatives and research concerning libraries and ICT. She has extensive research experience in EU projects covering ICT applications in libraries. She took part in the CALIMERA project (2003-5), in LIS Education in Europe (2005, Socrates programme) she lead the team on digitization of cultural heritage and produced a chapter on digitization education in LIS schools for the *European Curriculum Reflections on Library and Information Science Education*. In the TEL-ME-MOR project (FP6) with the National Library of Czech Republic, she performed two large-scale surveys of the European national libraries, addressing the issues of national strategic frameworks for ICT and cultural heritage and relevant technological progress in the national libraries. She completed a national survey of digitization in libraries and other cultural institutions (2006) in co-operation with the Ministry of Culture of Lithuania. Her latest research includes an analysis of monitoring frameworks for digitization of cultural materials in libraries, museums and archives at the international level, carried out in NUMERIC project.

Zinaida has been actively involved in expert activities in Lithuania and Europe. In 2005 she was a part of the national expert group on digitization in Lithuania contributing to the development of the national digitization concept for libraries, museums and archives. In 2005-2007 she was a member of the European expert group on coordinating digitization. She is currently a member of The European Library Users Advisory Board.

Dr. Albinas Kuncevičius is currently Professor of Archaeology in the department of archaeology, Faculty of History, Vilnius University. He was Director of the Cultural Heritage Department under the Ministry of Culture until 2008 and from 1998-2005 was Head of Všį Kultūros paveldo akademija and a member of the State Cultural Heritage Commission from 1995-2002. Albinas graduated from the Faculty of History, Vilnius University in 1980 and went on to become Archaeologist for

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Lithuanian Cultural Monument Protection Institutions and later the Divisional Head of the Scientific Methodological Council for Cultural Monument protection, Inspector of Archaeological Monument protection, Ministry of Culture. Albinas was research fellow with the Research Group of the territory of Vilnius Lower Castle Palace, Lithuanian Historical Institute.

His research interests include the archaeology of Middle Ages in Lithuania (13-16th century), West European Archaeology, and monument protection and monument management issues. He has published articles on Lithuanian Archaeology of the Middle Ages in Lithuania. Major publications include a catalogue on Vilnius city and castle tiles (in German, 1992), the monograph Lietuvos Viduramžių archeologija (Lithuanian Archaeology in the Middle Ages), 2006. He was co-author of Lietuvos istorija iki 1795 metų (Lithuanian History Before 1795) (1995, 2000, in English – 2000, in Polish – 2007). Albinas has conducted archaeological excavations in ancient castle sites of Old Trakai, Batadvaris and Dubingia, in the Napoleonic soldiers' burial site in Vilnius, the World War I Germany soldiers' burial site in Panevėžys and elsewhere.

dr. Linas Tamulynas is an archaeologist and a junior scientific researcher in the Department of Archaeology (Vilnius University, Faculty of History), and a member of the editorial board of the scientific journal "Archaeologia Lituana". Linas's field of academic research is the Archaeology of Roman and Migration Periods in Europe and the History of Archaeology. From 2008-2009, Linas carried out research on the development of the cultural landscape according to Archaeology and Natural Sciences data, and from 2006-2008 on Lithuanian Archaeological Sources: Register and Digitalization

P.27 National Archaeological Institute with Museum, Bulgaria (Content Provider)

The National Institute of Archaeology with Museum (NAIM), part of the Bulgarian Academy of Science, is one of the most significant research institutions in the field of archaeology in Europe. It is the successor of two primary state institutions – the Museum of Archaeology (1890) and the Institute of Archaeology (1901). In 1948, these institutions joined to become the Institute of Archaeology with Museum of Bulgarian Academy of Science (which was renamed the National Institute of Archaeology with Museum (NIAM) in 2007).

The scholars at NAIM work on the thorough investigation of the material and spiritual culture of the tribes and nations that inhabited the today's Bulgarian territories from about 1,400,000 before present to the 18th century. NIAM is the national centre and coordinator of all the field archaeological investigations on the Republic of Bulgaria territory organizing annual reports and carrying out scholarly and methodical control over them.

The National Museum of Archaeology is the greatest and oldest one in Bulgaria and its principal role is as one of the most important centres in Bulgaria for studying, preservation and popularization of the past of today's Bulgarian territory. It organizes permanent displays and many temporary exhibitions

The research activities of NIAM also contribute most significantly to working-out the issues of stable development of the State by taking advantage of the archaeological heritage. NIAM scholars actively take part in the investigation and work on improvement of the legal order in the Republic of Bulgaria and its harmony with the legislation of the European Union.

The National Institute of Archaeology with Museum has five sections: Prehistory, Thracian Archaeology, Classic Archaeology, Medieval Archaeology, Numismatics and Epigraphy, Interdisciplinary Studies; two Branches for the investigation of the initial Bulgarian Capitals in Shumen and Veliko Tarnovo; and two departments for Deposits and Exhibitions. The staff of NIAM includes 128 people, 106 of them with university and academic degrees.

The Research Archives of NIAM contain 812 collections covering archaeological sites investigated over the last 50 years. The Library holds 70,782 volumes of academic specialized literature. The

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National Information System the “Archaeological map of Bulgaria” is managed and operated by the NIAM

In 2007 NIAM co-operated in international academic projects with France, Hungary, Serbia, Greece, the Czech Republic, Britain, Japan and Poland. These projects included:

- Archaeological expedition in Kovachevo with France);
- Research into proto-Bulgarians and Magyars along the Middle and Lower Danube (with Hungary);
- Archaeological cultures on the territory of Bulgaria and Serbia (with Serbia);
- Western Thrace during the Chalcolithic (with Greece);
- Archaeological excavations of Emporion Pistiros and field research along the Upper Maritsa and in the Western Rhodopes (with Czech Republic, France and Britain);
- Investigations of the Bronze Age Tell by Dyadovo (with Japan)
- Roman military camp and early Byzantine town of Novae near Svishtov (with Poland);
- Culture along the northern border of the Roman Empire (with 10 countries).
- Supply of metal to the Late Roman mint yard of Serdica (with Britain)

The long-term archaeological investigations of the Institute contribute revealing the most significant sites over the Bulgarian territory dating from the Prehistory to the Middle Ages. The considerable numbers of Tell sites reveal much about the development of Prehistoric cultures in the Eastern Mediterranean and South–East Europe. Notable sites include Kozarnika Cave, Provadia, Durankulak, Karanovo, Yunatsite and Dyadovo, the great Thracian cult and town centres at Getai in Sboryanovo Reserve and Emporion Pistiros, the necropolises near Shipka – Sheinovo, Starosel, Alexandrovo, Sveshtari, the Greek colonies along the Black Sea coast Nesebar, Sozopol, Pomorie; the Roman and Late Antiquity Age towns Novae, Nicopolis ad Istrum, Oescus, Nicopolis ad Nestum, Heracleia Sintica; and the Bulgarian Capital towns of Pliska, Preslav and Veliko Tarnovo, and the early Bulgarian necropolis at Balchik.

The National Institute of Archaeology with Museum is financed through the Bulgarian Academy of Sciences from the state budget. The research is financed from particular state programs, self – organized activities, participation with projects in European and Bulgarian programs, grants of juridical and physical persons, donations, etc.

NIAM issues 15 periodicals and series: Archeologia, Bulletin of the Institute of Archeology, Annual of the National Archaeological Museum, Excavations and Research, Interdisciplinary Studies, Numismatica, Sphragistica and Epigraphica, Dissertations, Studia Praehistorica, Pliska – Preslav, Preslav, Problems of the Proto – Bulgarian History and Culture, Contributions to the Bulgarian Medieval Archaeology, Tsarevgrad Tarnov, Archaeological Discoveries and Excavations, and Helis.

Key personnel

Prof. Margarita Vaklinova is Director of NIAM and a specialist in the field of Early Byzantine and Medieval Archaeology. She is head of the excavations of the Early Mediaeval Second Bulgarian capital – Preslav and of other Medieval and Early Byzantine sites in Bulgaria. Margarita is author of over 200 articles. She specialized in Ravenna, Italy, the Sorbonne, France and the British Academy. She is a member of the National Council for Preservation of the Cultural Heritage, professor of archaeology at the “St. Kliment Ohridski” University of Sofia.

Prof. Diana Gergova is scientific secretary of the NIAM and a specialist in Thracian archaeology (Bronze and Iron Age), Professor of archaeology at the University of Rzeszow (Poland), Member of the Executive committee of ICOMOS- Bulgaria, member of the National Council of Monuments of Culture, representative of SE Europe and Asia in the WAC, member of EAA. She is the author of 6 monographs and over 200 articles, and is Head of international and national projects (Sboryanovo

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National Reserve, Bulgarian- Japanese project” Dyadovo”,Bulgarian-Italian project in Geoarchaeology, etc.).

Prof. Aleksey Gocev is a specialist in Thracian Archaeology and Head of the International Project “Pistiros”. He is the author of over 100 articles on the problems of Thracian culture, settlement life, and archaeology of the cult.

Prof. Pavel Georgiev graduated from the Veliko Tarnovo University “St. Cyrilus and Methodius”. He is a specialist in Early Mediaeval Archaeology. Pavel is head of the branch of the NIAM in Shumen and head of the excavation of the First Bulgarian capital Pliska and of many mediaeval sites in NE Bulgaria. He is the author of 3 books and over 150 articles mainly on medieval architecture and culture, and made special contributions to the study and reconstruction of the Great Basiliska in Pliska.

Pavlina Ilieva graduated from the “Syt. Kliment Ohridski “University of Sofia. Pavlina is curator of the Treasure collection and of the Graeco- Roman collections of NIAM and is a specialist in Graeco-Roman Bronzes. Author of 1 book and over 50 contributions in the field of Graeco - Roman archaeology and museum management.

P.28 National Technical University of Athens, Greece (Technical Expertise)

The Image, Video and Intelligent Multimedia Systems Lab (IVML, www.image.ntua.gr) was established in 1988, as one of the Laboratories of the School of Computer and Electrical Engineering and of the Institute of Computer and Communication Systems (ICCS) of the National Technical University of Athens (NTUA) in Greece. The members of the Lab (which are about 35, including research scientists, researchers, Ph.D students, programmers, and supporting staff) are active members of the research community having published more than 100 journal articles and 200 international conference contributions.

The most important areas of R&D activities performed or supported by IVML include:

- Knowledge based technologies
- Semantic Web technologies and knowledge representation
- XML, RDFS, OWL, SPARQL and SKOS technologies
- Content-based semantic multimedia content search and retrieval
- Interoperability and access to cultural content
- MPEG-7 , MPEG-21 standards and Semantic Web technologies
- Intelligent Human Computer Interaction and Intelligent agents
- Face, Emotion and Biometric Analysis and Recognition
- MPEG-4 and Natural - Synthetic Hybrid Coding, Augmented Reality.
- WEB 2.0 Technologies (Ajaz, RIA)

IVML has been involved in ninety R&D projects. Half of them have been funded by the European Commission and the rest by Greek organisations. Seventy five of them have been completed, while fifteen are in progress. In particular:

IVML participates in the design and implementation of intelligent semantic analysis and retrieval of multimedia content, following the MPEG (4,7,21) and Semantic Web standards (being a member of W3C). The leader of the Lab, Prof. Stefanos Kollias has been one of the experts that the EC has used for defining the framework of ‘Semantic Content Analysis’ and its perspective for 2012. Kollias was a member of the EC ‘Interoperability Group’ on Digital Libraries in 2006-2007 and National Representative of the Hellenic Ministry of Culture since 2004, participating in the NRG to 2006 and the EC Expert Group on digital libraries since then, and in EDLnet, Minerva-ec and the Michael plus projects. He was co-organiser of the Workshop on “Semantic Interoperability in the European Digital Library” in the European Semantic Web Conference, Tenerife, June 2008.

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IVML has participated in the 6th framework IP ACEMEDIA on semantic-based adaptive multimedia analysis systems (2004-2007), in the NoE MUSCLE on intelligent adaptive multimedia analysis (2004-2007), in the NoE Knowledge-Web on semantic Web technologies (2004-2007), in the IP AskIT on knowledge-based assistance for mobility-impaired people (2004-2007), in the IST NoE K-Space on multimedia and knowledge technologies (2006-2009), in the IST IP Mesh on knowledge technologies for news (2006-2009), in the IP X-Media, on knowledge technologies and business environments (2006-2009), in the STREP project Boemie on ontology evolution (2006-2009), in the We-Know-It IP project on collective intelligence and Web2 technologies (2008-2011), in the ICT E-Culture Imagination project, on knowledge-based access to historical content (2006-2009), in the E-Content-Plus Videoactive project being technical leader for unified access to audiovisual archives (2006-2009), in the E-Ten Michael Plus project being technical leader for a common platform for access to European cultural content and interoperability (2006-2008), in the E-content Plus Minerva-ec (2006-2008), collaborating with european libraries, museums, archives, being technical co-leader of the interoperability part of the project, in the ICT E-Inclusion Agent-Dysl project (2006-2009). Additionally, IVML participates or will participate in the following projects, European Digital Library Network (EDLnet, EuropeanaNet), ATHENA BPN (2008-2010), EU Screen BPN (2009-2011), EuropeanaConnect BPN (2009-2011), Europeana V01 thematic network (2009-2011).

Key personnel

Prof. Stefanos Kollias was born in Athens in 1956. He obtained his Diploma from NTUA in 1979, his M.Sc. in Communication Engineering in 1980 from UMIST in England and his Ph.D in Signal Processing from the Computer Science Division of NTUA. He is with the Electrical and Computer Engineering School of NTUA since 1986 and since 1997 he serves as a Professor. Since 1993 he is Director of the Image, Video and Multimedia Systems Laboratory of NTUA. His research interests include image and video processing and analysis, multimedia content based retrieval, and management, intelligent and knowledge-based systems, neural networks, human computer interaction, cultural content and digital libraries, semantic web and multimedia semantics. He has published more than 200 papers in the above fields, about half of which in international journals. Since 2004 he is national representative of the Ministry of Culture in new technologies and a member of the (cultural) National Representative Group and the subsequent Expert group of the EC.

Dr. Vassilis Tzouvaras has received the Bachelor of engineering degree (B-Eng) in the department of electronic and systems engineering of Essex University in UK. He received the Master of engineering degree (M-Eng) in the department of automatic control and systems engineering of Sheffield University in UK. He received the Ph.D. in 2005 in Image Video and Multimedia systems Laboratory (IVML) of National Technical University of Athens (NTUA) and his research includes semantic interoperability, knowledge representation languages, extension of logic formalism with fuzzy logic operators, semantic web technologies, multimedia retrieval and neurofuzzy systems. He has been involved in 8 R&D European IST projects and in 5 National projects. He has published 6 articles in international journals and books and 30 in international conferences.

P.29 Koninklijke Nederlandse Akademie van Wetenschappen: Data Archiving and Networked Services, Netherlands (Business expertise and DARIAH coordinator)

DANS – Data Archiving and Networked Services – is an institute of the Royal Netherlands Academy of Arts and Sciences (KNAW) and is also supported by the Netherlands Organisation for Scientific Research (NWO).

Since its establishment in 2005, DANS has been storing and making research data in the arts and humanities and social sciences permanently accessible. To this end DANS develops permanent archiving services, stimulates others to follow suit, works closely with data managers to ensure as much data as possible is made freely available for use in scientific research. Among other things

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DANS manages a substantial digital archive of archaeological data and studies. DANS is currently coordinator of the DARIAH project.

Key personnel

Peter Doorn studied human geography in Utrecht and defended his PhD at that university. He taught computing for historians at Leiden university between 1985 and 1997. He was director of the Netherlands Historical Data Archive and head of department at the Netherlands Institute for Scientific Information Services (NIWI). Peter directed a considerable number of externally funded digitisation projects and other projects in the field of humanities computing including: (2003 – present) HGIN: towards a Historical Geographical Information System for the Netherlands; (2002 – present) Life Courses in Context: a collaboration for the study of 19th and 20th century population history (in collaboration with IISG and Central Bureau of Statistics) and (2008 - 2010) Digital Research Infrastructure for the Arts and Humanities (DARIAH), a preparation project funded by the FP7 programme.

P.30 Centro Andaluz de Arqueología Ibérica, Universidad de Jaén, Spain (Content Provider)

The Andalusian Centre for Iberian Archaeology (CAAI) was founded in 1998 in the framework of the II Research Programme of the Regional Council following an agreement between the regional Education and Science Authority and the University of Jaén. Its main objectives are 1) The archaeology of the Iberians, 2) Historiography of Iberian culture, 3) Landscape archaeology and 4) Management of archaeological Iberian heritage. Its strategies must ensure knowledge transfer to the society of Andalusia.

The Centre's staff consists of 16 researchers. CAAI was partner in EPOCH (VI Framework Programme) and in the AREA IV-project (Culture 2000). It is currently coordinator of CATA (Virtual Corpus of Archaeological Ceramic, HUM 890) and the Consolider Project (Research about technologies for conservation and dissemination of Cultural Heritage (TCP -CSD2007-00058-).

Key personnel

Arturo Ruiz (PhD) is Professor in Prehistory and teaches Iberian Archaeology at the University of Jaén. He is currently the head of CAAI.

Alberto Sánchez (PhD) is lecturer in Prehistory and teaches Prehistory at the University of Jaén. He is currently member of CAAI and the coordinator of the Laboratory of Archaeometry of this Centre.

Manuel Molinos (PhD) is lecturer in Archaeology and teaches Experimental Archaeology at the University of Jaén.

Carmen Ríquez (PhD) is lecturer in Prehistory and teaches Archaeological Routes at the University of Jaén. **Luis Gutiérrez** (PhD) is lecturer in Archaeology and teaches Classical Archaeology at the University of Jaén.

Ana Martínez Carrillo (B.A.) is research assistant CAAI having a grant from the Regional Government.

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B3.2a Chosen approach

CARARE will aggregate metadata for digital content from heritage agencies and other archaeology/architecture organisations to make it available for aggregation by Europeana. The aim is to provide a channel which improves the interoperability of digital content from the archaeology/architecture domain with Europeana. To this end, CARARE will play a critical role in establishing and energising the necessary infrastructure and standards for content provision in the archaeology/architecture domain.

The largest technological challenge in CARARE is to ensure syntactic and semantic interoperability across the metadata standards and the different media formats that exist in heritage organisations. The technical standards enabling interoperability form an important dimension of the work of CARARE. To achieve interoperability between the different native metadata formats, CARARE will explore the use of the CIDOC CRM to mediate between the semantics of the original data and the standards and schemas defined by Europeana. This process will involve the content providers in mapping their metadata to the CRM and mapping the CRM to the Europeana schema(s). This approach provides flexibility, allowing for development by Europeana in the metadata that it maintains to support the main function of search and discovery and allowing for richer description of resources to support enriched services (domain-specific, education, tourism, map-based, etc.) in future.

Additionally, recent advances in Semantic Web technologies will facilitate the way that Cultural Organisations exchange information within the framework of the web. In order to achieve semantic interoperability we need a common automatic interpretation of the meaning of the exchanged information, i.e. the ability to automatically process the information in a machine-understandable manner. The first step of achieving a certain level of common understanding is a representation language that exchanges the formal semantics of the information. Then, systems that understand these semantics can process the information and provide web services like searching, retrieval etc. Semantic Web technologies provide the user with a formal framework for the representation and processing of different levels of semantics. Such technologies include W3C standards like XML, RDF, SKOS.

Europeana is based on a decentralised architecture where repositories (or aggregation services) are harvested to contribute metadata for its search and discovery services. The OAI-PMH communication protocol has become a chosen method for metadata delivery to Europeana although web services are now also being considered. CARARE will provide an aggregation service for Europeana, favouring the OAI-PMH to harvest metadata from its content providers in the archaeology/architecture domain. From the perspective of content providers, the use of OAI-PMH has benefits as it can be implemented on many systems using Open Source software and is increasingly being implemented by vendors of repository systems. It is one of the key standards that have been promoted to culture sector stakeholders and the resultant availability of tools means that the barriers to entry for stakeholders, especially those who are creating new repositories, are relatively low.

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The proposed technical approach is illustrated below:

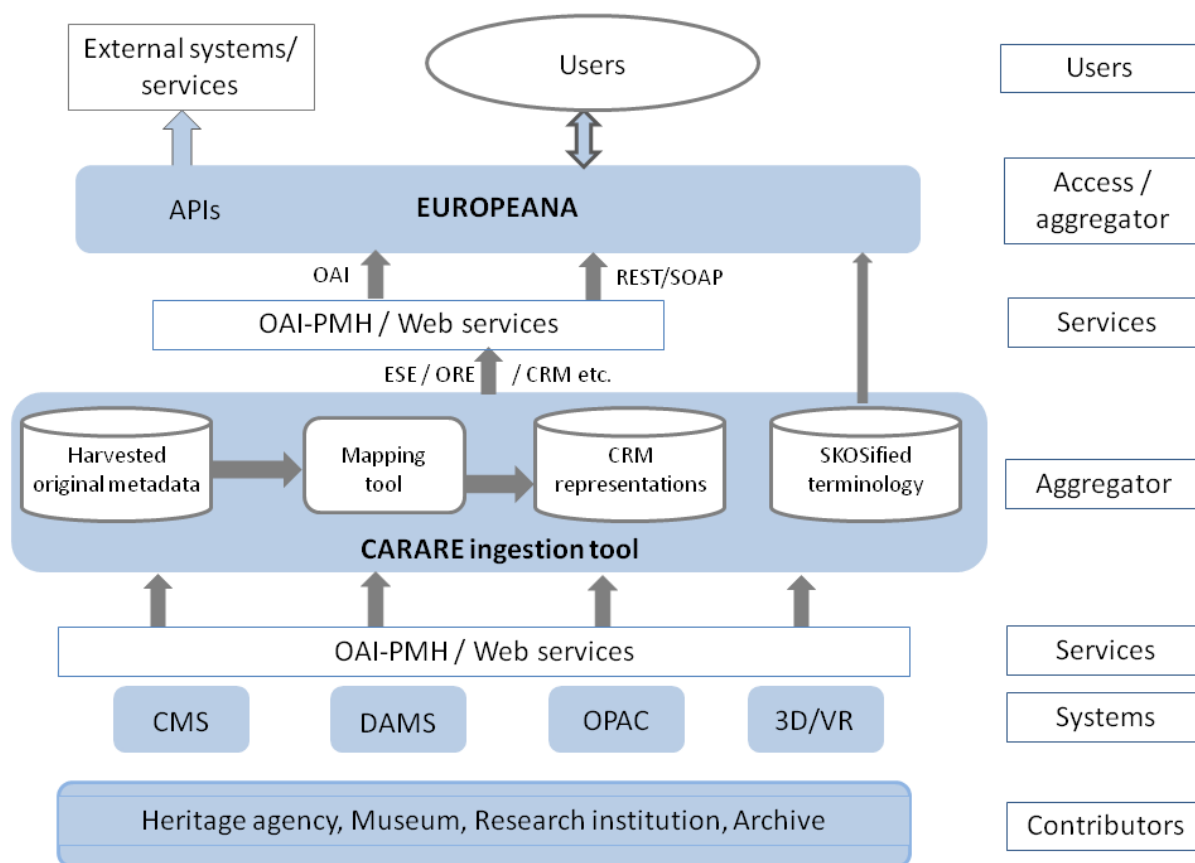


Figure: CARARE Architecture

To ensure interoperability in the first prototype, Europeana published the metadata specification for the Europeana Semantic Elements (ESE); this simple schema enabled the prototype to provide item-level search and retrieval. For the next release of the portal, Europeana v1.0 is currently developing the Europeana Data Model (EDM) which is based on Semantic Web principles and aims to providing more functionality. By mapping the CRM to the latest specification, CARARE will be able to enable its content providers to output conformant metadata without requiring them to undertake additional work. This helps reduce the cost for content providers and provides for flexibility. CARARE will customize the available metadata mapping tools to support the CRM and offer training and support to its content providers and in this way further the process of establishing interoperability with Europeana.eu.

Unlike classic digital libraries, in the case of archaeology and architecture, we have complex objects with rich metadata that cannot be represented well by the ESE. A mapping from the content provider's original schema to the ESE would lead to a loss of information. Using a rich and powerful mechanism such as the CIDOC-CRM enables CARARE to overcome this problem (by mapping the original content to CRM and then the CRM to ESE, EDM or future Europeana schemas). It can also allow us to enrich the information before outputting it to Europeana. In the long term, this approach will enable us to create richer and more powerful ingest which will allow the creation of more sophisticated services for users in future. This process requires the use of an intermediate repository and a rich schema that can incorporate the diversity of content providers' metadata.

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In order to enable the aggregation of quality metadata into Europeana.eu, we are proposing to implement an ingestion workflow, based on Europeana ingestion workflow. The proposed workflow centralises some processes in the CARARE repository to enable content providers to be involved in the different phases and control the quality of the metadata produced and to view their metadata in the Europeana.eu environment.

The phases in the workflow include:

Harvesting metadata from the content providers to the CARARE repository via OAI-PMH or by HTTP/FTP uploads. We plan to harvest, index and store all the available metadata from the Content providers in an XML data format. Content providers will be able to declare the harvest as either complete (new, updates or deletes) or partial (new or updated or mixed).

Import, Parsing and Indexing of the data submitted by content providers to generate information packages that allow access within the CARARE repository.

Versioning to manage repeat harvesting from content providers; newly harvested data will be compared to previous harvests and conflicts will be managed and resolved.

Semantic Mapping to support manual mappings of the Content Providers' data fields to the CIDOC-CRM or to stored bi-directional mappings between standard schemas and the CIDOC-CRM / Europeana Data Model. The semantic mapping tool will provide functionality for mapping graph structures needed for the CRM mappings.

Content checking and enrichment. Content providers will be able to view their data, transformed into a Europeana schema, in a test environment to check and resolve any data issues. This might include:

- mapping their terminology list to selected terminology lists;
- normalizing data e.g. terms, nationality/language to Europeana standards.
- Adding data not in the original metadata, e.g. Europeana specific elements
- Linking terms to SKOS thesauri

A quality control service will automatically check and report on Content Provider's data, e.g. missing values, malformed data.

Skosification. Selected multilingual thesauri will be Skosified using an automatic service, e.g. the Cliopatra tool developed in the MultimediaN Eculture project.

Exporting and publishing validated Europeana enabled metadata in the CARARE OAI-PMH repository for harvesting by Europeana. The SKOS thesauri created and used in CARARE will also be made available to Europeana.

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CARARE developers will work within the EuropeanaLabs environment, which consists of a sandbox factory and open source repository as illustrated below:

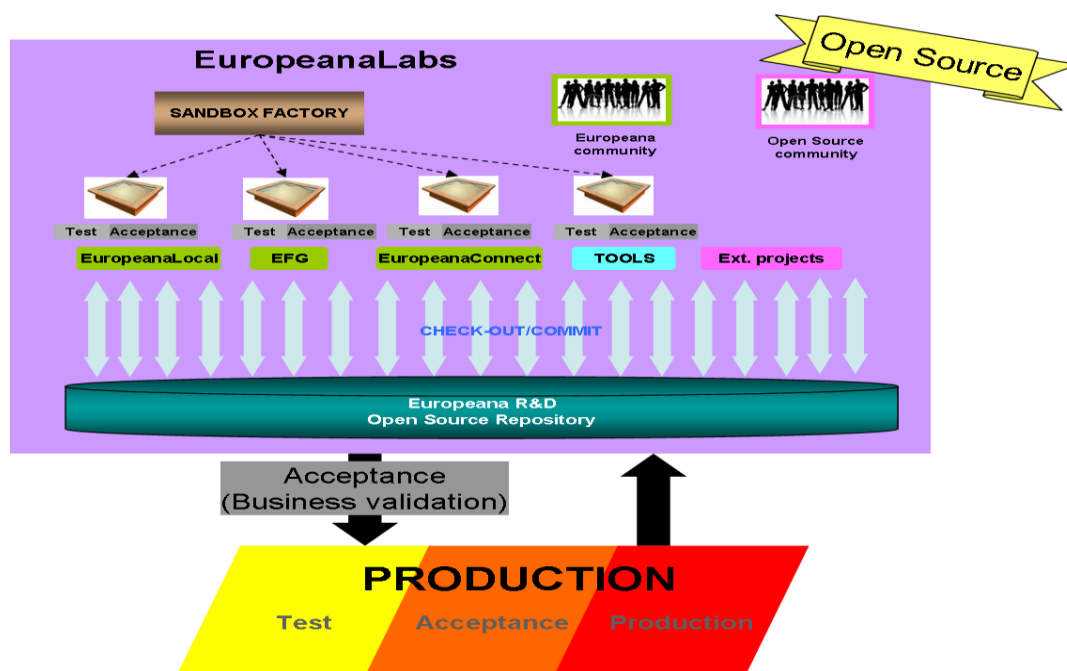


Figure: Europeana Labs infrastructure

This environment enables developers to share components with other users and to test and validate tools that interact with Europeana using the API provided. CARARE developers will extend some existing Europeana tools, for example the Europeana Content Checker to include 3D/VR functionality and use the tools repository to share the results with other EuropeanaLabs users.

3D/VR

As 3D/VR content is new to Europeana, both the ingest workflow and the workflow to the published content will be investigated by CARARE.

3D/VR models produced in the archaeology/architecture domain are representations of archaeological and architectural objects in three dimensions (3D) including models of sites or buildings as they survive in the present day and reconstructions of their appearance at various times in the past. They are based on 3D data collected from measurements of the real object using laser scanning or other electronic equipment. 3D data files provide a core which is then rendered with images and textures to visualise the appearance of the object. These 3D data files may be made available separately (and are useful and interesting for students and professionals) or incorporated in 3D/VR models with a range of other digital content such as text, images, textures, maps, program scripts, geo-referencing and metadata. Models vary considerably in size and complexity, from relatively simple models of museum objects to complex models of major sites. A very simple model consists of 3D data with textures and images. A complex 3D model could consist of a series of linked elements, including to related models or 2D digital files. Virtual Reality models also include program scripts to behaviours, such as the opening of a door, in addition to 3D data, images, textures and so on.

The content identified by the CARARE content providers includes a wide range of formats and levels of complexity including CAD data files useful for students and professional users, virtual tours, reconstructions, models of museum objects and 3D models associated with large

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related 2D archives. There are different levels of granularity and considerable variation in the metadata that is currently available.

The Europeana data model, which is currently in development, provides a super model which is based on Semantic Web standards to enable semantic search functionality in the Europeana v1.0 interface. The model provides pointers from a Europeana Object (consisting of an information package, some content and a surrogate) to original objects residing on the content provider's sites.

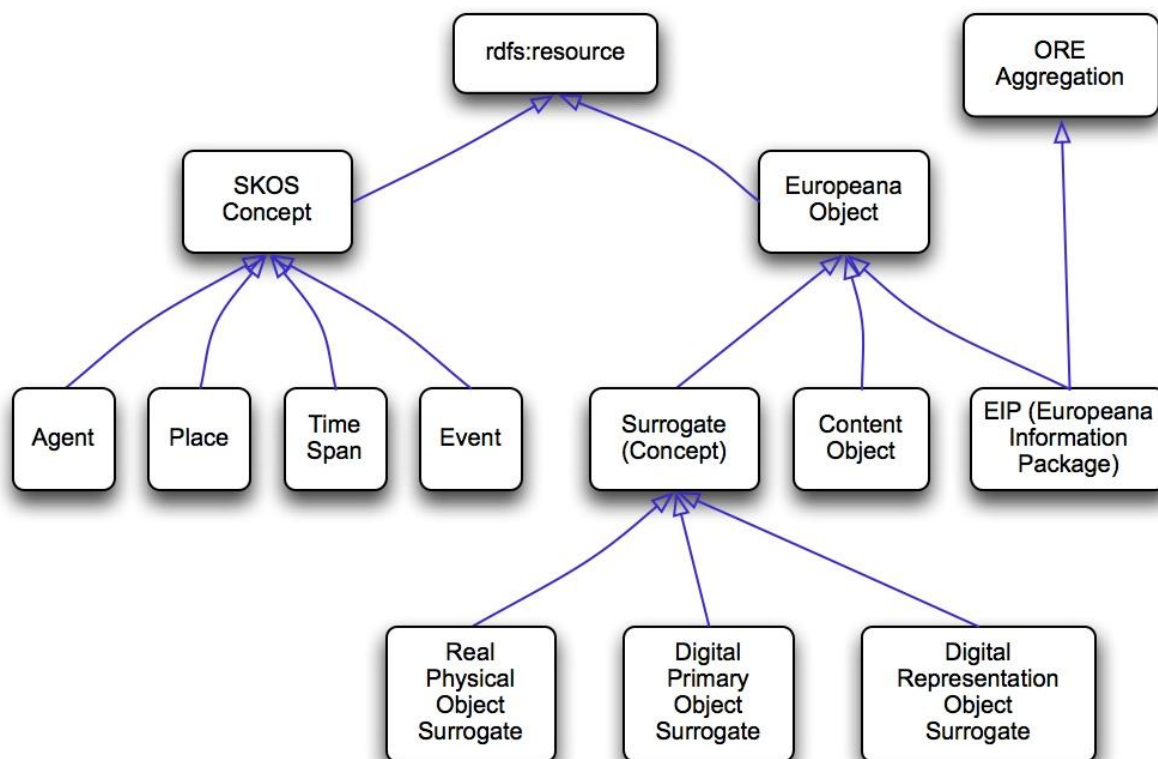


Figure: Europeana Data Model

The Europeana data model does not yet take 3D/VR content fully into consideration. CARARE will participate in the expert groups working on the model with the aim of establishing the framework for 3D/VR in Europeana.eu. It will consider:

- Surrogates for 3D/VR objects to be used within Europeana.eu
- Relations from Europeana to object in their original context and the information needed by users to access and use 3D/VR content
- Quality issues relating to the metadata for 3D/VR content and the harvesting and ingest process.

For users to have a satisfying experience of accessing 3D/VR it will be important that the 3D/VR content that it points to are published and delivered online in a way that provides for easy visualisation and use. CARARE will build on work by the EPOCH and MINERVA projects (which published guidance on standards and the use of open file formats suitable for publishing 3D/VR content such as Collada, X3D and VRML2) and will make recommendations to institutions on formats which are suitable for non-specialist Europeana.eu users. It will also explore the needs of professional users and students and the types of 3D content that they may wish to access via Europeana.

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3D models are generally created in specialist software and then converted or ‘published’ to open formats such as Collada, X3D or VRML2 with the associated files (images, drawings, maps, texts, textures, etc), geo-referencing and the units. This process often involves simplification (of the detail in the model) to reduce file sizes and make the data usable on less powerful computers. 3D visualisation tools are not preloaded in most common web browsers, they need to be installed. Promoting the use of a standard set of open formats and visualisation tools eases the process for Europeana end-users as once the plug-ins have been installed they will be able to view other 3D content.

An alternative publishing route, which does not require 3D visualisation tools involves publishing pre-rendered 3D models through a set of 2D images, for example in QuickTime VR or Flash. Currently, 3D content is available in Europeana in the form of snap-shots (images) or videos of ‘fly-throughs’ of the model.

Some changes will be needed to Europeana to add 3D/VR as an additional type alongside images, text, moving images and sounds. The surrogate for the 3D/VR object could be an icon, a snapshot or perhaps an animated GIF.

Content providers may offer access to their 3D/VR content in different formats, for example offering a preview in QuickTime VR, the 3D model in Collada, and the original CAD data files, image files, etc. Thus establishing relations between digital objects will be an important aspect of the metadata required to enable users to explore the available resources in the Europeana data space.

As with 2D digital items, Europeana needs appropriate metadata to enable its users to search for and retrieve 3D/VR content. Metadata issues to be considered include:

- 1) URLs that lead users to the 3D object at an appropriate landing point and metadata needed for them to access and use that object;
- 2) Data concerning the links between digital objects, which are specific to 3D/VR. For example, 4D models consist of sets of linked 3D models showing the evolution of a building or landscape over time.
- 3) Metadata concerning the visualisation of 3D data (rendered images, panoramas, interactive objects) and associated content such as maps, elevations, cross sections.
- 4) Additional metadata required by professional users wishing to re-use 3D models. For example specific metadata on the accuracy and resolution of a model.

CARARE will disseminate recommendations for content providers on implementing a workflow that captures the metadata needed to support Europeana’s functionality and user needs, and the process of ingesting the digital objects into the content provider’s repository. It will investigate the use of the PhotoCloud tool, developed under EPOCH, in creating links between 3D models and related 2D images. This tool provides an intuitive and visual link between 3D models and associated 2D images. It can be used for example to link historic photographs of a building to a 3D model of the building, or the images of an archaeological site used to create a 3D model of the remains to a virtual reconstruction of the site. PhotoCloud is a tool that would be installed with the original object on the content provider’s website and not by Europeana.eu.

CARARE will work closely with the EDL Foundation and 3D content providers to establish the methodology for aggregating 3D/VR content to Europeana this will include: Quality checking of the metadata and the published 3D content; Metadata enrichment; and recommendations on actions to be taken to make legacy 3D content more accessible such as converting it into standard open file formats.

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User Testing

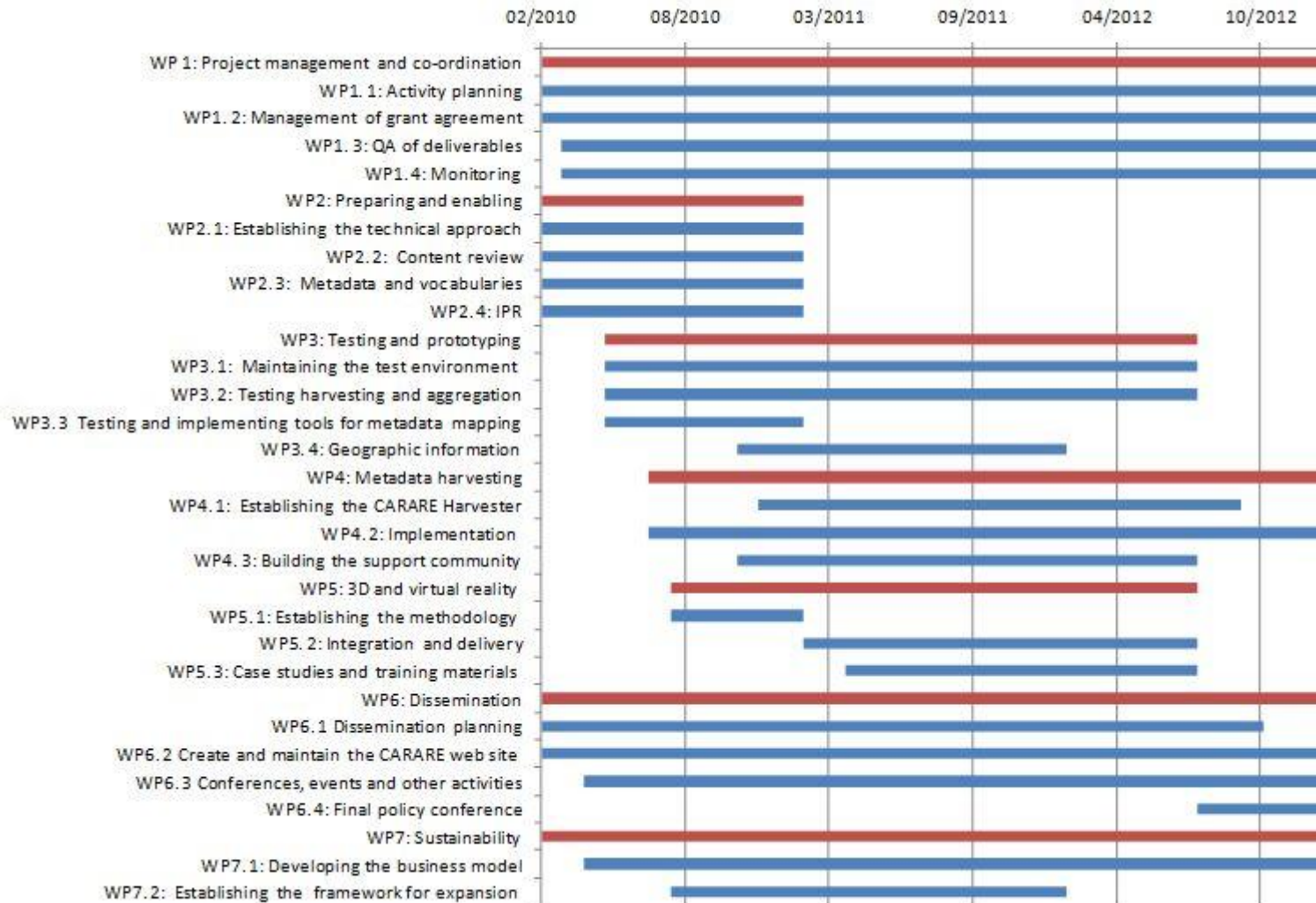
CARARE is proposing a redesign of the Europeana portal to incorporate searches for 3D and virtual reality material and the display of results. User testing of these new interfaces will be done through Europeana itself. Each year, Europeana runs a variety of user research studies on its functionality and features and specific feedback will be gathered on the front end prototypes.

The 2D archaeology/architecture domain content harvested by CARARE will be made accessible via the Europeana interface. This will be tested by Europeana's User Testing Panel and in focus groups held during the course of CARARE. The use of archaeological and architectural material can also be further measured via Europeana's log file analysis and this information will be supplied to CARARE content providers.

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B3.2b. Work plan

Gantt chart



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Work package overview

The CARARE will include the following main phased activities:

Work package 1 Project management.

See section B.3.2.c for a detailed description. This will include monitoring and evaluating progress by the network in aggregating content to Europeana.

Work package 2 Preparing and enabling. The objective of this work package is to establish the technical approach and review the content to be made accessible to Europeana in preparation for work to take place in work packages 3, 4 and 5:

- The test and development area in EuropeanaLabs will be established and technical partners will review the available tools in preparation for work to be carried out on testing and prototyping harvesting and ingest tools in WP3.
- Metadata schemas will be reviewed and bi-directional mappings completed in preparation for integration with the metadata mapping tool to be tested and evaluated in WP3.
- The overall technical approach for the project will be established and will inform and guide work on both harvesting and aggregating contents (WP3) and in establishing the functional specification for preparing 3D and virtual reality content for Europeana (WP5)
- Content partners will complete a review of their content and technical infrastructure in preparation for work to be carried out to implement harvesting in WP4.
- A review of any IPR issues in the content to be harvested will be completed to inform work by the Europeana IPR cluster.

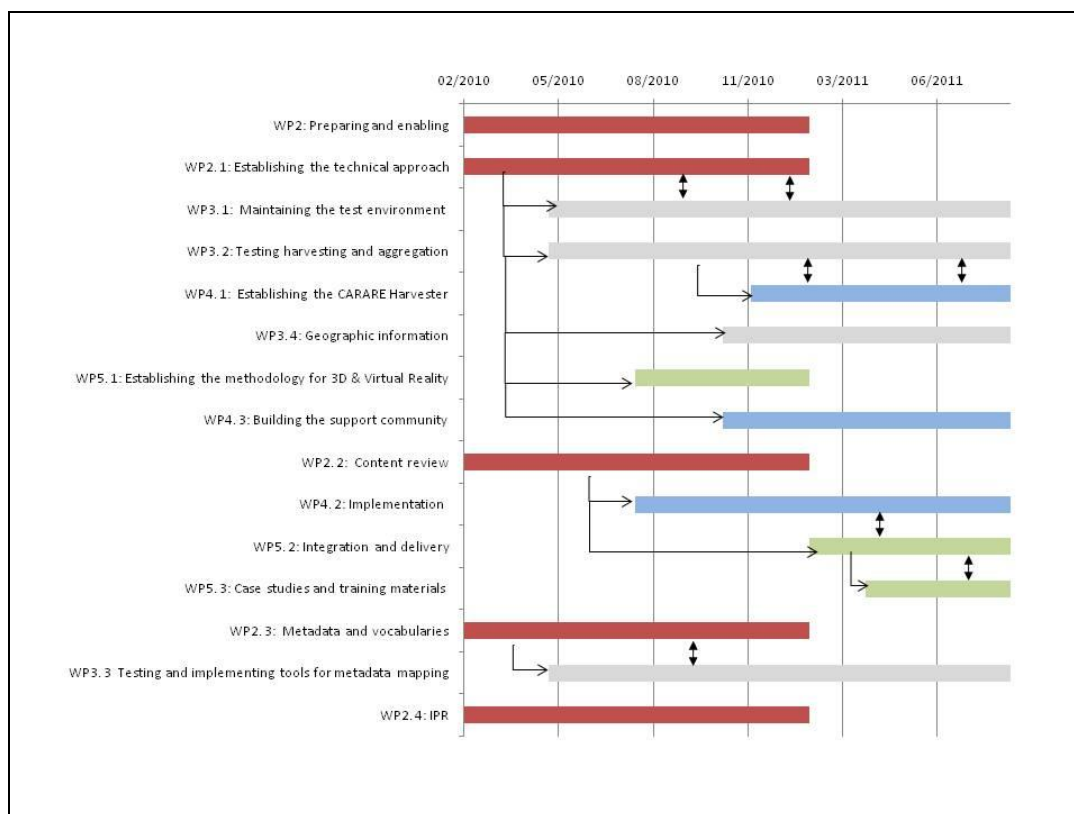


Figure: Overview of the interdependencies between WPs

Work package 3 Testing and prototyping. The objective of this work package is to test and evaluate tools and services to be implemented for harvesting and aggregation of content in WP4:

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- The EuropeanaLabs environment established in WP2 will be maintained for use by technical developers during the project.
- Tools and systems to enable the harvesting of content from partners to the CARARE repository and its delivery Europeana.eu will be tested in preparation for live harvesting to commence in WP4. The tools will be evaluated by content partners and the Europeana office to inform the development work.
- The workflow will be established and documented, and briefing papers will be prepared for use by CARARE content partners and in training workshops (WP4).
- APIs and GIS services being made available by the Europeana Connect project to developers via the EuropeanaLabs environment will be evaluated in preparation for a pilot implementation in WP4.

Work package 4 Harvesting and aggregating. This will involve establishing the CARARE aggregation service:

- The tools and systems tested in WP3 will be implemented for live harvesting in WP4.
- Content providers will implement OAI-PMH repositories to enable harvesting of their contents, using the tools provided by WP3 content providers will check and enrich their metadata in preparation for harvesting to Europeana via the CARARE repository.

Work package 5: 3D and virtual reality. This work package will focus on specific issues involved with the integration of 3D and virtual reality content to Europeana. Tasks will include:

- Building on work to establish the technical approach and on metadata mappings completed in WP2, WP5 will define the functional specification for providing 3D and virtual reality contents to Europeana, and the Europeana user interface will be adapted to enable the integration of 3D and virtual reality contents.
- Content providers will evaluate and test the recommended methodology and go on to prepare their 3D and VR content for harvesting in WP4.
- A series of case studies will be prepared by content providers for use in training materials.
- The potential for developing services for professional users of 3D/VR will be investigated to contribute to work on sustainability in WP7.

Work package 6: Dissemination. CARARE will work in close collaboration with the Europeana Communications Group in its dissemination activities, while having its own work plan and deliverables.

Work package 7: Sustainability. This will involve investigating and defining a sustainable business model for CARARE that allows for the continued provision of services and aggregation of content to Europeana after the end of project funding. It includes:

- reviewing and analysing sustainability issues in broader context of digital curation and access to heritage data including the regional and national aggregation services, aggregation services for the library, archive and museum domains, the developing Digital Research Infrastructure for the Arts and Humanities (DARIAH), and in the Europeana cluster of projects.
- Investigating the costs of maintaining the service and potential funding models. Defining a valid business case.

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Performance monitoring

Indicator No.	Objective/expected result	Indicator name	Expected Progress		
			Year 1	Year 2	Year 3
1	Quantity of digital content from CARARE accessible through Europeana.eu	Aggregation	0	500,000 items	2 million items
2	Number of content partners with repositories harvestable by CARARE	Repositories	3	12	20
3	3D/VR models accessible through Europeana.eu	3D/VR	0	100	3000
4	Number of new content providers applying to join CARARE	Expansion	3	8	15
5	Sustainable business model in place	Sustainability	0	0	1

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B3.3 Project management

B3.3.1 Organisation and responsibilities

CARARE will be managed through proven components and methodologies by a project management team consisting of an experienced project manager (MDR) with a demonstrable record of achievements in the management of large, pan-European networking activities in the cultural sector and involvement with developments relating to Europeana, and a Co-ordinator (KUAS) with a strong track record of knowledge of and involvement in developments related to interoperability of digital content from the archaeology/architectural heritage domain at European level.

The Coordinator and Project Manager will work closely together to ensure smooth and effective delivery of the project. The management arrangements and Project Plan will provide an effective and flexible environment for the project's activities. The project also benefits from (but does not rely on) the fact that several of the partners have worked together previously and have good personal and professional relationships from the outset.

The project management structure follows the principles of PRINCE2 and product-based planning, delegation of responsibility and exception-based reporting and is designed to provide effective administrative, financial and technical coordination, while supporting participants with the tools needed to achieve the project's objectives. It will:

- establish overall coordination and efficient communication between partners and stakeholders;
- monitor and report on the progress of the work packages and support the integration of their activities;
- make sure that all administrative and financial tasks relating to the activities of the consortium are handled timely and accurately;
- provide equitable and effective methods for decision making and resolving conflicts;
- ensure compliance with the Consortium Agreement;
- coordinate and support each partner's management responsibilities.

Project management team

The Coordinator will be directly responsible for the activities of the Best Practice Network to the European Commission and the Project Manager will have delegated responsibility for day-to-day communications on behalf of the Coordinator.

The project management team will be responsible for:

- Handling all communications with the Commission.
- Handling all administrative and financial responsibilities in the project
- Ensuring timely delivery of cost statements, activity reports etc.
- Convening, chairing, monitoring and providing a secretariat for both the Project Management Board and the Network Partner Group.
- Ensuring that all project deliverables are available on time.
- Creating conditions necessary for successful collaboration.
- Ensuring the compatibility of project management tools in use at each of the network members.
- Establishing and maintaining the Management Library, to contain updated copies of managerial documents generated by the Project (made available to members through a password-protected 'intranet' service on the Network website).

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Project Management Board (PMB)

The Project Management Board, chaired by the Coordinator, will be the ultimate project authority for the Network. It will comprise of the Coordinator, the Project Manager, the Europeana lead (EDL Foundation), all work package leaders and four members of the Network Partner Group (selected by the NPG on the basis is of their previous experience).

The PMB will monitor project progress, reviewing and/or amending the work plan as required, approving major technical decisions, recommend financial or other resource allocation, and approve periodic and final progress reports. It will:

- Define the schedule of project activities;
- Support the Coordinator in evaluating and validating the progress of the project;
- Identify project-level and external risks, track them and propose corrective action as required;
- Establish ad-hoc working groups as required;
- Assign responsibility to the most suitable partner when new events require it;
- Support the Coordinator in reporting progress to the Network Partner Group;
- Support the Coordinator and the Project Manager in coordinating the project's efforts for review meetings.

The PMB will meet in person every six months; additional meetings may be called to resolve any disputes between network members or conflicts of interest. Skype or telephone conferencing will be used for interim decision making or problem solving.

Decisions will be made by consensus between the PMB members, if voting is necessary, decisions will be made by a majority vote. In case of a tie, the Coordinator will have the casting vote.

Network Partner Group (NPG)

The Best Practice Network Partner Group (NPG) will guide and validate the work, and results of CARARE. It will consist of one senior representative from each of the partner organisations with the necessary delegated authority to make decisions on behalf of their organisation with regard to the project. The NPG will be chaired by the Co-ordinator or the Project Manager and will:

- Receive progress reports from the PMB and Coordinator
- Support the Coordinator in evaluating and validating the progress of the project;
- Consider major issues which have arisen and impact on the future direction of the project.
- Identify external risks, track them, report them to the Coordinator and propose action if required;
- Consider changes to the membership of the Network (both the admission of new members and also the exclusion of existing members).
- Support communications and team building in the project.

The NPG will meet at the project kick-off and mid-term meetings, and will in addition correspond electronically about important issues. Decisions will be made by consensus between the NPG members, if voting is necessary, decisions will be made by a majority vote. In case of a tie, the Coordinator will have the casting vote.

Each network partner will appoint an Associated Project Manager (APM) for the Project.

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Work packages (WP)

Each of the seven work packages will have a Work package leader with clear responsibility for the work and outcomes of and for reporting to the PMB and to the Coordinator. Work Package leaders will:

- Monitor progress towards the deliverables defined in the work plan ensuring that deadlines for milestones are met;
- Be responsible for the performance of the work package and accomplishment of its objectives;
- Provide regular reports, control the quality and the schedule of work;
- Identify work package level risks, track them and propose corrective actions;
- Make appropriate recommendations to the PMB on corrective actions such as reallocation of resources between members of the work package or between deliverables;
- Be responsible for making sure that the Management Library includes the management documents generated by the work package (both intermediate and final) including working drafts (latest version), work package deliverables and minutes of the work package meetings.

Work package leaders will convene physical, Skype or teleconference meetings with work package participants when necessary and in consultation with the Project Manager. Physical meetings will be linked to other events wherever possible; no specific pattern is identified for such meetings to retain operational flexibility. Work package leaders are responsible for making sure that meetings are adequately documented.

Appraisal Group

The Appraisal Group will consist of the Coordinator, the Project Manager and representatives of the project partners to be appointed by the PMB. The Appraisal Group will quality control project deliverables.

Comments of the group will be taken into account when finalising project deliverables. Members of the Appraisal Group will not comment on deliverables for which they are responsible. Disagreements will be resolved by negotiation or by a majority verdict as last resort. The group will communicate via email or other electronic means. No physical meetings of this group are foreseen.

Decision Process

The PMB will be responsible for making all strategic decisions regarding CARARE, including overall policy and strategy. Decisions at the PMB will be made by a majority vote (in case of a tie, the Coordinator will have the casting vote. Termination of membership of the PMB will also be subject to the latter procedure. Other Decision-making procedures will be specified in the Consortium Agreement. In the event of a termination of PMB membership, the PMB will invite a network member, determined by majority vote, to replace them on the PMB.

B3.3.2 Project communication mechanisms

Information Flow

The information originated by the Project may have a specialised or a managerial nature. Concerning the specialised issues, information flow will be achieved through:

- Work package meetings, Skype or teleconferences of key work package participants and activities to be held as necessary for the execution of the work plan.
- News and information posted to the website, a three-monthly newsletter and a news distribution facility (RSS Newsfeed)
- Online communication (email, chat, Skype, VOIP etc) to support collaborative work and resolve problems

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- Clustering activities with Europeana v.1.0 thematic network
- Concertation activities with ICT-PSP, eContentPlus and FP7 projects and events

As far as managerial, administrative and financial issues are concerned communication and information flow will be achieved through:

- Very regular communication between the Co-coordinator and the Project manager
- Meetings of the Project Management Board
- Distribution of reports by the Work Package Leaders and Project Manager

Project internal website

The Project Website will be used to provide a content and communication management system for partners enabling information to be exchanged via an internal forum stored information in a Management Library. The consortium will use a well-tested set of collaborative and groupware tools like MS Sharepoint to manage content and to support collaboration and communication.

Planning and Reporting

The foreseen procedures and tools for CARARE are:

- All formal meetings (PMB, Network Partner Meetings) will be notified at least 2 weeks in advance. Agenda, proposed resolutions, decisions and supporting documentation will be available to all attendees at least 1 week before the meeting. Issuing of all documents will be via the chair who is responsible for compiling all submissions from partners.
- All meetings will be formally minuted and minutes will be issued within 5 working days of the completion of the meeting.
- Due to the importance of documentation produced by the project (interim reports, cost statements, working papers, and deliverables), the Project Manager will be responsible for maintaining all document libraries.
- The necessary infrastructure to maintain these libraries will be based on the Web server where the project intranet will be set up. Minimum functionalities to be supported will be Groupware facilities (including electronic mail, document sharing, etc).
- Standard techniques such as Critical Path Analysis and Cash Flow Planning Models will be adopted where appropriate.
- Co-ordination of knowledge management and other innovation-related activities will be undertaken at work package level by the work package leaders and at consortium level by MDR.

B3.3.3 Conflict Resolution

The consortium believes that a well-planned project, where the roles and responsibilities of each partner are made explicit from the start, with good communications between partners should have no major conflicts. However, conflicts may arise through differences in priorities, resource allocation, technology choices, ways of working, or expectations of results. A conflict resolution mechanism is in place which reflects the overall project management structure and philosophy.

The primary mechanism for decision-making throughout the project will be by consensus (defined as a lack of sustained opposition to a decision); however, where consensus cannot be reached, processes are to escalate disagreements. The primary aims are:

- To minimise the impact of any disagreement and to localise its effect.
- To ensure the speediest possible resolution of disagreements.

Resolution will be within the limits imposed by the contract, the Network Agreement and the project plan. The conflict resolution path is as follows:

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Conflicts within a work package: Where there is sustained disagreement within a work package, which the Work Package Leader is unable to mediate, the Project Manager will be invited to mediate and in the absence of consensus, the PMB will be invited to mediate.

Conflicts between work packages: will be mediated by the Project Manager through the PMB. If the PMB is unable to reach consensus, the disagreement shall be referred to the Network Partner Group.

Conflicts between a work package and the Project Manager or the Coordinator will be mediated through the PMB; the PMB will temporarily elect a chairperson to replace the Project Manager or the Coordinator in that role.

Conflicts between institutions: will be mediated through the PMB (although the Project Manager or the Coordinator may first be invited to mediate disputes between Consortium Members).

The Project Management Board will be the final point of decision for internal resolution of all conflicts. It will always seek to make decisions by consensus. In the event that a conflict cannot be resolved by the PMB, the Network Partner Group retains the option of nominating an independent arbitrator and of pursuing conflict resolution through external channels.

B3.3.4 Project Quality Assurance

The Quality methodologies and procedures applied will be in line with ISO requirements, though a certain degree of flexibility will be retained due to the specific needs of a CIP ICT-PSP project. In particular they will refer to:

- organisation of the working team,
- roles and responsibilities of each participant,
- control actions planned,
- time schedules.

Requirement specifications and quality objectives will be clearly defined and documented. Responsibilities and authorities will be clearly defined. The work programme allocates clear, single-organisation, responsibility for each task, even where the responsible organisation has to coordinate inputs from other participants. Development, quality, testing, configuration, acceptance and maintenance plans will be defined and controlled. Agreed definitions of procedures for acceptance and quality control will be established.

Appropriate tools for planning, monitoring and progress reporting will be used. A standard tool will be selected for reporting.

Quality control of deliverables will be undertaken by the Appraisal Group. Appropriate deliverables (and in some case, milestones) will be sent to this group for review and appraisal and their comments will be taken into account in finalising the deliverables. Members of the Appraisal Group will not comment on deliverables for which they are responsible. Disagreements will be resolved by negotiation or by a majority verdict as a last resort.

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B3.3.5 Risk management

In general, risks are mitigated by the great enthusiasm and perception of strategic relevance among the project partners of Europeana and CARARE. Nevertheless, project management resources are allocated to the task of identifying and monitoring risks, and coordinating project activity to mitigate risks. The risk management path is as follows:

- Work package leaders will identify work package level risks, monitor them and propose corrective action to the Project Manager as appropriate;
- The Project Management Board (PMB) and Project Manager will identify project level and external risks, monitor them and propose corrective action to resolve them;
- The Network Partner Group will identify external risks, monitor them and propose action if appropriate to the PMB and Project Manager.

The Project Manager will be responsible for making sure that risks are identified, recorded and reviewed by the PMB. The Network will resolve external risks to the project, e.g. changes in technologies or regulatory matters, through regularly monitoring the situation.

Risk reporting will be placed on the agenda of each PMB Meeting, which will analyse identified risks and evaluate suitable responses to each risk. The Coordinator will ultimately be responsible for planning actions and allocating project resources to address risks supported by the Project Manager and in communication with the Commission as appropriate.

Risk description	Risk level	Action
Resource issues	Medium	Close monitoring of budgets at project and partner level
The mobilisation and adherence to timetable of a very large consortium with a dispersed network of content and technical partners across many countries.	Medium – the risk is mitigated by the perceived strategic relevance amongst network partners to increasing exposure of their content through Europeana.	Application of substantial project management resources to the task of monitoring and co-ordinating project activity.
In the longer term, there may be hesitancy among the wider community of archaeology/architecture content providers in the light of implementation work already undertaken.	Low	The commitment of the CARARE network partners to interoperable infrastructures and standards (e.g. OAI-PMH, CIDOC-CRM, Dublin Core Metadata Application Profiles, Europeana standards) will be an immensely positive factor in addressing any such concerns.

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B3.4. Security, privacy, inclusiveness, interoperability; standards and open-source

The overall strategy of the CARARE work plan is to aggregate archaeology/architecture content, including 3D/VR, for the purpose of making it accessible to Europeana and establishing the framework for archaeology/architecture domain content providers to contribute their digital content in future. To this end, CARARE will play a critical role in establishing and energising the necessary infrastructure and standards for content provision in the archaeology/architecture domain.

Interoperability

The technical standards enabling interoperability form an important dimension of the work of CARARE. Europeana is based on a decentralised architecture where repositories (or aggregation services) are harvested to contribute metadata for its search and discovery services. The OAI-PMH communication protocol has become a chosen method for metadata delivery to Europeana although other web services have also been explored.

CARARE will provide an aggregation service for Europeana, using OAI-PMH to harvest metadata from its content providers in the archaeology/architecture domain. The use of OAI-PMH has benefits from the perspective of content providers as it can be implemented on many systems using Open Source software. It is one of the key standards that have been promoted to culture sector stakeholders and the resultant availability of tools means that the barriers to entry for stakeholders, especially those who are creating new repositories, are relatively low.

A wide range of different stakeholders involved in the archaeology/architecture heritage representing a range of different interests – conservation, academic research, local studies, and museum curation – and the long history of investigation of the landscape. Information about a place in the landscape is often held by different institutions which are sometimes in different countries. Achieving the full picture of a place presents the classic interoperability challenge of drawing together information from systems that have developed independently with differences in design, metadata, the controlled vocabularies used, and in the languages used. However, there is a long history of Archaeology and Architectural heritage organisations working together to agree documentation standards.

In 1989 a working group was first convened to focus on architectural heritage information centres and ways of improving co-operation between them using new technology. This group carried out a survey of 78 organisations in 26 countries, representing 137 inventories, which found there was close agreement on the information essential to any inventory of the architectural heritage. A core data index to historic buildings and monuments of the architectural heritage was established in 1993. In 1992, CIDOC set up an Archaeological Sites Working Group with the aim of creating an equivalent international standard for archaeological sites inventories. The Archaeological Sites working group has completed projects on the Core Data Standard and multilingual thesauri. The data standard for archaeological sites was one of the first standards to be mapped to the CIDOC relational data model, which became the Conceptual Reference Model (CRM) in 1996.

The work on the CIDOC CRM has done much to provide common ground between the information systems maintained by archaeology and architectural heritage organisations, and by museums. The CRM defines an ontology for cultural heritage information that can be used to mediate between the semantics of different sources of heritage information. The CRM has been implemented by a number of organisations in the archaeology/architectural heritage domain (such as English Heritage) and also by European projects within the domain, (such as SCULPTEUR, BRICKS, EPOCH). The CRM CORE is a sub-set of the CRM model that was proposed for use in resource discovery.

Metadata. CARARE proposes to set up a harvesting infrastructure that enables metadata to be aggregated and supplied to Europeana in formats that are compliant with its requirements. To achieve interoperability between the different native metadata formats, CARARE will explore the use of the

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CIDOC CRM to mediate between the semantics of the original data and the standards and schemas defined by Europeana. This process will involve the content providers in mapping their metadata to the CRM and mapping the CRM to the Europeana schema(s). This approach provides flexibility, allowing for development by Europeana in the metadata that it maintains to support the main function of search and discovery and allowing for richer description of resources to support enriched services (domain-specific, education, tourism, map-based, etc.) in future.

At the time of writing Europeana has published the metadata specification for the Europeana Semantic Elements (ESE); this schema enabled the Europeana prototype to provide item-level search and retrieval. Currently Europeana is working on the Europeana Data Model (EDM) which the aim of providing more functionality in the next release of the Europeana portal.

By mapping the CRM to the latest specification, CARARE will be able to enable its content providers to output conformant metadata without requiring them to undertake additional work. It helps reduce the cost for content providers. Customization of the available metadata mapping tools to support the CRM and the offer of training and support through CARARE will go further to facilitate the process of establishing interoperability with Europeana for content providers.

Security

Security is an important factor that plays a significant role in many levels of the proposed implementation. The aggregation service that CARARE will design and develop will need to establish the identity of the content providers from whom it will harvest metadata. The design of the aggregation service will ensure the authenticity of the metadata being harvested and help avoid hijacking and poisoning attacks that could infect the target database. It should be noted that a successful attack on an aggregation service will result in the harvesting of false metadata. If the aggregator in turn is trusted by Europeana, this could result in the spread of infection and lead to improper functioning of Europeana's services (e.g. search). Several methodologies and technologies exist that can help strengthen the aggregation service these include:

- secure sockets layer,
- authentication mechanisms, and
- anomaly detection methodologies.

Privacy

Privacy issues involve the proper and identification of the levels of access (probably per user group) for digital objects being harvested. Although access to the digital objects will be handled by the content providers themselves, information regarding privacy and access can be used to design and provide better user services. Privacy related information could be made available as metadata through the harvester to the aggregation service.

Inclusiveness

End-users. For end-users the issue of inclusiveness surrounds the accessibility and usability of the Europeana portal and the content that is on offer.

Europeana has been able to address usability issues that end-users experienced when searching distributed data using protocols such as Z39.50 by implementing the OAI-PMH metadata harvesting approach. Harvesting metadata via OAI-PMH into a metadata warehouse has simplified the process for end-users as they are able to run a search on all the available metadata at once instead of being forced to choose which targets to search (before knowing much about the content available), having to wait for multiple searches to run before seeing any results or having to working through results grouped by target. The approach has also enabled features such as grouping results by type of content that improve the usability and inclusiveness of the portal.

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CARARE will support the development of Europeana as an inclusive portal by supporting the inclusion of 3D/VR content. This content is increasingly being developed to offer less-mobile citizens, students, tourists and others with the opportunity of making virtual visits to archaeological sites and historic buildings that might otherwise be inaccessible. By making recommendations to content providers on good practices in the publication of 3D/VR on the web in formats that can be run on machines held by average members of the public, CARARE will contribute to making these formats accessible to the widest possible audience.

Content-providers. For content providers the issue of inclusiveness surrounds the ease with which they are able to make their content accessible to Europeana. Implementing the OAI-PMH protocol eases the process for content providers as is widely adopted by the suppliers of repository systems and a good level of technical support and advice is available. Other aspects of standardisation such as the implementation of well-known schemas such as Dublin Core metadata and the CIDOC core index for archaeological and archaeological sites both enable interoperability and establish a common ground which includes content providers from the CARARE domain. Similarly there is familiarity with and expertise in the CIDOC CRM amongst the archaeology community which aids inclusion in the CARARE network. By providing mappings between the CIDOC CRM and schemas published by Europeana, CARARE will provide a platform which eases the process of making heritage content accessible to Europeana for content providers.

Standards

The standards that have been identified and will be used in CARARE include:

- OAI-PMH
- OAI-ORE
- XML
- SKOS
- OWL
- RDF
- SPARQL
- Dublin Core
- Europeana Semantic Element (ESE) - the metadata set, based on Dublin Core, which has been defined to match the functionality of the Europeana prototype.
- Europeana Data Model – the data model currently in development to extend the functionality of Europeana V.1.0.
- CIDOC Conceptual Reference Model (CRM) – the CRM provides definitions and a formal structure for describing the implicit and explicit concepts and relationships used in cultural heritage documentation. It will be used to promote a shared understanding of cultural heritage information by providing the common semantic framework that archaeology/architecture heritage information and the Europeana metadata standards can be mapped to. The CRM is ISO 21127:2006.

Open-source

Most of the standards and protocols are available open-source and rarely proprietary approaches are used. However, in some cases where performance is a critical factor, proprietary software can be used. Such examples can be found in the area of ontologies whereas proprietary software exists that can outperform existing open-source implementations. An example of such software is the AllegroGraph library which provides a set of tools and services for ontology and rdf handling while having excellent performance (compared to existing open-source libraries). The use of proprietary software will be explored after the initial requirements will be made available and with a proper evaluation of the relevant technologies.

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B3.5. Resources to be committed

Short name	Monthly rate	Subcontracting	Other major cost items
KUAS	7,150	0	45,000
MDR	9,800	0	10,000
EDLF	6865	15,000	50,000
ADS	4,724	0	
SNS	4,500	47,500	
STARC	8,000	0	
HM	2,500	0	
VisDim	7,000	0	
DCU	5,500	0	5,000
SwNHB	3,560	0	
EN	8,000	45,000	
CHA	4,500	0	
N303	9,000	0	
KOBiDZ	2,410	23,000	10,000
DAI	5,130	0	
MRBC	4,521	0	
EVKM	1,800	6,000	
NPU	2,500	14,000	
PUSR	2,000	14,000	
CC	6,160	0	
HMC-DNAM	4,500	0	
IPCHS	5,580	63,000	
AHAI	2,890	0	
VUFC	2,060	0	
NAIM	1,086	8,000	
CAAI	2,800	0	
NTUA	5,500	0	
KNAW-DANS	6,540	0	

Sub-contracting

The following partners wish to subcontract local technical expertise in order to assist with their work as described in WP 3 and 4, such as repository installation and configuration, metadata and vocabulary conversion, GIS expertise. Staff resources for the partners in question have been reduced pro rata to the extent of subcontracted resources.

- **Stichting European Digital Library (EDLF)** – 15,000 euros for design work on the Europeana interface to integrate 3D & VR content.
- **Scuola Normale Superiore di Pisa (SNS)** – 47,500 euros for work on metadata creation and to provide technical support for the operation of their OAI-PMH repository.
- **Erfgoed Nederland (EN)** – 45,000 euros – preparation of metadata records by local content providers in the Netherlands.
- **National Heritage Board of Poland (KOBiDZ)** – 23,000 euros - technical assistance to set up their OAI-PMH repository.
- **Ministry of Culture, Estonia (EVKM)** – 6,000 euros - technical support for their OAI-PMH repository.

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- **Narodni pamatkovy ustav (NPU)** – 14,000 euros - technical support for their OAI-PMH repository.
- **National Monument Institute, Slovakia (PUSR)** – 14,000 euros - technical support for their OAI-PMH repository.
- **Institute for the Protection of Cultural Heritage of Slovenia (IPCHS)** – 63,000 euros - GIS expertise.
- **National Archaeological Institute with Museum (NAIM)** – 8,000 euros – technical support for their OAI-PMH repository.

The total amount involved for subcontracting is 235,500 euros.

Other major cost items

- **Kulturarvsstyrelsen (KUAS)** – 45,000 euros. A contingency budget to enable external technical work on Europeana, technical support or equipment costs associated with content providers setting up OAI-PMH repositories or additional travel to Europeana Project Group meetings. The budget will be managed on a case by case basis by the PMB.
- **MDR Partners (MDR)** – 10,000 euros as a contingency for the CARARE website.
- **EDL Foundation (EDLF)** – 50,000 euros for the duration of the project for the set up, management and administration of the EuropeanaLabs for CARARE to test and validate the content aggregated and the 3D technologies developed.
- **Digital Curation Unit (DCU)** – 5,000 euros as a contingency budget for equipment costs associated with setting up the aggregation service for CARARE.
- **National Heritage Board of Poland (KOBiDZ)** – 10,000 euros to purchase a server to establish their OAI-PMH repository for CARARE.

Travel

The number of journeys that each partner is likely to make in each work package and for Europeana project cluster meetings, have been estimated and an average cost per journey of 750 euros has been used to estimate the budget required to support the travel.

Work package	Number of journeys
WP1	192
WP2	16
WP3	6
WP4	95
WP5	2
WP6	70
WP7	10
Europeana	12
Total journeys	403
Total cost	306,100 euros

Other items

Budget has been allocated to partners to support the costs of organizing workshops, attending conferences, preparing and printing dissemination materials and for the translation of project literature into national languages where this is required.

The total amount involved for other direct costs is 619,836 euros.

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B3.6. Dissemination/ Use of results

Dissemination activities will have the overall objectives of providing visibility to the project and to Europeana. Information about the activities and results of the project (tools, services, recommendation and practical guidance on interoperability) will be disseminated to promote their adoption by Archaeology/Architecture organisations, to encourage the expansion and sustainability of the CARARE network and increase the contents being made available to Europeana.

CARARE will be working in close collaboration with the EDL Foundation and other projects in the Europeana group, building on the Europeana brand to:

- raise awareness among the archaeology/architectural heritage stakeholder community in Europe of the issues and new developments relating to interoperability, the delivery of content, access and user services;
- To disseminate news about the project's activities through the partner network and stakeholder community to further institutions in their countries and to related heritage projects and initiatives (such as Europa Nostra, the European Heritage Network etc);
- To provide access to CARARE's results and news of related developments (such as developments in the EuropeanaLabs on multilingualism, GIS, ontologies, user access, etc) through the website, through news and social networking channels;
- To raise awareness of CARARE's activities amongst heritage professionals and the academic community, and others.

The general aim of dissemination activities will be to make archaeology and architecture institutions aware of the benefits of contributing their contents to Europeana via CARARE, and of the services offered by Europeana to its users. An important aim will be to attract new stakeholders to the network and the take-up of the project's results, including the best practice recommendations, standards and open source software tools that support and enable interoperability.

The following activities are envisaged:

- The project website will incorporate forms for stakeholders to register their interest in the network and provide access to briefing papers describing CARARE and Europeana, and to case studies;
- CARARE workshops and a final policy conference;
- CARARE's activities and results will be presented by partners at conferences and workshops for the academic and professional communities; presentations, articles, papers, fact-sheets and leaflets will be prepared to disseminate project results.
- Partners will participate in social networking channels to disseminate news about CARARE to the wider stakeholder communities; a regular eNewsletter will be circulated to stakeholders; .
- Press notices and short newspaper articles will be produced for mass audiences;
- Participation in events (e.g. conferences, meetings, workshops, trade fairs, exhibitions) at the request of the Commission and of Europeana;
- Collaboration with related projects funded by the ICT PSP and other EC funding programmes, in particular the Europeana Project Group and related networks of excellence, providing input, sharing results and cooperating in relevant outcomes.
- Provision of links/information about Europeana and the Europeana project group on the project web-site;
- monitoring and updating of information about the project on the Europeana website;
- monitoring and updating of information about the project published on the ICT PSP website.