D.1.5 - PROJECT FINAL REPORT

Version 1.0 - PUBLIC

20 September 2013

Grant Agreement number:	231809
Project acronym:	3D-COFORM
Project title:	Tools and Expertise for 3D Collection Formation
Funding Scheme:	FP7
Date of latest version of Annex I against which the assessment will be made:	31 October 2008 (approved contractual version)
Periodic report:	1st ☐ 2nd ☐ 3rd ☐ 4th ☑
Period covered:	from 01/12/11 to 30/11/12
Name, title and organisation of the scientific representative of the project's coordinator:	Prof David Arnold, University of Brighton
Tel:	+44 1273 642400
Fax:	+44 1273 642160
E-mail:	D.Arnold@brighton.ac.uk
Project website address:	www.3d-coform.eu

Contents

Final publishable summary report

Executive summary

The 3D-COFORM project was established to advance the state-of-the-art in 3D-digitisation and make 3D-documentation available as a practical choice for digital documentation campaigns in the cultural heritage sector. The project has addressed the integration of all stages of the workflow involved in such a campaign and in the subsequent use of digital assets in research and dissemination to the public and professional alike.

A typical workflow involves planning: 3D-capture; 3D-processing to produce complete models, provenance, and the incorporation of associated metadata; a suitable repository infrastructure for the artefacts, complete with search and browse tools, long-term preservation tools and viewer; analysis and presentation tools; integration with other sources (textual and other media).

A strong technical research program was complemented by research into practical aspects for cultural enterprises: business models for exploitation of 3D assets, workflow planning and execution for mass digitisation, socio-economic impact assessment; the creation of a Virtual Centre of Competence in 3D digitization and the validation of educational processes to develop future capacity. The VCC-3D has been designed to act as a catalyst in enhancing the sector's capacity for mass digitization of 3D assets – the tangible artefacts of the physical cultural heritage of the world.

The 3D-COFORM consortium brought together 19 partners to form a world class team on 3D-digitisation complemented by an equally prestigious group of Cultural Heritage organizations, with the Victoria and Albert Museum as a full partner and collaborations with the Louvre Museum, the Florentine Museums authority, World Heritage Sites in Cyprus, the Rijksmuseum in Amsterdam, the Brussels Museum of History and Art, and the Staatliche Museen zu Berlin amongst others. The consortium also contained organizations tasked at a national level with helping museums move in these directions: CNRS-LC2RMF, the research arm of the French National Museums and CultNat the digitisation body for cultural and natural heritage funded by the Egyptian Government. The combination in 3D-COFORM of research and take-up activities through deployment experiments, training and demonstration, has contributed distinctively to contribute to European 3D-digitisation capability and to reinforcing the objectives of the European initiative on digital libraries and its flagship project Europeana (European Digital Library) to develop 3D capability.

Project context and objectives

The 3D-COFORM project was established to advance the state-of-the-art in 3D-digitisation and make 3D-documentation available as a practical choice for digital documentation campaigns in the cultural heritage sector. The project has addressed the integration of all stages of the workflow involved in such a campaign and in the subsequent use of digital assets in research and dissemination to the public and professional alike.

3D-COFORM was established in a context where 3D-digitisation was capable of capturing surface properties of artefacts with restricted characteristics of their optical and geometrical surface properties. However, little progress had been made in developing integrated and practical workflows for mass digitisation of 3D heritage collections and other assets. Tools had little interaction and digital assets tended to be developed for a specific project rather than planned as the creation of re-usable resources that could support sustainable cultural and commercial enterprises.

The planning of the project has been based around three strands of technical work:

- 3D capture/acquisition and processing
- Integration of 3D Digital Objects, with metadata and related textual information
- Generative modelling and visualisation.
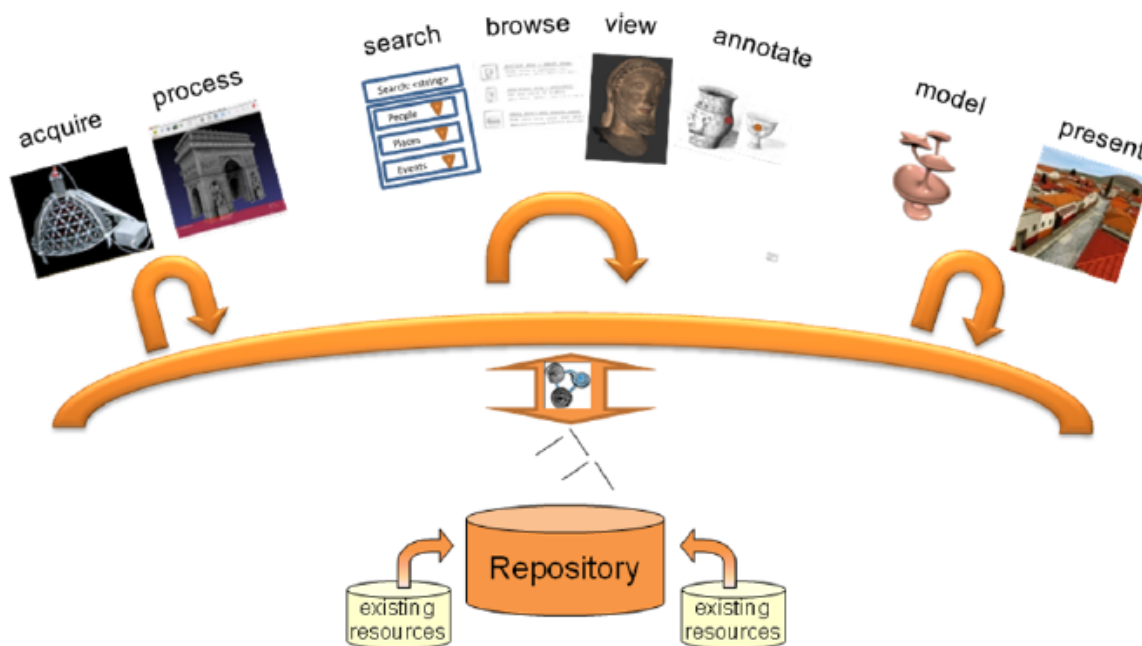
Figure 1: The 3D-COFORM workflow architecture or "pipeline"

In each strand the objectives were two-fold – to advance the state of the art and to define and investigate the barriers to adoption by experimenting to make adoption a practical proposition for heritage organisations. In the following sections we report on the prior state-of-the-art (before 3D-COFORM) and the progress 3D-COFORM has contributed to advancing the domains over the four years of the project.

3D capture/acquisition, and processing (including searching and browsing)

The production of 3D digital assets results from two fundamentally different classes of approach:

i.   Capturing the current state of a cultural artefact or environment, commonly encoded with triangular elements and associated colour and texture information (or sometimes image-based representations).

ii. Representing either an idealisation of the current state, or a hypothesis of previous states, where the representation is a mathematical construct usually including higher-level semantic components (shape primitives, surfaces and/or procedural definitions).

The first type consists of 3D digitisations, whilst the second can be produced by generative modelling (assembly and combination of elementary components) and is dealt with later. Explicit geometric representation remains the leading form for digital documentation (by means of triangle meshes or point sets), but other approaches are possible (see below).

The state-of-the-art in 3D capture/acquisition at the start of the project was represented in the taxonomy shown in Figure 2. At the time, 3D digitisation was mainly used to produce representations of shape and, to a more limited extent, of the colour or surface reflection properties; moreover, digitisation campaigns for significant volumes of cultural or scientific assets had not yet been attempted. For material and reflectance acquisition, image-based modelling and/or image-based rendering solutions were attracting increasing attention. Usable representations of artefacts were generated even when the geometry was only implicitly recorded and coarsely reconstructed. These techniques generated an additional cue to categorize artefacts and to support content-based search mechanisms. They did not at that time produce representations suitable for serious research and investigation of measurable geometry.

A huge range of challenges were identified as remaining to be covered for basic 3D capture: Shape complexity; Material attributes; Material complexity; Colour; Post-processing costs; Environmental conditions; Mass 3D digitisation work-flow; Low budget operations; and Accuracy vs. speed.

A wide set of geometry processing techniques were already available through the 2008 version of the MeshLab open source system, which was used as a point of departure by the 3D-COFORM project.
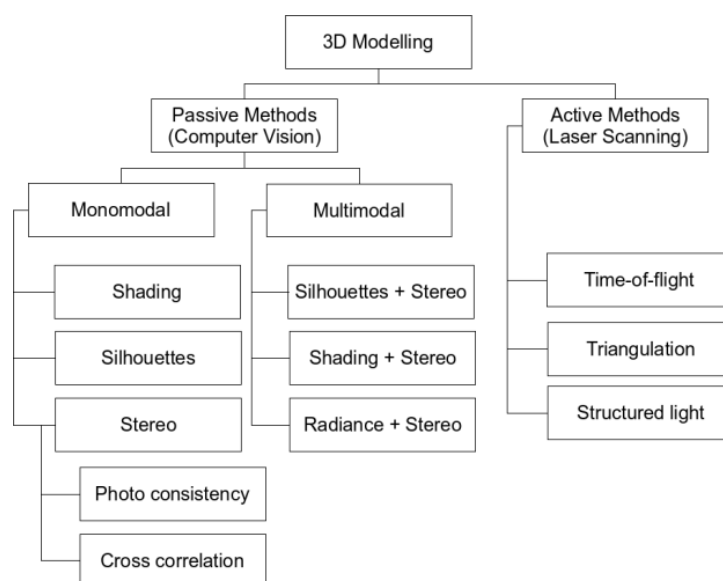

Figure 2: Taxonomy of approaches to 3D data capture (from Arnold and Geiser, The EPOCH Research Agenda for ICTs and Tangible Cultural Heritage (2008), Section 4.3.1)

5

Geometric data processing is used to convert raw sampled data into good quality 3D representations, typically taking 3D sampled raw data represented as range maps and filtering, aligning, merging and simplifying them. The tools which were current in 2008 still needed improvement (increased automation, better support for very high resolution digitisation and management of provenance data; improved processing of sampled colour data and efficient merging of very dens colour maps with complex 3D models).

A second shape processing area requiring research was on how to structure and segment geometric representations to support shape analysis, semantic-based search and query interpretation. Mesh-based representations require the identification or extraction of high-level concepts, whether automatically or by human intervention (mark-up or editing). Finally, it was recognised that the emerging CIDOC-CRM standard and other formats would need development to encode metadata and digital provenance data for 3D data objects. These were new research themes in 2008, where consolidated solutions were yet to emerge.

The information which these processes assemble includes:

a) graphic elements from which the artefact's graphics representation is modelled,

b) overlaid structural data describing object components and their properties, and

c) structured textual descriptions comprising the artefact's metadata organized by ontologies, thesauri and taxonomies from the CH domain and digital provenance.

In many cases the structured information is supplemented by free-text descriptions and indeed, in the wider context, there may be many documents that contain partial information relevant to our knowledge of a particular artefact or environment. There are on-going research challenges into the best ways of detecting similarities between digitised artefacts, and elucidating co-referencing, particularly in mixed mode situations (e.g. where a text entry, shape and image refer to the same artefact).

Turning the captured assets into a usable resource requires tools to locate items of interest in the 3D digital collection. Searching and browsing tools embrace a broad set of technologies that allow CH scholars to use the 3D data in practical and innovative ways. The heading therefore includes several sub-topics:

- Similarity-driven search in 3D repositories including shape-based and material-based searches
- Technologies to present artefacts that aggregate the visual, but other related knowledge/documents
- Tools to support cooperative work of scholars with presentation/validation of CH research results

In 2008 the problem of matching 3D shapes to find a 3D object "similar" to a given one was not yet convincingly solved. The most promising approach was to analyse and encode shape characteristics in feature vectors (shape descriptors), enabling fast comparison of objects. In 2008 visualisation systems in CH had reused generic 3D rendering engines or browsers, which was unsatisfactory since it ignored needs specific to CH. A paradigmatic shift in the way art research is performed and presented was being anticipated with a shift from paper-based to digital tools, integrating all sources and using the 3D model as the interactive visual index.

Artefacts Synthesis

The physical remains of historic sites are typically incomplete. Consequently, to produce complete representations of scanned artefacts in their "original" states, the scanned representations have to be augmented with synthesised elements representing the parts that have been lost. Computer-generated

historic 3D-reconstructions have great potential to illustrate historic environments, not only for public dissemination, but also for scholarly research and building hypotheses about the past.

Perhaps the greatest problem is the limited "half-life" of the reconstructions. Reconstructions are very difficult to keep up-to-date, integrating new facts and findings. One of the problems is that sustainability relies on long-lasting standards which have not been available given the pace of change in technology and the consequent revised expectations of users.

Another challenge is that scientifically well-founded models normally look artificial and have substantial "gaps", because not much is known for certain, and good-looking models are as much artistic invention as scientific hypothesis. They can also appear sterile if they would normally be populated in reality or their appearance would depend substantially on the environment in which they are lit – for example reflective surfaces where there is nothing in the virtual environment to reflect.

To summarize, the major features that were missing from systems for 3D reconstruction that were available in 2008 were:

- **Embedded scientific evidence.**

- **Standardised concepts and vocabulary**.

- **Visualisation of uncertainty and of optically complex artefacts**.

- **Spatiotemporal context** relating individual models as part of a single historic context.

- **An open development process to create, exchange and enhance,** which is possible only if scholars get standardized tools to collaborate on reconstructions.

Presentation

The greatest problem with the presentation of historic digital artefacts in museums in 2008 was the lack of suitable 3D presentation software, integrating digital assets from different sources and in different formats with additional authored multi-media into engaging and visually pleasing, yet scientifically accurate, presentations. Thus the challenge was a mix of the absence of content and the absence of technologies capable of integrating that content into exhibition experiences. Current software platforms for museum exhibits and 3D-exhibitions only allowed limited interaction and 3D navigation. In 2008 the best pre-existing material was the Arrigo VII presentation based on CNR-ISTI's "Virtual Inspector" software for displaying massive multi-resolution models.

A second challenge was audience expectations in an age of burgeoning 3D computer games generated over several years by employing dozens of developers and 3D-artists. Museums will never operate at this scale or in this way to create a digital exhibition – both because of the content (fiction vs. evidence-based narrative description/interpretation) and because the underlying processes are of interpreting and re-interpreting a constant evidence base. Developing an accepted paradigm of consumption requires a set of standardised 3D-interaction metaphors that work robustly and intuitively for the widest possible profile of museum visitor characteristics. However, to gain widespread adoption of such paradigms it was quite apparent and explicit, even before 3D-COFORM was proposed that audiences need education well beyond the timescale and scope of any individual project.

The rendering quality of digital cultural exhibitions is crucial to reinforce the museums' message of authenticity, particularly when displayed next to the real artefact. The best possible quality is needed, but in 2008 true photorealistic rendering was still slow. Repurposing 3D-presentations was also difficult (e.g. to re-use older exhibition materials to compose a new one, or to re-target a museum exhibition to a different distribution channel) in part because the evolving state-of-the-art raises aspects such as the resolution or colour fidelity and with it also raises audience realisation and expectation of what is possible.

Repository Infrastructure – Pre-Existing 3D repositories

In 2008 there were thousands of shapes on the Web, but well-directed search for shapes was still impossible. Around 20 research repositories and about 30 commercial sites offering 3D shapes were identified in the 3D-COFORM project proposal. The commercial sites were focussed on contemporary models, and mostly irrelevant for Cultural and Scientific Heritage, whereas the research repositories contained very few cultural heritage models of variable accuracy, resolution and quality (including very little information on either historic or digital provenance). In addition to these repositories, there are many virtual reconstruction projects of individual sites, all over the world, but they suffered from similar shortcomings and access to information on them was very difficult at best and not available online.

In summary, even though there are many 3D projects, only a limited number were relevant to CH and these only covered a small range of existing CH assets in general inadequately. More significantly there was no integrating architectural framework to make them accessible and to reinforce quality assurance and provenance. Metadata was limited to the level of graphical properties, with no embedding into context or higher-level semantics. Geometry search engines were of limited functionality (typically global shape similarity).

In 2008 Digital Libraries were offering ways of organising the huge amount of digital information but focussed mainly on classification and based around text sources. Image and Audiovisual libraries were viewed as developments of text-based sources using textual tags rather than content-based semantics. There was no integrated environment that would allow for systematic production of 3D models with organized tool sets, managing the integrity of all components and the connection to the necessary and relevant metadata, their preservation and reuse.

Summary of the context

3D-COFORM was initiated at a time when there were many elements for tools and systems to contribute to 3D documentation of tangible cultural heritage, but the elements all had fairly fundamental limitations and there was no overall conceptual framework or operational processes to embed the technologies into cultural heritage organisations and their working methods.

There was also limited understanding in either the ICT sector or the heritage sector about the implications for strategic planning of sustainable enterprises becoming involved in 3D documentation and the use of 3D digital assets.

3D-COFORM offered, for the first time, an holistic view of the place and potential of 3D documentation to have a fundamental impact on the sector, ranging from recording and support of curatorial and academic research, to the marketplace for tourism experiences and tangible replicas and the business models of sustainable enterprises ranging from the Digital Economy to live events.

Main S&T results/foregrounds

3D-COFORM contributions to the State-of-the-Art and results/foregrounds

In summary, 3D-COFORM has advanced the state-of-the-art for the creation of 3D collections of artefacts and environments in three directions:

- In the digitisation, representation and archival of 3D culturally significant objects and environments, including the representation of the semantics of shape (metadata, ontologies).

- In the production of information bases that integrate representations of shape and properties (materials, surfaces etc.) with other information on the significance of the digital assets, in terms of the semantic content of the 3D assets, their digital provenance (the background to the production of the digital assets), and their cultural history and significance linked into wider cultural information sources.

- In the effective deployment of tools and operational procedures to empower cultural heritage institutions in the creation of integrated collections of 3D digital assets and in making a proficient use of those resources in their daily work.

The 3D-COFORM project has produced a large number of tools designed to be interoperable and to allow different functionalities to be applied within an integrated workflow, interacting with digital assets stored and maintained in the 3D-COFORM 3D repository infrastructure. Each of the tools is described below and related to the plans of those who developed them, whilst the planning and development of the Virtual Centre of Competence in 3D (VCC-3D) as a collective measure to ensure sustainable impact is described in the next section.

3D-COFORM has based the 3D documentation and the tools that manipulate it, on an extensible core ontology (CIDOC-CRM) which is an ISO standard for representing information about cultural artefacts and allows the integration of more detailed, specialized models and terminological systems under the core model. Information integration has been designed through an annotation and co-referencing mechanism that uses linked data and annotations between the 3D models and their metadata in cultural heritage, with all the related resources and knowledge that this makes available, in order to enable efficient access, use, reuse and preservation.

The project has developed an integrated approach to the management of related metadata regarding:

- model structure and parameters, relations of models to modelled objects and their coordinates;
- digital provenance, i.e. employed sources, processes, tools and parameters;
- description and semantic classification of the modelled objects, their parts and employed analogies, their location, history and cultural-historical associations;
- links to other sources;
- expert annotations about modelling assumptions and related cultural-historical data.

3D-COFORM has made contributions beyond the State-of-the-Art by implementing the described approach with the following components:

1. **An integrated repository**, based on current technology and standards, that ingests, stores, manipulates and exports complex 3D artefacts, their components and related metadata in order to enable efficient access, use, reuse and preservation of 3D artefacts. This acts as a content

management system for an innovative combination of content-based assets and their metadata (semantically)-based indices, their metadata and related resources.

2. **Querying mechanisms** providing integrated access not only to 3D artefacts, but also to reconstructions, acquired datasets (processed and raw data), provenance, text documents, images and multimedia data, and the semantic relations between them.

3. **A workbench with tools and component libraries**, that allows for automating metadata generation in some processes and maintaining referential integrity of employed, referred and produced artefacts between laboratory, storage and use.

4. **A light-weight XML-based structured file format** which will be established as a standard exchange format for cultural reconstructions.

When it comes to creating content to fill such a repository, 3D-COFORM research followed two major strands in 3D acquisition. Firstly, the current 3D-reconstruction and digitisation techniques were extended to make them applicable to a wider range of situations and cultural content, to enhance more-automatic and rapid, user-friendly digitisation processes, and to target improved colour and reflectance properties either by digitisation or by mapping from other sources.

Secondly, new approaches for image-based reconstruction were investigated to improve the ability to digitise shape from image, and to capture reflectance properties and spectral colour of artefacts for which the pre-existing techniques were not effective. 3D-COFORM also developed techniques for reflectance acquisition for objects from multiple views of the same known surface, dealing with all levels of surface reflectance from simple texture maps to full 6D Bidirectional Texture Functions (BTF). Lastly, 3D-COFORM targeted the acquisition of spectral reflectance data from CH objects, to create a rapid acquisition device.

3D-COFORM has extended the reach and significance of the deployed technologies through tools deployments in digitisation projects undertaken with major cultural heritage institutions in order to develop operational workflows and enterprise solutions for the mass digitisation of 3D assets at low cost.

In subsequent processing of captured cultural documentation, 3D-COFORM has separated out:

- scientifically-based structural reconstructions and

- photo-realistic modelling for public dissemination.

For scientific reasoning, decorative artwork is probably counter-productive, because it occludes the essential elements. For photo-realistic imagery, the model may be more important than the reasoning behind it.

Secondly, historic reconstructions need high-level standard representations that allow bi-directional linking to and from each "part" of the model to show the reasoning behind the reconstruction. The 3D-COFORM approach uses a geometric mark-up to distinguish a part of the model, which can then be annotated (semantic enrichment) and linked to external documents, or elements within them. Such labelled mark-up needs to be maintained as the 3D component is re-used in new contexts (e.g. site reconstructions).

CIDOC-CRM, upon which the 3D-COFORM repository infrastructure is based, allows an historic content management system to provide the spatio-temporal context for all individual reconstructions (geo-referencing + time) that can manage multiple hypotheses, and interface and synchronize with other such databases. Furthermore, the repository infrastructure is capable of exporting the model data in a standard 3D format, for other uses. This includes the extraction of the data required to show the model in Europeana

or as a basis for the decorative artwork and the laborious workflow that is needed to produce scientifically-justified, accurate, yet high-quality photo-realistic 3D-reconstructions of historic sites.

3D-COFORM has: improved the quality of material acquisition and reproduction; accelerated the digitisation of 3D objects; improved acquisition workflows in the field; reduced 3D-digitisation costs; increased usability of the digitisation techniques; enabled the use of 3D-shape, reflectance and material properties for analysis, categorization and content based retrieval; reduced post-processing costs; defined a suitable 3D file format that accommodates attribute variations and well-defined extension mechanisms that enable inter-operability and digital preservation of provenance data; developed support for provenance data management; designed new algorithmic solutions for shape-based segmentation or decomposition for the design of shape annotation systems and a well-defined set of semantically-based queries; provided solutions for the completion of sampled models, based on segmentation and matching technologies and including the user in the loop; provided tools for fitting generative models to sampled models; developed tools for shape and material search; designed an application using the generic, coherent core ontology and co-reference links in a semi-automatic mechanism for identifying co-reference links, and for public engagement in the development of emerging knowledge; enhanced traditional search mechanisms with 3D shape and materials recognition mechanisms, linking an ontology of terms from the cultural context with characteristic vectors and normalized patterns; organised an ontology according to the function/use facet in the thesaurus software by generalization/specialization and related terms, extending the terminology base for CH applications using 3D; implemented procedural parametric 3D-modelling integrated with the 3D-COFORM repository architecture; produced tools for creating grammar-based representation for large-scale models of built architecture up to city size; produced tools for creating parametric shape templates.

3D-COFORM recognised that public presentations, both in museums and over the internet, are important distribution channels for the digital assets produced by the project's tools and through them for raising awareness of the tools and their underpinning technologies. Consequently, they are of strategic value, and providing high-end 3D-exhibits will stimulate demand for content and promotes understanding of 3D-COFORM technologies. The approach taken has therefore placed emphasis on mounting a public exhibition and then re-using the materials generated there in a program of public events, designed to further public and professional understanding of the potential of 3D technologies in the heritage field.

There now follows a more detailed description of the individual tools that have been developed within 3D-COFORM and of their current state and future plans. On top of the individual merits and scientific advances they represent they have all started life as designs that integrate into the overall 3D-COFORM architecture.

1 3D Artefact Acquisition and Processing

1.1 Minidome

- Its purpose

The Minidome can be used to acquire/capture/digitise 3D objects with moderate depth complexity. It is especially tailored to objects such as coins that are relatively flat but characterized by inscripts and reliefs. The Minidome leverages a Photometrics Stereo (PS) approach.

- How the foreground might be exploited, when and by whom

KU Leuven has already conducted large scale deployment experiments in the course of 3D-COFORM and wants to continue to exploit there device and the corresponding algorithms (software).

- IPR exploitable measures taken or intended

Deployment experiments and future digitization campaigns in Belgium and beyond.

- Further research necessary, if any

The device already creates good results and shows efficient acquisition times, nonetheless research will continue to further improve quality and speed.

- Potential/expected impact (quantify where possible)

Efficient (mass) digitization of suited 3D CH artefacts, e.g. coins.

Minidome

The *Minidome* is an automated digitizing solution that comprises a small, light-weight dome of light sources and a digital camera.
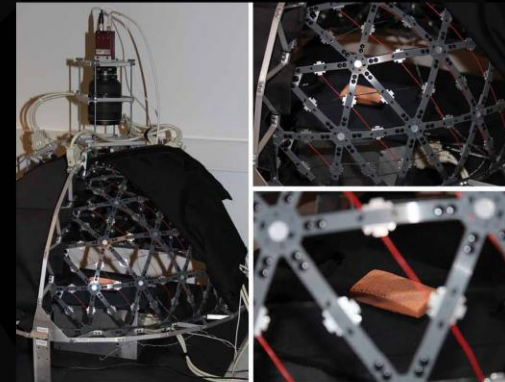
It is an easy-to-use, relatively inexpensive tool for recording objects where both the 2D and 3D aspects need to be considered. The results allow for photorealistic virtual re-lighting and non-photorealistic rendering of the objects in real-time.

1.2 Multiview Dome

- Its purpose

The Multiview dome was designed to acquire spatially-varying material information (material probes) and has been extended to a full 3D acquisition of optically complicated objects within 3D-COFORM. The size of the objects is limited to approx. 30 by 30 by 30 cm. Software tools to compress the data and use the compressed data for rendering are available to show the power of the multi-view approach.

- How the foreground might be exploited, when and by whom

In the Cultural Heritage field the foreground will be exploited by UBonn, for other branches UBonn has licensed the technology to x-rite a company known for material measuring devices.

- IPR exploitable measures taken or intended

See above

- Further research necessary, if any

The device can be used as is. However, there is space for further optimisation, e.g. making it more flexible with respect to object sizes and depth complexities, lowering acquisition and processing times. A full acquisition is still in the order of hours.

- Potential/expected impact (quantify where possible)

A miniaturisation of the device can revolutionize the way materials being measured and measured real materials being integrated into Computer Graphics visualisations. Branches interested in this technology range from automotive to furniture to advertisement, and other creative industries.

Multiview dome

The *Multiview Dome* uses an array of cameras to capture 240,000 different flash photographs of an object in a short space of time.

It is particularly useful for capturing objects rich in fine details and the resulting photo-realistic 3D model can provide the user with the same impression as if inspecting the real artefact. This even makes it possible to investigate properties such as material composition, cracks and scratches or wear.

1.3 MeshLab

- Its purpose

MeshLab is an open source software system for mesh processing and visualisation. MeshLab is used in many cases to process partial depth maps into full 3D reconstructions of digital CH objects or scenes.

- How the foreground might be exploited, when and by whom

Foreground is exploited by CNR-ISTI. MeshLab has been downloaded more than 250,000 times in 2012.

- IPR exploitable measures taken or intended
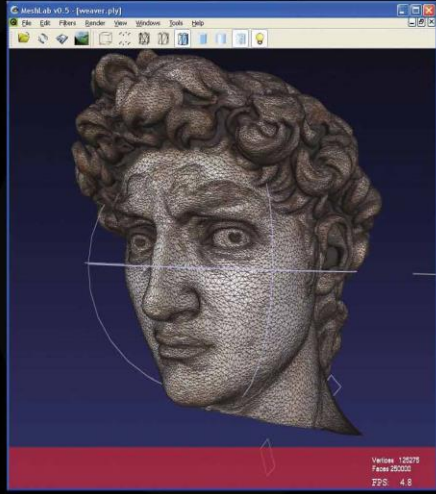
MeshLab is being heavily promoted by CNR-ISTI which raised the number of downloads exponentially. In addition, a tablet and iOS edition is available for mobile visualisation.

- Further research necessary, if any

MeshLab is used as is. It builds the basis of future research activities of CNR-ISTI wrt. 3D reconstruction, modelling and painting.

- Potential/expected impact (quantify where possible)

MeshLab is developing towards the defacto-standard tool in mesh processing for Cultural Heritage institutions. Financial solution to cover maintenance and extensions costs are under evaluation (including donation schemes, contracts with private companies for the design of libraries or software solution built on the basis of the MeshLab assets, or even spin-off concepts).

MeshLab

MeshLab is an open source, all-purpose mesh processing software.

Amongst other things, it provides a set of tools for measuring, checking, cleaning, healing, inspecting, rendering and converting 3D meshes. *MeshLab* is freely available, distributed under the GPL licensing scheme and it is available for all the major platforms.

1.4 Arc3D

- Its purpose

The purpose of Arc3D is to calculate 3D reconstructions from sets of images, more specifically to derive depth maps that are then further processed. Arc3D offers a web-service to upload sets of images and returns results. The web-service is free for non-commercial use.

- How the foreground might be exploited, when and by whom

In 3D-COFORM Arc3D has been further developed and optimized wrt. robustness, speed, accuracy. KU Leuven is exploiting Arc3D. The service is running and can be used by potentially interested organisations and companies.

- IPR exploitable measures taken or intended
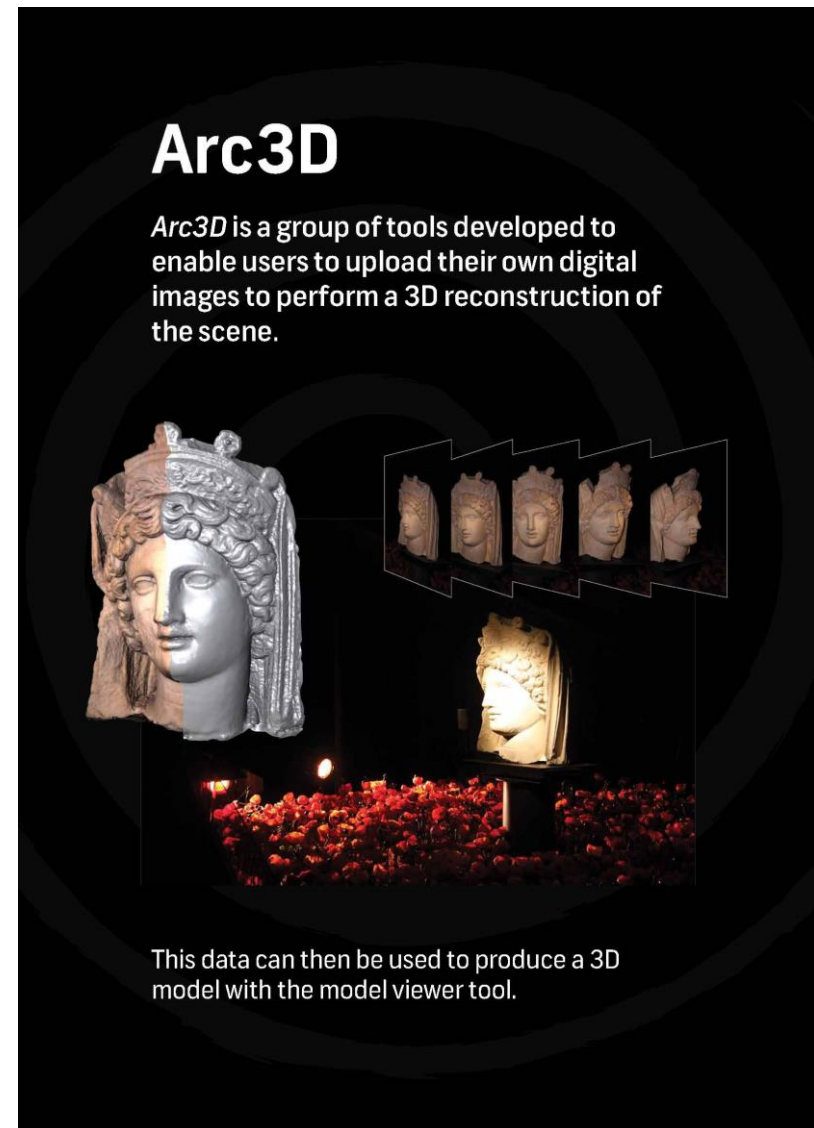
KU Leuven is promoting Arc3D especially in the Cultural Heritage field.

- Further research necessary, if any

The web-service can be used as is. Future research would go beyond the current possibilities addressing varying scale, lighting conditions, etc. to make 3D reconstruction even more robust wrt. difficult environment conditions.

- Potential/expected impact (quantify where possible)

Image-based 3D reconstruction will open the potential of 3D reconstruction to lay people and crowd-sourcing is envisaged to become a major contributor to the preservation of our heritage in digital form. Arc3D can have a considerable share in unlocking this potential since it is available on the Web.

Arc3D is a group of tools developed to enable users to upload their own digital images to perform a 3D reconstruction of the scene.

This data can then be used to produce a 3D model with the model viewer tool.

1.5 In-hand scanner

- Its purpose

An In-hand Scanner has been developed by KU Leuven. Its purpose is to 3D-acquire CH artefacts with a device that is moved around the object by a human operator which carries the device in his/her hand(s).

The KU Leuven system does not require a tracking system and trades lower accuracy for improved portability and lower costs.

- How the foreground might be exploited, when and by whom

The exploitation route for the KU Leuven device is not yet clear.

- IPR exploitable measures taken or intended

See above.

- Further research necessary, if any

The KU Leuven demonstrator is made out of off-the-shelf components and there is a lot of room for further miniaturisation.

- Potential/expected impact (quantify where possible)

Mobile scanning devices will enter new markets and enable new uses of scanning devices in environments and situations where traditional devices are hardly applicable.
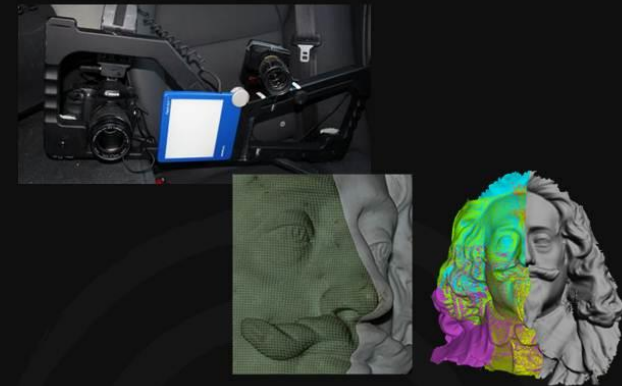
2   Infrastructure & Creating the 3D collection plus Search and Browse

2.1 Ingestion tool

- Its purpose

Data being acquired in digitisation campaigns need to be input into the 3D-COFORM repository for further use in downstream processes. The Ingestion Tool is an interactive software which allows the user to do so by specifying events and relationships between metadata, digital images and derived information.

- How the foreground might be exploited, when and by whom

The Ingestion Tool will be exploited by FORTH, the developing party of the Ingestion Tool. FORTH provides the Ingestion Tool along with documentation to interested parties and organisations. FORTH will maintain the ingestion tool for one year after the end of the 3D-COFORM project.

- IPR exploitable measures taken or intended

See above

- Further research necessary, if any
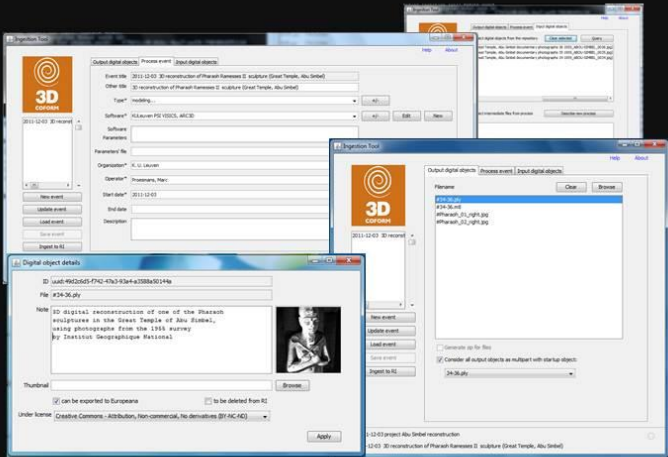
The Ingestion Tool reflects the current implementation status of the RI wrt. the CIDOC-CRM concepts being used. Changes to the RI may require adaptations on the Ingestion Tool side.

- Potential/expected impact (quantify where possible)

The Ingestion Tool is not only a way to ingest data but also a framework for users to get familiar with CIDOC concepts. Using the Ingestion Tool will implicitly teach/train people in the fundamental ideas behind CIDOC, e.g. its event-driven approach.

17

2.2 Repository Infrastructure

- Its purpose

The aim of the repository infrastructure is to provide a means of a distributed storage for digital 3D artefacts and associated metadata which is searchable in a semantically rich way (text-based queries, shape and material search)

- How the foreground might be exploited, when and by whom

The RI is mainly being implemented by FORTH and TU Graz with some contributions from ETHZ/KUL and UBonn in shape and material search respectively. FORTH and Graz have committed themselves to maintain the RI for one year after the end of the 3D-COFORM project.

- IPR exploitable measures taken or intended

See above

- Further research necessary, if any

The RI has proven stable in the last year of the 3D-COFORM project. Additional research might be implied by massive amounts of data under stress test conditions. These circumstances have not been evaluated under the course of 3D-COFORM.

- Potential/expected impact (quantify where possible)

The RI is likely to be the first (and only) implementation of a full-fledged CIDOC-CRM datastore based on Semantic Web technologies (triple stores) and Semantic Web reasoners. Structurally it is quite complex but easy to use from a client application point of view. In this respect, the RI can play the role of a reference implementation for others to compare with.

RI
Repository Infrastructure

The *Repository Infrastructure (RI) contains data and metadata of CH artifacts*

All tools communicate with the repository through a common single entry point API, the **RI-API**, to two main webservices: a) Data handling and administrational requests (e.g. ingest, upload, update, retrieval, download, thumbnails, areas, replicas and group management, user management, etc) are fed to **OR central webservice** and b) Queries are fed to **QM-MR central webservice**, via XML messages that follow the SOAP standard. **Data transfer** is performed directly between **clients** and **OR-locations** and it is initiated by the RI-API.

2.3 Export to Europeana

- Its purpose

The RI explained above is an internal data repository whereas Europeana is open to the whole public. The 'Export to Europeana' tool allows extraction of content from the RI and transforms it into Europeana-compliant formats.

- How the foreground might be exploited, when and by whom

The 'Export to Europeana' tool cannot be exploited without the RI, thus, the same mechanisms as in the case of the RI apply here.

- IPR exploitable measures taken or intended

See above.

- Further research necessary, if any

Currently 'Export to Europeana' transforms CIDOC-CRM structures into the Europeana ESE format. Within Europeana other (more sophisticated) formats than ESE are currently discussed. In case they become standard, 'Export to Europeana' would need to be adapted.

- Potential/expected impact (quantify where possible)

With the help of 'Export to Europeana' and Fraunhofer's X3DOM technology for presenting digital 3D artefacts and 3D models on the Internet, 3D-COFORM has contributed the majority of the 3D models available in Europeana (status: November 20 2012). 'Export to Europeana' and Europeana have the potential to bring many more people to appreciate digital 3D CH artefacts on the Internet.

19
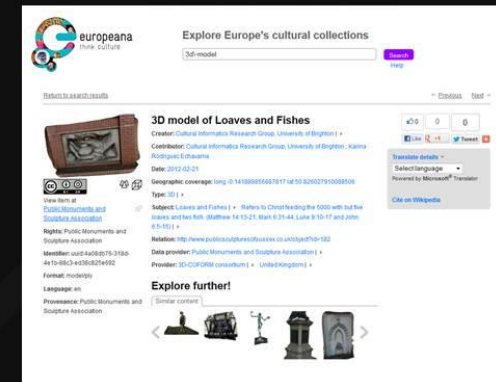
2.4 Legacy Mapping Tool

- Its purpose

Many museums have an inventory data management system running already. Most of these systems are using standard relational data base management systems and do not support 3D content. The Legacy Mapping Tool allows mapping of data from such existing (legacy) databases into the 3D-COFORM RI to allow further linking and annotating of 3D models.

- How the foreground might be exploited, when and by whom

PIN has developed the Legacy Mapping Tool and plans to exploit it in other research projects and in collaborations with museums in Italy and beyond.

- IPR exploitable measures taken or intended

Dissemination events as part of summer schools promoting the Legacy Data Mapping tool.

- Further research necessary, if any
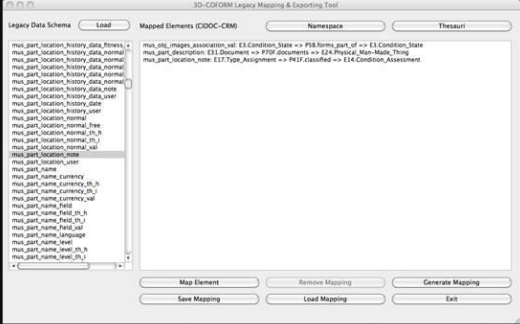
Mapping data structures form schema A to schema B is a current topic in research. Most approaches are following an interactive route, such as the Legacy Mapping Tool. To automate or to support the user in doing so, is an interesting research topic but it does not prevent the Legacy Mapping Tool from being applied beneficially.

- Potential/expected impact (quantify where possible)

Easing the process of using existing data in conjunction with digital 3D artefacts.

20

2.5 AnnoMAD

• Its purpose

AnnoMAD allows annotation of textual 'areas' within HTML documents and links them with other areas. In 3D-COFORM we have introduced an abstract concept of areas. Areas can be defined on text, images, and 3D models. By this means it is possible to put any number of areas in relationship to any number of areas, no matter to which media object they refer.

• How the foreground might be exploited, when and by whom

PIN has developed AnnoMAD and plans to exploit it in other research projects and in collaborations with museums in Italy and beyond.

• IPR exploitable measures taken or intended

Dissemination events as part of summer schools promoting AnnoMAD.

• Further research necessary, if any

Currently AnnoMAD can be used over HTML documents. An extension towards other document formats could widen the applicability of the tool. For text being displayed in Web pages (e.g. derived out of legacy systems) AnnoMAD can be used right away.

• Potential/expected impact (quantify where possible)

Ability to link text passages with digital 3D artefacts and other media objects.

2.6 Integrated Viewer Browser (IVB)

- Its purpose

The main purpose of the IVB is to semantically enrich the digital 3D content collection by adding information and relationships between different media objects (text, images, 3D artefacts). To this end, the IVB allows the user to search in the content collection, to browse the results, to view digital 3D artefacts, to segment them, to defined areas on top of them and to created semantic relationships between these areas to be stored back in the RI. The viewing component of the IVB is based on the Visual Support Library (VSL). The search component also provides shape and material search.

- How the foreground might be exploited, when and by whom

Fraunhofer intends to exploit its part of the IVB (infrastructure, view and annotate functionality) as part of its new 3D digitisation lab. Fraunhofer is promoting the IVB in the German chapter of the VCC-3D and at events such as EVA Berlin.

- IPR exploitable measures taken or intended

See above.

- Further research necessary, if any

The search and browse component can be further optimized wrt usability criteria, the segmentation possibilities are still somewhat limited, but the tool can be used in conjunction with the RI in its current form and has proven an appropriate robustness level in the user trials that have been performed in the last period of 3D-COFORM.

- Potential/expected impact (quantify where possible)

The IVB is the first tool of its kind that fully supports the complex annotation model of CIDOC-CRM. The complexity of the CIDOC-CRM annotation model has introduced a lot of UI design and usability considerations and the tool has been re-designed a few times but also allows a flexibility of annotations and relationship creation that is unique.

Integrated Viewer/ Browser (IVB)

The Integrated Viewer Browser (IVB) provides a user access point to the 3D Repository.
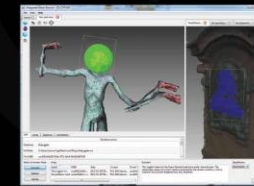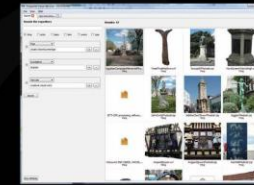
There is a search interface that enables the user to access and to retrieve information, and a 3D viewing and annotating interface from which the user can inspect and enrich the retrieved information.

22

2.7 PhotoCloud

- Its purpose

Image-based 3D reconstruction becomes ever more accessible (e.g. via Arc3D). It tries to recover the 3D shape of an object out of many photos that have been taken from various angles. Since these photos are many, the question arises how to browse these images in a meaningful way. Here PhotoCloud comes into play. It allows the user to navigate a 3D scene (rebuilt from photos) and visualise which part of the scene has been reconstructed out of which photo.

- How the foreground might be exploited, when and by whom

CNR-ISTI has developed PhotoCloud and further promotes it.

- IPR exploitable measures taken or intended

PhotoCloud can be downloaded from the CNR-ISTI site.

- Further research necessary, if any

No.

- Potential/expected impact (quantify where possible)

PhotoCloud opens a new route in how to experience photo collections. The browser interface has the potential to revolutionise browsing tools for photo collections even if no 3D reconstruction is available.

PhotoCloud

PhotoCloud offers an integrated browsing system which can be used to bring together different media (artefacts, drawings, images, etc.) in a virtual 3D space.

This composite space can then be navigated by users to explore each medium either on its own or to provide browsing/indexing capability in the search and navigation of the other media.

3   3D modelling and presenting

3.1 Sketching tool

- Its purpose

Sketch-based modelling has proven its ease-of-use in applications such as Google Sketch-Up which is mostly limited to analytic shapes. Sketching of freeform surfaces is as yet less established. The Procedural Sketching tool allows the user to sketch shapes or to add sketchy shapes to scanned objects (as depicted to the right). (Parts of the) sketches are internally transformed into procedures which can be re-applied elsewhere and whose parameters can be changed.

- How the foreground might be exploited, when and by whom

Fraunhofer intends to exploit the sketching tool as part of its new 3D digitisation lab. Fraunhofer is promoting the sketching tool in the German chapter of the VCC-3D and at events such as EVA Berlin.

- IPR exploitable measures taken or intended

Fraunhofer is supporting the exploitation of the sketching tool.

- Further research necessary, if any

The tool can be used in its current form. Further research can be directed in improving the usability of the tool, other input formats and additional interaction and sketch interpretation techniques.

- Potential/expected impact (quantify where possible)

Sketch-based free-form modelling (here of subdivision surfaces) can also influence other areas such as industrial design, automotive design and other creative industries branches.

Procedural Sketching Tool

This modelling tool transforms the user's sketching interaction into modelling operations such as planar drawing, rotational extrusion, sweeping, and lofting.
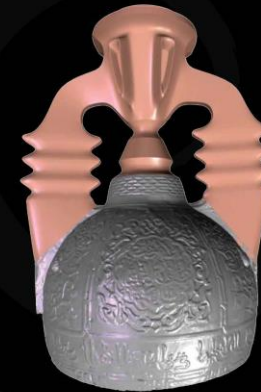
It can be used to create entirely new 3D models, or to add components to existing digitized models – as here with missing parts being indicated in 3D.

3.2 CityEngine

- Its purpose

CityEngine is a tool for the computer-aided generation of 3D city models following a procedural approach. In CityEngine rules have to be defined which create buildings. The style of the buildings is determined by rules - parameters define the size, height, etc. of the buildings. Buildings are placed on city maps. City maps can be modelled and changed interactively. CityEngine has proven success with virtual reconstruction of ancient cities, e.g. Rome, Pompeii.

- How the foreground might be exploited, when and by whom

CityEngine has originally been developed at ETHZ. A few years ago, the company Procedural Inc. has established as a spin-off of the university. The company has been bought by ESRI, one of the three biggest software vendors in the geo-spatial market.

- IPR exploitable measures taken or intended

Exploitation is managed between ESRI and ETHZ.

- Further research necessary, if any

CityEngine is a commercial product and available as such. This does not mean there is no research being performed by ESRI or in conjunction with ETHZ.

- Potential/expected impact (quantify where possible)

CityEngine has changed the way hypothetical cities are being modelled in the CGI industry, be it film, games, or CH.

CityEngine

This software enables users to easily generate 3D city modelling for urban planning, architecture, simulation, game development and film production.
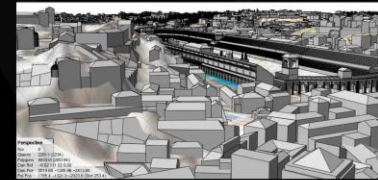
3.3 GML compositor

- Its purpose

GML compositor is a tool to compose scenes interactively using GML, the Generative Modeling Language.

- How the foreground might be exploited, when and by whom

TU Graz will exploit the 3D-COFORM results in future research and collaboration projects.

- IPR exploitable measures taken or intended

GML and GML compositor are promoted by TU Graz at events such as VAST. GML and GML compositor have found applications in branches beyond CH, e.g. in the customisation and visualisation of jewellery.

- Further research necessary, if any

No.

- Potential/expected impact (quantify where possible)

GML compositor can be used for exhibition planning and describing animations in virtual exhibitions. A new interface eases the definition of animations tremendously which can have a considerable impact on how animation is being created in the future.

GML compositor

GMLCompositor allows non–experts in 3D modeling to quickly create ornamented and repetitive structures as well as insert pre-defined procedural assets like windows and portals very easily.
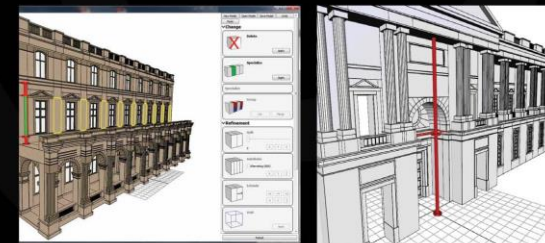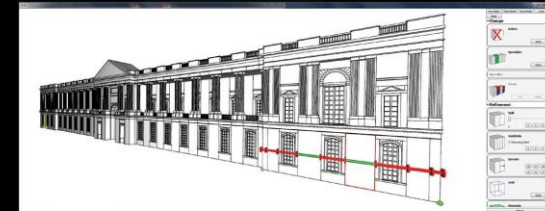
The model remains "alive" and editable and on any level of the model hierarchy dimensions can be interactively adjusted.

3.4 Community presenter

- Its purpose

Community Presenter is a software tool to implement and run multimedia presentations in museums preferably on touch devices, e.g. iPads. The presentation must be very easy to operate for museum visitors ranging from 8 to 80 years. Community Presenter is at the same time an infrastructure to develop such applications based on HTML5 and to run and use them in real environments.

- How the foreground might be exploited, when and by whom

CNR-ISTI will exploit Community Presenter in more and more virtual exhibitions in Italy and beyond.

- IPR exploitable measures taken or intended

CNR-ISTI has already used Community Presenter for creating virtual exhibitions and enriching physical ones with touch displays. More museums are interested in having augmented exhibits and further projects are underway.

- Further research necessary, if any

No.

- Potential/expected impact (quantify where possible)

Ease-of-use for creating media exhibitions and usability for museum visitors. Since modern Web technology is used, the same content can be shown on museum web sites.

Community Presenter

A collection of tools, libraries and templates for the creation of interactive 3D museum and web applications.

It allows easy visualisation of media such as 3D models, images, video and audio. It also supports streaming of multi-resolution 3D meshes over HTTP, allowing for exploration of very large models.

3.5 Footprint Extractor

- Its purpose

Cadastral maps often show outlines of buildings, streets, etc. – it is no different with ancient maps. This is a valuable source for reconstruction of sites because it contains hints of the size and shape of the 'footprint' of the buildings. Often these maps are incomplete, damaged, etc. which makes the automatic extraction of such information difficult. Footprint Extractor is coping with this challenge applying advanced image processing algorithms.

- How the foreground might be exploited, when and by whom

UEA has developed Footprint Extractor and is promoting it at events such as VAST.

- IPR exploitable measures taken or intended

See above.

- Further research necessary, if any

As mentioned above, extraction of lines from old worn maps can be challenging. A semi-automatic approach can be more efficient than a purely automatic one. User tests with Footprint Extractor have shown a considerable speed-up following a semi-automatic process which supports the user compared to a fully manual one. Further research can be directed in finding the best balance between automation and human intervention.

- Potential/expected impact (quantify where possible)

Accelerated extraction of building footprints from cadastral maps. Proven efficiency in comparison to fully manual process. Footprint Extractor can also impact the GIS sector.

Footprint Extraction

The Footprint Extractor analyses historic maps of towns and cities and processes them in order to detect the outlines of buildings.
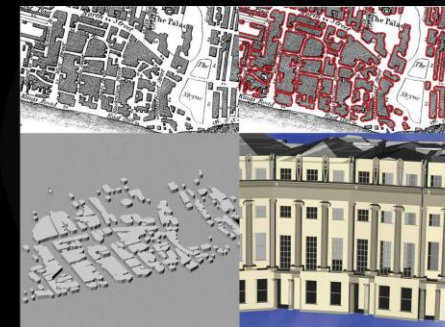
A map of Brighton in 1822 (top left) is processed to detect building outlines (top right). 3D shapes are extruded (bottom left) and CityEngine is used to generate realistic 3D models (bottom right).

Once identified, these building outlines can then be used to extrude basic 3D "building blocks". Software such as *CityEngine* can then use these building blocks to create realistic reconstructions of buildings appropriate to the time period.

3.6 Site Explorer

- Its purpose

The purpose of the tool is to explore full reconstruction sites that consist of, for example, a digital terrain model, several artefacts (building ruins, etc.) and additional meta information plus the photos from which the site may have been reconstructed.

- How the foreground might be exploited, when and by whom

UEA has developed Site Explorer and is promoting it at events such as the 3D-COFORM Reshaping History Exhibition.

- IPR exploitable measures taken or intended

See above.

- Further research necessary, if any

As of today, Site Explorer is useful and usable. Certainly there are options for more and more tailored functionalities for dedicated use cases such as cutting the terrain and calculating the length of the cut as sometimes demanded by archaeologists.

- Potential/expected impact (quantify where possible)

Site Explorer is especially useful when handling excavation sites because pictures from certain parts of the site can be linked to 3D scans even if the 3D reconstruction was not done following an image-based approach.

Site Explorer

Site Explorer allows users to retrieve multiple objects from the 3D-COFORM Repository and display them in an interactive 3D scene.
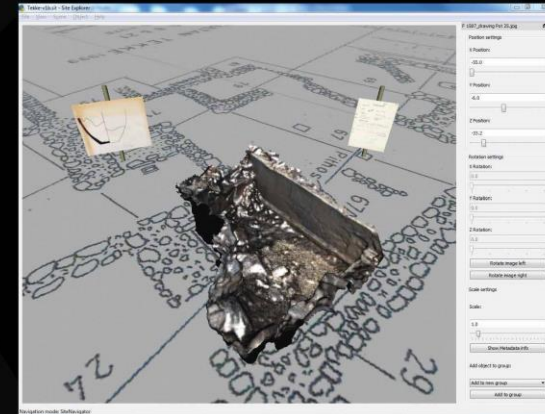
For instance it may be used to recreate an historic site which no longer exists, or to show the results of an archaeological dig by displaying the artefacts retrieved at the locations they were found. The user can interactively explore the scene and read information about the objects.

3.7 Fragment Re-assembler

- Its purpose

Many finds of cultural objects are fragmented - sometimes the original object is fragmented in hundreds of small pieces. It is unlikely that the pieces represent the whole object, so gaps between the pieces are highly probable.

The Fragment Re-Assembler provides the possibility for the user to suggest best fits between two fragments. An optimisation algorithm calculates the most likely (the best) fit out of the 'imprecise' information the user has roughly provided.

- How the foreground might be exploited, when and by whom

CNR-ISTI will exploit the Fragment Re-Assembler in future research and collaboration projects.

- IPR exploitable measures taken or intended

CNR-ISTI is promoting the Fragment Re-Assembler at different events and in deployment experiments.

- Further research necessary, if any

Fragment Re-Assembler is not as mature as MeshLab – another well-known tool from ISTI – and is likely to be enriched with new ideas and optimised before becoming a robust tool for the inexperienced user.

- Potential/expected impact (quantify where possible)

The semi-automatic process (as sketched above) has its benefits and weaknesses in comparison to purely automatic approaches also known in research literature. In case of a moderate number of fragments and where potential fits can be recognized by the operator, Fragment Re-Assembler can much more directly find a solution than an automated process which tries to find best fits in a brute-force trial and error approach. Today, humans still perform much better in shape recognition tasks than machine vision algorithms.

Fragment Re-assembler

The *Fragment Re-assembler* supports the reassembling of fragmented artworks

It starts from a set of digital 3D models of the fragments (digitized in 3D with scanning technology and stored on the Repository Infrastructure). The re-assembly process is not aimed to be fully-automatic, but conversely our approach is to put the expert users (an art historian or a restorer) in the loop, driving the process according to their experience. Therefore, the Fragment Re-assembler is intended to provide some semi-automatic and assisted procedures to help the user in the fitting and re-assembling task.

The potential impact (including the socio-economic impact and the wider societal implications of the project so far) and the main dissemination activities and exploitation of results

3D-COFORM's impact falls under two broad categories – the impact from partners continuing to exploit their results in further research and sector engagement, and the impact achieved through spin-off activities such as the Virtual Competence Centre in 3D CIC Ltd (VCC-3D). The potential impact by partners is described in the description of tools included above. This section describes the potential impact and planning for the VCC-3D.

Virtual Competence Centre in 3D CIC Ltd (VCC-3D)
The Virtual Competence Centre in 3D CIC Ltd (VCC-3D) is a non-profit Community Interest Company established in the UK and limited by guarantee. It is designed to provide the cultural heritage sector with advice, services, training and consultancy in the practical deployment of 3D digitisation at all stages of capturing and processing 3D artefacts, from documentation, through analysis and visualisation in the cultural heritage sector. This UK-based operation is able to operate internationally but it is also envisaged that similar organisational units, based with partners in other countries, may be more effective for legal and cultural reasons in achieving the objectives of the VCC-3D and would operate through collaborative arrangements with the VCC-3D. In this section the initial business planning for the VCC-3D is presented to demonstrate the range of services expected as the operations grow. The build-up of activity is expected to be gradual to prevent overstretching resources. Underpinning core resources are being sought at present to guarantee operations, whilst a full range of the anticipated services is further developed.

Background: VCC-3D will continue and expand the work of 3D-COFORM which has had a mission of making 3D documentation a practical proposition for Cultural Heritage Institutions. This in turn built on aspects of the research agenda developed under the EPOCH Network of Excellence in Processing Open Cultural Heritage, co-funded by the EC for the period 2004-08 under FP6.

The VCC-3D is one of a number of specialist Competence Centres (CCs) being established and emanating from FP6/7 projects. The CCs are all in touch with each other and becoming more organised as a collaboration in which each centre offers specialist knowledge to offer services to the holders of cultural assets and digital content and to act as intermediary between the European Digital Library (Europeana), European Commission and other stakeholders. The other main centres are:
- IMPACT – the Competence Centre for text digitisation and OCR
- Prestocentre – dealing with Audiovisual materials and their digitisation/collection handling
- Open Planets Foundation – dealing with long term preservation strategies
- V-Must – a new one in which some 3D-COFORM partners are also involved and incorporating knowledge about the use of content (both 3D and other content) in Virtual Museums, with or without physical counterparts.

Vision: The VCC-3D aims to become a sustainable organisation which is the natural choice for independent advice to organisations and individuals investigating the potential benefits and operational impact of incorporating 3D documentation of objects and collections within their collections management activities.

Mission: As a Community Interest Company the mission of the VCC-3D is quite explicitly to "serve its

community" (the cultural heritage sector) and a major difference from conventional UK limited companies is that there is an "asset lock" which prevents disposal of the company's assets other than to the benefit of the community. The mission of the VCC-3D is therefore to achieve the vision and provide help and advice to individuals and organizations considering the role(s) of 3D documentation of objects and collections in their activities. This will include organisations making 3D collections available digitally for use by collection management professionals (e.g. consolidators of content for the internet), for professional use and for communication to a wider audience using 3D technologies. To achieve this, the VCC-3D will provide membership services, consultancy and training for individuals and for organisations in the cultural and heritage sectors who wish to use 3D technologies integrated into their portfolio of activities in ways which are sustainable, and economically and practically viable over the long-term.

Governance: As a community interest company, there is an interim board of five directors, and allowance for up to 20 shareholders, expected to be drawn initially from the members of the 3D-COFORM consortium or individuals connected with them. The shareholding has been set at 20 £1 shares, with one share each currently allocated to nine individuals drawn from consortium members with a further 11 shares available for allocation to other stakeholders (there are 19 partners in 3D-COFORM).

Management: The interim board of five directors was formed as agreed by shareholders and comprising David Arnold as Chair, Mike Spearman, Franco Niccolucci, James Stevenson and Jaime Kaminski. This initial board permits the organisation to begin making proposals for core start-up funds to organisations such as the UK Heritage Lottery Fund. All of these are acting in a private capacity at present, pending consideration of potential shareholding by their respective organisations, but under the umbrella of the 3D-COFORM contractual commitment to develop a legal entity to carry forward the 3D-COFORM work with the sector beyond the funded period of the FP7 contract. There would not normally be more than one director from a single shareholder.

Business Model: The VCC-3D is being planned on a mix of membership subscription and benefits, and services provided to members, contracting organisations and individuals.

Staffing: Initially it is expected that a defined and limited amount of input will be provided by partner staff and effectively initially covered as institutional volunteer contributions arising from commitment to 3D-COFORM. Now that the funded period of the contract has been completed it is expected that limited input will be included as part of partners sign-up to the VCC-3D (in effect in-kind contributions). It is expected that as a pattern of activity is established the VCC-3D will need to balance contributions across the partners, and that any imbalance is monitored rather than compensated in the start-up period, where core costs are covered from start-up awards. As with other memberships, the 3D-COFORM partners are being prepared for the probable need to move to a contributing subscription model to cover core costs, depending upon the take-up from clients.

The partners need to determine the basis on which staff will be released to work on this form of community engagement. It seems likely that any attempt to recover full economic costs, as well as generating surpluses, would not be sustainable in the cultural heritage field and would lead to a need to load partners in the CIC with core costs that would look unreasonable to those providing contributions in kind. It therefore seems likely that contributions in kind would need to be costed and funded as community engagements, largely on the basis of staff volunteering and seen to be more akin to Corporate Social Responsibility than as a "for-

Profit" model.

These aspects are currently being clarified as a precursor to producing a more detailed business model.

Target Clients:
- Organisations that own and curate collections of artefacts or born digital assets, including archaeological sites (Museums, Cultural Heritage Sites and visitor centres,).
- Research Organisations, principally in the Arts and Humanities, that hold and research cultural artefacts.
- Private individuals, individual researchers, conservators, restorers, exhibition designers, creative and cultural industries.
- Suppliers of documentation tools, including both 3D data and metadata; creation and content management tools.

Activities and Services: The VCC-3D will engage in a range of activities and provide a range of services as follows:
- Membership services to include code of practice for members, and provision of guidance about good practice and a conduct of behaviour for associated suppliers.
- Dissemination and training materials and events – potentially to include extending the reach and useful life of the recent 3D-COFORM exhibition.
- Client specific consultancy, advice on projects and digitisation campaigns.
- Coordination and guidance on the engagement with the European Digital Library.
- Potential hosting of 3D-content for organisations – including long-term preservation and migration of content to new platforms.
- Potential brokerage arrangements acting as a conduit to allow those in search of services to identify suitable suppliers subscribing to the code of practices and standards. This will also potentially help members to identify project partners in search of externally funded projects.

Initial Strategy: The VCC-3D needs start-up funds and has prepared a proposal for UK funds available to new start-ups in heritage fields. These are being prepared on the basis that the CIC is a start-up by a number of individuals from the 3D-COFORM background. Once the VCC-3D has secured start-up funding we will implement the proposed call for take-up of additional shares by 3D-COFORM partners or individuals from partners.

It is essential to the business model to build an engaged member base, and this will be challenging in the current economic climate. The proposal is to get sign up through our current contact lists and through running a series of dissemination events, subsidised by the start-up funds and possibly by piggy-backing off events that partners and others may be running for other purposes. An example would be the degree to which we are successful in achieving other venues for the 3D-COFORM exhibition materials.

In the longer term the objective is to have a lean organisation that brokers arrangements and provides information, but where the majority of the actual delivery is done by volunteers or by individual staff from partners under their own umbrellas, but branded by VCC-3D labels and delivered according to the principles of engagement for CICs. The business model in any "steady state" (which is probably only steady as a continuing evolution) would be based on a lean core with activities and services delivered with self-contained and sustainable (break-even or better) budgets for each.

Competitive advantages:

The VCC-3D is the result of over seven years of work in several major projects funded by the European Union and is the principal outcome of the European Commission co-funded project, 3D-COFORM. Since 2009, the 19 partners in 3D-COFORM have brought together expertise and experience in all aspects of 3D technology for the heritage sector, ranging from 3D digitisation to visualisation in public engagement. The partners in 3D-COFORM are some of the very best 3D heritage organisations in Europe. The aim of the VCC-3D is to ensure that the knowledge and resources that have been built up by the partners during the funded period of 3D-COFORM continue to support the heritage community. We aim to produce the definitive resource regarding the technology of 3D for heritage sites.

- This pedigree gives a competitive advantage in terms of reputation in the sector.
- The contacts and mailing lists that have been built up in the last seven years will provide a springboard for the VCC-3D.

The VCC-3D has a number of products and services that are new to the market.

- The position of the VCC-3D in the consortium of EC related CC's is unique and unchallengeable within the remit for 3D content.
- Provision of consultancy for workflows delivering 3D content in Europeana remains a USP.
- The repository is still novel in the 3D heritage arena and is built on international standards. The challenge here is to secure on-going maintenance of the underlying systems/development agreements with the implementation partners, and to transition rights-to-use from 3D-COFORM implementation partners and their commitment to on-going maintenance at reasonable cost.

Assessment of business framework and environment

Products and Services

- Provision of independent advice and consultancy on: 3D digitisation technologies including geometry, materials and shape semantics. Integrating metadata (including provenance) and legacy sources with 3D assets. Mass digitisation business processes and workflow planning. Business models for exploitation of 3D digital assets. Tools for assessing socio-economic impact of investment in 3D digital assets.

  Consultancy rates in the heritage sector are unsurprisingly below rates in other sectors and range between c€250 and €450 per day. It is envisaged that the VCC-3D would initially charge out at €350 per day as a sector average, where individual consultancy is undertaken.

- Provision of services that allow cultural and heritage organisations to interface to Europeana (the European Digital Library). This service will be a USP for the VCC-3D. There are no organisations that are currently providing such a service to the Heritage sector and the group of Competence Centres for different content types (text, audiovisual, etc.) offer complementary skill sets that are spin-offs from different European projects. The centres are beginning to cooperate to formulate a common strategy and collective position in support of developing European digital content. The services will initially be treated as training exercises, consultancy on site or remote provision of advice (of which an initial consultation will be included in membership).

- Provision of training or consultancy services in cases where this is appropriate, in-line with the independence of the VCC-3D from suppliers' vested interests and consistent with the philosophy of a social enterprise.
  Events provided to the heritage sector in the area of digital heritage range between €100 and €145 plus VAT per day.

For events run by the VCC-3D at our premises the above delegate rates would apply.

Rooms for training can be provided at the Sussex Innovation Centre from €100 per day plus VAT.

Training events where a VCC-3D trainer travels to the customer site would be separately negotiated according to the staff, materials, travel and other costs and the number of delegates.

- Brokerage to helping organisations in search of those with 3D competences to obtain the help that they require. The accepted industry rate for brokerage is 5% of the contract value.

- Provision of access to a range of tools in capturing, preserving in the long-term and processing 3D assets and their associated metadata, etc. by negotiating with those holding the rights to operate such tools.

- Provision of a repository for 3D models.
  Pricing to be determined following market evaluation.

- As the VCC-3D develops there will be a membership option. The detail of this is still being examined but the recent experience of interest in these technologies shown by the public Reshaping History exhibition in Brighton has demonstrated that there is a demand.

  Sensitivity to membership rates is still being examined as the contacts lists have grown through the exhibitions

Marketing Plan

The market:

The VCC-3D has a clear and definable niche in the heritage sector. It focuses on 3D heritage as part of the digital cultural heritage sector. There are few players in this particular niche.

The VCC-3D has a natural focus on the heritage sector. There are over 25,000 museums in Europe, approximately 50% of the world total. There are many 'world leading' famous museums such as the Victoria & Albert in the consortium and new major ones such as the Acropolis Museum. However, most museums are 'Very Small' organisations with less than 10 staff. Very few have over 500 staff. The collections vary significantly in type with Archaeology, History and Decorative Arts being particularly rich in 3D objects. Ownership is diverse, ranging from public and private to university and corporate (e.g. in Germany). Technology capabilities vary greatly with most having extremely limited resources. National Museums are often exceptions, but not always, e.g. French National Museums, (C2RMF) but not the Uffizi, which has however received strong support from the University of Florence. University Museums are often exceptional cases in this regard because of their access to technical ICT resources in Academic Departments, e.g. Athens University Museum; University College London, UCL, with its 12 museums e.g. The Petrie Museum (and its ancient Egyptian collection).

We estimate that altogether there are at least 1,000 potential 'early cultural heritage adopter/user of VCC-3D services'. A 'ball-park scenario' for a possible target VCC-3D cultural heritage clientele across Europe in its first three or four years is therefore as follows:

- Museums – 400 -500

-       Archaeological Sites – 300 – 400
-       Castles, Palaces etc. – 200 – 300
-       Performing Arts & Others – 50 - 100

The timing of the use of 3D in these sub-sectors appears to vary. Museums and archaeological sites continue to lead the way and a single organisation might be classified under more than one category e.g. Castle and Museum.

However, it is also evident that the VCC-3D could supplement its revenue stream by supplying services to the wider 3D industry. The total pool of such relevant '3D Industry' and other organisations is also estimated to be of the order of 1,000 with a tentative scenario being as follows:
-       Large 3D companies (over 300 staff, but with obviously a relatively small proportion dedicated to 3D work)   ~ 100
-       Hi-tech SMEs   ~ 500-600
-       Consultants   ~ 100
-       Exhibition Design companies   ~ 100
-       Non-Profit & Government   ~ 50
-       Voluntary Groups   ~ 50

A desirable scenario for membership/association with the VCC-3D may be some 100-200 by 2015. It should be stressed that because the German (& Austrian) 3D Industry is advanced relative to the rest of Europe, that the proportions of target VCC-3D members by country could be something like:
Germany & Austria: ~30%; France: ~10%; UK: ~ 10%; Italy; ~10%; Spain: ~5%; Benelux: ~5%; Others: ~30%

Economics
•   Research indicates that the initial market for the VCC-3D will be in the order of 2,000 organisations in Europe. However, a full launch of the 3D-COFORM repository infrastructure could mean that the VCC-3D could provide services to a potentially global market.

•   As an early player in the heritage market, with visibility at a European level and as the European centre with 3D expertise, with little direct competition, the VCC-3D would expect to gain market share in the sector quite rapidly.

•   Current demand in the heritage sector is moderate with gradual growth.

•   There is perceived to be considerable growth potential and opportunities for a lean and flexible organisation like the VCC-3D to grow with, and adapt to, the market.

Strategy
The parent projects of the VCC-3D (3D-COFORM and before that EPOCH) have built up extensive contacts and reputation within the cultural heritage sector. This will be the foundation for the marketing and promotional strategy for the VCC-3D.

Promotion

• The VCC-3D has access to extensive databases within the cultural heritage sector which have been built up over eight years. This is in conjunction with the professional networks that have been built up. This will be one avenue of generating awareness.

• Members of 3D-COFORM regularly take part in conferences, and other tradeshows and industry events which could act as conduits to customers.

• There are also numerous listservers and other mailing lists that could be used to inform customers about the services of the VCC-3D.

• A website has been developed.

• Other mechanisms for advertising will be considered including Google Adwords, and other paid advertising.

The recent 3D-COFORM exhibition provides a window of opportunity for additional visibility that can be exploited for perhaps a year to 18 months and potentially longer as additional materials emerge.

Proposed Location

As the name suggests the VCC-3D is a virtual organization. The plan is to use the virtual office facilities and a presence on the internet using social media for communications with our market sector. This will help to keep costs down.
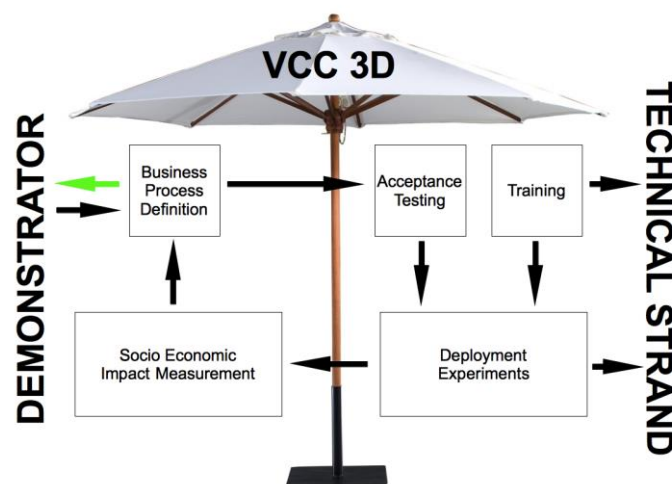
Figure 3: 3D-COFORM Business Cycle

The address of the project public website, if applicable as well as relevant contact details.

www.3d-coform.eu

Contact:

John Clinton

University of Brighton, Watts Building W107

Lewes road, Brighton, UK, BN2 4GJ

E-Mail: J.M.Clinton@brighton.ac.uk

Use and dissemination of foreground

A plan for use and dissemination of foreground (including socio-economic impact and target groups for the results of the research) shall be established at the end of the project. It should, where appropriate, be an update of the initial plan in Annex I for use and dissemination of foreground and be consistent with the report on societal implications on the use and dissemination of foreground (section 4.3 – H).

The plan should consist of:

- Section A

This section should describe the dissemination measures, including any scientific publications relating to foreground. **Its content will be made available in the public domain** thus demonstrating the added-value and positive impact of the project on the European Union.

- Section B

This section should specify the exploitable foreground and provide the plans for exploitation. All these data can be public or confidential; the report must clearly mark non-publishable (confidential) parts that will be treated as such by the Commission. Information under Section B that is not marked as confidential **will be made available in the public domain** thus demonstrating the added-value and positive impact of the project on the European Union.

Section A (public)

NO	Title	Main author	Title of the periodical or the series	Number date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers[1] (if available)	Is/Will open access[2] provided to this publication?
				TEMPLATE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS STARTING WITH THE MOST IMPORTANT ONES						
1	3D-COFORM: Tools and Expertise for 3D Collection Formation	David Arnold	Proceedings of EVA2009 Florence(Eds V Ca ellini and J Hemsley)	28-30th April 2009				94 - 99	ISBN 88-371-1772-8	No
2	Pushing Time-of-Flight scanners to the limit	Marco Callieri	The 10th International Symposium on Virtual Reality	(2009)	Archaeology and Cultural Heritage VAST		2009		10.2312/VAST/VAST09/085-092	No

---

[1] A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view) or to the final manuscript accepted for publication (link to article in repository)

[2] Open Access is defined as free of charge access for anyone via Internet Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards

3	Image-to-Geometry Registration: a Mutual Information Method exploiting Illumination-related Geometric Properties	Massimiliano Corsini	Computer Graphics Forum (proceedings of Pacific Graphics Int Conf)	28(7)			2009	1755-1764	10.1111/j.1467-8659.2009.01552.x	No
4	Color Enhancement for Rapid Prototyping	Paolo Cignoni	The 9th International Symposium on VAST International Symposium on Virtual Reality		Archaeology and Cultural Heritage Eurographics		2008	9-16	10.2312/VAST/VAST08/009-016	No
5	Image guided reconstruction of un-sampled data: a coherent filling for	Matteo Dellepiane	IEEE Workshop on eHeritage and Digital Art Preservatio			Tokio (Japan)	2009	(In press)	10.1007/s11263-010-0382-2	No

	uncomplete Cultural Heritage models		n							
6	Flash Lighting Space Sampling	Matteo Dellepiane	Lecture Notes in Computer Science	Volume 5496	VAST 2009 Best paper selected for publication of an extended version on ACM J Computing and Cultural Heritage		2009	217-229	10.1007/978-3-642-01811-4_20	No
7	Artifacts removal for colour projection on 3D models using flash light	Matteo Dellepiane	10th International Symposium on Virtual Reality Archaeology and Cultural		EG Publishing		2009	77-84	10.2312/VAST/VAST09/077-084	No

			Heritage VAST (2009)							
8	Rome Reborn 2 0: A Framework for Virtual City Reconstructi on Using Procedural Modeling Techniques	Dylla K	in proceeding s of Computer Application s and Quantitativ e Methods in Archaeolog y (CAA)				2009		http://ww w.caa2009. org/CAA20 09_PaperPr ogram03040 09.pdf	No
9	Tracking a Hand Manipulatin g an Object	Henning Hamer	IEEE Internation al Conference on Computer Vision 2009				2009		10.1109/IC CV.2009.54 59282	No
10	A Refletomete r Setup for Spectral BTF Measureme	Daniel Lyssi	In Proceeding s of the 13th Central European				2009		http://cg.cs .uni- bonn.de/en /publicatio ns/paper-	Yes

#	Title	Author	Source	Volume	Publisher		Year	Pages	DOI	
	nt		Seminar on Computer Graphics CESCG 2009						details/lyssi-2009-btfspectral/	
11	Managing Full-text Excavation Data with Semantic Tools	Franco Niccolucci	In VAST: 10th International Symposium on Virtual Reality Archaeology and Intelligent Cultural Heritage (2009) Debattista K Perlingieri C Pitzalis D Spina S (Eds)		Eurographics Association			125–132	10.2312/VAST/VAST09/125-132	No
12	Almost isometric mesh	Nico Pietroni	IEEE Transaction on	Volume 16	(In press)		2010		10.1109/TVCG.2009.96	No

	parameterization through abstract domains		Visualization and Computer Graphics						
13	3D enhanced model from multiple data sources for the analysis of the Cylinder seal of Ibni-Sharrum	Denis Pitzalis	The 9th International Symposium on VAST International Symposium on Virtual Reality		Archaeology and Cultural Heritage Eurographics		2008	79-84	10.2312/VAST/VAST08/079-084	No
14	Web Based Presentation of Semantically Tagged 3D Content for Public Sculptures and Monuments in the UK	Karina Rodriguez-Echavarria	Proceedings of the International Conference on 3D Web Technology				June 16-17th 2009	119-126	10.1145/1559764.1559783	Yes
15	Neighbouring-based	Sebastian	VRIPHYS 09	November 5-6		Karlsruhe	2009		10.2312/PE	No

	linear system for dynamic meshes	Pena Serna				Germany			/vriphys/vriphys09/095-103	
16	In-hand Scanning with Online Loop Closure	Thibaut Weise	IEEE International Workshop on 3-D Digital Imaging and Modeling 2009						10.1109/ICCVW.2009.5457479	No
17	Proceedings of VAST 2010	Alessandro Artusi	11th International Symposium on Virtual Reality		Eurographics Aire-La-Ville	Archaeology and Cultural Heritage	2010			No
18	Geometric morphometrics for provenance determination of Gallo-	Alexandre Bourdeu	In Alessandro Artusi Morwena Joly Genevieve	Proceedings of VAST 2010: 11th International Symposium	Eurographics	Aire-La-Ville		25-32	10.2312/VAST/VAST10/025-031	No

	Roman white clay figurines		Lucet Alejandro Ribes and Denis Pitzalis (eds)	on Virtual Reality Archaeolog y and Cultural Heritage						
19	Seeking the truth in the labyrinth of cultural semantics	Franco Niccolucci	Invited keynote paper in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)	Proceeding s of VAST 2010: 11th Internation al Symposium on Virtual Reality Archaeolog y and Cultural Heritage	Eurographics	Aire-La-Ville		xix-xiv	http://digli b.eg.org/E G/DL/WS/V AST/VAST1 0/0003_nic colucci_key .pdf	No
20	Semantic Enrichment of Geographic Data and 3D Models for the Managemen	Achille Felicetti	In Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro	Proceeding s of VAST 2010: 11th Internation al Symposium on Virtual Reality Archaeolog	Eurographics	Aire-La-Ville		115-122	10.2312/V AST/VAST1 0/115-122	No

	t of Archaeological Features		Ribes and Denis Pitzalis (eds)	y and Cultural Heritage						
21	AnnoMAD: A Semantic Framework for the Management and the Integration of Full-text Excavation Data and Geographic Information	Achille Felicetti	In Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage	Eurographics	Aire-La-Ville		123-130	10.2312/VAST/VAST10/123-130	No
22	Five years after: The London Charter revisited	Franco Niccolucci	In Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and	Eurographics	Aire-La-Ville		vol 2 101-104	10.2312/PE/VAST/VAST10S/101-104	No

			Ribes and Denis Pitzalis (eds)	Cultural Heritage						
23	LIDO and CRMdig from a 3D Cultural Heritage Documentati on Perspective in Alessandro Artusi	Denis Pitzalis	Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)	Proceeding s of VAST 2010: 11th Internation al Symposium on Virtual Reality Archaeolog y and Cultural Heritage	Eurographics	Aire-La-Ville		87-96	10.2312/V AST/VAST1 0/087-095	No
24	Wild-Goat Towards a virtual "Corpus Vasorum" of wild-goat style vessels of museum collections	Uros Damnjanovic					accepted at CAA 2010			No
25	Integrating 3D data	Roberto					accepted at		10.2312/PE /VAST/VAS	No

	acquisition techniques for comprehensi ve study of the ancient Hellenistic-Roman Theatre of Paphos Cyprus	Gabrielli					CAA 2010		T11S/053-056	
26	Finding the Language of Stereoscopic Technologie s for Archaeologic al Sites and Artefacts	Ropertos Georgiou					accepted at CAA 2010			No
27	Evaluation of Acquisition and Post-Processing Pipeline for 3D Models of Ancient Statues	Sorin Hermon					accepted at CAA 2010			No

28	The Hill of Agios Georgios Nicosia:	Sorin Hermon	3D Analysis of an on-going Archaeological Excavation				accepted at CAA 2010			No
29	Arc3D and 3D Laser-Scanning	Sorin Hermon	A comparison of two alternate technologies for 3D data acquisition				accepted at CAA 2010			No
30	Ontologies and Semantic Tools from the Management of Full-text Archaeological Documentation	Franco Niccolucci	Assessments from the Hala Sultan Tekke case-study				accepted at CAA 2010			No
31	3D Documentati	Maria Solomidou-				Cyprus	accepted at			No

	on in Architectural History: A case study of the 16th c Church of Stavros tou Missirikou in Nicosia	Ieronymidou					CAA 2010			
32	3D-COFORM: Making 3D documentation an everyday choice for the Cultural Heritage sector	Jaime Kaminski					accepted at Arqueologica 2 0		http://varjournal.es/doc/varj02_004_08.pdf	Yes
33	Innovative techniques for 3D digital survey of the Paphos theatre	Paola Ronzino				Sydney	XXIV FIG International Congress 2010		http://www.fig.net/pub/fig2010/papers/fs04h/fs04h_ronzino_4350.pdf	Yes

34	Il rilievo 3D del Teatro di Nea Pafos Geocentro 2 (2010) n 10	Paola Ronzino				Fondazione Geometri Italiani Roma	2010	64-68	http://www w.collegio. geometri.vr .it/pdf/201 0/7276_01 5.pdf	Yes
35	Fotogramme tria Aerea Automatica per il rilievo dei Beni Culturali e per l'aggiorname nto di ma e Catastali	Paola Ronzino			(in press)	Cagliari Italia	Convegno Nazionale SIFET 2010			No
36	Assessing the Socio-economic Impact of 3D Visualisation in Cultural Heritage	Jaime Kaminski					2010		10.1007/97 8-3-642-16873-4_18	No
37	Digital Heritage: Third	Marinos Ioannides	Hadjimitsis (eds)	November 8-13 2010		Lemessos Cyprus	EuroMed 2010	240-249		No

	International Conference								
38	3D-ISF: an impact measurement tool for business and strategic planning in ICT and 3d Heritage applications in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)	Jaime Kaminski	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage		Eurographics	Aire-La-Ville	2010	139-146	10.2312/V AST/VAST1 0/139-145	No
39	ICT in Japanese Museums: a Strategic and	Erminia Carillo	Proceedings of VAST 2010: 11th International		Eurographics	Aire-La-Ville	2010	vol 2: Short and Project Papers 95-99	10.2312/PE /VAST/VAS T10S/095-099	Yes

	Contextual Survey in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)		Symposium on Virtual Reality Archaeology and Cultural Heritage							
40	A Repository for 3D Model Production and Interpretation in Culture and Beyond in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and	Martin Doerr	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage		Eurographics	Aire-La-Ville	2010	97-104	10.2312/VAST/VAST10/097-104	No

54

	Denis Pitzalis (eds)									
41	A Distributed Object Repository for Cultural Heritage in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)	Xueming Pan	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage		Eurographics	Aire-La-Ville	2010	105-114		No
42	Procedural Modelling for Digital Cultural Heritage	Simon Haegler			Special Issue of EURASIP Journal on Image and Video Processing		Volume 2009		10.1155/2009/852392	Yes
43	An Object-Dependent Hand Pose Prior from	Henning Hamer					2010		10.1109/CVPR.2010.5540150	No

	Sparse Training Data IEEE Conference on Computer Vision and Pattern Recognition (CVPR'10)									
44	Removing shadows for color projection using sun position estimation in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis	Matteo Dellepiane	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage		Eurographics	Aire-La-Ville	2010	55-62	10.2312/VAST/VAST10/055-062	No

	(eds)									
45	Documenting and Monitoring Small Fractures on Michelangelo's David accepted at CAA2010	Christiane Bathow					2010		http://vcg.isti.cnr.it/ Publications/2010/BBCCDDSS10/CAA_2010_David_Scopigno_final.pdf	Yes
46	Verification and Acceptance Tests for High Definition 3D Surface Scanners in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis	Christiane Bathow	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage		Eurographics	Aire-La-Ville	2010	9-16	10.2312/VAST/VAST10/009-016	No

	(eds)								
47	Mutual Corresponde nces: a hybrid method for image-to-geometry registration	Michele Sottile			Eurographics	Italian Chapter Conference	Nov 2010		10.2312/Lo calChapter Events/Ital Chap/Italia nChapConf 2010/081-088	No
48	Improving 2D-3D registration by mutual information using gradient information	Gianpaolo Palma			Eurographics	Italian Chapter Conference	Nov 2010		10.2312/Lo calChapter Events/Ital Chap/Italia nChapConf 2010/089-094	No
49	Geometry-Aware Video Registration	Gianpaolo Palma				15th International Workshop on Vision Modelling and Visualization	Nov 2010		10.2312/PE /VMV/VMV 10/107-114	No
50	Improved Color Acquisition	Matteo Dellepiane	ACM Journal on Computers				Feb 2010	1-20	10.1145/17 09091.1709 092	No

	and Mapping on 3D Models via Flash-Based Photography		and Cultural Heritage Volume 2 Number 4						
51	Real-time Single Scattering Inside Inhomogene ous Materials	Daniele Bernabei	The Visual Computing (Special issue on CGI 2010 Conference) – 2010				2010		10.1007/s 00371-010-0449-7	No
52	Almost isometric mesh parameteriz ation through abstract domains	Nico Pietroni	IEEE Transaction on Visualizatio n and Computer Graphics Volume 16 Number 4				July/August 2010	621-635	10.1109/TV CG.2009.96	No
53	Feature-aligned T-meshes	Ashish Myles	ACM Transaction s on Graphics	Vol 29(4)			2010		10.1145/18 33349.1778 854	No

			Proceedings of SIGGRAPH 2010							
54	Practical quad mesh simplification	Marco Tarini	Computer Graphics Forum (Special Issue of Eurographics 2010 Conference)	Volume 29 Number 2 407-418					407-418	10.1111/j.1 467-8659.2009. 01610.x	No
55	Controlled and adaptive mesh zippering	Stefano Marras	GRA 2010 - International Conference in Computer Graphics Theory and Applications				2010			http://ugo. sc.unica.it/ papers/Ma rras2010CA M.pdf	Yes
56	Processing sampled 3D	Marco	Digital Imaging for		Taylor and Francis		2010	103-132		http://vcg.i sti.cnr.it/Pu	No

	data: reconstruction and visualization technologies Chapter in F Stanco S Battiato G Gallo (eds)	Callieri	Cultural Heritage Preservation						blications/2011/CDCS11/	
57	Using digital 3D models for study and restoration of Cultural Heritage artefacts	Matteo Dellepiane	Stanco S Battiato G Gallo (eds) Digital Imaging for Cultural Heritage Preservation		Taylor and Francis		2010	39-68		No
58	A framework for User-Assisted Sketch-Based Fitting of Geometric Primitives	Davide Portelli	Proceedings of WSCG the 18th Int Conference on Computer Graphics Visualization and Computer						http://130.203.133.150/viewdoc/summary;jsessionid=48420EB009B6E064363137ACF24ADF04?doi=10.1.1.169.8689	Yes

				Vision							
59	3D Reconstruction from Line Drawings In Institute for Systems and Technologies of Information Control and Communication (INSTICC) VISIGRA 2010	Lars Henning Wendt	Proceedings: International Joint Conference on Computer Vision Imaging and Computer Graphics Theory and Applications [CD-ROM]		INSTICC Press		2010	65-71	http://publica.fraunhofer.de/documents/N-134547.html	Yes
60	High Resolution Acquisition of Detailed Surfaces with Lens-Shifted Structured Light in Alessandro Artusi	Martin Ritz	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural		Eurographics	Aire-La-Ville	2010	1-8	10.2312/VAST/VAST10/001-008	No

	Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)		Heritage							
61	3D-digitisation of the "wild goat" vases in Alessandro Artusi Morwena Joly Genevieve Lucet Alejandro Ribes and Denis Pitzalis (eds)	David Kolin	Proceedings of VAST 2010: 11th International Symposium on Virtual Reality Archaeology and Cultural Heritage		Eurographics	Aire-La-Ville	2010	63-66	10.2312/PE /VAST/VAS T10S/063-066	No
62	Technologies Standards and Business Models for the	Franco Niccolucci			in press	IST-Africa 2010 Conference Proceedings IEEE Xplore	2010		http://ieee xplore.ieee. org/xpl/arti cleDetails.js p?reload=tr ue&arnum	No

No	Title	Author				Place	Date			
	Formation of Virtual Collections of 3D Replicas of Museum Objects: the 3D-COFORM Project In Paul Cunningham and Miriam Cunningham (eds)								ber=5753008&contentType=Conference+Publications	
63	The objects of scholarly information practice invited presentation to the Digital Research Infrastructure for the Arts and Humanities (DARIAH) Experts Forum on	David Arnold				Athens	June 10th 2010			No

	scholarly activity and information processing									
64	Shaping Up: 3D Documentation and Knowledge in Cultural Heritage Invited presentation at "Seeing is Believing: New Technologies for Cultural Heritage " International Society for Knowledge Organisation (ISKO) (UK)	David Arnold				Conference UCL London	June 9th 2010			No
65	3D-COFORM and	David Arnold				invited presentation 6th Meeting	May 19th 2010			No

	Europeana					of the Member States' Expert Group on digitisation and digital preservation				
66	Invited Keynote Technology Based Revolution of Cultural Heritage and Interpretation	David Arnold			eTourism: Horizons		February 10-12 2010			No
67	Invited presentation Interdisciplinary Research Infrastructures in the Eastern Mediterranean at the "Strategic workshop on	Franco Niccolucci				organised by the EUROPEAN SCIENCE FOUNDATION (ESF) - Standing Committee for the Humanities (SCH)	28-29 October 2010			No

	research communities and research infrastructur es in the Humanities"					Strasbourg			
68	Transform and 3d surf for robust three dimensional classification	Jan Knopp				In: ECCV	(2010)		No
69	Orientation Invariant 3D Object Classification using Hough Transform Based Methods	Jan Knopp				In: ACM Multimedia 3DOR	(2010)		Yes
70	Geometric tampering estimation by means of a sift-based forensic	Irene Amerini			IEEE International Conference on Acoustic Speech and Signal Processing	Dallas TX USA	March 14-19 2010	10.1109/IC ASSP.2010. 5495485	No

	analysis				ICASSP 2010				
71	Fast Image Clustering of Unknown Source Images	Roberto Caldelli			IEEE Workshop on Image Forensics and Security WIFS	Seattle WA USA	12-15 December 2010		10.1109/W IFS.2010.57 11454	No
72	Tracking a Hand Manipulatin g an Object	Henning Hamer			IEEE International Conference on Computer Vision 2009		2009		10.1109/IC CV.2009.54 59282	No
73	An Object-Dependent Hand Pose Prior from Sparse Training Data	Henning Hamer			IEEE International Conference on Computer Vision and Pattern Recognition		2010		10.1109/CV PR.2010.55 40150	No
74	Tools for Virtual Reassembly of Fresco Fragments	Benedict J Brown			Seventh International Conference on Science and Technology in Archaeology and	Petra	December 2010			No

					Conservations							
75	Groundtruth Data for Multispectral Bidirectional Texture Functions	M Rump	In proceedings of CGIV					2010	326-330	http://www.imaging.org/IST/store/epub.cfm?abstrid=43992	No	
76	Spectralization: Reconstructing spectra from sparse data	M Rump	In proceedings of EGSR '10 Rendering Techniques						1347-1354	10.1111/j.1467-8659.2010.01730.x	No	
77	A Comparison and Evaluation of Multi-View Stereo Reconstruction Algorithms	Seitz S M	CVPR 2006 vol 1						519-526		No	

78	3D Texture Recognition Using Bidirectional Feature Histograms	O Cula	International Journal of Computer Vision Vol 59	No 1			2004		http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.83.6620	No
79	Heightfield and spatially varying BRDF Reconstruction for Materials with Interreflections	R Ruiters	Computer Graphics Forum	28 (2)				513-522	http://diglib.eg.org/EG/DL/CGF/volume28/issue2/PDF/v28i2pp513-522.pdf	Yes
80	Efficient Level-of-Detail Methods for Procedural Building	Dennis Lorson	Master Thesis		ESAT	Katholieke Universiteit Leuven Belgium;	2009			No

	Models								
81	Grammar-Based Encoding of Facades	Simon Haegler			Presented at "21st Eurographics Symposium on Rendering 2010" (EGSR)	Saarbruecken Germany	2010		10.1111/j.1467-8659.2010.01745.x	No
82	Semantic Fitting and Reconstruction	Ullrich T	Journal on Computing and Cultural Heritage	1(2)			2008		10.1145/1434763.1434769	No
83	The Meaning of Shape and some Techniques to Extract It	Sven Havemann			Multimedia Information Extraction					No
84	Integrated High-Quality Acquisition of Geometry and	Christopher Schwartz	In Proceedings of The 12th Internation		Eurographics Association	Prato Italy	2011	25-32	10.2312/VAST/VAST11/025-032	No

	Appearance for Cultural Heritage		al Symposium on Virtual Reality Archaeology and Cultural Heritage VAST 2011							
85	WebGL-based Streaming and Presentation Framework for Bidirectional Texture Functions	Christopher Schwartz	In Proceedings of The 12th International Symposium on Virtual Reality Archaeology and Cultural Heritage VAST 2011		Eurographics Association	Prato Italy	2011	113-120		No
86	A Multi-Camera Multi-	Michael Weinmann	Modelling Processing Visualizatio		IEEE Computer Society's Conference	2011 International	2011	397-404	10.1109/3D IMPVT.201 1.57	No

	Projector Super-Resolution Framework for Structured Light in Proceedings of 3D Imaging		n and Transmission (3DIMPVT)		Publishing Services	Conference				
87	Capturing Shape and Reflectance of Food in proceedings of ACM	Christopher Schwartz			SIGGRAPH ASIA 2011: Sketches	Hong Kong China	(forthcoming 2011)		10.1145/2077378.2077413	No
88	Flow-Based Local Optimization for Image-to-Geometry Projection	Matteo Dellepiane	IEEE Transactions on Visualization and Computer Graphics				2011/12		10.1109/TVCG.2011.75	No
89	A Streaming Framework for Seamless	Ruggero Pintus			Proceedings of Eurographics Conference -		April 2011		http://diglib.eg.org/EG/DL/conf/	No

	Detailed Photo Blending on Massive Point Clouds				Cultural Heritage Papers - April 2011				EG2011/areas/PDF/025-032.pdf	
90	A Public System for Image Based 3D Model Generation Computer Vision/Computer Graphics Collaboration Techniques	David Tingdahl	Proceedings Lecture Notes in Computer Science	Volume 6930 2011 262-273	5th International Conference MIRAGE 2011	Rocquencourt France	October 10-11 2011		http://dl.acm.org/citation.cfm?id=2050343	No
91	Automatic Texturing without Illumination Artefacts from In-Hand Scanning	Frederic Larue			(in press) -	International Workshop on Multimedia for Cultural Heritage (MM4CH)	April 2011		http://vcg.isti.cnr.it/Publications/2011/LDHS11/InHandScanning.pdf	Yes
92	Improving High-Speed	Frederic Larue	VAST (Short	25-28			2011		10.2312/PE/VAST/VAST11S/025-	No

#	Title	Author	Journal	Volume		Venue	Date	Pages/Report	DOI/Link	Access
	Scanning Systems by Photometric Stereo Archaeology and Cultural Heritage		papers): The 11th International Symposium on Virtual Reality						028	
93	A compact and editable representation for measured BRDFs	Roland Ruiters				University of Bonn	December 2010	Technical Report number CG-2010-1		Yes
94	Non-Local Image Reconstruction for Efficient BTF Synthesis	Kai Schröder				ACM SIGGRAPH ASIA 2011 Sketches	December 2011		10.1145/2077378.2077416	No
95	3D models for Cultural Heritage: beyond plain visualization	Roberto Scopigno	IEEE Computer	Volume 44 Number 7			July 2011	48-55	10.1109/MC.2011.196	No
96	Processing a Complex	Marco Callieri					2011		http://130.203.133.150/viewdoc/	Yes

	Architectural Sampling with MeshLab: the case of Piazza Della Signoria Proceedings of 3D-ARCH 2011								summary?doi=10.1.1.230.3432
97	OCME: out-of-core Mesh Editing Made Practical	Fabio Ganovelli	IEEE Computer Graphics and Application	Volume 31 Number 2 - April 2011			2011		10.1109/MCG.2011.49	No
98	3D-centred media linking and semantic enrichment through integrated searching browsing viewing and annotating	Sebastian Pena Serna			In VAST11: The 12th International Symposium on Virtual Reality Archaeology and Intelligent Cultural Heritage	Prato Italy	(2011)		10.2312/VAST/VAST11/089-096	No

99	Considerations toward a Dynamic Mesh Data Structure	Sebastian Pena Serna			SIGRAD 2011: Eurographics Swedish Chapter Conference	Stockholm Sweden	November 17–18 2011		http://www.ep.liu.se/ecp/065/012/ecp11065012.pdf	Yes
100	Procedural 3D Building Reconstruction using Shape Grammars and Detectors 3DIMPVT 2011	M Mathias					2011		10.1109/3DIMPVT.2011.45	No
101	Automatic architectural style recognition 3D-ARCH 2011	M Mathias					2011		http://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXVIII-5-W16/171/2011/isprsarchives-XXXVIII-5-W16-171-	Yes

								2011.pdf	
102	Metadata And Tools For Integration And Preservation Of Cultural Heritage 3D Information	Achille Felicetti			23rd International CIPA Symposium	Prague Czech Republic	September 12 - 16 2011		http://cipa.icomos.org /fileadmin/ template/d oc/PRAGUE /051.pdf	Yes
103	A Repository for Heterogene ous and Complex Digital Cultural Objects	Achille Felicetti			VAST2011: The 12th International Symposium on Virtual Reality Archaeology and Intelligent Cultural Heritage	Prato Italy	October 18th-21st 2011		10.2312/V AST/VAST 11/081-087	No
104	Hough Transform and 3D SURF for three dimensional classification	Jan Knopp			In IEEE ECCV	Chersonissos	2010		http://dl.ac m.org/citati on.cfm?id= 1888212.18 88257	No
105	Orientation invariant 3D	Jan Knopp			Multimedia Workshop on 3D	Firenze	2010		10.1145/18 77808.1877 813	Yes

	object classification using Hough Transform based methods In ACM				Object Retrieval					
106	Scene Cut: Class-specific Object Detection and Segmentation in 3D Scenes In 3DIMPVT	Jan Knopp				Hangzhou	2011		10.1109/3D IMPVT.2011.30	No
107	3D-centered media linking and semantic enrichment through integrated searching browsing viewing and	Sebastian Pena Serna			In VAST11: The 12th International Symposium on Virtual Reality Archaeology and Intelligent Cultural Heritage (	Prato Italy	2011		10.2312/V AST/VAST11/089-096	No

									No
	annotating								
108	Aligning archive maps and extracting footprints for analysis of historic urban environments	Stephen Laycock	Computers and Graphics	vol 35				242-249	10.1016/j.c ag.2011.01. 002	No
109	Genetic B-Spline Approximati on on Combined B-reps	Bein M			CGI'11: Computer Graphics International conference	Ottawa Ontario Canada	June 12-15 2011		10.1007/s0 0371-011-0592-9	No
110	3D models for Cultural Heritage: beyond plain visualization	Roberto Scopigno	IEEE Computer	Volume 44 Number 7			July 2011	48-55	10.1109/M C.2011.196	No

111	Modelli digitali 3D per il su orto al restauro: riassemblagg io digitale e ricostruzione virtuale	Callieri M		74 - 82	Lucia Arbace Elisabetta Sonnino (eds)	Pescara Italy: Edizioni ZIP	2011 (text in Italian and English)			No
112	Usability Evaluation of a Prototype iPhone App for Osaka Castle Museum: Outcomes and Reflections	Erminia Carillo	Short and Project Papers Proceeding s	65-68	VAST 2011 The 12th International Symposium on Virtual Reality Archaeology and Cultural Heritage	Prato Italy	October 18 – 21		10.2312/PE /VAST/VAS T11S/065- 068	No
113	Using Procedural Modelling as a framework for Representin	Erica Calogero	Cultural Heritage Area Papers	41-48	EUROGRAPHICS		2011		http://digli b.eg.org/E G/DL/conf/ EG2011/ar eas/PDF/04 1-048.pdf	Yes

	g Style: An Example from Regency Architecture								
114	Generating Alternative Proposals for the Louvre Using Procedural Modelling	Erica Calogero	International Archives of Photogram metry Remote Sensing and Spatial Informatio n Sciences	Volume XXXVIII-5/W16	Proceedings of the 4th ISPRS International Workshop; 3D-ARCH 2011: "3D Virtual Reconstruction and Visualization of Complex Architectures"	Trento Italy	2-4 March 2011		http://ww w.int-arch-photogram m-remote-sens-spatial-inf-sci.net/XXX VIII-5-W16/185/2 011/isprsar chives-XXXVIII-5-W16-185-2011.pdf	Yes
115	MeshLab and ARC 3D: Photo-reconstructi on and processing 3D meshes: Evaluating usability assessment methods for Web based	Paolo Cignoni	in Arnold D Van Gool L Niccolucci F and Pletinckx D (eds)	61-66	EPOCH/3D COFORM publication	Open digital cultural heritage systems conference Archaeolingu a: Budapest	2011			No

	cultural heritage Applications								
116	A multi-level approach to the study of the socio-economic impact of ICT at cultural heritage sites EPOCH/3D COFORM publication	Jim McLoughlin	in Arnold D Van Gool L Niccolucci F and Pletinckx D (eds)	85-91	Open digital cultural heritage systems conference	Archaeolingua: Budapest	2011			No
117	Open digital cultural heritage systems conference (edited book)	David Arnold			EPOCH/3D COFORM publication	Archaeolingua: Budapest	(2011)			No

| 118 | Research Infrastructures in the Digital Humanities | David Arnold | | | European Science Foundation Science Policy Briefing 42 European Science Foundation | | September 2011 ISBN: 978-2-918428-50-3 44 | | | No |
| 119 | ICTs for Cultural Heritage Introduction (10-11) to and Guest Editors for the Special Theme of ERCIM News: Issue 86 European Research Consortium for Informatics and Mathematics (July 2011) Section 10-51 Keynote | David Arnold | | | Circulation ~12 000 copies including all MEPs etc | | 2011 | 10-11 | | No |

	article ICT and Cultural Heritage: Research Innovation and Policy by Khalil Rouhana Director Digital Content & Cognitive Systems European Commission DG Information Society and Media 29 articles accepted from 52 submissions								
120	3D-COFORM: A Large-Scale Digital Production Environment	Tzompanaki K			ERCIM News 86		July 2011		No

121	A New Framework for Querying Semantic Networks	Tzompanaki K			TECHNICAL REPORT: ICS-FORTH/TR-419		May 2011		http://www.ics.forth.gr/tech-reports/2011/2011.TR419_Querying_Semantic_Networks.pdf	Yes
122	A generic digital provenance model for scientific observation	Martin Doerr			Ta '11 3rd USENIX Workshop on the Theory and Practice of ProvenanceHeraklion	Crete Greece	June 20-21 2011		http://static.usenix.org/event/tapp11/tech/final_files/Doerr.pdf	Yes
123	A Distributed Object Repository for Cultural Heritage Proc The 11th Intern Symp on Virtual Reality	Pan X	Archaeology and Cultural Heritage (VAST 2010)		Eurographics Press		2010	105–114	10.2312/VAST/VAST10/105-114	No

124	Fundamental Categories and Relationships for Intuitive querying CIDOC-CRM based repositories	Tzompanaki K				TECHNICAL REPORT: ICS-FORTH/TR-429	2012		http://www.cidoc-crm.org/docs/TechnicalReport429_April2012.pdf	Yes
125	A New Framework For Querying Semantic Networks	Tzompanaki K			Museums and the Web 2012: the international conference for culture and heritage on-line	San Diego CA USA	April 11-14 2012		http://www.museumsandtheweb.com/mw2012/papers/a_new_framework_for_querying_semantic_networks	Yes
126	3D-centered media linking and semantic enrichment through integrated searching browsing viewing and	Sebastian Peña Serna	Proceedings of VAST11: The 12th International Symposium on Virtual Reality Archaeolog			Prato Italy	October 18-21 2011		10.2312/VAST/VAST11/089-096	No

	annotating		y and Intelligent Cultural Heritage							
127	A Design and Implementation of a tool for formulating recall-oriented structured queries on semantic networks	Tzompanaki	Master of Science Thesis		Department of Computer Science University of Crete	Crete	September 2012			No
128	A scalable repository infrastructure for CH digital object management	Pan X			In 18th International Conference on Virtual Systems and Multimedia (VSMM) IEEEXplore digital library	(Milan Italy	Sept 2012		10.1109/VSMM.2012.6365928	No

129	A generic approach for generating cultural heritage metadata	Schrottner M			In 4th International Euro-Mediterranean Conference on Digital Heritage (EuroMed) Springer LNCS (in press)	Limassol Cyprus	Oct 2012		10.1007/978-3-642-34234-9_23	No
130	An enhanced distributed repository for working with 3D assets in cultural heritage	Pan X			In 4th International Euro-Mediterranean Conference on Digital Heritage (EuroMed) Springer LNCS (in press)	(Limassol Cyprus	Oct 2012)		10.1007/978-3-642-34234-9_35	No
131	From the Digitization of Cultural Artifacts to the Web Publishing of Digital 3D	Frederic Larue	Journal of Multimedia	Volume 7 Number 2			May 2012	132-144	10.4304/jmm.7.2.132-144	No

	Collections: an Automatic Pipeline for Knowledge Sharing									
132	Fusing Structured Light Consistency and Helmholtz Normals for 3D Reconstructi on	Michael Weinmann				Proceedings of the British Machine Vision Conference 2012	Sep 2012		10.5244/C. 26	No
133	Acquisition and Presentation of Virtual Surrogates for Cultural Heritage Artefacts	Christopher Schwartz				Workshop proceedings of the EVA Berlin 2012	Nov 2012		http://cg.cs .uni-bonn.de/en /publicatio ns/paper-details/sch wartz-2012-virtualsurro gates/	Yes
134	Telling The Story Of Ancient	Gianpaolo Palma				CAA	2012			No

	Coins By Means Of Interactive RTI Images Visualization									
135	Insourcing outsourcing and crowdsourcing 3D collection formation: perspectives for cultural heritage	Jaime Kaminski				VAST	2012		10.2312/VAST/VAST12/081-088	No
136	Base materials for Photometric stereo	David Tingdahl				ECCV workshop Color and Photometry in Computer Vision CPCV	2012		10.1007/978-3-642-33868-7_35	No
137	Multiview	Aljosa Osep				Proceedings	April 2012		http://www.cescg.org	Yes

	Normal Field Integration using Graph-Cuts					of the 16th Central European Seminar on Computer Graphics (CESCG 2012)			/CESCG-2012/papers/Osep-Multiview_Normal_Field_Integration_using_Graph-Cuts.pdf	
138	A Statistical Method for SVBRDF Approximation from Video Sequences in General Lighting Conditions	Gianpaolo Palma	Computer Graphics Forum (Issue of Eurographics Symposium on Rendering 2012)	Volume 31 Number 4				1491-1500 – 2012	10.1111/j.1467-8659.2012.03145.x	No
139	Example-based Interpolation and Synthesis of Bidirectional Texture Functions	Roland Ruiters			submitted to Eurographics 2013		2013			No

140	A Low-Memory Straightforward and Fast Bilateral Filter Through Subsampling in Spatial Domain	Francesco Banterle	Computer Graphics Forum	Volume 31 (2012) number 1				19–32	10.1111/j.1 467-8659.2011. 02078.x	No
141	Archeological excavation monitoring using dense stereo matching techniques	Matteo Dellepiane			accepted for publication on Journal of Cultural Heritage Elsevier	Volume available online	2012		10.1016/j.c ulher.2012. 01.011	No
142	OCME: out-of-core Mesh Editing Made Practical	Fabio Ganovelli	IEEE Computer Graphics and Applications	Volume 32 Number 3			May/June 2012	46-58 -	10.1109/M CG.2011.49	No

143	MeshLab as a complete open tool for the integration of photos and color with high-resolution 3D geometry data	Marco Callieri					CAA 2012 Conference Southampton (UK)	2012			No
144	Semantically rich 3D documentation for the preservation of tangible heritage	Karina Rodriguez-Echavarria	VAST 2012: The 13th International Symposium on Virtual Reality Archaeology and Intelligent Cultural Heritage					2012		10.2312/V AST/VAST1 2/041-048	No
145	Interactive Semantic Enrichment	Sebastian Pena Serna	VAST 2012: The 13th International							10.2312/V AST/VAST1 2/033-040	No

	of 3D Cultural Heritage Collections		al Symposium on Virtual Reality Archaeolog y and Intelligent Cultural Heritage						
146	Exploring and Enriching 3D Cultural Heritage Collections	Sebastian Pena Serna		In submission process to ACM Journal on Computing and Cultural Heritage					No
147	A Three-Layered Approach to Facade Parsing	A Martinovic			European Conference on Computer Vision 2012 Florence (Italy)	Oct 7-13 2012		10.1007/97 8-3-642-33786-4_31	No
148	Learning Domain Knowledge for Facade	D Dai			Florence (Italy)	Oct 7-13 2012		10.1007/97 8-3-642-33718-5_51	No

	Parsing European Conference on Computer Vision 2012							
149	Semantically rich 3D documentation for the preservation of tangible heritage	Karina Rodriguez-Echavarria	Accepted at VAST 2012: The 13th International Symposium on Virtual Reality Archaeology and Intelligent Cultural Heritage						No
150	Interactive Semantic Enrichment of 3D Cultural Heritage	Sebastian Pena Serna	Accepted at VAST 2012: The 13th International al Symposium						No

	Collections		on Virtual Reality Archaeology and Intelligent Cultural Heritage							
151	Exploring and Enriching 3D Cultural Heritage Collections	Sebastian Pena Serna	In submission process to ACM Journal on Computing and Cultural Heritage							No
152	PhotoCloud: realtime web-based interactive exploration of large mixed 2D-3D datasets	P Brivio	IEEE Computer Graphics and Applications	Vol 32			2012		http://doi.ieeecomputersociety.org/10.1109/MCG.2012.92	No

153	PileBars: Scalable Dynamic Thumbnail Bars	P Brivio			Submitted to VAST 2012 Brighton (UK) 2012				10.2312/VAST/VAST12/049-056	Yes
154	Hough Transform and 3D SURF for three dimensional classification	Jan Knopp			In IEEE ECCV Chersonissos		2010		http://dl.acm.org/citation.cfm?id=1888257	No
155	Orientation invariant 3D object classification using Hough Transform based methods	Jan Knopp				In ACM Multimedia Workshop on 3D Object Retrieval Firenze	2010		10.1145/1877808.1877813	Yes
156	Scene Cut: Class-specific Object Detection and	Jan Knopp			In 3DIMPVT	Hangzhou	2011		10.1109/3DIMPVT.2011.30	No

	Segmentatio n in 3D Scenes									
157	Class-specific 3D Localization using Constellatio ns of Object	Mukta Prasad			In BMVC	PartsDundee	2011		10.5244/C. 25.34	Yes
158	Material Recognition: Bayesian Inference or SVMs?	Ishrat Badami			In proceedings of Central European Seminar on Computer Graphics for Students		April 2012		http://cg.cs .uni-bonn.de/ai gaion2root /attachmen ts/Badami-Material_R ecognition_ Bayesian_I nference_o r_SVMs.pdf - c36eeeaea 5c6b46485 8731d473a 63c83.pdf	Yes
159	Incorporatin g Uncertainty in procedural	D Dai			Submitted to ACM Journal on Computing and Cultural Heritage					No

	modelling									
160	Vectorising Building Footprints From Historic Maps	Philip Brown			Accepted to VAST 2012		2012		10.2312/V AST/VAST1 2/017-024	No
161	Digital Cultural Heritage Objects by Sketching Subdivision Surfaces toward Restoration Planning	Bein M				Accepted at EUROMED 2012: International Conference on Cultural Heritage	2012		10.1007/97 8-3-642-34234-9_30	No
162	A new approach for interactive procedural modelling in cultural heritage	R Zmugg			In Proceedings of the 40th Conference of Computer Applications and Quantitative Methods in Archaeology	CAA	2012			No

163	Authoring animated interactive 3D Museum Exhibits using a Digital Repository	R Zmugg			Accepted at VAST 2012		2012		10.2312/VAST/VAST12/073-080	No
164	A practical framework for assembling fragmented objects	Gregorio Palmas			paper submitted to IEEE Computer Graphics and Applications on August 2012		Submitted August 2012			No
165	Innovative uses of 3D digital technologies to assist the restoration of a fragmented terracotta statue"	Lucia Arbace			Journal of Cultural Heritage	Elsevier	2012		10.1016/j.culher.2012.06.008	No
166	High Resolution	M Ritz	Computers & Graphics	Vol 36 1			2012	16-27	10.1016/j.cag.2011.10.004	No

	Acquisition of Detailed Surfaces with Lens-Shifted Structured Light								
167	Integrated High-Quality Acquisition of Geometry and Appearance for Cultural Heritage	Christopher Schwartz	Proceedings of VAST 2011				Oct 2011	25-32	10.2312/VAST/VAST11/025-032	No
168	WebGL-based Streaming and Presentation Framework for Bidirectional Texture Functions	Christopher Schwartz	Proceedings of VAST 2011				Oct 2011	113-120	10.2312/VAST/VAST11/113-120	No

169	CENOBIUM – A Project for the Multimedia Representation of Romanesque Cloister Capitals in the Mediterranean Region	Ute Dercks				EVA Berlin (Germany)	7-9 November 2012			No
170	Telling The Story Of Ancient Coins By Means Of Interactive RTI Images Visualization	Gianpaolo Palma				CAA 2012 Conference Proceedings Southampton (UK)	2012			No

NO.	Type of activities[3]	Main leader	Title	Date/Period	Place	Type of audience[4]	Size of audience	Countries addressed
						TEMPLATE A2: LIST OF DISSEMINATION ACTIVITIES		
1	Conference	Roberto Scopigno	VAST 2008	02 – 06 Dec 2008	Braga, Portugal	Scientific community	100	
2	Conference	David Arnold	EVA Florence 2009	28-30 April 2009	Florence, Italy	Scientific community		
3	Conference	Franco Niccolucci	CAARI workshop	21 June 2009	Nicosia, Cyprus	Scientific community	150	Cyprus
4	Conference	Franco Niccolucci	IFLA World Conference	23-27 August 2009	Milano, Italy	Scientific community	150	International al
5	Conference	Franco Niccolucci	VSMM 2009	9-12 September 2009	Vienna, Austria	Scientific community	100	
6	Conference	Albert Gauthier / Denis Pitzalis / Christian Naffah	VAST 2009	22-25 September 2009	La Malletta, Malta	Scientific community	100	Austria, Belgium, Cyprus, France, Germany, Greece, Italy, Switzerland and UK
7	Conference		Researchers	25th September		Civil Society		

---

[3] Please choose the dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.

[4] Please choose the type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other ('multiple choices' is possible).

#	Type	Person	Event	Date	Location	Target audience	Number	Region
			Night	2009				
8	Conference	Sorin Hermon	EVA Jerusalem	10-11 November 2009		Scientific community		
9	Conference	Jim McLoughlin / Dr Jaime Kaminski	BMTA 2009	19-22 November 2009	Paestum, Italy	Scientific community, Industry, Media	10,000 visitors	Mediterranean region
10	Workshop		Sector Advisory Board	25 February 2009	Paris	Industry		
11	Workshop	Franco Nicolucci	Focus Group with museum managers	24-25 April 2009		Industry	4	Krakow, Vienna, Roma
12	Workshop		Victoria & Albert Museum	14 May 2009	London	Industry		
13	Workshop	Franco Nicolucci	University of Naples "L'Orientale"	25 May 2009	Naples, Italy	Scientific community,		
14	Workshop	Sorin Hermon	Bezalel Academy of Arts & Design,	6 September 2009	Jerusalem	Scientific community,	80	
15	Workshop	Sorin Hermon	Lund University	15 & 16 October 2009		Scientific community		
16	Workshop	Franco Niccolucci/ Prof Talal Akasheh	Amman	10 November 2009	Amman, Jordan	Scientific community, Industry		
17	Workshop		UNESCO Experts	10-12 November 2009	Nicosia	Scientific community,		Corfu, Kefallonia, Crete and the Cyclades Islands
18	Website		Project Presentation	2009	Available for download from Website www.3d-coform-eu	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other		
19	Leaflet		Project Leaflet	2009	Printed copies.	Scientific Community (higher education,		

					Research), Industry, Civil Society, Policy makers, Medias, Other		
20			*Project Poster*		*Displayed at Exhibitions & Events*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	
	Poster			*2009*			
21						Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	
	Video & Slideshow			*2009*			
22			*ICOM Site*		*Web page in different languages. Paper & electronic format.*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*Including: English, German and French*
	Press Release			*2009*			
23			*National newspaper Libero*		*Electronic edition*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*Italian*
	Press Release			*2009*			
24			*Gazzetta del Mezzogiorno*		*Electronic edition*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*Italian*
	Press Release			*2009*			
25			*official press agency ANSA*			Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*Italian, Spanish, Catalan, Slovenian, Greek, Russian*
	Press Release			*2009*			
26			*Japanese news*			Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*Japanese*
	Press Release			*2009*			
27			*Egypt news*			Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*Arabic*
	Press Release			*2009*			
28			*Article concerning 3D scanning activity for archaeological documentation*		*Cyprus Mail*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*In English*
	Article in Popular Press			*2009*			
29			*Article concerning 3D scanning*		*Simerini newspaper*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	
	Article in Popular Press			*2009*			

			activity for archaeological documentation					
30	*Article in Popular Press*		*Article on the CAARI presentation*	*2009*	*Cyprus Weekly (magazine)*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other		*In English*
31	*Media*	*Franco Niccolucci and Kirsi Lorentz of CyI*	*TV Interview*	*10-12 November 2009 (Coincided with the Workshop UNESCO Experts)*		Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other		
32	*Media*	*Kirsi Lorentz*	*TV Interview 3D scanning*	*16 April 2009*	*Cypriot prime-time talk show (Apo Mera Se Mera)*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other		*Cyprus*
33	*Media*		*Radio Interviews*	*2009*	*Released to German and Italian Radio stations*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other		
34	*Publication*	*David Arnold*	*"3D-COFORM: Tools and Expertise for 3D Collection Formation Proceedings of EVA2009 Florence (Eds. V. Cappellini and J. Hemsley),*	*28-30th April 2009,*	*ISBN 88-371-1772-8 (pp 94 - 99)*	Scientific Community		
35	*Publication*	*Marco Callieri*	*Pushing Time-of-Flight scanners to the limit*	*2009*	*The 10th International Symposium on Virtual Reality, Archaeology and Cultural Heritage VAST*	Scientific Community		
36	*Publication*	*Massimiliano Corsini*	*Image-to-Geometry Registration: a*	*2009*	*Computer Graphics Forum (proceedings of*	Scientific Community		

			Mutual Information Method exploiting Illumination-related Geometric Properties		*Pacific Graphics Int. Conf.), 28(7), pp.1755-1764,*			
37	*Publication*	*Paolo Cignoni*	*Color Enhancement for Rapid Prototyping",*	*2008*	*The 9th International Symposium on VAST International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, pp.9-16,*	Scientific Community		
38	*Publication*	*Matteo Dellepiane*	*Image guided reconstruction of un-sampled data: a coherent filling for uncomplete Cultural Heritage models",*	*2009*	*IEEE Workshop on eHeritage and Digital Art Preservation, Tokio (Japan) page: (In press),*	Scientific Community		
39	*Publication*	*Matteo Dellepiane*	*Artifacts removal for colour projection on 3D models using flash light*	*2009*	*10th International Symposium on Virtual Reality, Archaeology and Cultural Heritage VAST (2009), EG Publishing, pp.77-84, (VAST 2009 Best paper, selected for*	Scientific Community		

					publication of an extended version on ACM J. Computing and Cultural Heritage)		
40	*Publication*	*Dylla K.*	*Rome Reborn 2.0: A Framework for Virtual City Reconstruction Using Procedural Modeling Techniques",*	*2009*	*in proceedings of Computer Applications and Quantitative Methods in Archaeology (CAA), 2009.*	Scientific Community	
41	*Publication*	*Henning Hamer*	*Tracking a Hand Manipulating an Object*	*2009*	*IEEE International Conference on Computer Vision*	Scientific Community	
42	*Publication*	*Daniel Lyssi,*	*A Refletometer Setup for Spectral BTF Measurement*	*2009*	*In Proceedings of the 13th Central European Seminar on Computer Graphics CESCG*	Scientific Community	
43	*Publication*	*Niccolucci F.*	*Managing Full-text Excavation Data with Semantic Tools".*	*2009*	*In VAST: 10th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage (2009), Debattista K., Perlingieri C., Pitzalis D., Spina S., (Eds.), Eurographics Association, pp. 125–132.*	Scientific Community	
44	*Publication*	*Nico Pietroni*	*"Almost isometric mesh*	*2008*	*IEEE Transaction on Visualization and Computer*	Scientific Community	

			parameterizati on through abstract domains",		*Graphics, Volume 16, (In press), 2010.*		
45	*Publication*	*Denis Pitzalis*	*3D enhanced model from multiple data sources for the analysis of the Cylinder seal of Ibni-Sharrum",*	*2008*	*The 9th International Symposium on VAST International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics , page 79-84*	Scientific Community	
46	*Publication*	*Karina Rodriguez-Echavarria*	*Web Based Presentation of Semantically Tagged 3D Content for Public Sculptures and Monuments in the UK*	*June 16-17th 2009*	*Proceedings of the International Conference on 3D Web Technology, (pp. 119-126)*	Scientific Community	
47	*Publication*	*Pena Serna S.*	*"Neighboring-based linear system for dynamic meshes",*	*November 5-6, 2009,*	*VRIPHYS 09, Karlsruhe, Germany.*	Scientific Community	
48	*Publication*	*Matteo Dellepiane*	*"Flash Lighting Space Sampling",*	*2009*	*Lecture Notes in Computer Science, Volume 5496, page 217-229,*	Scientific Community	
49	*Publication*	*Thibaut Weise*	*"In-hand Scanning with Online Loop Closure",*	*2009*	*IEEE International Workshop on 3-D Digital Imaging and Modeling*	Scientific Community	
50	*Conference*	*Dieter*	*Focus-K3D*	*11-12 February*	*Sophia-Antipolis,*	Scientific Community	

		Fellner	project	2010	France.			
51	*Conference*	*David Arnold*	*ENTER2010 eTourism: Horizons*	*10-12 February 2010*	*Lugano*	*Scientific Community and government representatives*		
52	*Conference*	*Roberto Scopigno*	*CAA2010 (Computer Applications and Quantitative Methods in Archaeology)*	*6-9 April 2010*	*Granada Spain*	*Scientific Community*	*150*	
53	*Conference*		*EVA Florence*	*21-25 April 2010*	*Florence, Italy*	Scientific Community	**Effected by Icelandic volcano.*	
54	*Conference*		*Heritage Impact Conference*	*22-23 April 2010*	*Brighton, UK*	*Scientific Community, Industry*	** Effected by Icelandic Volcano*	
55	*Conference*	*Roberto Scopigno*	*Stachem International Conference*	*26-28 April 2010*	*Nicosia, Cyprus*	*Scientific Community, Industry*	*90*	*Eastern Mediterran ean region*
56	*Conference*	*Franco Niccolucci*	*IST-Africa International Conference*	*19-21 May 2010*	*Durban, South Africa*	*Scientific Community, Industry*	*30*	*Africa and from Europe,*
57	*Conference*	*Denis Pitzalis*	*SEEDI Conference*	*19-20 May 2010*	*Sarajevo, Bosnia y Herzegovina*	Scientific Community		
58	*Conference*	*David Arnold*	*Sixth Meeting of Member States Expert Group on digitisation & digital preservation*	*19 May 2010*	*Luxembourg*	*Scientific Community and government representatives*		
59	*Conference*	*David Arnold*	*International Society for knowledge Organisation (ISKO) UK*	*9 July 2010*	*UCL, London*	*Scientific Community*		

60	*Conference*	*Denis Pitzalis, Franco Niccolucci*	*Arqueologica*	*16-19 June 2010*	*Sevilla, Spain*	*Scientific Community, Industry*		*Spain*
61	*Conference*	*David Arnold*	*Digital Research Infrastructure for the Arts and Humanities (DARIAH)*	*10 June 2010*	*Athens*	*Scientific Community, Industry*		*European*
62	*Conference*	*Heinz Rüther, Franco Niccolucci and Albert Gauthier*	*VAST*	*21-24 September 2010*	*Paris, France*	*Scientific Community*	*120*	
63	*Conference*		*The Researchers Night*	*24 September 2010*	*Limassol, Cyprus*	*Scientific Community, Civil Society*		
64	*Conference*	*Jaime Kaminski*	*EuroMed*	*8-13 November 2010*	*Limassol, Cyprus*	*Scientific Community*		
65	*Conference*	*Franco Niccolucci / David Arnold*	*ESF invited workshop, Research Communities & Research Infrastructures in the Humanitites*	*29-30 October 2010*	*Strasbourg, France*	*Scientific Community, Industry*	*45*	
66	*Conference*		*ICT conference & Exhibition*	*27-29 September 2010*	*Brussels*	*Scientific Community, Industry*	*Over 6000 visitors 1257 leaflets were distributed as well as 378 USB sticks.*	
68	*Other*	*David*	*Sector*	*21 September*	*Held during the*	*Scientific Community, Industry,*	*18*	

		Arnold / James Stevenson / Andre Stork / Roberto Scopigno / Sven Havemann / Martin Doerr / Franco Niccolucci	*Advisory Board (SAB)*	*2010*	*VAST conference, Paris*			
69	*Media*	*Euronews*	*3D-COFORM ten minute documentary*	*9 – 12th September 2010 (broadcast 10 times)*	*Filmed in Crete, Belgium and Paris. Available of the project website*	Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other	*121 countries worldwide to 193 million homes.*	*Euronews broadcasts simultaneously in 9 languages (English, French, German, Italian, Spanish, Portuguese, Arabic, Russian and Turkish*
72	*Publication*	*Alessandro Artusi*	*Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage.*	*2010*	*Eurographics, Aire-La-Ville, 2010.*	*Scientific Community*		
73	*Publication*	*Alexandre Bourdeu*	*Geometric morphometrics*	*2010*	*In Alessandro Artusi, Morwena*	*Scientific Community*		

				for provenance determination of Gallo-Roman white clay figurines.		*Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 25-32*			
74		*Franco Niccolucci*	*Seeking the truth in the labyrinth of cultural semantics*			*Invited keynote paper, in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, xix-xiv.*	*Scientific Community*		
	Publication				*2010*	*cultural semantics*			
75		*Achille Felicetti*	*Semantic Enrichment of Geographic Data and 3D Models for the Management of*			*Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th*	*Scientific Community*		
	Publication			*Archaeological*	*2010*				

114

			Features.		*International Symposium on Virtual Reality, Archaeology and Cultural Heritage, (2010). Eurographics, Aire-La-Ville, 115-122.*		
76		*Achille Felicetti*	*AnnoMAD: A Semantic Framework for the Management and the Integration of Full-text Excavation Data and Geographic Information.*		*In Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 123-130.*	*Scientific Community*	
	Publication			*2010*			
77		*Franco Niccolucci*	*Five years after: The London Charter revisited*		*In Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics,*	*Scientific Community*	
	Publication			*2010*			

					Aire-La-Ville, vol. 2, 101-104.		
78		*Denis Pitzalis*	*LIDO and CRMdig from a 3D Cultural Heritage Documentation Perspective*		*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 87-96.*	*Scientific Community*		
	Publication			*2010*			
79		*Uros Damnjanov ic*	*Wild-Goat. Towards a virtual "Corpus Vasorum" of wild-goat style vessels of museum collections*		*accepted at CAA 2010.*	*Scientific Community*		
	Publication			*2010*			
80		*Roberto Gabrielli*	*Integrating 3D data acquisition techniques for comprehensiv e study of the ancient Hellenistic-Roman Theatre of Paphos, Cyprus,*		*accepted at CAA 2010.*	*Scientific Community*		
	Publication			*2010*			
81	*Publication*	*Ropertos*	*Finding the Language of*	*2010*	*accepted at CAA 2010.*	*Scientific Community*		

		Georgiou	*Stereoscopic Technologies for Archaeological Sites and Artefacts,*		*(www.fig.net/pub/fig2010/papers/fs04h%5Cfs04h_ronzino_4350.pdf).*			
82	*Publication*	*Sorin Hermon*	*Evaluation of Acquisition and Post-Processing Pipeline for 3D Models of Ancient Statues,*	*2010*	*Accepted at CAA 2010.*	*Scientific Community*		
83	*Publication*	*Sorin Hermon*	*The Hill of Agios Georgios, Nicosia: 3D Analysis of an on-going Archaeological Excavation,*	*2010*	*Accepted at CAA 2010.*	*Scientific Community*		
84	*Publication*	*Sorin Hermon*	*Arc3D and 3D Laser-Scanning A comparison of two alternate technologies for 3D data acquisition,*	*2010*	*Accepted at CAA 2010.*	*Scientific Community*		
85	*Publication*	*Franco Niccolucci*	*Ontologies and Semantic Tools from the Management of Full-text Archaeological Documentation. Assessments from the Hala Sultan Tekke*	*2010*	*Accepted at CAA 2010.*	*Scientific Community*		

117

			case-study				
86	*Publication*	*Maria Solomidou-Ieronymidou*	*3D Documentation in Architectural History: A case study of the 16th c. Church of Stavros tou Missirikou*	*2010*	*In Nicosia, Cyprus accepted at CAA 2010.*	*Scientific Community*	
87	*Publication*	*Jaime Kaminski*	*3D-COFORM: Making 3D documentation an everyday choice for the Cultural Heritage sector,*	*2010*	*accepted at Arqueologica 2.0.*	*Scientific Community*	
88	*Publication*	*Paola Ronzino*	*Innovative techniques for 3D digital survey of the Paphos theatre*	*2010*	*XXIV FIG International Congress 2010, Sydney (www.fig.net/pub/fig2010/papers/fs04h%5Cfs04h_ronzino_4350.pdf).*	*Scientific Community*	
89	*Publication*	*Paola Ronzino*	*Il rilievo 3D del Teatro di Nea Pafos, Geocentro 2*	*2010*	*n. 10, 64-68, Fondazione Geometri Italiani, Roma.*	*Scientific Community*	
90	*Publication*	*Paola Ronzino*	*Fotogrammetria Aerea Automatica per il rilievo dei Beni Culturali e per l'aggiornamento di mappe*	*2010*	*Convegno Nazionale SIFET 2010, Cagliari, Italia (in press).*	*Scientific Community*	

					Catastali			
91			*Jaime Kaminski*	*Assessing the Socio-economic Impact of 3D Visualisation in Cultural Heritage*		*in Marinos Ioannides, Dieter Fellner, Andreas Georgopoulos and Diofantos G. Hadjimitsis (eds.) Digital Heritage: Third International Conference, EuroMed 2010, Lemessos, Cyprus 240-249.*	*Scientific Community*	
	Publication				*November 8-13, 2010.*			
92			*Jaime Kaminski*	*3D-ISF: an impact measurement tool for business and strategic planning in ICT and 3d Heritage applications*		*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 139-146.*	*Scientific Community*	
	Publication				*2010*			
93			*Erminia Carillo*	*ICT in Japanese Museums: a Strategic and Contextual Survey*		*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th*	*Scientific Community*	
	Publication				*2010*			

					International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, vol. 2: Short and Project Papers, 95-99.			
94			*Martin Doerr*	*A Repository for 3D Model Production and Interpretation in Culture and Beyond*		*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 97-104.*	*Scientific Community*		
	Publication				*2010*			
95			*Xueming Pan*	*A Distributed Object Repository for Cultural Heritage*		*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage,*	*Scientific Community*		
	Publication				*2010*	*Cultural Heritage,*		

					Special Issue of EURASIP Journal on Image and Video Processing, Volume 2009. PDF can found at http://downloads. hindawi.com/journ als/ivp/2009/8523 92.pdf Eurographics, Aire-La-Ville, 105-114.			
96	*Publication*		*Simon Haegler*	*Procedural Modelling for Digital Cultural Heritage,*	*2010*		*Scientific Community*	
97	*Publication*		*Henning Hamer*	*An Object-Dependent Hand Pose Prior from Sparse Training Data*	*2010*	*IEEE Conference on Computer Vision and Pattern Recognition (CVPR'10), 2010. PDF can be found at: http://www.vision. ee.ethz.ch/~gallju /download/jgall_h andposeprior_cvp r10.pdf*	*Scientific Community*	
98	*Publication*		*Matteo Dellepiane*	*Removing shadows for color projection using sun position estimation*	*2010*	*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th*	*Scientific Community*	

					International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 55-62.		
99	*Publication*	*Christiane Bathow*	*Documenting and Monitoring Small Fractures on Michelangelo's David*	*2010*	*accepted at CAA2010*	*Scientific Community*	
100	*Publication*	*Christiane Bathow*	*Verification and Acceptance Tests for High Definition 3D Surface Scanners*	*2010*	*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 9-16.*	*Scientific Community*	
101	*Publication*	*Michele Sottile*	*Mutual Corresponden ces: a hybrid method for image-to-geometry registration,*	*November 2010*	*Eurographics Italian Chapter Conference 2010.*	*Scientific Community*	
102	*Publication*	*Gianpaolo Palma*	*Improving 2D-3D registration*	*2010*	*Eurographics Italian Chapter*	*Scientific Community*	

122

			by mutual information using gradient information,		*Conference 2010*		
103		*Gianpaolo Palma*	*Geometry-Aware Video Registration,*		*15th International Workshop on Vision, Modelling and Visualization*	*Scientific Community*	
	Publication			*November 2010*			
104		*Matteo Dellepiane*	*Improved Color Acquisition and Mapping on 3D Models via Flash-Based Photography,*		*ACM Journal on Computers and Cultural Heritage, Volume 2, Number 4, Feb. 2010, 1-20.*	*Scientific Community*	
	Publication			*February 2010*			
105		*Daniele Bernabei*	*Real-time Single Scattering Inside Inhomogeneous Materials,*		*The Visual Computing (Special issue on CGI 2010 Conference)*	*Scientific Community*	
	Publication			*2010*			
106		*Nico Pietroni*	*Almost isometric mesh parameterization through abstract domains,*		*IEEE Transaction on Visualization and Computer Graphics, Volume 16, Number 4, 621-635.*	*Scientific Community*	
	Publication			*July/August 2010,*			
107		*Ashish Myles*	*Feature-aligned T-meshes*		*ACM Transactions on Graphics, Proceedings of SIGGRAPH 2010, Vol. 29(4).*	*Scientific Community*	
	Publication			*2010*			
108		*Marco Tarini*	*Practical quad mesh simplification,*		*Computer Graphics Forum (Special Issue of Eurographics*	*Scientific Community*	
	Publication			*2010*			

					2010 Conference), Volume 29, Number 2, 407-418.		
109		*Stefano Marras*	*Controlled and adaptive mesh zippering,*		*GRAPP 2010 - International Conference in Computer Graphics Theory and Applications.*	*Scientific Community*	
	Publication			*2010*			
110		*Marco Callieri*	*Processing sampled 3D data: reconstruction and visualization technologies Chapter*		*in F. Stanco, S. Battiato, G. Gallo (eds) Digital Imaging for Cultural Heritage Preservation, Taylor and Francis, 103-132.*	*Scientific Community*	
	Publication			*2010*			
111		*Matteo Dellepiane*	*Using digital 3D models for study and restoration of Cultural Heritage artefacts Chapter*		*in F. Stanco, S. Battiato, G. Gallo (eds) Digital Imaging for Cultural Heritage Preservation, Taylor and Francis, 39-68.*	*Scientific Community*	
	Publication			*2010*			
112		*Davide Portelli*	*A framework for User-Assisted Sketch-Based Fitting of Geometric Primitives*		*Proceedings of WSCG, the 18th Int. Conference on Computer Graphics, Visualization and Computer Vision.*	*Scientific Community*	
	Publication			*2010*			
113	*Publication*	*Lars Henning*	*3D Reconstruction*	*2010*	*In Institute for Systems and*	*Scientific Community*	

		Wendt	*from Line Drawings,*		*Technologies of Information Control and Communication (INSTICC) VISIGRAPP 2010. Proceedings: International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications [CD-ROM]. INSTICC Press, 2010, 65-71.*			
114	*Publication*	*Martin Ritz*	*High Resolution Acquisition of Detailed Surfaces with Lens-Shifted Structured Light in Alessandro Artusi, Morwena Joly*	*2010*	*Genevieve Lucet, Alejandro Ribes and Denis Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 1-8*	*Scientific Community*		
115	*Publication*	*David Kolin*	*3D-digitisation of the "wild goat" vases*	*2010*	*in Alessandro Artusi, Morwena Joly, Genevieve Lucet, Alejandro Ribes and Denis*	*Scientific Community*		

					Pitzalis (eds.) Proceedings of VAST 2010: 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, Eurographics, Aire-La-Ville, 63-66.			
116		Franco Niccolucci	Technologies,		Standards and Business Models for the Formation of Virtual Collections of 3D Replicas of Museum Objects: the 3D-COFORM Project In Paul Cunningham and Miriam Cunningham (eds.) IST-Africa 2010 Conference Proceedings, IEEE Xplore, in press.	Scientific Community		
	Publication			2010				
117		David Arnold	The objects of scholarly information practice		invited presentation to the Digital Research Infrastructure for the Arts and Humanities (DARIAH) Experts Forum on scholarly activity	Scientific Community		
	Publication			10 June 2010	and information			

					processing, Athens, (http://sites.google.com/a/dcu.gr/scholarlyactivity/home/programme)		
118	*Publication*	*David Arnold*	*Shaping Up: 3D Documentation and Knowledge in Cultural Heritage Invited presentation at "Seeing is Believing: New Technologies for Cultural Heritage."*	*9 June 2010*	*International Society for Knowledge Organisation (ISKO) (UK) Conference, UCL, London. (http://www.iskouk.org/cultural_heritage_jun2010.htm*	*Scientific Community*		
119	*Publication*	*David Arnold*	*3D-COFORM and Europeana,*	*19 May 2010*	*invited presentation 6th Meeting of the Member States' Expert Group on digitisation and digital preservation.*	*Scientific Community*		
120	*Publication*	*David Arnold*		*February 10-12, 2010.*	*Invited Keynote. Technology Based Revolution of Cultural Heritage and Interpretation. ENTER2010. eTourism: Horizons. Lugano, http://www.enter2010.org/LatestProgramme.pdf*	*Scientific Community*		

127

121		*Franco Niccolucci*			*Invited presentation Interdisciplinary Research Infrastructures in the Eastern Mediterranean at the "Strategic workshop on research communities and research infrastructures in the Humanities" organised by the EUROPEAN SCIENCE FOUNDATION (ESF) - Standing Committee for the Humanities (SCH), Strasbourg*	*Scientific Community*		
	Publication			*28-29 October 2010.*				
122		*Knopp, J.*	*transform and 3d surf for robust three dimensional classification.*		*In: ECCV*	*Scientific Community*		
	Publication			*2010*				
123		*Knopp, J.*	*L: Orientation Invariant 3D Object Classification using Hough Transform Based Methods*		*In: ACM Multimedia 3DOR*	*Scientific Community*		
	Publication			*2010*				
124		*Irene Amerini*	*Geometric tampering estimation by means of a*	*14-19 March 2010*	*IEEE International Conference on Acoustic, Speech*	*Scientific Community*		
	Publication							

			sift-based forensic analysis		*and Signal Processing, ICASSP 2010, Dallas, TX, USA.*		
125	*Publication*	*Roberto Caldelli*	*Fast Image Clustering of Unknown Source Images*	*12-15 December 2010*	*IEEE Workshop on Image Forensics and Security WIFS 2010, Seattle WA, USA.*	*Scientific Community*	
126	*Publication*	*Henning Hamer*	*Tracking a Hand Manipulating an Object*	*2009*	*IEEE International Conference on Computer Vision*	*Scientific Community*	
127	*Publication*	*Henning Hamer*	*An Object-Dependent Hand Pose Prior from Sparse Training Data*	*2010*	*IEEE International Conference on Computer Vision and Pattern Recognition*	*Scientific Community*	
128	*Publication*	*Benedict J. Brown*	*Tools for Virtual Reassembly of Fresco Fragments.",*	*December 2010 (To Appear)*	*Seventh International Conference on Science and Technology in Archaeology and Conservations, Petra)*	*Scientific Community*	
129	*Publication*	*M. Rump*	*Groundtruth Data for Multispectral Bidirectional Texture Functions",*	*2010*	*In proceedings of CGIV 2010, pp. 326-330*	*Scientific Community*	
130	*Publication*	*M. Rump*	*Spectralization : Reconstructing spectra from sparse data",*		*In proceedings of EGSR '10 Rendering Techniques, pp. 1347-1354*	*Scientific Community*	

131		Seitz S.M.	A Comparison and Evaluation of Multi-View Stereo Reconstruction Algorithms		CVPR 2006, vol. 1, pp. 519-526.	Scientific Community		
	Publication			*2006*				
132		O. Cula	3D Texture Recognition Using Bidirectional Feature Histograms		2004, International Journal of Computer Vision, Vol. 59, No. 1	Scientific Community		
	Publication			*2004*				
133		R. Ruiters	Heightfield and spatially varying BRDF Reconstruction for Materials with Interreflections		Computer Graphics Forum 28 (2), pp. 513-522	Scientific Community		
	Publication							
134		Dennis Lorson	Efficient Level-of-Detail Methods for Procedural Building Models;		Master Thesis; ESAT, Katholieke Universiteit Leuven, Belgium;	Scientific Community		
	Publication			*2009*				
135		Simon Haegler	Grammar-Based Encoding of Facades		Presented at "21st Eurographics Symposium on Rendering 2010" (EGSR 2010) in Saarbruecken, Germany	Scientific Community		
	Publication			*2010*				
136		Ullrich T.	Semantic Fitting and Reconstruction		Journal on Computing and Cultural Heritage, 1(2), 2008.	Scientific Community		
	Publication							
137		Havemann S.	The Meaning of Shape and some		Multimedia Information Extraction, to	Scientific Community		
	Publication							

			Techniques to Extract I		*appear.*			
138	*Presentation*		*First International Conference for photographers in the Cultural Heritage Sector (AHFAP)*	*14 June 2011*	*Brighton*	*Scientific Community*		
139	*Presentation*	*David Arnold*	*Contributor to "Research Infrastructures in the Digital Humanities", European Science Foundation Science Policy Briefing 42. European Science Foundation,*	*September 2011*		*Scientific Community*		
140	*Presentation*	*David Arnold*	*Museums Association Annual Conference, Exhibition workshop*	*3 October 2011*	*Brighton*	*Scientific Community*		
141	*Presentation*	*Roger Evans*	*CityEngine Workshop*	*4 November 2011*	*University of Southampton, UK*	*Scientific Community*		
142	*Presentation*	*Roger Evans*	*Mini conference: computing research in CEM*	*28 March 2011*	*University of Brighton*	*Scientific Community,*		
143	*Presentation*	*Roger Evans*	*DATR Entropy day*	*4 May 2011*	*University of Brighton*	*Scientific Community*		
144	*Presentation*	*James Stevenson*	*Chinese Cultural Relics Association*	*8 August 2011*	*Dunhuang, Gansu, China,*	*Scientific Community*		

131

			Conference				
145	*Presentation*	*James Stevenson*	*Chinese Cultural Relics Association Conference*	*18 August 2011*	*Dunhuang, Gansu, China,*	*Scientific Community*	
146	*Presentation*	*James Stevenson*	*AHFAO Annual Conference*	*10 November 2011*	*Westminster Cathedral, London*	*Scientific Community*	
147	*Presentation*	*James Stevenson*	*Hereford Photography Festival*	*29 October 2011*	*Hereford*	*Scientific Community*	
148	*Presentation*	*James Stevenson*	*Museums Association*	*3 October 2011*	*Brighton*	*Scientific Community*	
149	*Presentation*	*M. Prasad*	*BMVC*	*2011*	*Dundee*	*Scientific Community*	
150	*Presentation*	*Carlos Jimenez*	*AHFAP Annual Conference*	*10th November 2011;*	*Westminster Cathedral, London.*	*Scientific Community*	
151	*Presentation*	*Erica Calogero,*	*Eurographic*	*2011*	*Bangor, Wales.*	*Scientific Community*	
152	*Presentation*	*Erica Calogero*	*CityEngine Workshop*	*4 November 2011,*	*University of Southampton, Southampton, United Kingdom.*	*Scientific Community*	
153	*Presentation*	*Karina Rodriguez-Echavarria*	*International Meeting on Graphic Archaeology and Informatics, Cultural Heritage and Innovation.*	*June 2011*	*Seville, Spain*	*Scientific Community*	
154	*Presentation*	*Karina Rodriguez-*	*The first International*	*June 2011.*	*Brighton, UK*	*Scientific Community*	

			Echavarria	Conference for photographers in the Cultural Heritage Sector.					
155	Presentation		David Arnold	EVA Florence	4 May 2011	Florence	Civil Society		
156	Presentation		David Arnold	Art Day Public Workshop	18 October 2011	Prato, Italy	Civil Society		
157	Presentation			'Share Your Heritage' crowdsourcing efforts	7-10 September 2011	Jubilee Library, Brighton and Brighton Seafront	Civil Society		
158	Presentation			'Share Your Heritage' crowdsourcing efforts	21 September 2011	International Student Fair, Brighton & Hove	Civil Society		
159	Presentation		Demonstrator exhibition	Museums Association Conference	2011		Scientific Community, Industry		
160	Presentation		Demonstrator exhibition	VAST	2011		Scientific Community		
161	Presentation		Demonstrator exhibition	BMTA	2011		Scientific Community, Industry, Civil Society, Media		
162	Presentation		KUL	International Conference on Cultural Heritages and Digitisation	2011		Scientific Community		
163	Presentation		KUL	KUL meeting with (local) Brussels Museums, Royal Museum, Africa Museum, Museum of	27 October 2011		Industry		

			Natural Sciences.					
164	*Presentation*	*KUL*		*20-21 July 2011*	*V & A Museum, London*	*Scientific Community*		
165	*Presentation*	*KUL*	*European Project Framework Conference*		*Brussels*	*Scientific Community*		
166	*Presentation*	*Erica Calogero*	*CityEngine*	*18 February 2011*	*University of Brighton, East Sussex*	*Scientific Community*		
167	*Presentation*	*Erica Calogero*	*Regency Architecture of Brunswick Town and Brighton*	*-8-10 September 2011 -11 September*	*-Regency Town House, Brighton, East Sussex -Old Market, Brighton, East Sussex*	*Scientific Community*		
168	*Presentation*		*Heritage Impact 2011*	*21 October 2011*	*Prato, Italy*	*Scientific Community, Industry*		
169	*Presentation*		*7th International Conference on Science and Technology in Archaelogoy and Conservation*	*7-12 December 2010*	*Heritage Places Petra (Jordan)*	*Scientific Community*		
170	*Presentation*		*Merck KGaA*	*3 March 2011*	*Fraunhofer, Darmstadt, Germany*	*Scientific Community*		
171	*Presentation*		*Forschungsallianz Kulturerbe*	*16 August 2011*	*Fraunhofer, Darmstadt, Germany*	*Scientific Community*		
172	*Presentation*		*WWW goes 3D*	*17 August 2011*	*Darmstadt, Fraunhofer, Germany*	*Scientific Community*		
173	*Presentation*		*Demo Staatliche*	*17 August 2011*	*Museen Berlin, Fraunhofer, Darmstadt, Germany*	*Scientific Community*		

174	*Presentation*		*Demo German National Library*	*29 August 2011*	*Fraunhofer, Darmstadt, Germany*	*Scientific Community*	
175	*Presentation*		*Demo RTT*	*7 November 2011*	*Darmstadt, Fraunhofer, Germany*	*Scientific Community*	
176	*Presentation*		*Demo Innowep*	*18 November 2011*	*Fraunhofer, Darmstadt, Germany*	*Scientific Community*	
177	*Presentation*		*Forum Kultur in 3D*	*23 November 2011*	*Fraunhofer, Darmstadt, Germany*	*Scientific Community*	
178	*Media*		*Fraunhofer Interview with Switzerland Broadcasting*	*30 March 2011*	*Darmstadt, Germany*	*Civil Society*	
179	*Media*		*Media Release to support crowdsourcing efforts*		*Brighton, East Sussex*	*Civil Society*	
180	*Other*	*David Arnold*	*Meeting with trustees of the PMSA (Public Monuments and Sculptures Association, UK)*	*8 July 2011*		*Industry*	
182	*Other*	*David Arnold*	*Meeting with regional archive centres working for the PMSA*	*26 October 2011*		*Industry*	
183	*Other*	*Erica Calogero*	*Trained several volunteers on the use of ARC 3D for building facade and*	*October 2010*		*Civil Society*	

			architectural ornament reconstruction and visualisation. These volunteers have contributed circa 130 photographic reconstructions of Regency and Listed Buildings for the "Brighton Listed Buildings in 3D" collection.					
184	*Other*		*KUL undertook scanning sessions*	*-August 2011 -October 2011*	*-Minidome at Shandong Museum in Jinan, China (set of oracle bones) - San Matteo Museum in Pisa (collection of coins),*	*Industry*		
185	*Other*		*KUL officially released version 2.1 of the new ARC 3D webservice for existing and new*			*Scientific Community, Industry, Civil Society*		

						users.		
186	*Exhibition*		*Museums Association Conference*	*3-4 October 2011*	*Brighton*	*Scientific Community, Industry*	*1300 attendees * 500 project leaflets distributed*	
187	*Exhibition - Seminar*	*David Arnold / James Stevenson*	*Museums Association Conference (45 Seminar)*	*3-4 October 2011*	*Brighton*	*Scientific Community, Industry*	*50*	
188	*Exhibition*		*VAST 2011*	*19-21 October 2011*	*PIN S.c.R.L Prato, Italy*	*Scientific Community*	*85*	
189	*Exhibition*		*BMTA (Borsa Mediteranea del Turismo Archaeologico, Mediterranean Exhibition of Archaeological Tourism)*	*Mid November*	*Paestum, UNESCO World Heritage site*	*Scientific Community, Civil Society*	*Civil Society - estimated in their thousands*	*Italian, translation for lectures in English*
190	*Exhibition – presentation*		*BMTA (Borsa Mediteranea del Turismo Archaeologico, Mediterranean Exhibition of Archaeological Tourism)*	*19 November 2011*	*Paestum, UNESCO World Heritage site*	*Scientific Community*		
192	*Publication*	*Michael Weinmann*	*A Multi-Camera, Multi-Projector Super-Resolution Framework for Structured Light,*	*2011*	*In Proceedings of 3D Imaging, Modelling, Processing, Visualization and Transmission (3DIMPVT), 2011 International Conference on, pages 397-404, IEEE Computer*	*Scientific Community*		

137

					Society's Conference Publishing Services.			
193		*Christopher Schwartz*	*WebGL-based Streaming and Presentation Framework for Bidirectional Texture Functions*		*In Proceedings of The 12th International Symposium on Virtual Reality, Archaeology and Cultural Heritage VAST 2011, Eurographics Association, Prato, Italy, pages 113-120, Eurographics Association.* **Note***: this paper has been selected as a Best Paper at the conference and will be invited for publication of an extended version on* **ACM J. on Computing and Cultural heritage***.*	*Scientific Community*		
	Publication			*2011*				
194		*Christopher Schwartz*	*Capturing Shape and Reflectance of Food,*		*In proceedings of ACM SIGGRAPH ASIA 2011: Sketches, Hong Kong, China.*	*Scientific Community*		
	Publication			*(forthcoming 2011)*				
195	*Publication*	*Matteo Dellepiane*	*Flow-Based Local Optimization*	*Online first, 2011 (to be published in*	*IEEE Transactions on Visualization and*	*Scientific Community*		

			for Image-to-Geometry Projection,	*hardcopy in 2012).*	*Computer Graphics,*		
196	*Publication*	*Christopher Schwartz*	*Integrated High-Quality Acquisition of Geometry and Appearance for Cultural Heritage,*	2011	*In Proceedings of The 12th International Symposium on Virtual Reality, Archaeology and Cultural Heritage VAST 2011, Eurographics Association, Prato, Italy, pages 25-32, Eurographics Association.*	*Scientific Community*	
197	*Publication*	*Ruggero Pintus*	*Streaming Framework for Seamless Detailed Photo Blending on Massive Point Clouds,*	*April 2011*	*Proceedings of Eurographics Conference – Cultural Heritage Papers*	*Scientific Community*	
198	*Publication*	*David Tingdahl*	*A Public System for Image Based 3D Model Generation*	*10-11 October 2011*	*Computer Vision/Computer Graphics Collaboration Techniques, 5th International Conference, MIRAGE 2011, Rocquencourt, France, Proceedings, Lecture Notes in Computer Science, Volume 6930, 2011, 262-273.*	*Scientific Community*	

199	Publication	Frederic Larue	Automatic Texturing without Illumination Artifacts from In-Hand Scanning,	April 2011	International Workshop on Multimedia for Cultural Heritage (MM4CH), (in press)	Scientific Community		
200	Publication	Frederic Larue	Improving High-Speed Scanning Systems by Photometric Stereo,	2011	VAST (Short papers): The 11th International Symposium on Virtual Reality, Archaeology and Cultural Heritage, 25-28 – 2011.	Scientific Community		
201	Publication	Roland Ruiters	A compact and editable representation for measured BRDFs,	December 2010	University of Bonn, Technical Report number CG-2010-1,	Scientific Community		
202	Publication	Kai Schröder	Non-Local Image Reconstruction for Efficient BTF Synthesis	To appear, December 2011.	ACM SIGGRAPH ASIA 2011 Sketches,	Scientific Community		
203	Publication	Roberto Scopigno	3D models for Cultural Heritage: beyond plain visualization	July 2011	IEEE Computer, Volume 44, Number 7, page 48-55	Scientific Community		
204	Publication	Marco Callieri	Processing a Complex Architectural Sampling with MeshLab: the case of Piazza Della Signoria	2011	Proceedings of 3D-ARCH 2011	Scientific Community		
205	Publication	Fabio Ganovelli	OCME: out-of-core Mesh Editing Made	April 2011	IEEE Computer Graphics and Application,	Scientific Community		

			Practical",		Volume 31, Number 2		
206		Sebastian Pena Serna	3D-centred media linking and semantic enrichment through integrated searching, browsing, viewing and annotating.		In VAST11: The 12th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage (Prato, Italy, 2011). **Note**: this paper has been selected as a Best Paper at the conference and will be invited for publication of an extended version on **ACM J. on Computing and Cultural heritage**.	Scientific Community	
	Publication			2011			
207		Sebastian Pena Serna	Considerations toward a Dynamic Mesh Data Structure.		SIGRAD 2011: Eurographics Swedish Chapter Conference. Stockholm, Sweden.	Scientific Community	
	Publication			November 17–18, 2011,			
208		M. Mathias	Procedural 3D Building Reconstruction using Shape Grammars and Detectors		3DIMPVT	Scientific Community	
	Publication			2011			
209		M. Mathias	Automatic architectural style recognition		3D-ARCH	Scientific Community	
	Publication			2011			

210		Achille Felicetti	Metadata And Tools For Integration And Preservation Of Cultural Heritage 3d Information		23rd International CIPA Symposium, Prague, Czech Republic	Scientific Community		
	Publication			12-16 September 2011				
211		Achille Felicetti	A Repository for Heterogeneous and Complex Digital Cultural Objects,		VAST2011: The 12th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage (Prato, Italy,	Scientific Community		
	Publication			18-21 October 2011				
212		Jan Knopp	Hough Transform and 3D SURF for three dimensional classification."		In IEEE ECCV, Chersonissos, 2010.	Scientific Community		
	Publication			2011				
213		Jan Knopp	Orientation invariant 3D object classification using Hough Transform based methods."		In ACM Multimedia Workshop on 3D Object Retrieval, Firenze	Scientific Community		
	Publication			2010				
214		Jan Knopp	Scene Cut: Class-specific Object Detection and Segmentation in 3D Scenes		In 3DIMPVT, Hangzhou	Scientific Community		
	Publication			2011				
215		Sebastian Pena Serna	3D-centered media linking and semantic enrichment		In VAST11: The 12th International Symposium on Virtual Reality,	Scientific Community		
	Publication			2011				

			through integrated searching, browsing, viewing and annotating.		*Archaeology and Intelligent Cultural Heritage (Prato, Italy)*		
216	*Publication*	*Stephen Laycock*	*Aligning archive maps and extracting footprints for analysis of historic urban environments*	*Accepted on 7th January 2011*	*Computers and Graphics, vol. 35, pp. 242-249.*	*Scientific Community*	
217	*Publication*	*Bein M.*	*Genetic B-Spline Approximation on Combined B-reps. CGI'11:*	*June 12-15, 2011.*	*Computer Graphics International conference. Ottawa, Ontario, Canada*	*Scientific Community*	
218	*Publication*	*Roberto Scopigno*	*3D models for Cultural Heritage: beyond plain visualization*	*July 2011*	*IEEE Computer, Volume 44, Number 7, page 48-55*	*Scientific Community*	
219	*Publication*	*Callieri M.*	*Modelli digitali 3D per il supporto al restauro: riassemblaggio digitale e ricostruzione virtuale"*	*2011*	*In: La madonna di Pietranico - Storia, restauro e ricostruzione di un'opera in terracotta. 74 - 82. Lucia Arbace, Elisabetta Sonnino (eds.). Pescara, Italy: Edizioni ZIP, 2011 (text in Italian and English).*	*Scientific Community*	
220	*Publication*	*Erminia*	*Usability*	*October 18 –*	*Outcomes and*	*Scientific Community*	

143

		Carillo	*Evaluation of a Prototype iPhone App for Osaka Castle Museum*	*21, 2011*	*Reflections, Short and Project Papers Proceedings, VAST 2011, The 12th International Symposium on Virtual Reality, Archaeology, and Cultural Heritage, Prato, Italy, 65-68.*			
221		*Erica Calogero*	*Using Procedural Modelling as a framework for Representing Style: An Example from Regency Architecture".*		*Cultural Heritage Area Papers, EUROGRAPHICS 2011 (Eds A.Day, R. Mantiuk, E.REinhard and R.Scopigno), 41-48.*	*Scientific Community*		
	Publication			*2011*				
222		*Erica Calogero*	*Generating Alternative Proposals for the Louvre Using Procedural Modeling*		*Proceedings of the 4th ISPRS International Workshop; 3D-ARCH 2011: "3D Virtual Reconstruction and Visualization of Complex ". Architectures". Trento, Italy, (Eds: Fabio Remondino, Sabry El-Hakim). International Archives of Photogrammetry,*	*Scientific Community*		
	Publication			*2-4 March 2011*	*Remote Sensing*			

				and Spatial Information Sciences, Volume XXXVIII-5/W16.			
223		*P. Cignoni*	*MeshLab and ARC 3D: Photo-reconstruction and processing 3D meshes: Evaluating usability assessment methods for Web based cultural heritage Applications*		*in Arnold, D., Van Gool, L., Niccolucci, F. and Pletinckx, D. (eds.) Open digital cultural heritage systems conference, EPOCH/3D COFORM publication, Archaeolingua: Budapest, 61-66.*	*Scientific Community*	
	Publication			*2011*			
224		*Jim McLoughlin*	*A multi-level approach to the study of the socio-economic impact of ICT at cultural heritage sites*		*in Arnold, D., Van Gool, L., Niccolucci, F. and Pletinckx, D. (eds.) Open digital cultural heritage systems conference, EPOCH/3D COFORM publication, Archaeolingua: Budapest, 85-91.*	*Scientific Community*	
	Publication			*2011*			
225		*David Arnold*	*Open digital cultural heritage systems conference,*		*EPOCH/3D COFORM publication, Archaeolingua: Budapest (edited book).*	*Scientific Community*	
	Publication			*2011*			

226		David Arnold	Contributor to "Research Infrastructures in the Digital Humanities		European Science Foundation Science Policy Briefing 42. Editors/authors: Professor Maria Ågren, Professor Andrea Bozzi, Dr Arianna Ciula, Professor Margaret Kelleher, Professor Kristin Kuutma, Professor Claudine Moulin , Dr Julianne Nyhan, Professor Marko Tadić. European Science Foundation, ISBN: 978-2-918428-50-3, 44.	Scientific Community		
	Publication			September 2011				
227		David Arnold	ICTs for Cultural Heritage" Introduction (pp10-11) to, and Guest Editors for, the Special Theme of ERCIM News:		Issue 86. European Research Consortium for Informatics and Mathematics (July 2011). Section 10-51. Keynote article "ICT and Cultural Heritage: Research, Innovation and Policy by Khalil Rouhana, Director, Digital	Scientific Community		
	Publication			2011				

					Content & Cognitive Systems European Commission, DG Information Society and Media. 29 articles accepted from 52 submissions. Circulation ~12,000 copies including all MEPs etc.			
228	*Press Release*		*Culture 24 on line museum*	*13 August 2012*		*Civil society*		
229	*Press Release*		*Brighton Argus*	*18 August 2012*	*UK*	*Civil society*		
230	*Press Advertisement*		*Latest 7 Magazine*			*Civil society*		
231	*Media*		*BBC Radio 4 Flagship 'Today' news programme*			*Civil society*		
232	*Media*		*BBC South East news*			*Civil society*		
233	*Media*		*ITV Meridian news,*			*Civil society*		
234	*Media*		*Sunday Telegraph*	*9 September 2012*		*Civil society*		
235	*Media*		*Heritage Portal*	*4 September 2012*				
236	*Media*		*Mail online*	*17 September 2012*		*Civil society*		
237	*Media*		*Brighton, Argus*	*31 July 2012*		*Civil society*		
238	*Media*		*The Huffington Post*	*17 September 2012*		*Civil society*		
239	*Conference*	*Martin Doerr*	*CIDOC2012 – Enriching Cultural*	*10-14 June 2012*	*Helsinki, Finland*	*Scientific Community*		

			Heritage					
240	Other		Contact with IT department of British Museum Research Space		London	Scientific Community, Industry		
241	Other		Europena/IMLS DCC working meeting	7-9 March 2012	Champaign-Urbana, USA	Scientific Community		
242	Other	Martin Doerr	Archaeological Institute of Naples	September 2012	Naples, Italy	Scientific Community, Industry		
243	Other	Martin Doerr	Italian Ministry of Culture	September 2012	Rome, Italy	Scientific Community, Policy makers		
244	Workshop	Martin Doerr	CRM summer school	20-30 September 2012	Prato	Scientific Community		
245	Workshop		First Cultural Heritage Management Masters degree granted by the French University, Egypt (UFE)	January 2012	Egypt	Scientific Community		
246	Workshop		Use if laser scanning technology to reconstruct 3D models of artifacts	May 2012	Egypt	Industry	30	
247	Workshop	Prof. Waelkens	Sagalassos	January / February 2012	KUL	Scientific Community		
248	Other		Museum of Brussels	April 2012	Brussels, Belgium	Scientific Community		
249	Interviews		University partners		Holland	Scientific Community		

			Assyriology					
250	*Other*	*Patrick Semal*	*Synthesis NA3 module*	*6 March 2012*	*Belgium*	*Scientific Community*		
251	*Other*		*Photo session at Leuven Monastery*	*June 2012*	*Belgium*	*Scientific Community, Industry*		
252	*Other*		*Access to the Archäologiemuseum Schoss Eggenberg*		*Austria*	*Scientific Community, Industry*		
253	*Other (distribution of leaflets and scanning on structured light and Minidome)*		*Europeana Big Bang Event*	*May 2012*	*Brussels, Belgium*	*Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other*		
254	*Exhibition*		*3D-COFORM Reshaping History Exhibition*	*July-August 2012*	*Brighton, UK*	*Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other*		
256	*Seminar*		*Portable scanning.*	*23 August 2012*	*Brighton, UK*	*Scientific Community (higher education, Research), Industry, Civil Society*		
257	*Conference*		*Digital Fossil*	*24-26 September 2012*	*Berlin*	*Scientific community*		
258	*Workshop*		*New Visualisation Systems within Cuneiform Studies*	*12-14 September 2012*	*Brussels*	*Scientific community*		
259	*Other*		*Interdisciplinary meeting between cuneiform specialists (Oxford, ASS Leuven) and acquisition partners/engineers (Southampton, ESAT Leuven)*	*13 September 2012*	*Leuven*	*Scientific Community*		
260	*Other*		*Workshop by*	*14 September*	*Museum of*	*Scientific community*		

			end users	*2012*	*Natural History, Brussels*		
261	*Other*		*Study of busts of Charles 1*	*October 2012*	*Windsor Castle, UK*	*Scientific community, Industry*	
262	*Other*		*Acquisition tests with the Minidome i*		*British Museum, Brighton, UK*	*Scientific Community (higher education, Research), Industry, Civil Society*	
263	*Other*		*Flandrica, Flemish cultural heritage library*	*15 November 2012*	*University Library Leuven, Belgium*	*Scientific community, Industry*	
264	*Workshop*	*Marco Callieri*	*3D heritage on mobile web*	*4-8 February 2012*	*Brighton, UK*	*Scientific Community (higher education, Research), Industry, Civil Society*	
265	*Workshop*	*Roberto Scopigno*	*Introduction to 3D scanning and interactive 3D graphics technologies for CH, 25 h*	*15-16, 20-21 March 2012*	*Institute for Advanced Studies (IMT), Lucca, Italy*	*Scientific Community (higher education, Research), Industry*	
266	*Conference*	*Marco Callieri*	*CAA 2012*	*26-30 March 2012*	*Southampton, UK*	*Scientific community*	
267	*Other*	*Matteo Dellepiane*	*Digital Archaeology*	*26-30 March 2012*	*Lund, Sweden*	*Scientific community*	
268	*Workshop*	*Daniele Bernabei*	*Digital Cultural Heritage*	*9-11 May 2012*	*Cyprus*	*Scientific community*	
269	*Workshop*	*Marco Callieri*	*Meshlab and 3DCOFORM,*	*16 May 2012*	*University of Siena, Italy*	*Scientific community, Industry*	
270	*Workshop*	*Roberto Scopigno*	*Introduction to 3D scanning for CH, Training on MeshLab and WebGL,*	*27-30 June 2012*	*Montelibretti, Rome, Italy*	*Scientific community, Industry*	
271	*Workshop*	*Roberto Scopigno*	*Summer School on "3D Graphics for Cultural Heritage" Contributing Introduction to*	*10-13 September 2012*	*Otranto, Lecce (Italy)*	*Scientific community*	

			3D scanning for CH, Training on MeshLab,				
272	*Workshop*	*Guido Ranzuglia*	*Digital Cultural Heritage (organised by EC NoE "V-MUST")*	*23-28 September 2012*	*Alexandria, Egypt*	*Scientific community, Industry*	
273	*Conference*		*SIGGRAPH ASIA 2011 Oral presentation of reported 3D-COFORM publication "Capturing Shape and Reflectance of Food"*	*13 December 2011*	*Hong Kong*	*Scientific community, Industry*	*60*
274	*Conference*		*Eurographics 2012 Oral presentation of reported 3D-COFORM publication "Data-Driven Surface Reflectance from Sparse and Irregular Samples"*	*15 May 2012*	*Cagliari, Italy*	*Scientific community*	*70*
275	*Workshop*		*Central European Seminar on Computer Graphics for students 2012 Oral*	*30 April 2012*	*Smolenice, Slovakia.*	*Scientific Community*	*50*

				presentation of reported 3D-COFORM publications "Material Recognition: Bayesian Inference or SVMs?" and "Multiview Normal Field Integration using Graph-Cuts"				
276	*Workshop*			*3D-COFORM Exhibition*	*July – August 2012*	*Brighton, UK*		
277	*Conference*			*British Machine Vision Conference 2012 Poster presentation of reported 3D-COFORM publication*	*5 September 2012*	*Guilford, UK*	*Scientific community, Industry*	*100*
278	*Conference*			*EVA 2012 Oral presentation of reported 3D-COFORM publication*	*7 November 2012*	*Berlin, Germany*	*Scientific community*	*70*
279	*Posters*			*250 distributed*	*To promote the project and summer exhibition*	*Brighton & Hove. Cultural Heritage sites in East & West Sussex. UK partners were sent posters to display locally.*	*Scientific Community (higher education, Research), Industry, Civil Society, Medias, Other*	

280	Pop up Banners		*6 used at travelling exhibitions / events plus 7th for the summer exhibition*		*3D-COFORM Sector Advisory Board meeting and Santander workshop in February 2012, Heritage Impact symposium in June 2012 and at the University of Brighton Graduation week in the Royal Pavilion and Dome Theatre in July 2012.*	*Scientific Community (higher education, Research), Industry, Civil Society, Medias, Other*	
281	Flyers			*Months running up to the Summer Exhibition*	*Meetings and conferences attended by 3D-COFORM partners*	*Scientific Community (higher education, Research), Industry, Civil Society, Medias, Other*	
282	Film		*Link: 3D-COFORM Introductory*		*Shown on IPads and Laptops during events*	*Scientific Community (higher education, Research), Industry, Civil Society, Medias, Other*	
283	Exhibition		*Launch reception for the Summer Exhibition*	*26 July 2012*		*Government, Industry, Media, Scientific community*	*120*
284	Exhibition		*Summer Exhibition*	*27 July 2012-26 August*	*Grand Pavilion Gallery,Brighton, UK*	*Civil Society*	*900*
285	Other		*Mail out to database of contacts*		*UK and to contacts in Partner countries*		*100s*
286	Other		*Twitter*	*Augusts 2012: 2, 6, 8, 14, 20, 22 (x3), 23, 24*		*Civil Society*	*10 Tweets from @uniofbrig hton*
287	Other		*Facebook page*			*Civil Society*	*Seen by 10,966,*

							Liked by 16	
288	*Exhibition*	*PIN*	*3D-COFORM exhibition*	*9-18 October 2012*	*Prato*	*Civil Society*	*200 people*	
289	*Exhibition*	*Sponsored by the Municipality and by the Soprintendenza Archaeologica, and was supported by the University of Naples*	*3D-COFORM exhibition*	*30 October – 5 November*	*National Archaeological Museum in Naples, Italy*	*Civil Society, government, Scientific Community*	*The exhibition is a free extension to the visit of the Museum, which is daily visited by an average of some 1000 visitors per day.*	
290	*Exhibition*		*3D-COFORM exhibition*	*26-30 March 2012*	*University of Southampton*	*Civil Society*	*200*	
291	*Exhibition*		*3D-COFORM exhibition*	*16-17 May 2012*	*Earls Court, London*	*Civil Society*	*Over 200*	
293	*Publication*	*TZOMPANAKI, K., & DOERR*	*M.: Fundamental Categories and Relationships for Intuitive querying CIDOC-CRM based repositories.*	*2012*	*TECHNICAL REPORT: ICS-FORTH/TR-429, 2012* *The paper [PSS*12] has won the best paper award on EuroMed 2012.*	*Scientific community*		
294	*Publication*	*TZOMPANAKI, K.*	*A New Framework For Querying Semantic Networks.*	*April 11-14, 2012*	*Museums and the Web 2012: the international conference for culture and heritage on-line. San Diego, CA,*	*Scientific community*		

154

				USA			
295		*Sebastian Peña Serna*	*A. : 3D-centered media linking and semantic enrichment through integrated searching, browsing, viewing and annotating.*	*October 18-21, 2011*	*Proceedings of VAST11: The 12th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage. Prato, Italy*	*Scientific community*	
	Publication						
296		*TZOMPAN AKI, A.*	*Design and Implementation of a tool for formulating recall-oriented structured queries on semantic networks.*	*September 2012*	*Master of Science Thesis, Department of Computer Science, University of Crete,*	*Scientific community*	
	Publication						
297		*PAN X*	*A scalable repository infrastructure for ch digital object management*	*September 2012*	*In 18th International Conference on Virtual Systems and Multimedia (VSMM) (Milan, Italy), IEEEXplore digital library.*	*Scientific community*	
	Publication						
298		*SCHRÖTT NER M.*	*W.: A generic approach for generating cultural heritage metadata.*	*October 2012*	*In 4th International Euro-Mediterranean Conference on Digital Heritage (EuroMed) (Limassol, Cyprus, Springer LNCS (in press).*	*Scientific community*	
	Publication						

299		PAN X.	An enhanced distributed repository for working with 3d assets in cultural heritage.		In 4th International Euro-Mediterranean Conference on Digital Heritage (EuroMed) (Limassol, Cyprus, Springer LNCS (in press).	Scientific community		
	Publication			October 2012				
300		Frederic Larue	From the Digitization of Cultural Artifacts to the Web Publishing of Digital 3D Collections: an Automatic Pipeline for Knowledge Sharing,		Journal of Multimedia, Volume 7, Number 2, page 132-144	Scientific community		
	Publication			May 2012				
301		Michael Weinmann	Fusing Structured Light Consistency and Helmholtz Normals for 3D Reconstruction		Proceedings of the British Machine Vision Conference 2012,	Scientific community		
	Publication			September 2012				
302		Christopher Schwartz	Acquisition and Presentation of Virtual Surrogates for Cultural Heritage Artefacts,		Workshop proceedings of the EVA Berlin 2012,	Scientific community		
	Publication			November 2012				
303	*Publication*	Gianpaolo Palma	Telling The Story Of	2012	CAA 2012	Scientific community		

			Ancient Coins By Means Of Interactive RTI Images Visualization				
304	*Publication*	*Jaime Kaminski*	*Insourcing, outsourcing and crowdsourcing 3D collection formation: perspectives for cultural heritage,*	*2012*	*VAST 2012*	*Scientific community*	
305	*Publication*	*David Tingdahl*	*[Base materials for Photometric stereo,*	*2012*	*ECCV workshop, Color and Photometry in Computer Vision CPCV, 2012*	*Scientific community*	
306	*Publication*	*Aljosa Osep*	*Multiview Normal Field Integration using Graph-Cuts,*	*April 2012*	*Proceedings of the 16th Central European Seminar on Computer Graphics (CESCG 2012)*	*Scientific community*	
307	*Publication*	*Gianpaolo Palma*	*A Statistical Method for SVBRDF Approximation from Video Sequences in General Lighting Conditions*	*2012*	*Computer Graphics Forum (Issue of Eurographics Symposium on Rendering 2012), Volume 31, Number 4, page 1491-1500*	*Scientific community*	
308	*Publication*	*Roland Ruiters*	*Example-based Interpolation and Synthesis*	*2013*	*submitted to Eurographics*	*Scientific community*	

			of Bidirectional Texture Functions				
309		*Francesco Banterle*	*A Low-Memory, Straightforwar d and Fast Bilateral Filter Through Subsampling in Spatial Domain*		*COMPUTER GRAPHICS Forum, Volume 31 (2012), number 1 pp. 19–32.*	Scientific community	
	Publication			*2012*			
310		*Matteo Dellepiane*	*Archaeological excavation monitoring using dense stereo matching techniques",*		*accepted for publication on Journal of Cultural Heritage, Elsevier, Volume available online - 2012 (in press).*	Scientific community	
	Publication			*2012*			
311		*Fabio Ganovelli*	*OCME: out-of-core Mesh Editing Made Practical*		*IEEE Computer Graphics and Applications, Volume 32, Number 3, page 46-58 - [Note: this paper was already mentioned in the Year 3 WP5 report, but it was effectively published on 2012]*	Scientific community	
	Publication			*May / June 2012*			
312		*Marco Callieri*	*MeshLab as a complete open tool for the integration of photos and color with*		*CAA 2012 Conference Proc, Southampton (UK)*	Scientific community	
	Publication			*26 March 2012*			

158

			high-resolution 3D geometry data"				
313	*Publication*	*Karina Rodriguez-Echavarria*	*Semantically rich 3D documentation for the preservation of tangible heritage*	*2012*	*VAST12: The 13th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage.*	*Scientific community*	
314	*Publication*	*Sebastian Pena Serna*	*Interactive Semantic Enrichment of 3D Cultural Heritage Collections*	*2012*	*VAST12: The 13th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage.*	*Scientific community*	
315	*Publication*	*Sebastian Pena Serna*	*Exploring and Enriching 3D Cultural Heritage Collections*		*In submission process to ACM Journal on Computing and Cultural Heritage.*	*Scientific community*	
316	*Publication*	*A. Martinovic*	*A Three-Layered Approach to Facade Parsing*	*7-13 October 2012*	*European Conference on Computer Vision 2012, Florence (Italy),*	*Scientific community*	
317	*Publication*	*D. Dai*	*Learning Domain Knowledge for Facade Parsing"*	*7-13 October 2012*	*European Conference on Computer Vision 2012, Florence (Italy),*	*Scientific community*	
318	*Publication*	*Karina Rodriguez-Echavarria*	*Semantically rich 3D documentation for the preservation of tangible heritage*	*2012*	*Accepted at VAST12: The 13th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage.*	*Scientific community*	

159

319		Sebastian Pena Serna	Interactive Semantic Enrichment of 3D Cultural Heritage Collections.		Accepted at VAST12: The 13th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage.	Scientific community		
	Publication				2012			
320		Sebastian Pena Serna	A.: Exploring and Enriching 3D Cultural Heritage Collections		In submission process to ACM Journal on Computing and Cultural heritage.	Scientific community		
	Publication				2012			
321		P. Brivio	PhotoCloud: realtime web-based interactive exploration of large mixed 2D-3D datasets		IEEE Computer Graphics and Applications, Vol 32(?),(in press) Available at: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?tp=&arnumber=6253199&contentType=Early+Access+Articles&sortType%3Dasc_p_Sequence%26filter%3DAND%28p_IS_Number%3A5185484%29	Scientific community		
	Publication				2012			
322		P. Brivio	PileBars: Scalable Dynamic Thumbnail Bars"		Submitted to VAST 2012, Brighton (UK), 2012	Scientific community		
	Publication				2012			
323		3D-COFORM 3rd year report, D7.3				Scientific community		
	Publication				2011			

324	*Publication*	*J. Knopp*	*Hough Transform and 3D SURF for three dimensional classification*	*2010*	*In IEEE ECCV, Chersonissos,*	*Scientific community*		
325	*Publication*	*J. Knopp*	*Orientation invariant 3D object classification using Hough Transform based methods*	*2010*	*In ACM Multimedia Workshop on 3D Object Retrieval, Firenze*	*Scientific community*		
326	*Publication*	*J. Knopp*	*Scene Cut: Class-specific Object Detection and Segmentation in 3D Scenes*	*2011*	*In 3DIMPVT, Hangzhou, 2011*	*Scientific community*		
327	*Publication*	*M. Prasad*	*Class-specific 3D Localization using Constellations of Object Parts*	*2011*	*In BMVC, Dundeee*	*Scientific community*		
328	*Publication*	*Ishrat Badami*	*Material Recognition: Bayesian Inference or SVMs?*	*April. 2012*	*In proceedings of Central European Seminar on Computer Graphics for Students*	*Scientific community*		
329	*Publication*	*Karina Rodriguez-Echavarria*	*Semantically rich 3D documentation for the preservation of tangible heritage.*	*2012*	*Accepted at VAST12: The 13th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage.*	*Scientific community*		
330	*Publication*	*Sebastian*	*Interactive*	*2012*	*Accepted at*	*Scientific community*		

		Pena Serna	Semantic Enrichment of 3D Cultural Heritage Collections		VAST12: The 13th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage.		
331	Publication	Sebastian Pena Serna	A.: Exploring and Enriching 3D Cultural Heritage	2012	Collections In submission process to ACM Journal on Computing and Cultural heritage	Scientific community	
332	Publication	D. Dai	Incorporating Uncertainty in procedural modelling;	2012	To be submitted to: ACM Journal on Computing and Cultural Heritage	Scientific community	
333	Publication	Philip Brown	Vectorising Building Footprints From Historic Maps Brown;	2012	accepted to VAST 2012 Toolkit for non-expert users to create procedural models	Scientific community	
334	Publication	Bein M.	D.W.: Completing Digital Cultural Heritage Objects by Sketching Subdivision Surfaces toward Restoration Planning.	2012	Accepted at EUROMED 2012: International Conference on Cultural Heritage.	Scientific community	
335	Publication	Zmugg R.	A new approach for interactive procedural modelling in cultural	2012	In Proceedings of the 40th Conference of Computer Applications and Quantitative	Scientific community	

					Methods in Archaeology (CAA 2012).			
336			R. Zmugg	Authoring animated interactive 3D Museum Exhibits using a Digital Repository.		Accepted at VAST 2012.	Scientific community		
	Publication				2012				
337			Gregorio Palmas	A practical framework for assembling fragmented objects		paper submitted to IEEE Computer Graphics and Applications on August 2012 (currently under review).	Scientific community		
	Publication				2012				
338			Lucia Arbace	Innovative uses of 3D digital technologies to assist the restoration of a fragmented terracotta statue		Journal of Cultural Heritage, Elsevier, 2012 (in press).	Scientific community		
	Publication				2012				
339			Ritz M.	High Resolution Acquisition of Detailed Surfaces with Lens-Shifted Structured Light.		Computers & Graphics, Vol.36 (2012), 1, pp. 16-27. http://dx.doi.org/10.1016/j.cag.2011.10.004	Scientific community		
	Publication				2011				
340			Christopher Schwartz	Integrated High-Quality Acquisition of Geometry and Appearance for Cultural Heritage,		Proceedings of VAST 2011 pages 25-32	Scientific community		
					October 2011				

341			Christopher Schwartz	WebGL-based Streaming and Presentation Framework for Bidirectional Texture Functions		Proceedings of VAST 2011, pages 113-120,	Scientific community		
	Publication				*October 2011*				
342			*Ute Dercks*	*CENOBIUM – A Project for the Multimedia Representation of Romanesque Cloister Capitals in the Mediterranean Region*		*EVA Berlin 2012, Berlin (Germany*	*Scientific community*		
	Publication				*7 – 9 November 2012*				
343			*Gianpaolo Palma*	*Telling The Story Of Ancient Coins By Means Of Interactive RTI Images Visualization*		*CAA 2012 Conference Proc., Southampton (UK*	*Scientific community*		
	Publication				*26 March 2012*				

Section B (Confidential[5] or public: confidential information to be marked clearly)

Part B1

The applications for patents, trademarks, registered designs, etc. shall be listed according to the template B1 provided hereafter.

The list should, specify at least one unique identifier e.g. European Patent application reference. For patent applications, only if applicable, contributions to standards should be specified. This table is cumulative, which means that it should always show all applications from the beginning until after the end of the project.

TEMPLATE B1: LIST OF APPLICATIONS FOR PATENTS, TRADEMARKS, REGISTERED DESIGNS, ETC.					
Type of IP Rights[6]:	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
NONE					

---

[5] Note to be confused with the "EU CONFIDENTIAL" classification for some security research projects.

[6] A drop down list allows choosing the type of IP rights: Patents, Trademarks, Registered designs, Utility models, Others.

Part B2

In addition to the table, please provide a text to explain the exploitable foreground, in particular:

- Its purpose
- How the foreground might be exploited, when and by whom
- IPR exploitable measures taken or intended
- Further research necessary, if any
- Potential/expected impact (quantify where possible)

See table in Publishable Summary.

Please complete the table hereafter:

Type of Exploitable Foreground[7]	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application[8]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	**REPOSITORY INFRASTRUCTURE (RI) NEW DISTRIBUTED DATABASE INFRASTRUCTURE TO MANAGE DIGITAL 3D CH ARTEFACTS AND ASSOCIATED SEMANTICS (META DATA)**	**NO**		**SOFTWARE**	**R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES**		**NO**	**OWNERS: TU GRAZ, FORTH (OBJECT REPOSITORY, METADATA REPOSITORY) TU BONN (MATERIAL SEARCH INDEXING), KUL (SHAPE SEARCH INDEXING)**
General advancement of knowledge	**INGESTION TOOL INTERACTIVE SOFTWARE TOOL TO INGEST DATA INTO THE RI**	**NO**		**SOFTWARE**	**R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES**		**NO**	**OWNER: FORTH**

---

[19] A drop down list allows choosing the type of foreground: General advancement of knowledge, Commercial exploitation of R&D results, Exploitation of R&D results via standards, exploitation of results through EU policies, exploitation of results through (social) innovation.

[8] A drop down list allows choosing the type sector (NACE nomenclature) : http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & other Beneficiary(s) involved
General advancement of knowledge	Europeana Extractor Interactive Software tool to extract metadata from the RI to publish in Europeana	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: FORTH (Europeana Extractor), Fraunhofer (digital 3D file conversion or-> X3D)
General advancement of knowledge	Long term preservation manager interactive software tool to preserve data for long term	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: HATII
General advancement of knowledge	Metadata Generator Interactive Software tool to map mass metadata into CIDOC-CRM	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: TU Graz

Type of Exploitable Foreground	DESCRIPTION OF EXPLOITABLE FOREGROUND	CONFIDENTIAL CLICK ON YES/NO	FORESEEN EMBARGO DATE DD/MM/YYYY	EXPLOITABLE PRODUCT(S) OR MEASURE(S)	SECTOR(S) OF APPLICATION	TIMETABLE, COMMERCIAL OR ANY OTHER USE	PATENTS OR OTHER IPR EXPLOITATION (LICENCES)	OWNER & OTHER BENEFICIARY(S) INVOLVED
General advancement of knowledge	COREXPLORER INTERACTIVE SOFTWARE TOOL TO ADMINISTRATE THE OBJECT REPOSITORY	NO		SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES		NO	OWNER: TU GRAZ
General advancement of knowledge	ARC3D SERVER-BASED SOFTWARE FOR IMAGE-BASED 3D RECONSTRUCTION	NO		SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES		NO	OWNER: KU LEUVEN
General advancement of knowledge	IN-HAND SCANNING DEVICE AND SOFTWARE FOR DIGITIZING 3D OBJECTS	NO		HARDWARE / SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES AND OTHER BRANCHES		NO	OWNER: ETHZ

Type of Exploitable Foreground	Description of Exploitable Foreground	Confidential Click on YES/NO	Foreseen Embargo Date DD/MM/YYYY	Exploitable Product(s) or Measure(s)	Sector(s) of Application	Timetable, Commercial or Any Other Use	Patents or Other IPR Exploitation (Licences)	Owner & Other Beneficiary(s) Involved
General advancement of knowledge	Mini dome (incl. SW and rendering components) Apparatus for acquiring 'flat' 3D objects leveraging a Photo-metric Stereo approach	NO		Hardware / Software	R91 - Libraries, archives, museums and other cultural activities and other branches	??	NO	Owner: KU Leuven

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	Multi-view dome (incl. SW and rendering components) Apparatus for acquiring material and shape properties of optically complicated 3D objects	NO		Hardware / Software	R91 - Libraries, archives, museums and other cultural activities and other branches	Commercialization underwas via X-Rite	??	Owner: TU Bonn
General advancement of knowledge	MeshLab (incl. Watermarking, TabletPC edition, iOS edition, …)) Interactive software tool for mesh processing	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: CNR-ISTI

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (Licences)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	Shape Segmentation Tool Interactive software tool for segmenting digital 3D artefacts	NO		Software	R91 - Libraries, archives, museums and other cultural activities	Use in other projects is under negotiation (as part of the IVB)	NO	Owner: Fraunhofer
General advancement of knowledge	Shape Dimensioning Toolkit Interactive software tool to measure digital 3D shapes	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: TU Graz

172

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen Embargo Date DD/MM/YY YY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (Licences)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	Legacy data Mapping Tool Interactive software tool to map metadata from existing databases (LEgacy DB) into the CIDOC-CRM structures of the 3D-COFORM repository	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: PIN
General advancement of knowledge	Multi-Lingual Support Library Software component (library) to support the processing and mapping of multiple languages	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: UoB

Type of Exploitable Foreground	DESCRIPTION OF EXPLOITABLE FOREGROUND	CONFIDENTIAL CLICK ON YES/NO	FORESEEN EMBARGO DATE DD/MM/YYYY	EXPLOITABLE PRODUCT(S) OR MEASURE(S)	SECTOR(S) OF APPLICATION	TIMETABLE, COMMERCIAL OR ANY OTHER USE	PATENTS OR OTHER IPR EXPLOITATION (LICENCES)	OWNER & OTHER BENEFICIARY(S) INVOLVED
General advancement of knowledge	CO-REFERENCING RESOLUTION TOOL INTERACTIVE SOFTWARE TOOL TO RESOLVE CO-REFERENCING ISSUES IN THE SEMANTIC NET OF METADATA	NO		SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES		NO	OWNER: FORTH
General advancement of knowledge	IVB INTERACTIVE SOFTWARE TOOL TO SEARCH, BROWSE, VIEW AND ANNOTATE DIGITAL 3D ARTEFACTS IN THE RI	NO		SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES	USE IN OTHER PROJECTS IS UNDER NEGOTIATION COMMERCIALIZATION PLANNED (VIEW AND ANNOTATE) AS PART OF FRAUNHOFER'S DIGILAB ACTIVITY (2014)	NO	OWNER: FRAUNHOFER (VIEW AND ANNOTATE COMPONENT), CNR-ISTI (SEARCH AD BROWSE COMPONENT), KUL (SHAPE SEARCH COMPONENT), UBo (MATERIAL SEARCH COMPONENT)

Type of Exploitable Foreground	Description of Exploitable Foreground	Confidential Click on YES/NO	Foreseen Embargo Date DD/MM/YYYY	Exploitable Product(s) or Measure(s)	Sector(s) of Application	Timetable, Commercial or Any Other Use	Patents or Other IPR Exploitation (Licences)	Owner & Other Beneficiary(s) Involved
General advancement of knowledge	Shape Search Component	NO		Software	R91 - Libraries, Archives, Museums and Other Cultural Activities		NO	Owner: KUL
General advancement of knowledge	Material Search Component	NO		Software	R91 - Libraries, Archives, Museums and Other Cultural Activities		NO	Owner: UBo

Type of Exploitable Foreground	Description of Exploitable Foreground	Confidential Click on YES/NO	Foreseen Embargo Date DD/MM/YYYY	Exploitable Product(s) or Measure(s)	Sector(s) of Application	Timetable, Commercial or any other use	Patents or other IPR Exploitation (Licences)	Owner & Other Beneficiary(s) Involved
General advancement of knowledge	SITEEXPLORER INTERACTIVE SOFTWARE TOOL TO VISUALIZE AND EXPLORE A DIGITIZED EXCAVATION SITE AND LINK DIGITAL IMAGES FROM THE EXCAVATION ENDEAVOUR	NO		SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES		NO	OWNER: UEA
General advancement of knowledge	PHOTOCLOUD INTERACTIVE SOFTWARE TOOL TO BROWSE IMAGE-BASED 3D RECONSTRUCTIONS AND THE ASSOCIATED IMAGE COLLECTIONS	NO		SOFTWARE	R91 - LIBRARIES, ARCHIVES, MUSEUMS AND OTHER CULTURAL ACTIVITIES		NO	OWNER: CNR-ISTI

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (Licences)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	AnnoMAD Interactive software tool to annotated texts and create semantic relationships between documents in the CIDOC-CRM based RI	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: PIN
General advancement of knowledge Commercial exploitation of R&D results	CityEngine interactive software tool to generate buildings and cities following a rule-based approach	NO		Software	R91 - Libraries, archives, museums and other cultural activities and other branches, e.g. film and games	Commercially available via ESRI	??	Owner: ETHZ, ESRI

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & other Beneficiary(s) involved
General advancement of knowledge	Footprint Extractor Interactive Software tool to vectorize outlines of buildings from ancient maps	NO		Software	R91 - Libraries, archives, museums and other cultural activities, GIS		NO	Owner: UEA
General advancement of knowledge	GML Compositor Interactive Software tool to compose scenes based on GML	NO		Software	R91 - Libraries, archives, museums and other cultural activities, exhibition planning		NO	Owner: TU Graz

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	Shape Sketching Interactive software tool to create digital 3D shapes or to extend and augment scanned ones using a sketch-based modelling approach	NO		Software	R91 - Libraries, archives, museums and other cultural activities, industrial design		NO	Owner: Fraunhofer
General advancement of knowledge	Fragment Re-Assembler Interactive software tool to re-assemble scanned fragments in the digital domain	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: CNR-ISTI

Type of Exploitable Foreground	Description of Exploitable Foreground	Confidential Click on YES/NO	Foreseen Embargo Date DD/MM/YYYY	Exploitable Product(s) or Measure(s)	Sector(s) of Application	Timetable, Commercial or any other use	Patents or other IPR Exploitation (Licences)	Owner & Other Beneficiary(s) Involved
General advancement of knowledge	Visualization Support Library Software Component (Library) which supports sophisticated rendering algorithms (IBL. HDRI, PRT, BTF, etc.) and dedicated model representations (GML, CityEngine, Nexus) based on OpenSG 2.0	NO		Software	R91 - Libraries, Archives, Museums and other cultural activities and other branches		NO	Owner: UBo, CNR-ISTI, Fraunhofer, ETHZ, TU Graz, UoB

Type of Exploitable Foreground	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date DD/MM/YYYY	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & other Beneficiary(s) involved
General advancement of knowledge	Community Presenter Authoring tool to create presentations out of digital 3D artefacts and associated multi-media for museum and Web visitors	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: CNR-ISTI
General advancement of knowledge	Scene Assembler Interactive software tool to compose and animate scenes based on GML	NO		Software	R91 - Libraries, archives, museums and other cultural activities		NO	Owner: TU Graz

Report on societal implications

Replies to the following questions will assist the Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

A	General Information *(completed automatically when **Grant Agreement number** is entered.*

Grant Agreement Number:	231809

Title of Project:	3D-COFORM – Tools and Expertise for 3D Collection Formation

Name and Title of Coordinator:	Prof. David Arnold

B	Ethics

1. Did your project undergo an Ethics Review (and/or Screening)? • If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 *'Work Progress and Achievements'*	*0Yes ☑No*

2. Please indicate whether your project involved any of the following issues (tick box) :	
RESEARCH ON HUMANS	
• Did the project involve children?	
• Did the project involve patients?	
• Did the project involve persons not able to give consent?	
• Did the project involve adult healthy volunteers?	
• Did the project involve Human genetic material?	
• Did the project involve Human biological samples?	
• Did the project involve Human data collection?	
RESEARCH ON HUMAN EMBRYO/FOETUS	
• Did the project involve Human Embryos?	
• Did the project involve Human Foetal Tissue / Cells?	
• Did the project involve Human Embryonic Stem Cells (hESCs)?	
• Did the project on human Embryonic Stem Cells involve cells in culture?	
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	
PRIVACY	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	
• Did the project involve tracking the location or observation of people?	
RESEARCH ON ANIMALS	
• Did the project involve research on animals?	
• Were those animals transgenic small laboratory animals?	

• Were those animals transgenic farm animals?	
• Were those animals cloned farm animals?	
• Were those animals non-human primates?	
RESEARCH INVOLVING DEVELOPING COUNTRIES	
• Did the project involve the use of local resources (genetic, animal, plant etc)?	
• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?	
DUAL USE	
• Research having direct military use	0 Yes ☑No
• Research having the potential for terrorist abuse	

C   Workforce Statistics

3.   Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).

Type of Position	Number of Women	Number of Men
Scientific Coordinator	0	2
Work package leaders	5	9
Experienced researchers (i.e. PhD holders)	13	40
PhD Students	3	32
Other	12	43

4. How many additional researchers (in companies and universities) were recruited specifically for this project?	**22**
Of which, indicate the number of men:	17

D Gender Aspects

5.	**Did you carry out specific Gender Equality Actions under the project**?	○ ☑	Yes No

6. **Which of the following actions did you carry out and how effective were they?**

	Not at all effective				Very effective
❑ Design and implement an equal opportunity policy	○	○	○	○	○
❑ Set targets to achieve a gender balance in the workforce	○	○	○	○	○
❑ Organise conferences and workshops on gender	○	○	○	○	○
❑ Actions to improve work-life balance	○	○	○	○	○
○ Other:					

7. **Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?**

○ Yes- please specify

☑ No

E Synergies with Science Education

8. **Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?**

☑ Yes- please specify   [See public deliverables]

○ No

9. **Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?**

☑ Yes- please specify   [See public deliverables]

○ No

F Interdisciplinarity

10. **Which disciplines (see list below) are involved in your project?**

○ Main discipline[9]: 1.1

○ Associated discipline[9]: 1.2   ○ Associated discipline[9]: 6.1

G Engaging with Civil society and policy makers

11a	**Did your project engage with societal actors beyond the research community?** *(if 'No', go to Question 14)*	☑ ○	Yes No

11b **If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?**

○ No

○ Yes- in determining what research should be performed

☑ Yes - in implementing the research

☑ Yes, in communicating /disseminating / using the results of the project

---

[9] Insert number from list below (Frascati Manual).

11c	**In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?**	○ ☑	Yes No

12. Did you engage with government / public bodies or policy makers (including international organisations)

- ○ No
- ○ Yes- in framing the research agenda
- ☑ Yes - in implementing the research agenda
- ☑ Yes, in communicating /disseminating / using the results of the project

13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?

- ○ Yes – as a **primary** objective (please indicate areas below- multiple answers possible)
- ☑ Yes – as a **secondary** objective (please indicate areas below - multiple answer possible)
- ○ No

13b If Yes, in which fields?

Agriculture **Audiovisual and Media** Budget Competition Consumers **Culture** Customs Development Economic and Monetary Affairs **Education, Training, Youth** Employment and Social Affairs	Energy Enlargement **Enterprise** Environment External Relations External Trade Fisheries and Maritime Affairs Food Safety Foreign and Security Policy Fraud Humanitarian aid	Human rights **Information Society** Institutional affairs Internal Market Justice, freedom and security Public Health Regional Policy **Research and Innovation** Space Taxation Transport

13c	**If Yes, at which level?**
	☑ Local / regional levels
	☑ National level
	☑ European level
	☑ International level

H   Use and dissemination

14. How many Articles were published/accepted for publication in peer-reviewed journals?	**170**
To how many of these is open access[10] provided?	**32**
How many of these are published in open access journals?	
How many of these are published in open repositories?	
To how many of these is open access not provided?	**138**
Please check all applicable reasons for not providing open access:	
☑ publisher's licensing agreement would not permit publishing in a repository ❑ no suitable repository available ❑ no suitable open access journal available ☑ no funds available to publish in an open access journal ☑ lack of time and resources ❑ lack of information on open access ❑ other[11]: ……………	

15. How many new patent applications ('priority filings') have been made? *("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).*		**0**
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	Trademark	**0**
	Registered design	**0**
	Other	**0**

17. How many spin-off companies were created / are planned as a direct result of the project?	**1**
Indicate the approximate number of additional jobs in these companies:	

18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:
❑ Increase in employment, or   ❑ In small & medium-sized enterprises ❑ Safeguard employment, or   ❑ In large companies ❑ Decrease in employment,   ❑ None of the above / not relevant to the project ☑ Difficult to estimate / not possible to quantify

19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (*FTE = one person working fulltime for a year*) jobs:	*Indicate figure:*

Difficult to estimate / not possible to quantify	☑

I Media and Communication to the general public

20.	**As part of the project, were any of the beneficiaries professionals in communication or media relations?**
	☑ Yes ○ No

21.	**As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?**
	○ Yes ☑ No

22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?

☑	Press Release	☑	Coverage in specialist press
☑	Media briefing	☑	Coverage in general (non-specialist) press
☑	TV coverage / report	☑	Coverage in national press
☑	Radio coverage / report	☑	Coverage in international press
☑	Brochures /posters / flyers	☑	Website for the general public / internet
☑	DVD /Film /Multimedia	☑	Event targeting general public (festival, conference, exhibition, science café)

23 In which languages are the information products for the general public produced?

☑	Language of the coordinator	☑	English
☑	Other language(s)		

Question F-10: Classification of Scientific Disciplines according to the Frascati Manual 2002 (Proposed Standard Practice for Surveys on Research and Experimental Development, OECD 2002):

FIELDS OF SCIENCE AND TECHNOLOGY

1. NATURAL SCIENCES
1.1 Mathematics and computer sciences [mathematics and other allied fields: computer sciences and other allied subjects (software development only; hardware development should be classified in the engineering fields)]
1.2 Physical sciences (astronomy and space sciences, physics and other allied subjects)
1.3 Chemical sciences (chemistry, other allied subjects)
1.4 Earth and related environmental sciences (geology, geophysics, mineralogy, physical geography and other geosciences, meteorology and other atmospheric sciences including climatic research, oceanography, vulcanology, palaeoecology, other allied sciences)
1.5 Biological sciences (biology, botany, bacteriology, microbiology, zoology, entomology, genetics, biochemistry, biophysics, other allied sciences, excluding clinical and veterinary sciences)

2 ENGINEERING AND TECHNOLOGY
2.1 Civil engineering (architecture engineering, building science and engineering, construction engineering, municipal and structural engineering and other allied subjects)
2.2 Electrical engineering, electronics [electrical engineering, electronics, communication engineering and systems, computer engineering (hardware only) and other allied subjects]
2.3. Other engineering sciences (such as chemical, aeronautical and space, mechanical, metallurgical and materials engineering, and their specialised subdivisions; forest products; applied sciences such as

geodesy, industrial chemistry, etc.; the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other applied subjects)

3. MEDICAL SCIENCES
3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immunohaematology, clinical chemistry, clinical microbiology, pathology)
3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)
3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)

4. AGRICULTURAL SCIENCES
4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)
4.2 Veterinary medicine

5. SOCIAL SCIENCES
5.1 Psychology
5.2 Economics
5.3 Educational sciences (education and training and other allied subjects)
5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary , methodological and historical S1T activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].

6. HUMANITIES
6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.)
6.2 Languages and literature (ancient and modern)
6.3 Other humanities [philosophy (including the history of science and technology) arts, history of art, art criticism, painting, sculpture, musicology, dramatic art excluding artistic "research" of any kind, religion, theology, other fields and subjects pertaining to the humanities, methodological, historical and other S1T activities relating to the subjects in this group]

FINAL REPORT ON THE DISTRIBUTION OF THE EUROPEAN UNION FINANCIAL CONTRIBUTION

This report shall be submitted to the Commission within 30 days after receipt of the final payment of the European Union financial contribution.

Final payment yet to be received

Report on the distribution of the European Union financial contribution between beneficiaries

Name of beneficiary	Final amount of EU contribution per beneficiary in Euros
1.	
2.	
n	
Total	