Proceedings e report

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Electronic Imaging & the Visual Arts

EVA 2016 Florence

11-12 May 2016

edited by
Vito Cappellini and Enrico Del Re

Firenze University Press
2016

Electronic Imaging & the Visual Arts : Eva 2016 Florence / edited by Vito Cappellini and Enrico Del Re. – Firenze : Firenze University Press, 2016.
(Proceedings e report ; 111)

http://digital.casalini.it/9788866559740

ISBN 978-88-6655-973-3 (print)
ISBN 978-88-6655-974-0 (online)

Peer Review Process
All publications are submitted to an external refereeing process under the responsibility of the FUP Editorial Board and the Scientific Committees of the individual series. The works published in the FUP catalogue are evaluated and approved by the Editorial Board of the publishing house. For a more detailed description of the refereeing process we refer to the official documents published on the website and in the online catalogue of the FUP (www.fupress.com).

CC 2016 Firenze University Press
Università degli Studi di Firenze
Firenze University Press
via Cittadella 7, 50144 Firenze, Italy
www.fupress.com
Printed in Italy

PROGRAM

Electronic Imaging & the Visual Arts

'The Foremost European Electronic Imaging Events in the Visual Arts'

Forum for Users, Suppliers & Researchers

The key aim of this Event is to provide a forum for the user, supplier and scientific research communities to meet and exchange experiences, ideas and plans in the wide area of Culture & Technology. Participants receive up to date news on new EC and international arts computing & telecommunications initiatives as well as on Projects in the visual arts field, in archaeology and history. Working Groups and new Projects are promoted. Scientific and technical demonstrations are presented.

Main Topics

- 2D – 3D Digital Image Acquisition
- Leading Edge Applications: Galleries, Libraries, Education, Archaeological Sites, Museums & Historical Tours
- Mediterranean Initiatives in Technology for Cultural Heritage: Synergy with European & International Programmes
- Integrated Digital Archives for Cultural Heritage and Contemporary Art
- Management of Museums by using ICT Technology: Access, Guides, Documentation & Other Services
- The Impact of New Mobile Communications on Cultural Heritage and Modern Arts Area
- Semantic Webs
- Human - Computer Interaction for Cultural Heritage Applications
- Copyright Protection (Watermarking), Anti-Counterfeiting and Electronic Commerce
- Culture and *e-government*
- Activities and Programmes for *e-learning*
- Applications to TV & Cinema
- 3D Developments and Applications in the Cultural Heritage Area
- Digital Theater
- Cultural Tourism & Travel Applications
- Art and Medicine

WHO SHOULD ATTEND

THE CULTURAL SECTOR: The Visual Arts Community including Museums, Libraries, Archaeological Sites, Educational Institutions, Commercial Galleries and Dealers, Auction Houses, Artists & Collectors

THE HI-TECH INDUSTRY SECTOR: Multimedia Systems, Image Acquisition & Analysis, Data-bases, Display & Printing, ICT Industry, Telematics & Systems Manufacturing, On-line Information Services

MEDIA & RELATED SECTORS: Publishing, Press, Film, Television, Photography, Printing, Advertising, Graphics Design, Consumer Media

IMAGING SYSTEMS RESEARCHERS: Imaging Systems, 3-D Acquisition, Reconstruction & Representation Systems, Information Sciences

TOURISM & TRAVEL SECTOR: Tourism Agencies & Operators, Travel Agencies

THE GOVERNMENT SECTOR: Ministries of Culture and other Institutions involved in Cultural Heritage, Ministries of Industry, Education, Research and Science, Regional Governments

Vito Cappellini and Enrico Del Re (edited by), *Electronic Imaging & the Visual Arts. Eva 2016 Florence.*
ISBN 978-88-6655-973-3 (print) ISBN 978-88-6655-974-0 (online)

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PROGRAM

1 - CONFERENCE

Wednesday, 11 May: 14,15 – 19,10
Thursday, 12 May: 9,00 – 17,55

2 - WORKSHOP

Wednesday, 11 May: 9,00 – 13,00

3 - SPECIAL EVENT

Wednesday, 11 May: 19,30 – 21,30

4 - TECHNICAL EXHIBITION

Thursday, 12 May: 10,00 – 17,00

Venue: **Hotel Pierre**
Via De' Lamberti, 5
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ROOM A

1 - CONFERENCE

Wednesday, 11 May

Chairmen: *Vito Cappellini, University of Florence*
Enrico Del Re, University of Florence

14,15 *Opening:* *Luigi Dei,*
Rector of University of Florence
Enrico Del Re,
Director of Department of Information Engineering – University of Florence
James Hemsley,
EVA Conferences International
Pier Luigi Rossi Ferrini,
Vice-President Ente Cassa di Risparmio di Firenze
Paolo Castellacci,
President GRUPPO SESA

15,15 Coffee Break

ROOM A

15,30 **SESSION 1 – STRATEGIC ISSUES**
Chairman: *Paolo Blasi, University of Florence, Florence, Italy*

"Innovative tools for the creation, reuse and retrieval of digital cultural content"	Rossella Caffo Michael-Culture Association
"IP Strategic Role"	Daniela Mainini Anti-Counterfeiting Center Milan, Italy
"High Quality Archive Project for Polo Museale Fiorentino: Exploitation Activities. Demonstrations and Exhibitions in Japan"	Takashi Hamazaki DIS Project, Hitachi Ltd. Yokohama, Japan
"eFoto Hamburg Lab"	Christoph Wienberg[1], Horst Scholz[2] [1]IT and Project Management, Office of Hamburg's CIO, Hamburg, Germany [2]Information Technology and Digital Projects, Hamburg Ministry of Culture, Hamburg, Germany

“Museo Nazionale del Bargello”	Ilaria Ciseri Museo Nazionale del Bargello, Florence, Italy
“Uffizi Virtual Experience. Da Giotto a Caravaggio”	Marco Cappellini[1], Paolo De Rocco[1], Paolo Romoli[1], Marxiano Melotti[2], Vito Cappellini[3], [1]VirtuItaly, Florence, Italy [2]Bicocca University, Milan, Italy [3]University of Florence, Florence, Italy

ROOM A

17,30 **SESSION 2 – NEW SCIENCE AND CULTURE DEVELOPMENTS & APPLICATIONS**

Chairman: Konstantine Karczmarski, University Innovation Office, ITMO University, St.Petersburg, Russia

“Beauty as a Bridge Between Cultures”	Giuseppe O. Longo Information Theory, University of Trieste, Trieste, Italy
“Recent advances in spectral imaging for cultural heritage documentation and analysis”	Jon Yngve Hardeberg, Sony George, The Norwegian Colour and Visual Computing Laboratory, NTNU, Gjøvik, Norway
“Application of Big Data and Content Curation to Exploitation of Cultural Heritage"	Konstantine Karczmarski Department of Innovations, ITMO University, Saint Petersburg, Russia
“Piezomusicolor. A natural Form of Technological Art”	Giuseppe Caglioti[1], Marco Marcon[1], Tatiana Tchouvileva[1], Riccardo Della Ragione[2] [1]Politecnico di Milano, Milan, Italy [2]Magic Music s.a.s, Livorno, Italy
“The Use of Patient Specific Instrumentation during Total Knee Replacement Surgery”	Lawrence Camarda, Antonio D’Arienzo, Salvatore Morello, Michele D’Arienzo Orthopaedic and Traumatology Department, University of Palermo, Palermo, Italy

Thursday, 12 May

ROOM A

9,00 **INTERNATIONAL FORUM ON "CULTURE & TECHNOLOGY**
Chairman: Vito Cappellini, University of Florence, Florence, Italy

The structure of the FORUM is presented.
Actual developments and perspectives are outlined:

- Cooperation Groups
- Proposed Projects
- Funding Opportunities
- European Commission Plans (HORIZON 2020)

Speakers Include:

- Cristina Acidini, President Accademia delle Arti del Disegno, Florence, Italy
- Nikolay Borisov, President of Center of Design and Multimedia, ITMO University, Saint Petersburg, Russia
- Edoardo Calia, Research Director, Istituto Superiore Mario Boella, Torino, Italy
- Alberto Del Bimbo, Director Centro per la Comunicazione e l'Integrazione dei Media, Florence, Italy
- Monica Carfagni, President Promo Design, Calenzano, Florence, Italy
- Fabio Donato, University of Ferrara, Italian Representative in HORIZON 2020-SC6 Committee
- Paolo Zampini, Director of Conservatorio di Musica Luigi Cherubini, Florence, Italy

11,00 Coffee Break

11.15 **SESSION 3 – NEW TECHNICAL DEVELOPMENTS & APPLICATIONS**
Chairman: *Jon Yngve Hardeberg, The Norwegian Colour and Visual Computing Laboratory, NTNU, Gjøvik, Norway*

"The Fear for Virtual: Social Innovation and Technology"	Eugenia Romanelli Journalist Rome, Italy

"Perception-Based Histogram Equalization for Tone Mapping Applications"	S. Ploumis[1], Ronan Boitard[1], Mahsa T. Pourazad[2, 3],Panos Nasiopoulos[1, 3] [1]Elect. and Computer Eng. Department, University of British Columbia, Vancouver, Canada [2]TELUS Communications Inc., Vancouver, Canada [3]The Inst. for Computing, Information and Cognitive Systems (ICICS), Vancouver, Canada
"From *Encyclopédie* plates to visual knowledge for craftsmen: the project *Visuoplanches"*	Marcantonio Catelani[1], Maria Teresa Zanola[2], Clara Vecchio[2] [1]University of Florence, Florence, Italy [2]Università Cattolica del Sacro Cuore, Milan, Italy
"Culture and Computer Science to Change Society's Behavior"	Wilhelmina Ndapewa-Onyothi Nekoto[1,2], Hippolyte N'Sung-Nza Muyingi[2] Jürgen Sieck[1,2] [1]University of Applied Sciences Berlin, Berlin, Germany [2]Namibia University of Science and Technology, Namibia
"New Trends of 3D Technologies"	Chiara Soffici[1], Francesca Uccheddu[2], Francesco Falaschi[3], Vito Cappellini[4], [1]Master Thesis in Economy and Management, Florence University, Florence, Italy [2]DINFO - University of Florence, INN-3D, Florence, Italy [3]VARGROUP, Empoli, Florence, Italy [4]University of Florence, INN-3D, Florence, Italy
"New 3D Scene Representation for FTV"	Masayuki Tanimoto Nagoya Industrial Science Research Institute Nagoya, Japan

13,15 Lunch Break

ROOM A

14,40 **SESSION 4 – MUSEUMS – VIRTUAL GALLERIES AND RELATED INITIATIVES**

Chairman: Andrea De Polo, Fratelli Alinari IDEA, Florence, Italy

"Terahertz Advanced Research Techniques for Non-Invasive Analysis in Art Conservation (THz-ARTE)"	M. Picollo[1], A. Aldrovandi[1,2], G. Bartolozzi[1], A. Casini[1], C. Cucci[1], A. Doria[3], K. Fukunaga[4], G.P. Gallerano[3], E. Giovenale[3], R. Olmi[1], M. Poggesi[1], L. Stefani[1] [1]"Nello Carrara" Institute for Applied Physics of the Italian National Research Council (IFAC-CNR), Sesto Fiorentino, Florence, Italy [2]Opificio delle Pietre Dure (OPD), Florence, Italy [3]National Institute of Information and Communications Technology (NICT), Tokyo, Japan [4]ENEA-Frascati, Frascati, Rome, Italy

"The Secrets of the Work of Art. Mysteries concealed behind old Restorations and the Truth Revealed "	Sara Penco, Restorer ad Creator for the "SMARTICON Project", Rome, Italy
"Cultural Assets, 'Extended' Museums and the Historic City: the Case Study of an App for Genoa"	Valentina Fiore, Lauro Magnani, Sara Rulli Dept. D.I.R.A.A.S. Università degli Studi di Genova Genoa, Italy
"3D Services at Museo Galileo"	Luisa Barattin, Marco Berni, Elena Fani Museo Galileo - Institute and Museum of the History of Science, Florence, Italy

16,00 Coffee Break

ROOM A

16,15 **SESSION 5 – ACCESS TO THE CULTURE INFORMATION**
Chairman: James Hemsley, EVA Conferences International, U.K .

"Art in the Neuroscience Era. How the Brain Understands and Creates Art"	Raffaella Folgieri[1], Ludovico Dei Cas[2], Francesco Soave[3], Claudio Lucchiari[1] [1]Dipartimento di Filosofia, Università degli Studi di Milano, Milan, Italy [2] CdL Scienze Biologiche, Università degli Studi di Milano, Milan, Italy [3]Msc Interactive Digital Media, Ravensbourne College of Design and Communication, London, U.K
"Disability & Digital Discussion: Global, EU & Italian Developments in the New Millennium"	James Hemsley VASARI Research Centre, Birkbeck College, Universtity of London and EVA Conferences International, London, U.K.
"Toviva Project: Documenting the Spanish Defense Towers along the Valencian Coast with a Comprehensive Digital Methodology	A. Pablo Rodríguez-Navarro[1], B. Giorgio Verdiani[2], C. Teresa Gil Piqueras[1] [1]Departamento de Expresión Gráfica Arquitectónica Univesitat Politècnica de Valèncian Valencia, Spain [2]Dipartimento di Architettura, Università degli Studi di Firenze, Florence, Italy
"Rio´s Digital Atelier Murat under Verrochio´s Spell"	Heitor Luiz Murat de Meirelles Quintella, Stratimidia's Murat MAGIC (Maison d'Art Galerie et Imaginarium Contemporain) Atelier, Rio de Janeiro, Brasil

2 - WORKSHOP

ROOM A

WORKSHOP INNOVATION AND ENTERPRISE – INNOVAZIONE E IMPRESA

(Italian Language)
9,00 – 13,00

Chairman: *Enrico Bocci, Progetto Ricerca e Innovazione, Confindustria Firenze e Presidente Opera Medicea Laurenziana, Florence, Italy*

Technological requirements in the Cultural Heritage field are outlined and opportunities for Italian Enterprises and SME's working in the field, using new technologies, are presented.

Regional and national applied research Programs in Italy are described.

Activities by National Organizations and Firms working in the area of Telecommunications, Informatics, Environment and Infomobility are presented.

Funding by European Commission is considered, with particular reference to multimedia and telematics for Cultural Heritage. Special consideration is given to the new EC Plan HORIZON 2020.

Initiatives regarding the "know-how" transfer from Research Organizations to the Industrial Sector are described.

Organizations and Companies present their activities and experiences.

Invited Speakers:
- *Andrea Arnone, Pro-Rettore al Trasferimento Tecnologico e Presidente di CsaVRI, Università degli Studi di Firenze*
- *Laura Castellani, Responsabile del Settore Infrastrutture e Tecnologie per lo Sviluppo della Società dell'Informazione, Regione Toscana*

Speakers include:
- *Renzo Zampini, INFOCAMERE*
- *Stefano Cinquini, TELECOM ITALIA*
- *Paola Castellacci, VARGROUP*
- *Daniele Corsini, CABEL*
- *Riccardo Bruschi and Luca Bencini, T.T. Tecnosistemi, Prato*
- *Francesca Gemma, Aracne editrice int.le, Roma*
- *Gianpiero Alfarano, DESIGN CAMPUS, Calenzano, Firenze*
- *Gianluca Vannuccini, Servizio Sviluppo Infrastrutture Tecnologiche, Comune di Firenze*
- *Andrea del Re, Studio Legale Del Re – Sandrucci, Firenze*
- *Franco Guidi, NEUMUS, Firenze*
- *Carlo U. Quinterio Brentano, Philip Mazzei Association, Firenze*
- *Alessandra Scappini, SINCRESIS, Empoli, Firenze*

3 - SPECIAL EVENT

Wednesday, 11 May 19,30 – 21,30

Visit to Opera Medicea Laurenziana
Piazza San Lorenzo, 9, Florence

*(in cooperation with **Antica Compagnia del Paiolo**)*

4 - TECHNICAL EXHIBITION

Thursday, 12 May: 10,00 – 17,00

ROOM B

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PROCEEDINGS

STRATEGIC ISSUES

Vito Cappellini and Enrico Del Re (edited by), *Electronic Imaging & the Visual Arts. Eva 2016 Florence*.
ISBN 978-88-6655-973-3 (print) ISBN 978-88-6655-974-0 (online)

TOVIVA PROJECT: DOCUMENTING THE SPANISH DEFENSE TOWERS ALONG THE VALENCIAN COAST WITH A COMPREHENSIVE DIGITAL METHODOLOGY

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Abstract – The Spanish Mediterranean coasts, offers a suggestive sequence of towers, they were built, since the sixteenth century, to protect the territory from pirates. Once defeated the piracy of that time in the "Mare Nostrum", the coastal towers system lost its defensive function, but remained as a testimony of history. The Toviva project, supported by the Spanish Ministry and developed by a Spanish-Italian team, is aimed to the creation of a virtual network using advanced digital tools, where the towers become components for knowledge dissemination and a link between the cultural heritage of a territory and its history.

INTRODUCTION

Spain, in its Mediterranean coasts, offers a suggestive sequence of towers, this system is integrated and showed in the landscape for defence and surveillance purposes. It has represented an articulated military system since the XVI century, when there was the need to protect a territory otherwise at risk of being attacked by pirates. Once the pirates were defeated in the "Mare Nostrum", the coastal towers system lost its defensive function, but remained as a historical witness. Such a heritage can now benefit from a specific digital approach. In this, as under development in the research presented here it is important to analyze what are the final research needs, while they rise a list of products to be obtained and will result from the point of view of the graphical documentation, in a number of plans to scale, photogrammetries, 3D models, pictures and videos [1]. The first step is defining an appropriate methodology which may include traditional direct surveys, photogrammetric surveys (2D correction, 3D restitution), 3D laser scanning, UAV/drones aerial shooting, photographs, spherical panoramas, videos, etc... The Toviva project, supported by the Spanish Ministry and developed by a Spanish-Italian team, is aimed to contribute in creating a virtual network of towers as an amplification of the real buildings, where the towers become component of dissemination of knowledge and represent a link between the cultural heritage of a territory and its history.

Historical notes

In 1453 Constantinople was conquered by Sultan Mehmed II. This event signed the beginning of the fight to control the Mediterranean Coast. The quantity of pirate attacks

augmented and this caused the conquest of Argel in 1516 by Arrouj *Barbarrosa*. During the XVI century pirate attacks increased and expanded around the coast causing sacking and robbery [2]. This century was also a period of confluence as never seen before along the Valencian Coast. A complex social-political context and the technological development produced the birth of a very articulated military architecture system in the territory. In 1557, Felipe II became King and began an ambitious project which was previously traced by the Duke of Maqueda, it was based on building a network of watchtowers, fortresses, walls and defences to protect the coast. Giovanni Battista Antonelli "the elder" was entrusted for the realization of this ambitious project. He was followed by other members of his own family. In his ideas about defence it is possible to see the comparing of the coast with a wall, where towns were the doors, the villages were the bastions and watchtowers were the battlements.

Specific features of the Valencian Coast

The Valencian coast is characterized by mixing rough areas with sandy lands and lightly slopes. The locations of every tower followed tactical criteria, getting the higher view of the coast and controlling landing for attack or obtaining provisions. However, the higher points of flat lands were used to get the capacity of viewing the sea and towards the horizon [3].

In 1554, "Las ordenanzas de la Guardia Marítima del reino de Valencia" was published to organize the defensive system of Valencian coast and to describe the army organization that every tower needed: Guards were responsible of looking after the coast and warning in case of danger, and "Atajadores" were responsible of communicating news between towers. This strategic network spread around all the Mediterranean area, especially and with clear architectural "system" in all the areas controlled or influenced by the Spanish Reign.

VALENCIAN TOWERS: TYPOLOGIES

The typologies of towers along the Valencian coast have gone developing in time and they have been adapted to new necessities and technological developments of attack solutions and strategies. From the architectural point of view, building typologies changed their morphology throughout XV and XVI centuries. It is possible to recognize 3 main stages [3]: Stage 1: From the end of the XV century to the beginning of the XVI century. Towers have prismatic shape with squared or circular base, the structure is very simple, answering to the need of visual control of the territory. Stage 2: From 1520 to 1560, the towers are pre-bastioned, they have singular elements like *alambores* and *esperontes* (sloping and screeding systems). Stage 3: XVII century, towers have important variations regarding previous phases. The use of conical shapes allows a higher resistance against artillery. The hexagonal shape appeared widening the eyesight and enhancing the offensive functions.

Towers were composed by three parts, foundation, base and main body. Each part had a structural and defensive function. The diameter of foundation generally was bigger than the tower base and it was adapted to the terrain. Base reaches a third of the total height and its function was to avoid the access and to reject artillery shots. The main part includes watching area while the interiors were built using vaulted system. The specific elements of these typologies were: an elevated access by a ladder, holes on the shaft, loopholes, machicolations. All these elements gave to the tower the necessary support to functions for defending and controlling the surrounding areas.

DIGITAL SURVEY AND 3D MODELS POST PROCESSING

The first objective of the Toviva project is to provide a methodology for the graphic documentation of coastal tower architectures, where the generation of proper metadata linked to 3D models is a task empowering the possibilities of interpretation and effective sharing.

The Toviva project proposes the use of advanced technical tools for graphical representation, employing a flexible methodology, trying to simplify processes and optimizing resources while maintaining the maximum reliability and quality of results. In addition, these same results can be adapted for cultural uses of a general public.

The first inspection is established after obtaining the following basic items: Location: town and access to the tower (conditions and issues). / Cartography of the area. / Ownership: public or private. Needed Permissions. / In case of building with a current occupation: contact managers; Tourist Office, dealership / Contact with local technicians and scholars: archaeologist, architect, engineer / Conditions for the access to the interior of the tower.

During the first inspection a set of photos and sketches is realized. The photographs are taken according to a specific procedure, enriched by notes and setting the Exif data in proper ways, so that later on it is easier to work on these archives. A specific record of the structure is prepared, with the following main information:

- Location: On plain or mountain / Exempt or within an urban area / Visible/accessible or not around its entire perimeter.
- Form: Polygonal / Rounded / Flown elements / Specific Shape /
- Dimensions: Height / Number of floors / Number of rooms per floor /
- Staircase: Size / Shape - Coverage/roof; accessible or not.
- Inside Presence of movable objects - Presence of annexed buildings.
- Presence of trees and/or invasive vegetation - Other features.

Ground and UAV Photogrammetry

After the remarkable evolution of the recent years, photogrammetry and UAV/Drone survey became a significant tool for architecture survey. For photogrammetry this “rebirth” is due to new algorithms that have facilitated the production of 3D models using S.f.M. (Structure from Motion) method [4]. When working with this kind of software, the workflow starts from the alignment of the pictures. The procedure is based on the use of each pixel of the image as a point, looking for homologous points in all the pictures and thereby the relative positions of each camera. The set of camera positions, along with the pictures themselves, are used in the following phase, with the construction of the model’s geometry. In the end it is possible to create a photo-realistic texture for the final 3D model, ready to be exported to other software to be used for analysis, drawing production, multimedia.

Using UAV unit (drone) for taking aerial photographs solves many accessibility problems. Aerial photographs allow a great freedom in taking pictures from any point of view. I is possible to use the same camera for ground shooting or to prefer different cameras and then mixing the images with no significant variation in the workflow. But in general, with a double sequence of pictures, one from the ground, one from the air, it is possible to reduce the post processing needs. In example, none of the pictures taken from the ground need the masking of the sky process: the presence of aerial pictures defines clearly the borders of a tower, allowing a perfect processing without noisy artefacts in the skyline of the architecture.

3D Laser Scanner

For complex structures, especially in presence of articulated internal/external parts, the use of 3D laser scanner technology is necessary. It solves the problem posed by photo-modeling for interiors, whether for lighting reasons or for a question of space and complexity. Scanning is much more laborious, both for data acquisition and subsequent processing (alignment of the point-clouds, mesh generation, surfaces treatments, texturing, etc...), but when correctly operated, it ensures excellent data acquisition under any circumstances, keeping the quality of all the data gathered with the same accuracy [4,5]. A specific topographic support is operated for the 3D Laser Scanner survey, it is limited to the targets applied this survey, reducing needs for overlapping scans and making easier and robust the process of alignment of isolated rooms and of the coverage/roof.

A Multimedia Catalogue

The Toviva project is based on the use of 3D photo-realistic models with the inclusion of their full data, including each model in its geographic location to facilitate their individuation and support the dissemination task. The opportunity of the project is to expand the visibility of these cultural assets along the Valencian coast, providing data to the general public through a "light" computing platforms such as Smart-Phones or PDAs (using APPs for virtual and augmented reality). The access will be through the Internet, using local WiFi network or the telephone data access. The strategies are based on the use of easily accesible solutions, like the Sketchfab (www.sketchfab.com) platform, while for more complex and site specific situation it is possible to foreseen more complex and articulated solutions, based on multimedia/programming software. The will is to create a versatile standard, capable to be easily replied in other experiences in the future, but with a solid and complete archive in its background. The catalogue, now open to the public in its online version (http://toviva.blogs.upv.es/) even if still in ongoing development, shows the system of defensive elements as a tool of knowledge and tourism guide for the Valencian Mediterranean coast, a solution usable by scholars, researchers, students, tourists, curious and any kind of interested user. The contents are organized around graphical elements like pictures and (when possible) digital survey derived representations. This system will connect to the visitor position useful information about the territory, the history of the tower and the system of the fortifications. At the same time, an annual conference, the Fortmed (www.fortmed.eu), helps in connecting scholars and researcher on this subject.

Conclusions

The watchtowers located in along the Mediterranean coast are historical witnesses of a defensive system from the XVI and XVII centuries. The goal to use them as a base to transmit knowledge through advanced data collection finds important solutions in the digital tools for survey and representation, thus, such an archive will be quite limited if not shared. And this can be supported by interactive schemes and 3D visualizations. Multimedia information will allow to enhance the awareness about the systems of towers, to better understand how each single tower is part of a system along the Mediterranean coast, created for defending against Barbary attacks but still capable to drive a network of knowledge between past and present. At the same time, an accurate reconstruction of buildings is a significant step in the understanding of the "evolution" of this Heritage. All the previous documents, collected and organized, are the base for a correct evaluation. Proper technologies allow to explain the defensive system along Mediterranean coast connecting new experiences to consolidated knowledge. Multimedia tools may help people to take a look in a distant past, not only to obtain an idea about tower systems with high historical and patrimonial interest but also to better understand the complex system of relationships spreading all across the Mediterranean.

Fig. 1 - Four samples of the towers documented by the Toviva Project (G.Verdiani)

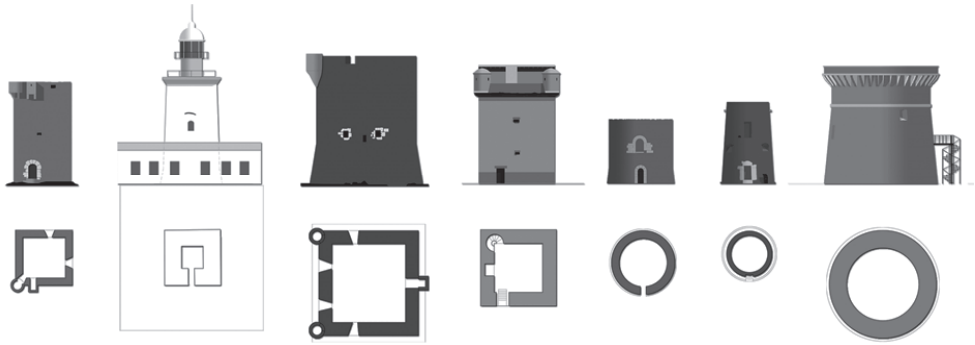

Fig. 2 - Towers typologies in the set analysed by Toviva Project, (R.Atzeni, V. Naldini [6])

Fig. 3 - 3D Laser Scanner and Octacopter Drone at work (G. Verdiani, S. Giraudeau)

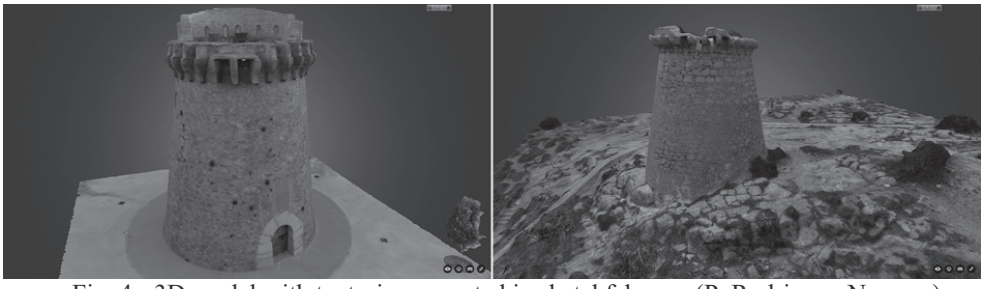

Fig. 4 - 3D model with texturing exported in sketchfab.com (P. Rodriguez-Navarro)

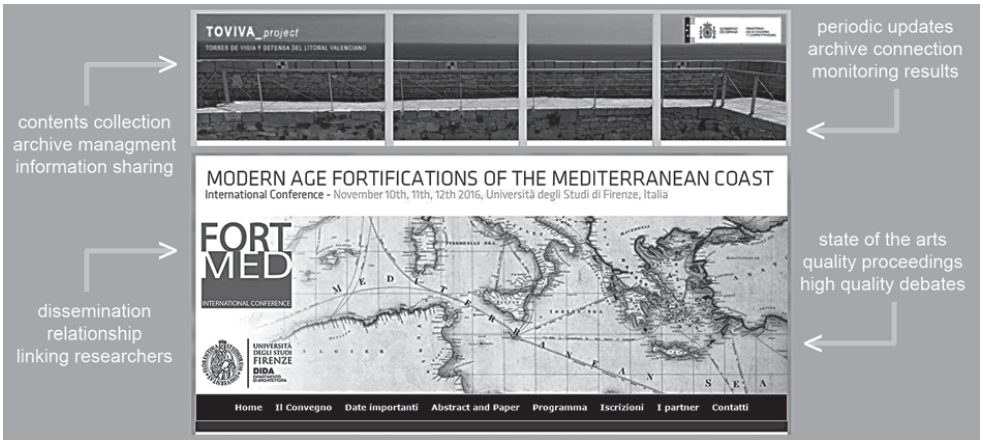

Fig. 5 - The Fortmed2016 and the Toviva Websites (P. Rodriguez-Navarro, G. Verdiani)

ACKNOWLEDGEMENTS

The Toviva project is a part of the R&D project entitled "Surveillance and Defense Towers of the Valencian Coast. Metadata generation and 3D models for interpretation and effective enhancement" reference HAR2013-41859-P. Principal investigator: P. Rodríguez-Navarro. The project is funded by the National Program for Fostering Excellence in Scientific and Technical Research, National Sub-Program for Knowledge Generation, Ministry of Economy and Competitiveness (Government of Spain). The project is developed by an International Team, mainly composed by members of the Universitad Politecnica de Valencia (UPV) and Dipartimento di Architettura di Firenze (DiDA). The research team: P. Rodríguez-Navarro, T. Gil Piqueras, F. Juan Vidal, A. Zaragozá Catalán, S. Varela Botella, A. Soler Estrela, S. Yudici Oliver, J. Luis Menéndez Fueyo, G. Verdiani, S. Lillo Giner, In collaboration with S. Iurilli, G. Guidi, M. Pucci, R. Atzeni, V.Naldini, M. Mangani, P. Cabezos Bernal, S. Giraudeau, A. Leonardi, T. Pignatale, S. Columbu.

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Vito Cappellini and Enrico Del Re (edited by), *Electronic Imaging & the Visual Arts. Eva 2016 Florence.*
ISBN 978-88-6655-973-3 (print) ISBN 978-88-6655-974-0 (online)

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