3D digital modelling as a method for the reconstruction of the historical image of the city: the case of piazza Bodoni in Turin (Italy) at the end of nineteenth century

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AntiCIPAting the future of the cultural past

Zappeion Megaron
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- CIPA Treasurer
  Prof. Pierre Grussenmeyer
  National Institute of Applied Sciences in Strasbourg
  Photogrammetry & Geomatics Group
  24, Boulevard de la Victoire
  F-67084 Strasbourg, France
  
tel/fax: +33 3 88 14 47 33
  e-mail: Pierre.Grussenmeyer@insa-strasbourg.fr

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CONTENTS

Tuesday 02.10.2007

Session 1
Innovative photogrammetric techniques

Digital Presentation, Documentation and Analysis of Paintings, Monuments and Large Cultural Heritage with Infrared Technology, Digital Cameras and Range Sensors, Rizzi A., Voltolini F., Girardi S., Gonzo L., Remondino F., ITALY

Fisheye Lens Camera System Application to Cultural Heritage Data Acquisition, Kedzierski M., Walvzykowski P., POLAND

The Solid Image Web Viewer: A New Way For 3D Survey Data Web-Fruition, Agosto E., Picco I., Rinaudo F., ITALY

Stereo-Panoramas: Problems and Solutions, Varshosaz M., Amini, IRAN

The Multi-Image Spherical Panoramas as a Tool for Architectural Survey, Fangi G., ITALY

Session 2
Documentation and Archaeology

Documentation and Analysis of Archaeological Sites Using Aerial Reconnaissance and Airborne Laser Scanning, Doneus M., Briese C., Fera M., Fornwagner U., Griebel M., Janner M., Zingerle M-C., AUSTRIA

Mapping Traditional Belief Systems and Establishing Contemporary Connections In An Ancient Cultural Landscape, Kasiannan S., AUSTRALIA


The Governance of Identity. Recording Values of Rural Heritage in Urban Areas, Agostini S., Cairoli, ITALY

Poster Session 1 – Photogrammetric Applications & e-Technology

3D-Modeling of the Brazilian Antarctic Station Comandante Ferraz - A Visualization With Animation, Erwes H. J.B., Prado W.S., Fazan J.A., Fonseca E.S.Jr., BRAZIL


The Integrated Survey for the Knowledge and the Documentation of the Archaeological Heritage: The "Villa Dei Misteri" in Pompei, Canciani M., Maestri D., Spadafora G., ITALY

Page 631
Page 809
Page 23
Page 733
Page 311
Page 275
Page 803
Page 346
Page 764
Page 297
Page 487
Page 141
Page 193
To Teach Drawing in the University Degree In "Preservation and Restoration of Cultural Heritage" of University of Studies of Turin, in Venaria Reale (Italy), Spallone R., ITALY

Visible and Thermal IR Documentation of a Masonry Brickwork Building, Lerma J. L., Mileto C., Vegas F., Cabrelles M., SPAIN

Evaluation of Shape Capture as a Heritage Documentation and Monitoring Tool, Quimet C., Robertson G., CANADA

Three-Dimensional Risk Mapping for Anti-Disaster Recording of Historic Buildings, Santana-Quintero M., Van Genuchten B., BELGIUM

Data Gathering in Underwater Archaeology by Means of a Remotely Operated Vehicle, Conte G., Zanoli S., Scaradozzi D., Gambella L., Caiti A., ITALY

Simple Tools for Architectural Photogrammetry, Tsioukas V., GREECE

Mapping of Archaeological Areas Using a Low-Cost Uav: The Augusta Bagiennorum Test Site, Beneda H., Chiabrando F., Giulio Tonolo F., Marenzhino D., ITALY

Obtaining Facade Plan of a Historical Building with Orthorectification of Single Images Gathered By Mobile Phones, and Digital Cameras, Aydar U., Aysar E. O., Altun M. O., TURKEY

Studies and Knowledge Fusion in Archaeological Site Maps Managed in a 3D GIS, Bonfanti C., Chiabrando F., Spano A., ITALY

Geomatic Contributions to Archaeological Investigations: The Case of Torrione of Pollenzo (Piedmont-Italy), Bonora V., Preacco C., Spano A., ITALY

Imagery Information on the Study of Cultural Heritage, Lazaridou M., Patmios E., ITALY

Experimenting with Museum and User Friendly Video Files Distribution Platform on the Web "Volumeone", Iwabuchi J., JAPAN

Digital Recording In Archaeological Excavation Using Tablet PC, Cianciarulo D., Guerra F., ITALY

Underwater Archaeological Knowledge Analysis and Representation in the Venus Project: A Preliminary Draft, Jeansoulin R., Papini O., FRANCE

3D Modelling by Advanced Total Station, Yildiz F., Karabork H., Yakar M., Altuntas C., Karasaka L., Goktepe A., TURKEY


Photogrammetric Documentation of the Vaults of Historical Monuments, Potuckova M., Stefanova E., Gril S., CZECH REPUBLIC

Documentation of Destroyed Parts of Monuments Using Low Cost Rectification Techniques, Antoniou G., GREECE

The Virtual Reconstruction of the "Titane" Archaeological Site (Greece) by Aims of Photogrammetry, Nuttens T., Goossens R., Tytgat C., De Wulf A., Van Damme D., Hennau M., Devriendt D., BELGIUM

Application Of Mixed Technique For The 3d Modelling Of The Noble Floor Of The Real Villa In Monza, Fassi F., Achille C., Brumana R., Tuncer H., ITALY
653

The Euphrates Channel Changes and Archaeology along Jebel Bishri in Syria, Lonqvist M., Torma M., Okkonen J., Lonnqvist K., Nuñez M., Latikka J., FINLAND
465

Visualization of the Architecture Through Simplified Models: Strategies for Knowledge Sharing, Pievè a Socana, Casentino, Toscana, Battini C., Cornetti M., Fantini F., Iurilli S., ITALY
112

3D Digital Reconstruction of Hue Complex of Monuments (Vietnam) and Web Application for a Sustainable Urban Development, Pugnaloni F., Issini G., Fangi G., Dag M.N., ITALY
619

Improving Satellite Quickbird-Based Identification Of Landscape Archaeological Features Through Principal Component Analysis And Tasseled Cap Transformation, Lasaponara R., Masini N., ITALY
812

The Documentation of the Medieval Entrance of the Rhodes Fortification Complex, Giannou P., Georgopoulos A., Tsakiri M., Della K., GREECE
334

Digital Geometric Documentation of the Rail Journey of the Historic Train of Pelion, Stamnas A., Georgoulas O., GREECE
691

Session 3
Laser Scanning and automation

828

Automated Modelling of Surface Detail from Point-Clouds of Historical Objects, Nothegger C., Dorminger P., AUSTRIA
538

Laser Scanning and Automatic Multi-Image Texturing of Surface Projections, Petsa E., Grammatikopoulos L., Kalisperakis I., Karras G., Pagounis V., GREECE
579

From the Relief to the 3D Reconstruction _The Methodology, Moro A., Vassallo V., Vico L., ITALY
501

Session 4
GIS in Cultural Heritage

Archaeological and Methodological Approaches for the Construction of an Intrasite And Interstie GIS of Elatussa Sebaste (Turkey), Borgia E., ITALY
171

Spatial Information System For 3D Documentation Of Plaka, The Historical Center Of Athens, Charkiolakis N., Ioannidis Ch., Kantza Ch., Keramida I., Koumna A., Leni M., Georgopoulos A., GREECE
769

A GIS in Cultural Heritage Based Upon Multiformat Databases And Hypermedial Personalized Queries, Chias P., Abad T., Echeverria E., Da Casa F., Celis F., SPAIN
222

Using Smart Map in a Mobile Information Environment for Tourism, Malek M. R., Samany N., Aliabady S., Hajibabai L., Kashyha M., IRAN
471
Wednesday 03.10.2007

Session 5
Low cost photogrammetric systems


Implementation of a Low-Cost Photogrammetric Methodology for 3D Modelling of Ceramic Fragments, Kalantari M., Kasser M., FRANCE

A Tool to Help Mapping Planning in Close Range Photogrammetry, Bernardini A., Fangi G., ITALY

Low-Cost Image Based System for Non-Technical Experts in Cultural Heritage Documentation and Analysis, Boocho F., Heinz G., Huxhagen U., Mueller H., GERMANY

The 3D Photo-Logging System for Easy and Effective Recording and Understanding of Archaeological Sites, Kadobayashi R., Sekie A., JAPAN

Session 6
3D Reconstructions based on TLS point clouds

Application of High Resolution Scanning Systems for Virtual Moulds and Replicas of Sculptural Works, Tucci G., Bonora V., ITALY

Documentation of the Geometry and Earlier Interventions of the Ancient Theater Of Dodona, Antoniou G., GREECE

3D Height Accuracy Survey and Modelling of one of Acosta's Anthropomorphic Stela, Bornz L., Poprorato Ch., Rinaudo F., De Gattis G., Focareta R., ITALY


RecordIM Session


Guiding Principles and Illustrated Examples. Recording, Documenting and Information Management for the Conservation of Cultural Heritage Flaces, Eppich R., LeBlanc F., Chabbi A., Letellier R., USA
Session 7

Service for the Restoration of Acropolis Monuments

Principles and Methodology of Intervention for Structural Restoration, Ioannidou M., GREECE

Parthenon Restoration Project, Toganidis N., GREECE

The Surface Conservation Project of the Acropolis Monuments: Studies and Interventions, Papakonstantinou E., Panou A., Franzikinaki K., Tsimereki A., Frantzi G., GREECE

The Restoration of the Superstructure of the Propylaia Central Building: Study and Intervention, Tanoulas T., GREECE

Poster Session 2 – Archaeology & Conservation – GIS

Computerization and Management of Archive Sources for the Study of Urban Cultural Heritage, Lelo K., Travaglini C., ITALY

The Roman City of Uxama Argeala (Soria, Spain) and its Study by Means of Remote Sensing and Digital Cartography, Gilliani G., SPAIN

Rapid Approach of Integrated Survey for the Conservative Analysis of Pictures, Costantino D., Angelini M.G., Caprino G., ITALY

Myanmar: A Comparison Between Past and Present. What is Happening in the Field of Architectural Heritage Conservation: The Techniques Used, the Principles of Preservation Applied and the Relative Plans for Heritage Management, Masseri B., ITALY

Outcome of the Representation of Architecture: Image and Memory, De Masi P., De Masi A., ITALY

Integrated Methodologies and Technologies for the Reconstructive Study of Dur-Sharrukin (Iraq), Cultraro M., Gabellone F., Scardozzi G., ITALY

Recording for Urban Planning: A Case from Manama, Bahrair, Elwazani S.A., Lerma Jose Luis, SPAIN

Contribution of Laser Scanning, Photogrammetry and GIS to an Interdisciplinary Special Research Program on the History of Mining Activities (SFB HIMAT), Hanke K., AUSTRIA

The Volponi’s Kiln in Urbino. Industrial Archaeology and Historic Landscape in the Cradle of the Renaissance. Documentation, Survey and Drawing, Agostinelli M., Clini P., Lancioni N., Quattrini R., Sabbatini G., ITALY

National Historic Sites Of Canada: A Values-Based Approach to Posteriority Heritage Recording, Leboeuf J.-F., Quinet C., Lumsdon C., Zvonar J., Utas G., CANADA

Digital Documentation of Monuments of Natural Beauty: A Case Study, Stylianidis E., CYPRUS

Traditional Drawings Versus New Representation Techniques, Almagro A., Almagro Vidal A., SPAIN

WEBGIS Open Source Solutions for the Documentation of Archaeological Sites, Agosto E., Ardissone P., Rinaudo F., ITALY
Raw Materials Project. Archaeological WEBGIS with Gogolemaps API, Cantoro G., ITALY


Multimedia Database for the Heritage Information System of the Ancyra Project, Gabrielli M., Malinverni E.S., ITALY

An Important Middle Bronze Age Cemetery at West-Central Anatolia: Dede Mezari, Kocak O., Uyumaz M., Cay T., Ilalio A., Iscan F., TURKEY

The Land and City of Tarhuntaensa Geodetic Researches Around it, Bahar H., Cay T., Iscan F., TURKEY

Spatial Information System For Historic Buildings, Gunay S., TURKEY

The Completion The Conservation Plan For The M.KogainIceanu Street Church, Cluj Napoca, Romania, Maksay A., Pirez H., Kandra L., Makay D., ROMANIA

GIS Application in Archaeological Site of Solunto, Tantillo M. D., ITALY

Innovative Systems for Assisted Analysis and Diagnosis, Appolonia L., Molteo L., Picco R., Saloni P., ITALY

In Sicilian Ancient Theatres Interventions of Restorations in Sicily, Ruggirello V.L., ITALY

The Use of 3D Reconstruction for Architectural Study: The Asklepieion of Ancient Messene, Yoshitake R., Ito J., JAPAN

Survey Procedure And Archaeological G.I.S Data Base for the Medieval Mine of Rocca San Silvestro, Bianchini L., Chiaverini I., Ostuni D., ITALY

Poggioiereale Old Town In Sicily: Strategies, Memory, Knowledge And Planning Place, Guglielmini R., ITALY

The Use of GIS Technology in Culture Heritage, Petrescu F., ROMANIA

Architectural Patrimony Management in Yemen, Heno R., FRANCE

Customized GIS Environment for Integrated Management of Archaeological Research Data, Roustanis T., Kalmaris D., Georgoula O., Patias P., GREECE

Session 8
Architectural Heritage Conservation

Digital Management of the Documentation of the Acropolis Restoration, Mallouchou-Tufano F., Alexopoulos Y., GREECE

Art Work In Historic Sikh Shrines : Need for their Documentation and Conservation, Singh B., INDIA
Artistic Heritages: From Knowledge to Valorisation, Di Natoli E., Lanzarone F., ITALY

Documenting Architectural Heritage In Bahia - Brazil, Using Digital Technologies, Amorim, A. L., BRAZIL

NDT Detection of Decay Areas and Evaluation of their Attributes, Kapsalas P., Zervakis M., Maravelaki-Kalaitzaki P., Delegou E.T., Moropoulou A., GREECE

Session 9
Information Technology and Cultural Heritage

Digitising Aegean Bronze Age Buildings: Building Typologies From Digital Plans, Constantinidis D., AUSTRALIA

Merging Augmented Reality Based Features in Mobile Multimedia Museum Guides, Damala A., Marchal I., Houlier, M., FRANCE

Robust Shape Fitting and Semantic Enrichment, Torsten U., Fellner D. W., AUSTRIA

Friday 05.10.2007

Session 10
Modelling Laser Scanner data

Digitization of the Collection of Moldings of the University Marc Bloch in Strasbourg : A Study Case, Smigiel E., Callegaro P., Grussenmeyer P., FRANCE

The Imprint of a City: Massa Marittima, Micoli M., Nomikou Tz., ITALY

Laser Scanning for Historical and Geotechnical Studies at Pointe du Hoc, Warden R., Burt R., Briaud J.L., Everett M., USA

Facade Modelling for Historical Architecture, Bohm J., Haala N., Becker S., GERMANY

Session 11
Archaeological conservation

Social and Spatial Patterns of Cultural Heritage, Charalambous N., CYPRUS


Session 12
e-Technology, Education and Training

A Digital Future for Cultural Heritage, Mudge M., Ashley M., Schroer C., USA
The Project of the Italian Culture Portal. A Standard Based Model for Interoperability Amongst Cultural Heritage Data Sources, Masci M.-E., Euonazia I., Merlitti D., ITALY

A Virtual Collaborative Environment for Archaeology Through Multi-User Domain in the Web, Pietroni E., Forte M., ITALY

Cultural Heritage Inventory System of Turkey on the Web, Cayirezmez A., TURKEY

State of the Art in Built Heritage Internet Applications: Which Trends are Leading this Field?, Lancia R., ITALY

Poster Session 3 – Laser Scanning – Animation & Modeling

Ajax Web Scripting Applied to Interactive Stereoscopic Imaging, Pomaska G., GERMANY

Laser Scanner & Photogrammetry for the Survey of the Monumental Cemetery in Piazza Del Duomo, Pisa (Italy), Caroti G., Piemonte A., ITALY


First Experiences with the Deformation Analysis of a Large Dam Combining Laserscanning and High-Accuracy Surveying, Aguilera G. D., Gomez J., Sanchez A., Sanchez J.A., SPAIN

3D Buildings Modelling Based on a Combination of Techniques and Methodologies, Pop G., Bucksch A., Gurt B., ROMANIA

Using Hybrid Surveying Techniques for Documenting the Largest Ancient Theatre in Greece, Vozikis G., GRECE


The Development of Virtual Museum in Iran. Presenting Historic Buildings of Azerbaijan Province, Iran, in 8 Historic Complexes, Combination of Different Models and Materials, Pirbabaiei M.T., Pour-Rahimian F., Ibrahim R., IRAN

Reverse Engineering Architectural Hardware, Waggoner T., CANADA

3D Digital Modelling as a Method for the Reconstruction of the Historical Image of the City: The Case of Piazza Bodoni In Turin (Italy) at the End of Nineteenth Century, Spallone R., ITALY


A Combination of Modern and Classic Methods of Surveying Historical Buildings - The Church St. Valentin in the South Tyrol, Burger A., Grimm - Pitzinger A., Thaler E., AUSTRIA
Process Evaluation of 3D Reconstruction Methodologies Targeted to Web Based Virtual Reality, Koutsoudis A., Armaoutoglou F., Pavlidis G., Tsiooukas V., Chamzas Ch., GREECE

Laser Scanner and Architectural Accuracy Test, Adami A., Guerra F., Vernier P., ITALY

Digital Representations and Analysis of Deformations Induced in Map Supporting Materials, Adami A., Fregonese L., Guerra F., Livieratos E., Tsiooukas V., GREECE

Towards Creating a Dialogue Between the Specialized Technician and non Technician Users of the 3D Laser Scanner, Haddad N., JORDAN


The Grumentum's Arena: Measure, Geometry and Shape, Balletti C., Guerra F., Pillon M., Sartorelli L., ITALY

Documentation of the Zazadin Inn with Laser Scanning, Cokepe A., Yildiz F., Karabork H., Yakar M., Altuntas C., Karasaka L., TURKEY

Surveying and Documentation of Detailed Historical Heritage by Laser Scanning, Altuntas C., Yildiz F., Karabork H., Yakar M., Karasaka L., TURKEY

Modelling and Visualization Using Laser Scanner in Documentation of Cultural Heritage, Karabork H., Yildiz F., Yakar M., Altuntas C., Karasaka L., TURKEY

Methodology of 3D Digital Survey Operations and Data Processing According to Architectural Investigations in Archaeological Area, Verdiani G., Di Tondo S., ITALY

Filining Lacunas in Terrestrial Laser Scanning Data: The "Cavallo Ligneo" of the "Palazzo Della Ragione" (Padua, Italy), Fabris M., Achilli V., Bragagnolo D., Menin A., Salemi G., ITALY

High Density Digital Form for Cultural Heritage: Synthetic Modelling and Reverse Engineering of the Four Horses of the Basilica of San Marco In Venice, Fassi F., Fregonese L., Brumana R., Monti C., Achille C., Cassani C., Vio E., ITALY

Transportable 3D Acquisition Systems for Cultural Heritage. Reverse Engineering And Rapid Prototyping of the Bronze Lions of the Saint Isidoro Chapel in the Basilica of San Marco In Venice, Achille C., Brumana R., Fassi F., Fregonese L., Monti C., Taffurelli L., Vio E., ITALY

Laser Scanning Methodology for the Structural Modelling, Fabris M., Achilli V., Bragagnolo D., Menin A., Salemi G., ITALY


3D Tools for Scientific Visualization and Documentation of Archaeological Heritage, Case Study: A Sassanid Shrine of Daregaz, Northeastern Iran, Niknami K. A., Mirashe Z., IRAN
Session 13
Spatial Information Management

GIS And Web-GIS, Commercial and Open Source Platforms: General Rules for Cultural Heritage Documentation, Rinaudo F., Agosto E., Ardissoe P., ITALY

GIS-Based Impact Assessment Model In Urban Historic Culture Heritage Protection and Planning, Shi R., Liu M., P.R. China

Application Of A Gis For The Accessibility Of Archaeological Sites By Visitors With Disability And Visitors With Reduced Mobility, Ioannidis Ch., Vozikis K. Th., GREECE

Practice for Built Environment Awareness: From Survey to 3D Modelling and Related Database, Ballabeni M., Ricciotti Angelillo D., ITALY

Session 14
Photogrammetric Recording Applications

Digital 3D Reconstruction of Antonio Gaudi's Lost Design for a Church Near Barcelona Spain, Moser M., Hanke K., SPAIN

Photogrammetric Documentation and Visualization of Choli Minaret and Great Citadel in Erbil/Iraq, Pavelka K., Svatavskova J., Kralova V., CZECH REPUBLIC

Combination of Terrestrial Recording Techniques For 3D Object Modelling Regarding Topographic Constraints. Example of the Castle of Haut-Andlau, Alsace, France, Landes T., Grussenmeyer P., Voegtle T., Ringle K., FRANCE

Phohtogrammetric Documentation and Digital Representation of the Macedonian Palace in Vergina, Patias P., Satsoglou-Paliadeli Ch., Georgoula O., Pateraki M., Stamnas A., Kyriakou N., GREECE

Topographic and Photogrammetric Recording of the Acropolis of Athens, Moullou D., Mavromati D., GREECE

Saturday 06.10.2007

Session 15
Non-conventional Photogrammetric applications

A Digital Map for the Interior Restoration of St. Ninian's Cathedral, Nickerson S., CANADA

Saint Anthony's Chapel Facade Pathology Documentation, Gardiol M.-R., Pighini A.M., ARGENTINE

Documentation of a Vernacular House with Close-Range Digital Photogrammetry, Akbaylar I., Hamameoglu-Tutan M., TURKEY

Quickbird Imagery Processing For The Extraction Of Archaeological Features: Performance From Data Fusion Algorithms, Masini N., Lasaponara R., ITALY
Session 16
3D Rendering and Virtual Environments

Virtual Delphi: Two Case Studies, Flaten A. R., Gill A. A., USA
780

Passing Excellence, the Interactive Art Visualization of the Kizhi Ensemble, Tsoupikova D., USA
716

123
3D DIGITAL MODELLING AS A METHOD FOR THE RECONSTRUCTION OF THE HISTORICAL IMAGE OF THE CITY: THE CASE OF PIAZZA BODONI IN TURIN (ITALY) AT THE END OF NINETEENTH CENTURY.

R. Spallora*

*DINSE, I Facoltà di Architettura del Politecnico di Torino, Viale Mattioli 39, 10125 Torino, Italy. - roberta.spallone@polito.it

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ABSTRACT:

The experience that I want to present consists of the case of piazza Bodoni in Turin, characterized, between 1866 and 1924 by the presence of an original pavilion dedicated to market.

The 3D digital reconstruction allows to recognize the role that the building of the market plays in the characterization and identification of this specific urban location as an essential element in the image of the city.

To reconstruct the architectural and urban morphology of the place, I have conducted researches on iconographical records of the urban setting and of the historical market at the Turin city archives. In my researches I discovered a large number of tables, consisting of city plans of the area and architectural designs of the buildings around the square.

The research project was also based on other information culled from: period photographs sources in others archives and in bibliographic sources.

The rich iconography that emerged from the archival records has enabled me to address the research to an attempt to simulate the activities of market that existed historically within his specific location.

The data drawn from historical-archival and bibliographical sources were compared and integrated with the planimetric and altimetric survey, prepared by me, of still existing buildings.

I designed the virtual piazza Bodoni with its market, consisting in a closed pavilion that was demolished in the 1920s.

The 3D perspective visualizations of the square, revealed an image that reminds the paintings of the "ideal cities" of Italian Renaissance.

1 TO RECONSTRUCT FOR RECOGNIZING IN THE PRESENT THE HISTORICAL IMAGE OF THE URBAN FABRIC.

"... to reconstruct means to collaborate with the time in his shape of 'past', to pick up the spirit or to modify it, to stretch it out, almost, towards a longer future, means to discover under the stones the secret of the springs...”

Marguerite Yourcenar, Mémoires d’Hadrien, 1951

The reconstruction of the historical images of an urban fabric, as well as of buildings or complexes, allows viewing through its present aspect the different looks it had in the past, and recognizing their traces.

Thanks to digital modelling it is possible to go back in the time and to recover images of places today modified.

Besides thanks to digital modelling, the 3D visualization of the morphological transformations of the urban fabric in various historical periods makes it possible to share this information and diffuse it in a readily understandable form to a wide-ranging spectrum of public.

The urban setting of "piazza Bodoni" in Turin nowadays appears to the visitor as an unitary composition of buildings of the second half of nineteenth century, characterized by homogeneous style and, on the southern side, by a continue curtain with arcades.

Only one building, on the southern-eastern side of the square, shows as a contemporary architecture of the second half of the twentieth century.

As a matter of fact, another building on the eastern side of the square, the Conservatoire of Music of Turin, had not origin in the same period of the other buildings of the urban fabric.

It was built at the end of 1920's, in place of a not very well-known building, sometimes described as "octagonal pavilion".
demolished in 1924.
It was a closed pavilion, built between 1864 and 1866, in function as market and public wash-house.
It originated along with the urban setting it had been inserted into. Its location was one that was originally in the outskirts of the city, along the town’s southern barricades. The space was cleared when the eighteenth-century walls were knocked down.
As is documented in some archival records, the activities of market in this place preceded the construction of the pavilion. In the half of the nineteenth century on the western side of the square there was a U-shaped shed, for the wholesale of fruits and vegetables and, on the northern side, forty moveable stands (figure 1).
An iconographical record of the shed (figure 2) shows the distribution of the 65 stands under cover and the merchandise sold (vegetables, legumes, flours, cheeses, butter, poultry, lamb, fishes, cooked foods).
Around the shed there were other 30 stands.
A record of 1857, together with a historical view (figure 3), supports by document the presence in the square of peddlars of vegetables, eggs, poultry, butter and fruits.
In 1863 the Municipality deliberated the building of the new pavilion, on the eastern side of the square, to replace the old shed.
The engineers Edoardo Pecco and Carlo Velasco designed (1864-1866) a square-shaped building surmounted by an octagonal drum (figure 5).

The report and the drawings were published in the magazine “Il Giornale del Genio Civile” (1865) in which it is affirmed that the nearly finished building “is good for the beauty and for the regularity of the square”.
The pavilion was built on two floors: on the ground floor there was the market with 300 ring-shaped fixed structure of the stands, on the underground floor there were the public wash-house and 180 stock yards.
It was built with bricks and stones walls and covered by wood, iron and cast iron structure.
In the market were sold: meat, poultry, butter, eggs, tripe, cheeses, pasta, fishes, fruits and vegetables.
In 1888 an extraordinary snowfall caused the fall down of the roof; the structure was rebuilt completely in metal by design of Carlo Velasco (figure 7).
In 1893 the interior of the pavilion was modified: the number of stands was reduced from 300 to 118 (with different distribution), and two large stock yards were built (figure 6).
In 1924 the Municipality deliberated the demolition of the pavilion.
The 3D digital reconstruction allows to recognize the role that the building of the market plays in the characterization and identification of this specific urban location as an essential element in the image of the city.
To reconstruct the architectural and urban morphology of the place, I have conducted researches on iconographical records of the urban setting and of the historical market at the Turin city archives.
The research project was also based on other information culled from period photographs sources in others archives and in bibliographic sources. The rich iconography that emerged from the archival records has enabled me to address the research to an attempt to simulate the activities of market that existed historically within his specific location. The data drawn from historical-archival and bibliographical sources were compared and integrated with the planimetical and altimetrical survey, prepared by me, of still existing buildings.

2. 3D DIGITAL MODELLING FOR VISUALIZING THE HISTORICAL RECONSTRUCTION.

The reconstruction of the historical evolution of a urban fabric allows viewing through its present aspect the different looks it had in the past, and recognizing their traces. Francesca Cataliotti wonders about the purpose of such studies, and suggests possible answers. “Why reconstruct? Perhaps is it possible to restore the identity, the sense of unicum, by adding up fragments and appearances? We reconstruct because of a sort of intellectual pleasure which the architect cannot do without, because of the necessity to satisfy that romantic taste of reviving, if only on the drawing board, the original shape of the ancient monument, in order to understand what has disappeared, in part or whole,... or, perhaps, is it the architecture itself that asks to be represented in order to be understood and enjoyed at a distance, in time and space? The reconstructive representation is, first of all, a way to understand the object and could become an important tool of historic and iconographic research...”. (Cataliotti, 2001)

3D digital modelling offers in this respect a powerful method of checking hypotheses. Notes Gabriele Rossi: “in a 3D digital model, the complexity of the representation gives way to an illustrative schematization which has, in any case, better spatial control of the object and far exceeds the traditional static axonometric and perspective forms of representation. The model thus becomes an essential tool to check and control the validity of reconstructive hypotheses”. (Rossi, 2000)
3. 3D DIGITAL MODELLING AS A TOOL FOR KNOWLEDGE.

3D digital modelling, a technique of representation by now widely consolidated in the various design phases, is presently stirring a renewed interest for the survey of existing structures. This is, on the one hand, due to the natural connection with the most innovative methodologies of instrumental survey. On the other, it is a consequence of the wide-ranging potential applications in the fields of critical thematic analyses and of spatial and temporal simulation: "digital mock-ups [...] allow a richer and more controlled interaction between user and model [...] digital mock-ups are able to cover, within a unique representation system, the entire range of possible modelling". (Maldonado, 1992).

The quick evolution of digital technologies, hardware and software, makes it ever easier to build 3D models of considerable geometrical complexity.

A critical selection of data, first of all in respect of the relationship between scale and contents of the representation, is absolutely essential to avoid, in the modelling phase, very complex procedures adding insignificant detail which uselessly increases the size of the digital file. In this respect it should be considered that the most suitable support for the visualization of the model in its space-time dimensions usually is the monitor of a personal computer.

While 2D digital drawings now usually implement a level of detail that is greater than the level achieved, for the same scale of reduction, in a traditional drawing, it is most appropriate to simplify 3D digital modelling by implementing primitive solids, by analogy with material plastic modelling.

3D digital modelling complements drawing as an information and communication tool, while adding, as a specific prerogative, the possibility to enter the fourth dimension.

This important aspect is underlined by Claudio Moriconi, who observes that "with the digital support the drawing simulates the hypothetical reality, overcomes static limitations and allows interacting with any kind of sign. By creating virtual images, digital graphics is probably the most suitable tool to interpret the complexity of reality [...]". (Moriconi, 2001)

The creation of a 3D digital model offers, as a result, infinite possibilities of observation: from the objective visualization of a conical projection, to the subjective visualization of a cylindrical projection. In this respect Mario Docci and Riccardo Migliani state that: "modelling is not only a creative strategy, but also a cognitive one. Digital models allow 3D simulations... Computerized models are conceived as 3D systems, like maquettes that live in a virtual space perfectly corresponding to a real space, so much so that they encompass all four dimensions. They are visible through a screen, a window (which reminds the window of Alberti’s perspectiva artificialis). This window visualizes the models in a 2D space that can be perceptive (in a central projection) or measurable (in a parallel projection), with the capability to vary the point of view so as to simulate the mobility and the transformability in time and appearance". (Docci, Migliani, 2000)

The urban fabric of piazza Bodoni characterized, between 1866 and 1924 by the presence of an original pavilion dedicated to market, was a test case of the potential of 3D digital modeling for the historical reconstruction.

Thanks to digital modelling, the 3D visualization of the morphological transformations of the urban fabric as well as of buildings or complexes in various historical periods makes it possible to share this information and diffuse it in a readily understandable form to a wide-ranging spectrum of public.

"The digital techniques of representation make it possible to create a picture of the situation before and after the intervention, and to rebuild, if necessary, the stratification too. The era of graphic papers that only the specialists can decipher is over. Now the very users of a building or of an urban complex can appreciate spaces [...] before during and after its irreversible transformation". (Moriconi, 2000)

4. INTEGRATED METHODOLOGIES OF ANALYSIS: FROM ARCHIVAL, ICONOGRAPHICAL AND BIBLIOGRAPHICAL RESEARCHES, TO DIRECT METRICAL SURVEYS, TO 3D MODELLING.

The reconstruction of the evolution of the buildings required the geometric modelling of the exterior. This was based on data drawn from historical-archival, iconographical and bibliographical sources integrated with the recent planimetrical and altimetrical survey by Roberta Spallone (Calorio, Spallone, 2001), and additional measurements directly taken in a survey of the exterior.

3D digital modelling required a critical selection of the data
with the goal of simplifying the representation of the geometrical external shape, of the buildings. For the reconstruction of the demolished pavilion, based on a work published in a historic magazine (Giornale Genio Civile, 1865), on archival iconographical records, on archival photographs (Fondazione Torino Musei, Fondo Gabino). The AutoCAD 2006 software package was used for the preparation of the 3D digital model, for different visualizations and for renderings. The model was used to produce a set of axonometric and perspective views of the exterior. The 3D perspective visualizations of the square, revealed an image that reminds the paintings of the “ideal cities” of Italian Renaissance.

Figure 9. 3D reconstruction of the pavilion for market and wash-house, (model and rendering by Robera Spallone)

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