

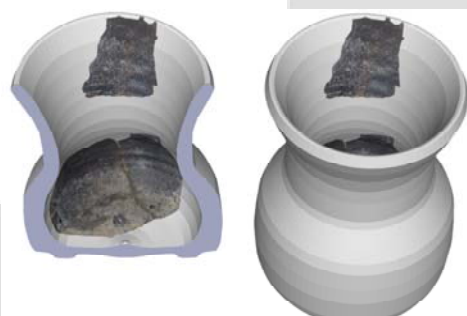


SERVICE CATALOGUE

LABORATORY FOR THE GEOMETRIC DOCUMENTATION OF HERITAGE (LABORATORIO DE DOCUMENTACIÓN GEOMÉTRICA DEL PATRIMONIO)

GRUPO DE INVESTIGACIÓN EN PATRIMONIO CONSTRUIDO - GPAC (UPV/EHU)

UFI – GLOBAL CHANGE AND HERITAGE (UPV/EHU)



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1, Justo Vélez de Elorriaga St. (Centro de Investigación Micaela Portilla)
01006 Vitoria-Gasteiz, Álava (Spain).

Phone: +34 945 013222 / 013264

e-mail: ldgp@ehu.eus web: <http://www.ldgp.es>

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1. PRESENTATION

The **Laboratory for the Geometric Documentation of Heritage (LDGP)** of the University of the Basque Country (UPV/EHU) is a multidisciplinary group of technicians and professionals committed to the research and implementation of projects dealing with the collection of geometric data about heritage elements, their representation, management, dissemination and preservation.

The **LDGP** is part of the **Built Heritage Research Group¹ (GPAC)**, which was recognised by the Basque Government, and also belongs to the unit of formation and research **Global Change and Heritage**.

Since 1997, the Laboratory has carried out more than a hundred projects related to the documentation of various types of elements of heritage, such as churches, castles, archaeological and paleontological excavations, bridges, statuary and furniture, caves, megaliths and dinosaur footprints. Covering a wide time span from prehistory, through Celtiberian, Roman, medieval and modern eras, to contemporary items. Most of the projects have been developed in the Basque Country and La Rioja, the others having taken place in other regions of Spain and Italy.



The techniques and equipment for each project are selected on the basis of a detailed planning of the work, which defines the methodology and analytical tools required by the objectives of the undertaking and the available resources. One of the main aims of the Laboratory is to develop and test innovative working methodologies, tailored to the necessities of both the elements of heritage and the research in progress.

Other areas of interest are the preservation and the management of information, virtual models and Augmented Reality, the monitoring of the deformations and the stability of the

¹ <http://www.ehu.eus/gpac/portal/index.php>

buildings as well as the development of specific tools and ancillary components for recording data under special conditions.

The Laboratory is also engaged in the training of young professionals and the dissemination of cultural heritage to society. For this reason, the Laboratory gives access to the results as soon as they are obtained by means of the website, the institutional repository of the University, scientific papers or technical workshops. Dissemination also includes the programming of specific software for documentation projects that is available from the web on an open-access basis.

2. VISION AND MISSION

The Laboratory defines its vision and mission as follows:

- **VISION:** the Laboratory develops methodologies and establishes intervention criteria in processes of geometric documentation of heritage elements with the aim of generating and preserving relevant information about them. The Laboratory commits to: (1) ensuring quality, both of the processes and the products, and (2) disseminating the results. All this is in the interest of socializing the knowledge and raising the awareness on heritage.
- **MISSION:** to that end, the Laboratory takes into account current and future users' needs, as well as the characteristics of the results to be obtained in order to satisfy these needs. It selects the methodologies and equipment suitable for the implementation. Moreover, each stage of the projects and the features of the results are defined in an open manner to society and according to internationally recognized standards. Proposals are validated by means of contrast both in international scientific forums and dissemination activities.

3. STAFF AND EQUIPMENT

Dr. Álvaro Rodríguez and Dr. José Manuel Valle, lecturers at the University College of Engineering at Vitoria-Gasteiz (UPV/EHU), coordinate the Laboratory with the assistance of other members of faculty and external collaborators who were trained at the Laboratory, currently lead a professional career in a field of expertise related to Geomatics (GIS, civil works, 3D modelling, web mapping, etc.) and contribute to the ongoing projects with their expertise and working force.

The Laboratory headquarters is in an office located in the building Micaela Portilla on the Alava campus, located within the space of the Research Group on Built Heritage (GPAC). There are four working stations (with specialised software available for the computation, management and display of geographic information) as well as a digital stereoplotter and a

web server. Fieldwork equipment is stored in an independent warehouse of the same building.

Regarding fieldwork instrumentation, there are two total stations, a GNSS receiver for satellite positioning and photographic equipment (including cameras with up to 50 megapixels and calibrated lenses). In this respect, wide experience has been gained in the use and processing of information gathered with other devices, such as laser scanners or unmanned aerial vehicles that are rented when necessary.

Finally, a wide range of software is available in order to take the successive steps of data processing, the presentation of results and the management of information, including specific software for CAD and 3D modelling, point cloud processing, photogrammetry, GIS, etc.

4. CITIZEN'S CHARTER

The Laboratory offers a set of services focussed on the following areas:

- 1) Geometric documentation of heritage elements.
- 2) Collaboration and research support.
- 3) Training.

4.1.- GEOMETRIC DOCUMENTATION OF HERITAGE ELEMENTS

The works for the geometric documentation of elements of heritage always start with a careful definition of the needs that is matched with the available resources (funds, time, equipment, etc.) as well as the particular features of the heritage element and the context of the action. Then, a draft is prepared in which a proposal of the registration procedures, the characteristics of the information and the final results are described. This proposal, which is accompanied by the budget and discussed with all the agents involved in the project, stipulates the technical conditions of the undertaking.

For giving support to the project, a contract is signed through the University Office for Transfer of Research Results (OTRI). Thus, it is possible both for University staff and external individuals, companies or administrations to hire the services of the Laboratory.

The Laboratory can engage in these tasks on its own or, when many fields of expertise are called for, as an integral part of a larger group that encompasses more researchers and technical or administrative staff.

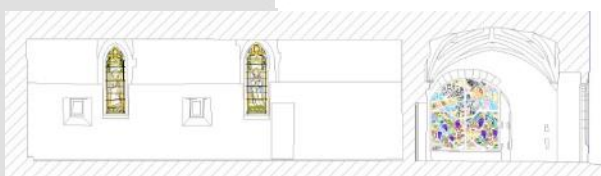
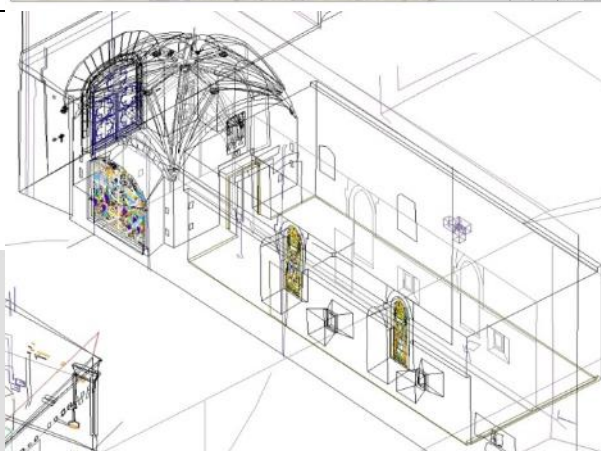
Given its innovative character, the Laboratory welcomes works with high degree of experimentation, to which there is not any contrasted approach, in such a way that the description of the methodology is the main result of the project. Moreover, in line with its vocation of training, the Laboratory aims at disseminating the work methods, the socialization and the valorisation of cultural heritage, and is, therefore, interested in projects that comprise these aspects.

The table below presents the products available from the Laboratory for the Geometric Documentation of Heritage.

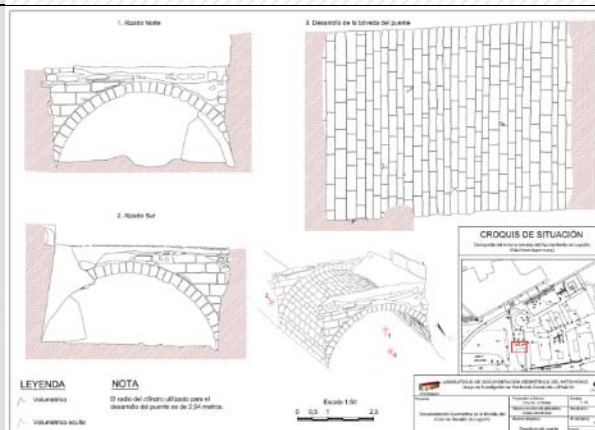
Progressive documentation of archaeological excavations: reference network, documentation of the stratigraphic units and levels.

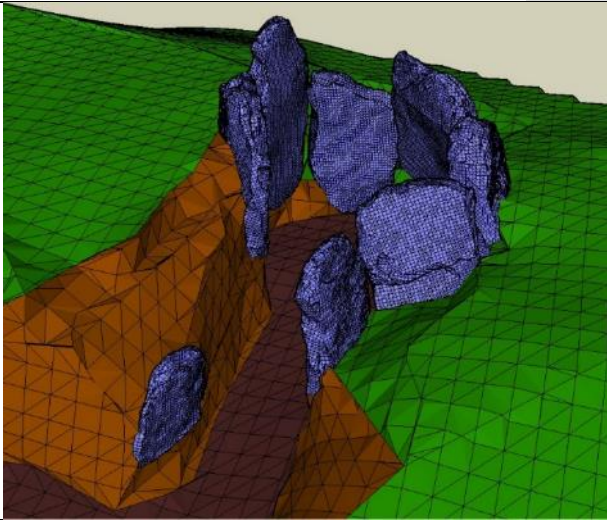
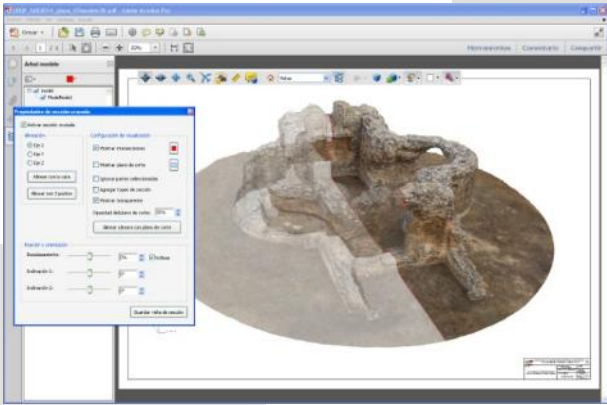
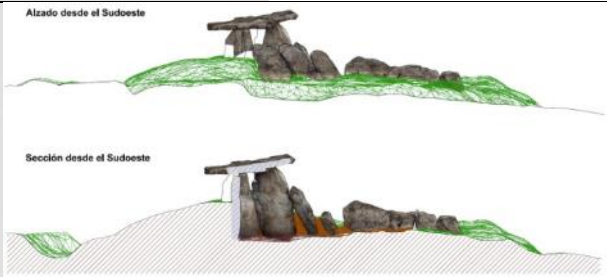



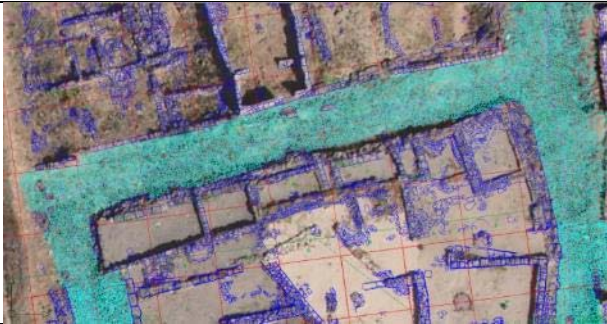


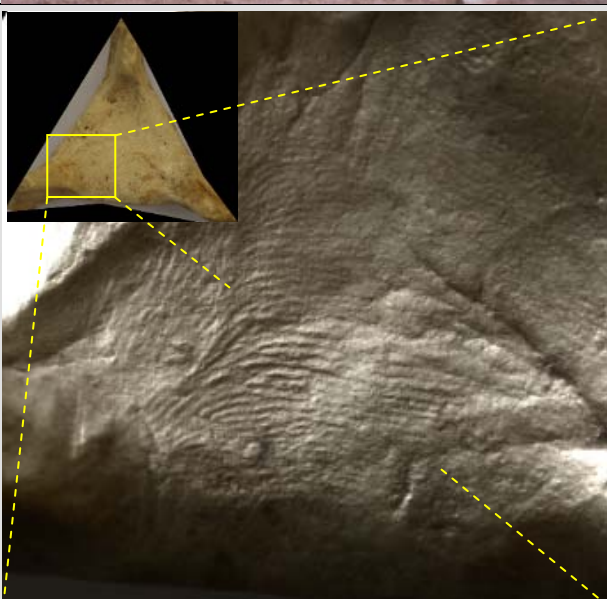
Three-dimensional wireframe models obtained by surveying techniques, set of plans, elevations, cross-sections and all the views necessary for the correct interpretation of the heritage element.



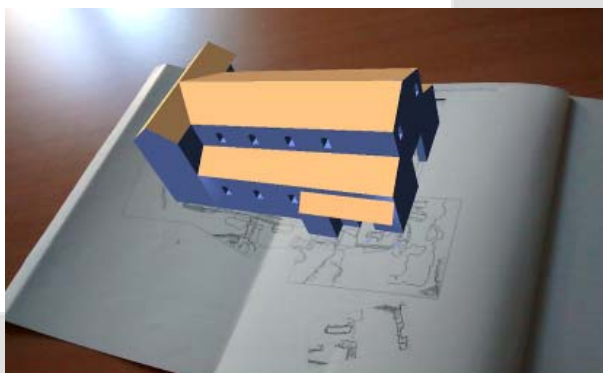
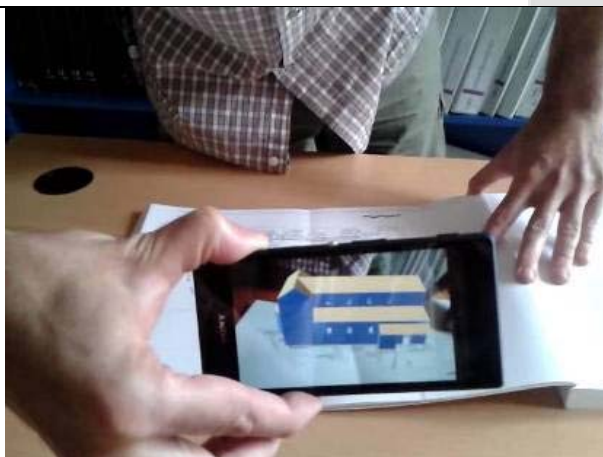
Collection of photographs and plotting of photogrammetric stereo-pairs.



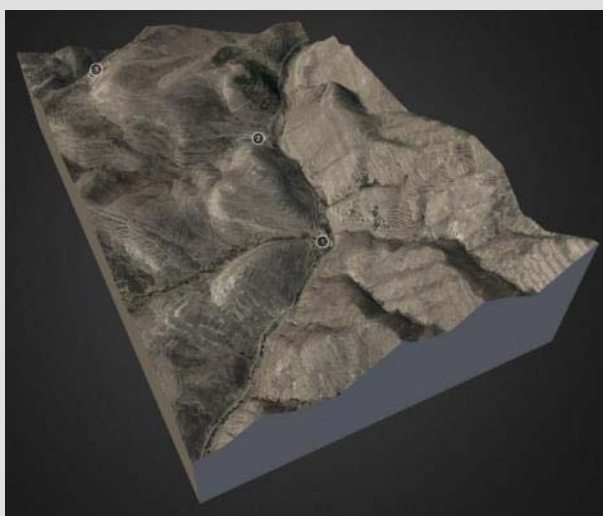
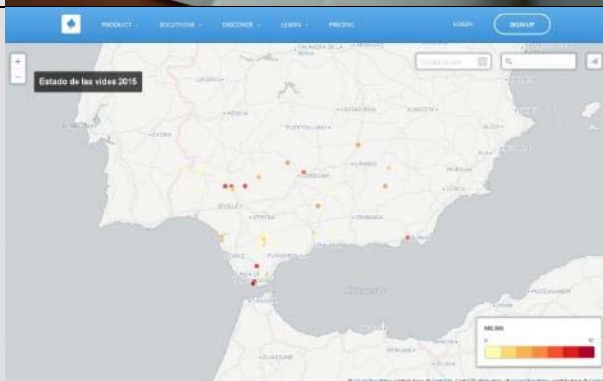
<p>3D surface modelling.</p>	
<p>3D models with photographic textures.</p>	
<p>Orthographic views.</p>	
<p>Map edition at different spatial scales.</p>	

<p>Integration of complex information for the generation of new cartographic products, as well as their conversion to GIS.</p>	
<p>3D models from point clouds.</p>	
<p>Virtual recreation of hypotheses.</p>	
<p>Application of RTI (<i>Reflectance Transmission Imaging</i>) techniques for the detection of hardly visible features.</p>	

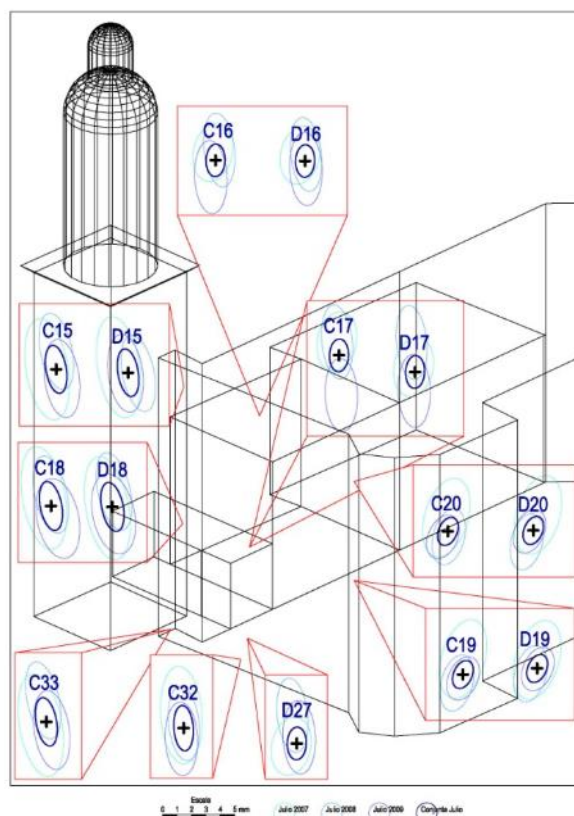
Augmented Reality applications.



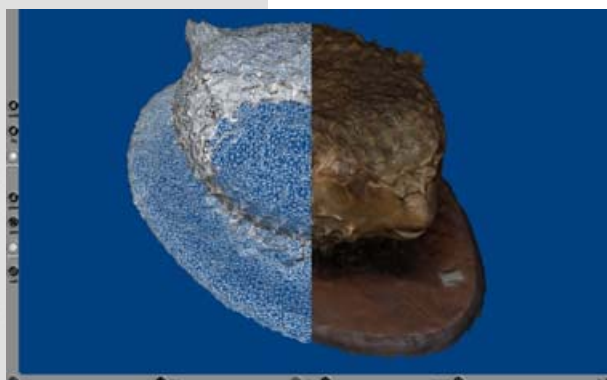
Web mapping based on Spatial Data Infrastructures.



Geometric monitoring of buildings.



Photographic documentation, scanning and 3D modeling of archaeological artifacts and museum collections.



Aerial photographic recording by means of drones



4.2.- COLLABORATION AND RESEARCH SUPPORT

The Laboratory can provide support for research groups or individual researchers -both from the University of the Basque Country and from other universities- on aspects concerning geographic representation of features and the development of spatial databases, three-dimensional modeling or information management (classification, preservation, re-use and use monitoring).

In this respect, the Laboratory has extensive experience in fields such as Geology, Agriculture, Biology or Linguistics; and has collaborated, among others, with the Universities of La Rioja, Navarra (Public) and Seville in Spain as well as, on an international basis, with the Hafen City Universität Hamburg, Vilnius University, Università degli Studi di Siena and National Technical University of Athens.

Finally, the equipment is available for external staff by renting or cession.

4.3.- TRAINING

The Laboratory is open to undergraduate and postgraduate students on training programmes. Over the years, more than 40 students from different countries have got internships and developed part of their bachelor's, master's or doctoral theses in its premises. Therefore, requests for academic exchanges and research visits -national or international- are most welcome.

The Laboratory is also active in developing non-formal education programmes in collaboration with secondary schools, associations, companies and social collectives interested in topics concerning the geometric documentation of heritage.

5. PROJECTS IMPLEMENTED

The following table presents some of the heritage elements in which works have been done. They are grouped according to their typology and sorted by date (oldest first).

Churches and Monasteries



- Asunción (Ullibarri de los Olleros, Álava)
- Santa Eulalia (Gámiz, Álava)
- San Andrés de Astigarribia (Mutiku, Gipuzkoa)
- San Martín (Arlucea, Álava)
- Asunción (Viñaspre, Álava)
- San Vicente (Vitoria-Gasteiz, Álava)
- Basílica de San Prudencio de Armentia (Vitoria-Gasteiz, Álava)
- San Esteban (Ribera de Valderejo, Álava)
- Main refectory of the Monastery of Yuso (San Millán de la Cogolla, La Rioja)
- Santa Eulalia (Vitoria, Álava).
- Medieval church of Tuscolo (Lazio, Italia)
- Old guest quarters and Archdeacon's bedchamber of the Monastery de la Estrella (San Asensio, La Rioja)
- Santa María de la Blanca (Agoncillo, La Rioja)
- Monastery of San Prudencio de Monte Laturce (Clavijo, La Rioja)
- Sanctuary of Santa María del Yermo (Laudio/Llodio, Álava)
- Graffiti of the cloister of the monastery of San Millán de la Cogolla (La Rioja)

Hermitages



- San Julián y Santa Basilisa (Zalduondo, Álava)
- Andra Mari (Ullibarri-Arana, Álava)
- Larrauri (Urarte, Álava)
- Vera Cruz (Durango, Bizkaia)
- San Antonio (Erandio, Bizkaia)
- Shrine of Briñas (Briñas, La Rioja)
- La Concepción (Enciso, La Rioja)
- Virgen del Tajo (Camprovín, La Rioja)

Walls



- Walls of Labraza (Labraza, Álava)
- Cemetery and church of Santa María (Orduña, Bizkaia)
- City walls of Vitoria-Gasteiz (Vitoria-Gasteiz, Álava)
- Contrebia Leucade (Aguilar del Río Alhama, La Rioja)
- Hondarribia walls (Hondarribia, Gipuzkoa)
- Ravelin (Logroño, La Rioja)

Fountains



- Moor's fountain (Labraza, Álava)
- Medieval fountain (Viñaspre, Álava)
- Archaic fountain of Tusculum (Lazio, Italia)
- Nymphaeum (Alfaro, La Rioja)

Excavations



- Catedral de Santa María (Vitoria-Gasteiz, Álava)
- Old secondary schools (Laguardia, Álava)
- Sanctuary of la Encina (Artziniega, Álava)
- Calagurris Iulia (Calahorra, La Rioja)
- Graccuris (Alfaro, La Rioja)
- Tusculum (Lazio, Italia)
- Mariturri (Vitoria-Gasteiz, Álava)
- Castle of los Monjes (Lumbreras, La Rioja)
- Monastery of Valbuena (Logroño, La Rioja)
- El Mandalor (Legarda, Navarra)
- Contrebia Leucade (Aguilar del Río Alhama, La Rioja)
- La Noguera (Tudelilla, La Rioja)
- San Miguel's hill (Arnedo, La Rioja)
- Roman theatre (Córdoba, Córdoba)
- Plot of the former shopping gallery "La Ideal" (Logroño, La Rioja)
- Plot between the streets Rúa Vieja and San Nicolás (Logroño, La Rioja)
- Monte Cantabria (Logroño, La Rioja)
- Church of the monastery of Yuso (San Millán de la Cogolla, La Rioja)
- Village of la Hoya (Laguardia, Álava)
- Square of Santa María (Vitoria-Gasteiz)
- Trench of the Spanish Civil War in mount San Pedro (Amurrio, Álava)

Statuary



- Mural paintings of the parish of Santa María (Déllica, Álava)
- Statuary of the main door of the church of San Pedro (Vitoria-Gasteiz, Álava)
- Altarpiece of the University Chapel in Oñati (Oñati, Gipuzkoa).
- Façade of the convent of Madre de Dios (Logroño, La Rioja).
- Façade "de los Hierros" of the Cathedral of Valencia (Valencia, Valencia).
- Façade "de los abuelos" of the church of San Juan (Laguardia, Álava).
- Outside statuary (Apostles and Pietà) of the Monastery of Arantzazu (Oñati, Gipuzkoa).

Castles



- Castle of Lanos (Ocio, Álava).
- Castle and town of Portilla (Portilla, Álava).
- Aitz Txiki (Abadiño, Bizkaia).
- Castle of Cornago (Cornago, La Rioja).
- Alcázar (Nájera, La Rioja).
- Castle of Castro de Bilibio (Haro, La Rioja).

Towers and Palaces



- Tower-house of Hurtado-Mendoza (Martido, Álava).
- Caserio Landeta (Aretxabaleta, Gipuzkoa).
- Tower of Orgaz (Fontecha, Álava).
- Tower of Martiartu (Erandio, Bizkaia).
- Palace of Salazar (Manzanos, Álava).
- Tower of Láriz (Durango, Bizkaia).
- Tower of Muñatones (Muskiz, Bizkaia).
- Palace of Condestables (Casalarreina, La Rioja).

Bridges



- Old bridge (Armiñón, Álava).
- Medieval bridge (Nanclares de la Oca, Álava).
- Ajoain bridge (Legorreta, Gipuzkoa).
- Piqueras inn (Lumbreras, La Rioja).
- Mantible bridge –Logroño (La Rioja), Lanciego (Álava)-.

Palaeontology, Caves and Megaliths



- Dinosaur footprints (Enciso, La Rioja).
- Praile Aitz I cave (Deba, Gipuzkoa).
- Santimamiñe cave (Kortezubi, Bizkaia).
- "In situ" paleontological site (Ambrona, Soria).
- Dolmen of El Montecillo (Villabuena de Álava, Álava).
- Dolmen of Alto de la Huesera (Laguardia, Álava).
- Dolmen of la Chabola de la Hechicera (Elvillar, Álava).

Other



- Historic centre of Otxandio (Otxandio, Bizkaia).
- Roman dam "La Degollada" (Calahorra, La Rioja).
- *Tabula Ansata* from la Casa del Oculista (Calahorra, La Rioja).
- Foundry of Bolunburu (Zalla, Bizkaia).
- Threshing floors (Villoslada de Cameros, La Rioja).
- Cider press of Caserio Goikoetxea (Laudio/Llodio, Álava).
- Roman mausoleum of "La Sinagoga" (Sádaba, Zaragoza).
- Iregua river way in the vicinity of Viguera (La Rioja).

6. ADDITIONAL INFORMATION

Further information about research outcomes, as well as ongoing and completed projects is available from:

Web:



www.ldgp.es

Repository of UPV/EHU (ADDI):



<https://addi.ehu.es/handle/10810/5483>

Databases (Publications)

Álvaro Rodríguez (ARM), José Manuel Valle (JMV)

Dialnet: [ARM](#) [JMV](#)

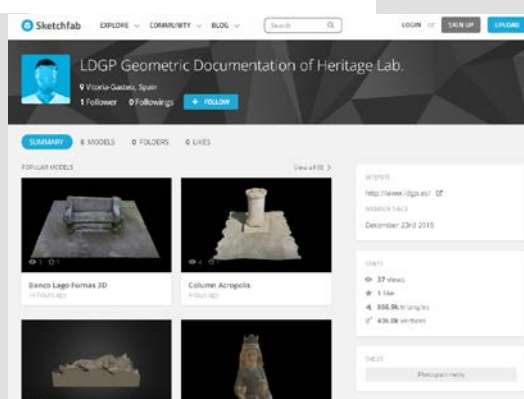
Orcid: [ARM](#) [JMV](#)

Scopus: [ARM](#) [JMV](#)

WoK: [ARM](#) [JMV](#)

Google Scholar: [ARM](#) [JMV](#)

Sketchfab (repository for 3D models):



<https://sketchfab.com/ldgp>

Álvaro Rodríguez Miranda & José Manuel Valle Melón
Laboratorio de Documentación Geométrica del Patrimonio
Grupo de Investigación en Patrimonio Construido (UPV/EHU)
1, Justo Vélez de Elorriaga St. (Centro de Investigación Micaela Portilla)
01006, Vitoria-Gasteiz (Álava) - Spain

tel: +34 945 01 32 22 / 945 01 32 64

fax: +34 945 01 32 70

cor-e: ldgp@ehu.eus

web: <http://www.ldgp.es> // <http://www.ehu.es/docarg>