Early Medieval Churches: History, Archaeology and Heritage

This work makes part of the Marie Curie CIG EMCHAHE project “Early Medieval Churches: History, Archaeology and Heritage” (2013-2017), led by José Carlos Sánchez-Pardo at the University of Santiago de Compostela (Spain).

The research area of this project is the archaeology and history of the early medieval rural churches and their value for cultural management in Galicia (Northwest Spain). The project has two major goals:

• First, to generate new archaeological/historical knowledge on the social dynamics in such a peripheral area of Europe during the period of transformations that goes from the end of the Roman World until the peak of the feudal system (5th-11th centuries) by means of the study of the remaining evidences of the religious buildings of this period.
• Second, to learn how to re-direct all this knowledge towards a proper and effective reappropriation and communication of the important and rather unknown heritage value of the remains of these buildings: architectural, archaeological (unearthed or visible), artistic, documentary or even toponymic.

At an archaeological level, the project characterises by a wide perspective, strongly linked to Landscape Archaeology approaches combined with stratigraphical analysis of both underworth or standing remains of early medieval churches.

In this sense, the project, rather than focusing on a few examples, aims to study a high number of churches in order to get new evidence of the early medieval churches, comparing construction techniques, chronologies and founders as well as distribution areas. As an estimation, the initial compilation of data for the project has recorded 265 churches with possible early medieval evidences in Galicia.

Within this panorama, we have chosen 3 case-study areas:

• Area of Lougo: 2943 km² comprising 65 churches to survey
• Area of Pía: Dos: 1058 km² and 84 churches to survey
• Area of Ourense: 1820 km² and 86 churches to survey

So the project faces an important challenge: “How to document all these buildings in a feasible and practical way?”

Approaches to the study and geometric survey of early medieval churches

Study approach in EMCHAHE

The methodological strategy in EMCHAHE is based on the application of two successive work phases:

• Prospective phase (descriptive strategy)
  – Revision of documentary sources
  – Creation of a GIS
  – Selection of study areas
  – Architectural survey

• Analytical phase (intensive strategy)
  – Complementary study of the early medieval churches:
    • Documentation of the early medieval remains
    • Geometric documentation of singular elements and churches
    • Stratigraphic analysis of parameters
    • Cluster analysis
    • Analysis of mortars and bricks
    • Analysis of lapidary inscriptions and markings
  – Territorial analysis

From the data acquisition to the results

High level of detail can be achieved (singular element)

Photographs of details can achieve high quality.

Advantages
• It does not involve a large investment of time, ie. the case of S. Macedo sarcophagus: 30 min. for taking photos + 1 h for editing results.
• It improves the analysis: details that can not be observed in reality, can be appreciated in the 3D model: inscriptions, relief, prints, erosion, etc.
• It facilitates the disclosure: the 3Dpdf, sketchfab, etc. enables to visualize and interact with the model.

Problems
• It is necessary a good field data record (quality images, enough overlapping, correct lighting, etc.).
• It implies more effort in the post-processing phase.

Ortoimage - Parameters

Essential result for Analytical phase:

Advantages
• It improves representation: the whole of the elevation can be represented unstereobased and without distortion; it involves less work than image rectification or creating mosaics of photographs.
• It speeds up analysis: it allows to review in the office the analysis performed in the field and to take new measurements without having to return to the site.
• It facilitates disclosure: the representation of the results is more uniform and complete.

Problems
• The elements that are too high (tower bells, roofs) are not well represented with photographs taken from the ground.

3D Models from terrestrial photogrammetry

Advantages
• 3D metric copy: it allows to record the geometry, analyze volume, texture, relationship with the environment, etc., in the office.
• It increases the possibility of representation: elevations, plans, sections, perspectives, interactive 3D models can be obtained.
• It allows to represent three-dimensionally the constructive phases of the building, propose 3D reconstruction hypotheses, etc.
• It facilitates research and dissemination of results.

Technical Sheet

• Director of EMCHAHE Project: José Carlos Sánchez-Pardo (USC)
• IP of EMCHAHE Project: Marcos V. García Quintela (USC)
• Director of archaeological works: Rebeca Blanco-Rotea (USC)
• 3D Documentation support: Patricia Mañana-Borrazás (Incipit, CSIC)

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Conclusions

Initially EMCHAHE did not envisaged the use of any heritage geometric documentation method except conventional photography, because the wide-scale focus of the project was directed to the understanding of churches within a larger context rather than to the detailed study of each one.

However, the complexity of the stratigraphy documented in many of the buildings and the need to individually understand the characteristics of the construction phases, bondings, decorative items or typologies employed in these first Galician churches, required a more detailed study of the buildings. This implied representation by means of quick, cheap and easy to use system.

Profile of this workflow
• The photogrammetric methodology developed has proved to be very effective and practical for the needs of a large-scale study.
• It offers flexibility to adapt to the characteristics of each church that needs to be documented.
• Lowest cost in comparison with other geometric documentation methodologies.
• Create a digital copy enough agile and accurate. It can be used later to make decisions or recover information without returning to the place.
• It improves the heritage outreach, the presentation of the results and reconstruction hypotheses that include not only the 2D stratigraphy but the volumes of the ancient buildings that have survived in the interior of the current churches.

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