

VAST 2008 | Universidade do Minho| Dezembro 2008

(FCT:PTDC/AUR/66476/2006)



THE 9TH INTERNATIONAL SYMPOSIUM ON VIRTUAL REALITY, ARCHAEOLOGY AND CULTURAL HERITAGE.



# A Report on Multiple Approaches to the S. Frutuoso of Montélios Chapel Survey

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2008**

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Centro de Investigação em Arquitectura, Urbanismo e Design

**CIAUD**  
FACULDADE DE ARQUITECTURA  
UNIVERSIDADE TÉCNICA DE LISBOA

## ARCHITECTURAL HERITAGE CONSERVATION

### Methodology to 3d Laser Scanning and Digital Photogrammetry Documentation

#### RELEVANT KNOWLEDGE FIELDS

Architecture; Conservation and Rehabilitation; Archaeology; Photogrammetry; 3d Laser Scanning

#### TEAM

José Aguiar (FAUTL - director)  
Francisco Agostinho (FAUTL)  
Cristina Henriques (FAUTL)  
Luís Mateus (FAUTL)  
Víctor Ferreira (FAUTL)  
Luís Fontes (UM)  
Paulo Bernardes (UM)  
Natália Botelho (UM)  
Helena Catarino (UC)  
Sónia Filipe (UC)  
Marla Ramalho (IGESPAR)  
Manuel Lacerda (IGESPAR)

#### CONSULTANTS

Juan José Martín (Universidad de Valladolid)

#### APPLICANT INSTITUTION

 **FACULDADE DE ARQUITECTURA**  
UNIVERSIDADE TÉCNICA DE LISBOA  
<http://archc3d.fa.utl.pt/>

#### PARTICIPATING INSTITUTIONS

 **igespar**  
Instituto de Gestão do Património  
Arquitectónico e Arqueológico

 **Universidade do Minho**  
Unidade de Arqueologia

#### DURATION

36 Months (October 2007 - September 2010)



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- **OVERALL RESEARCH OBJECTIVES**
  - 1) To create the basis for a minimum system of surveying and documentation of architectural heritage based both in photogrammetry and 3d laser scanning to support safeguard actions whenever needed.
  - 2) To explore the possibilities of fusion between digital photogrammetry and 3d laser scanning in order to investigate methodological implications both in analysis and diagnosis processes both in the field of the Archaeology of Architecture and Architectural Restoration.
  - 3) To implement an Information System that allows the management of qualitative and geometric data (2D and 3D) about Architectural Heritage. This should serve as base to the implementation of conservative measures, as base to the widespread and study of architectural heritage, and complement other existing Information Systems.
- **PAPER OBJECTIVES**

To present an empirical comparison and evaluation of methods to archaeological survey, based on the survey of S. Frutuoso Chapel:

  - (Topographic survey)
  - Hand drawing survey
  - Convergence photogrammetry
  - Drawing rectification
  - Laser scanning

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- S. FRUTUOSO CHAPEL

It is a small mausoleum with a visigothic origin.

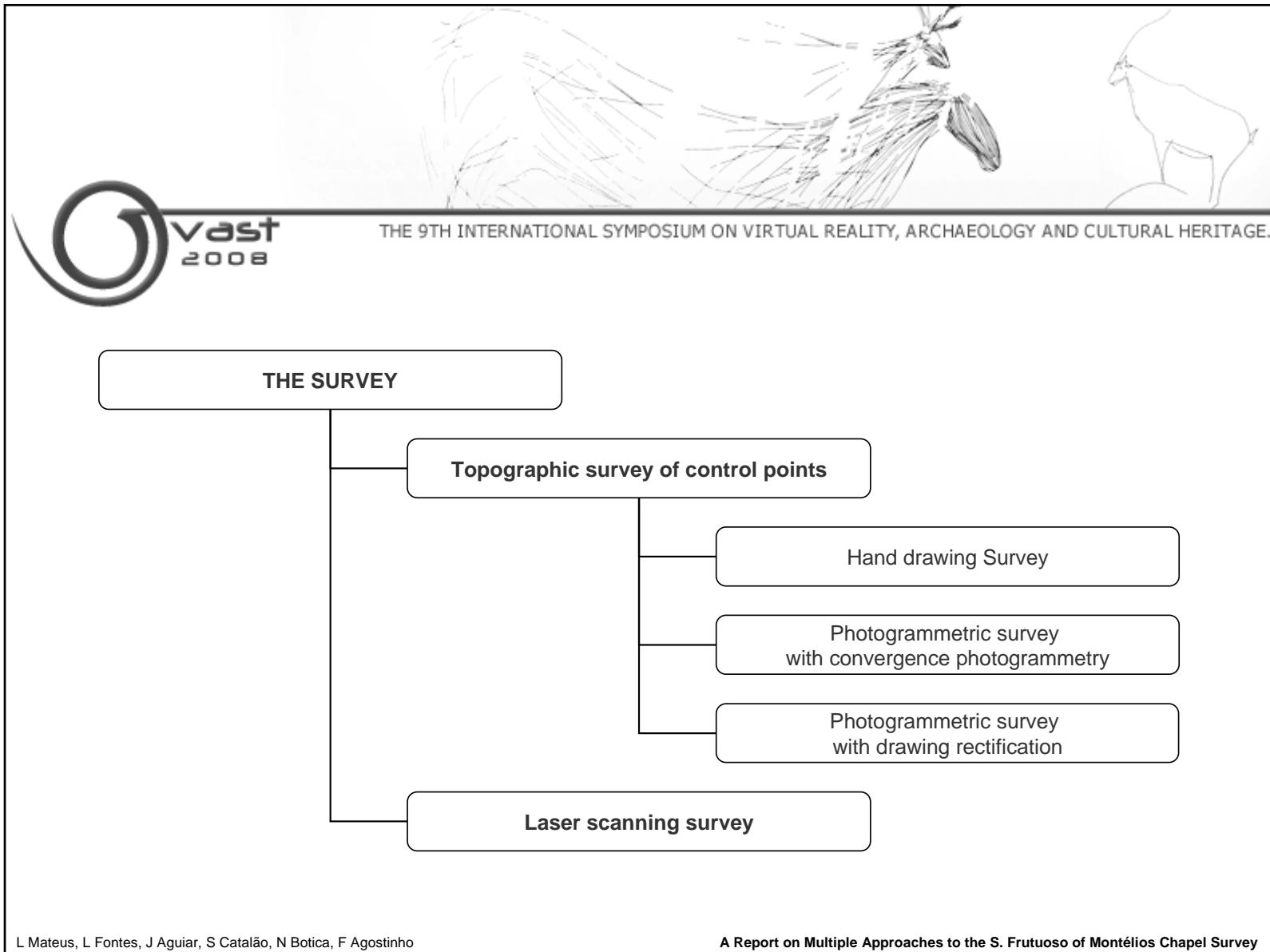
It was built c. 665 by the bishop Frutuoso of Braga.

It has an approximate area of 100m<sup>2</sup> with a Greek cross plan and 10.5m height.



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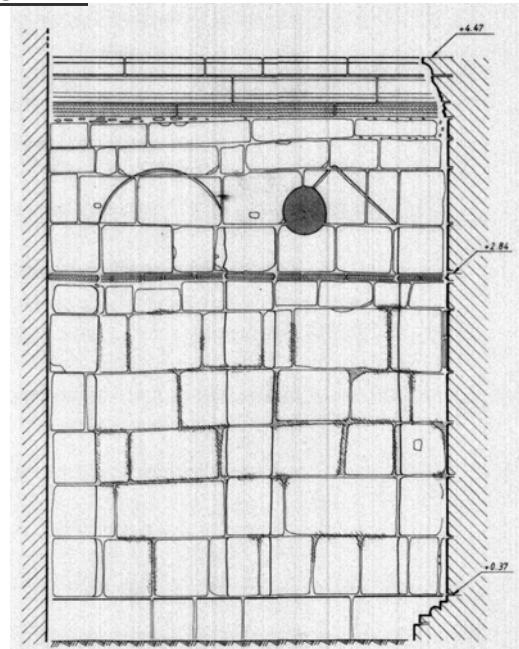
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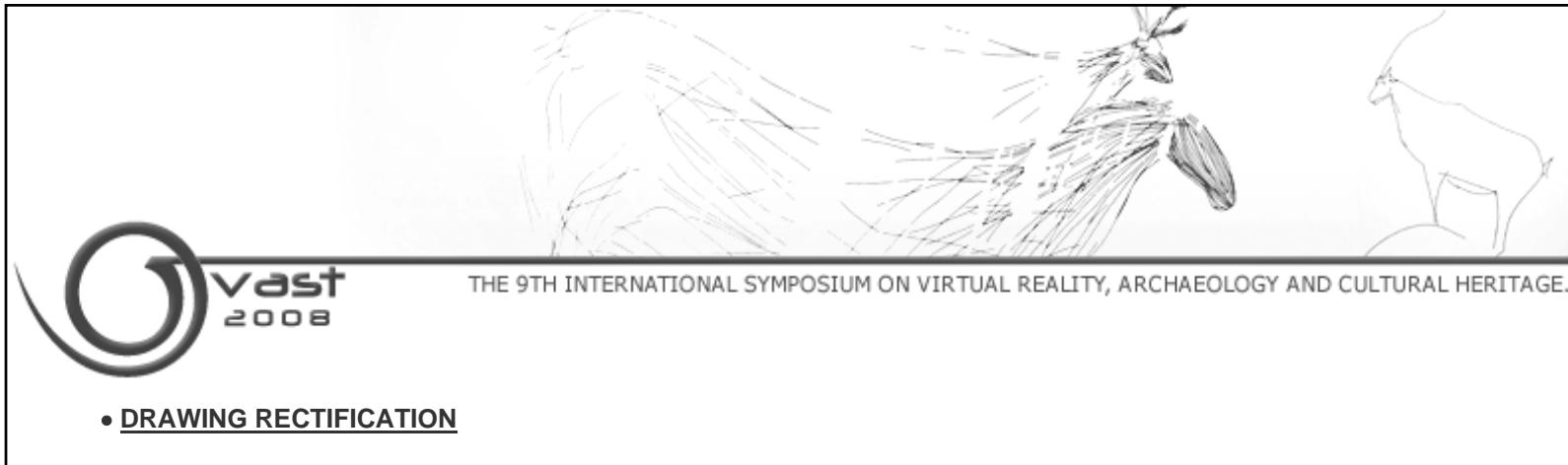
• HAND DRAWING SURVEY



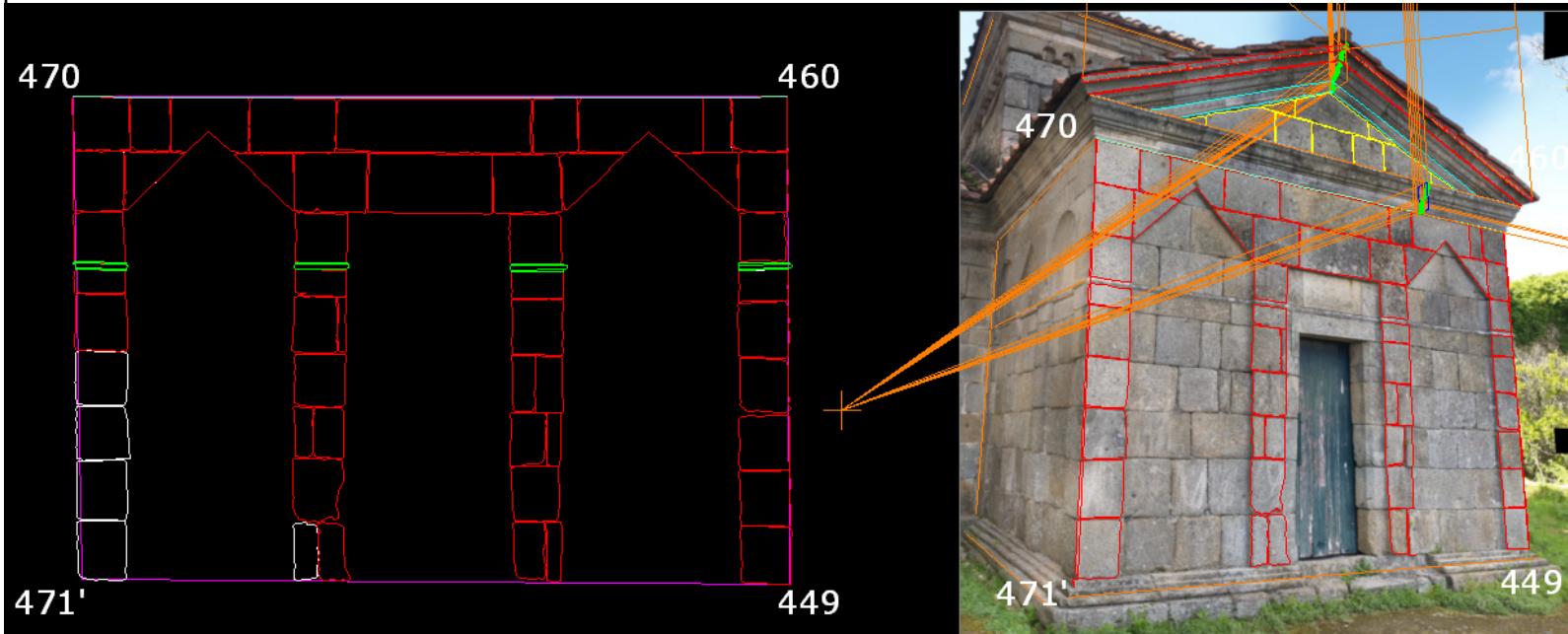
**• CONVERGENCE PHOTGRAMMETRY**

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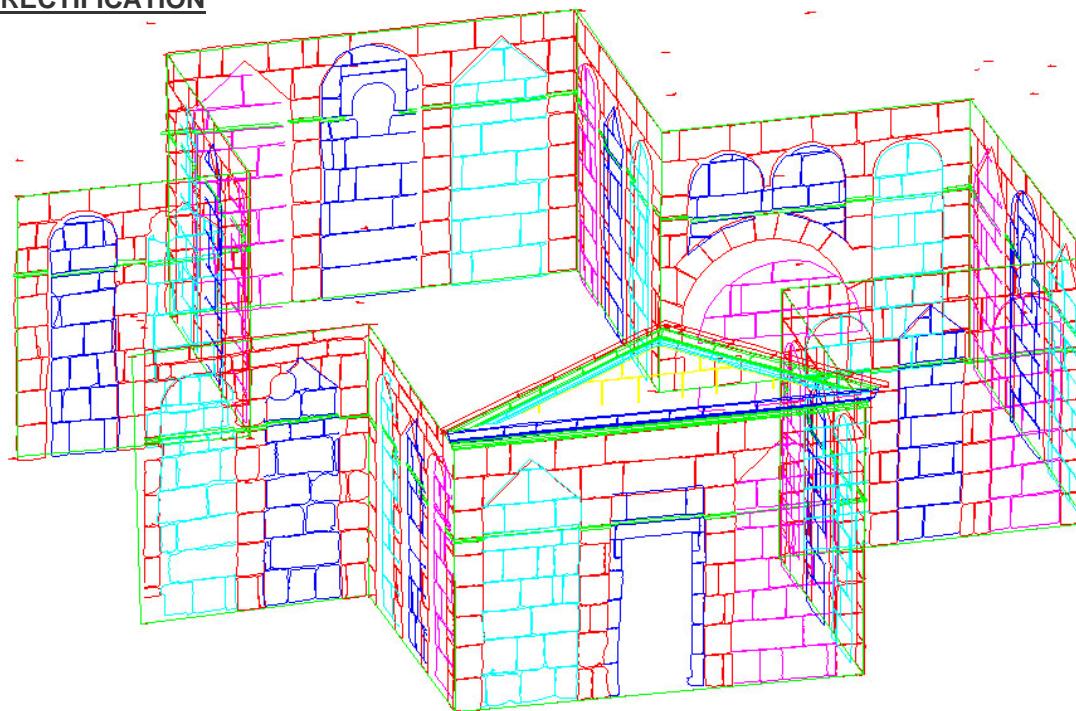
• DRAWING RECTIFICATION





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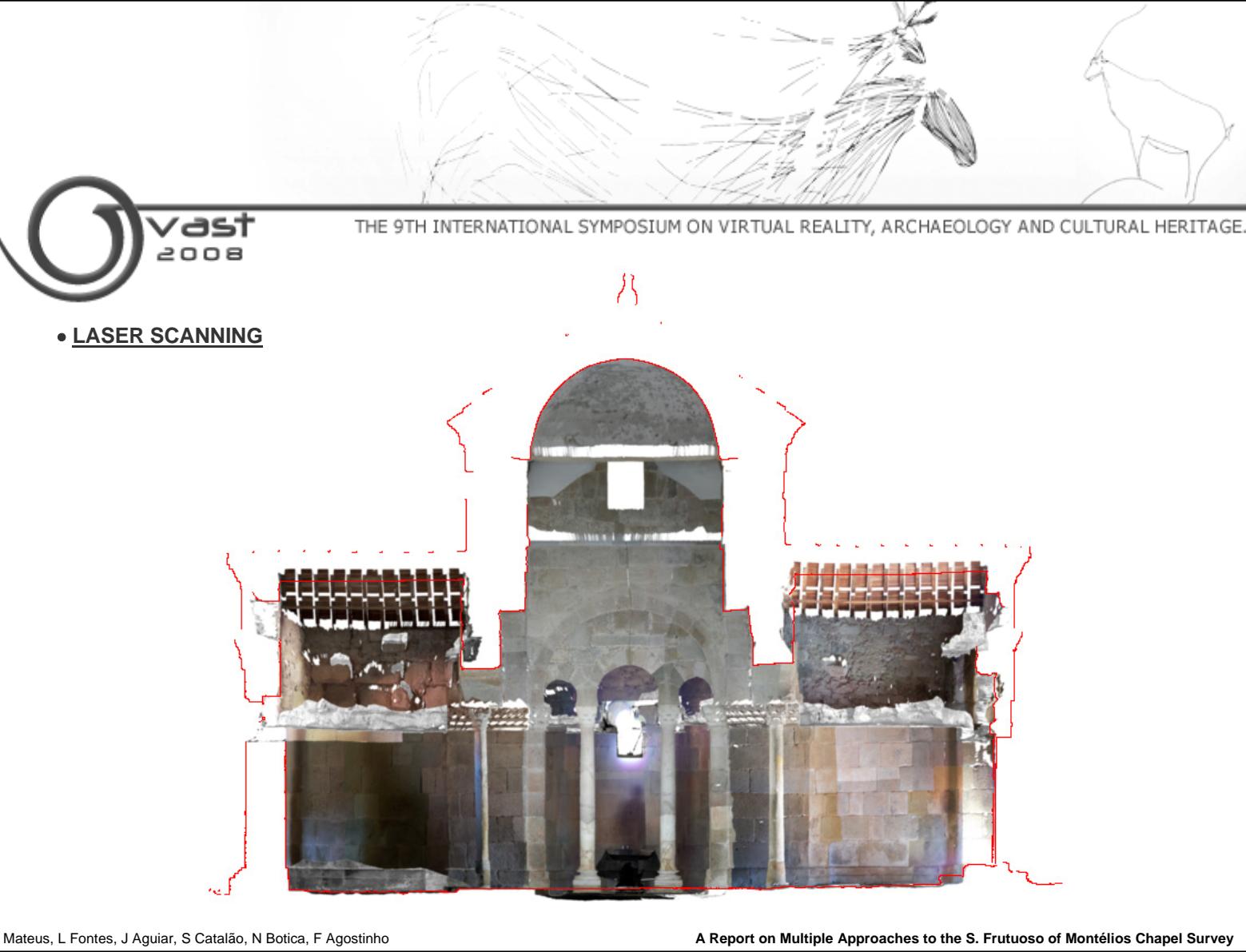
• DRAWING RECTIFICATION



• LASER SCANNING

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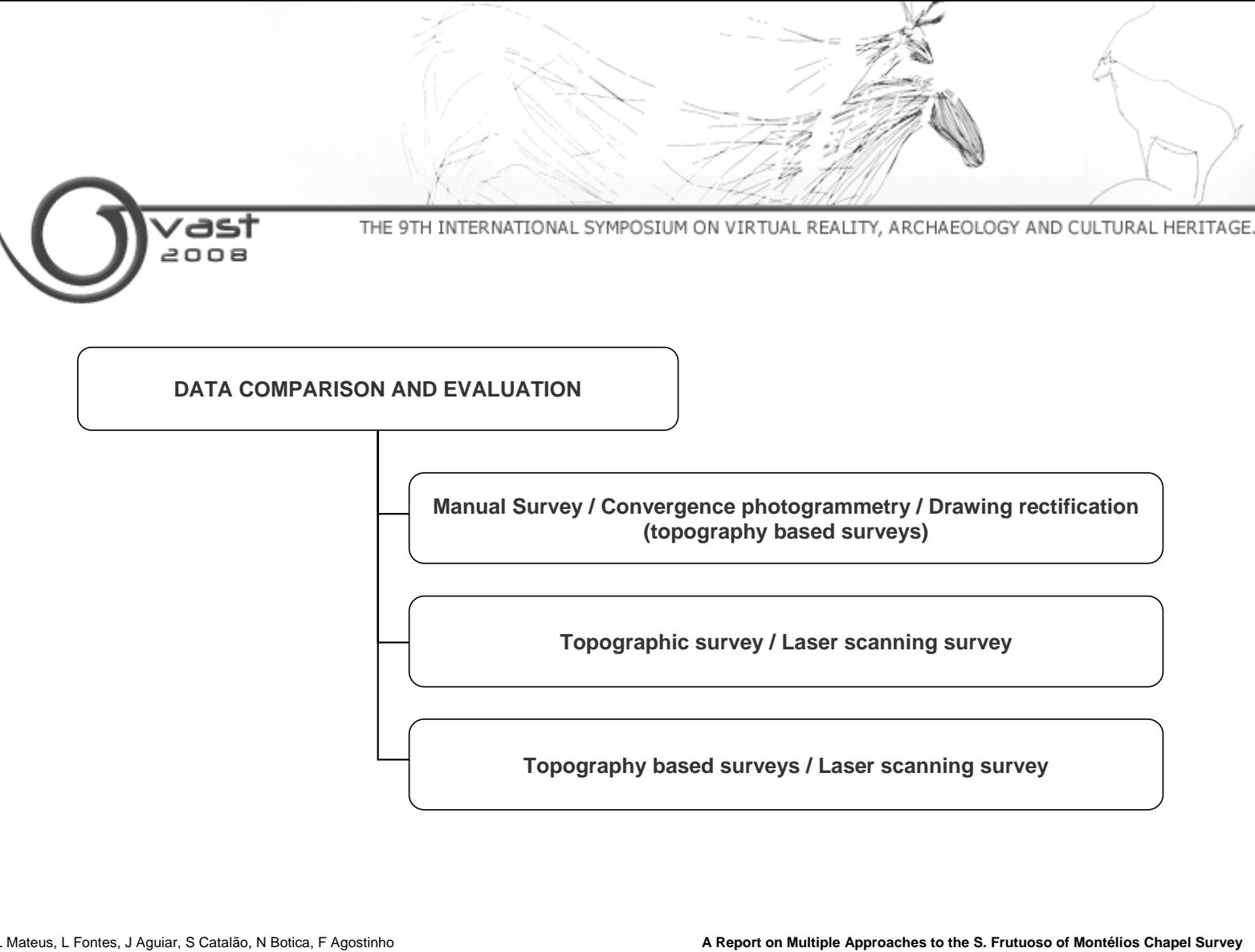
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• LASER SCANNING



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**• LASER SCANNING / CONVERGENCE PHOTGRAMMETRY / DRAWING RECTIFICATION**

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• TOPOGRAPHIC SURVEY / LASER SCANNING SURVEY

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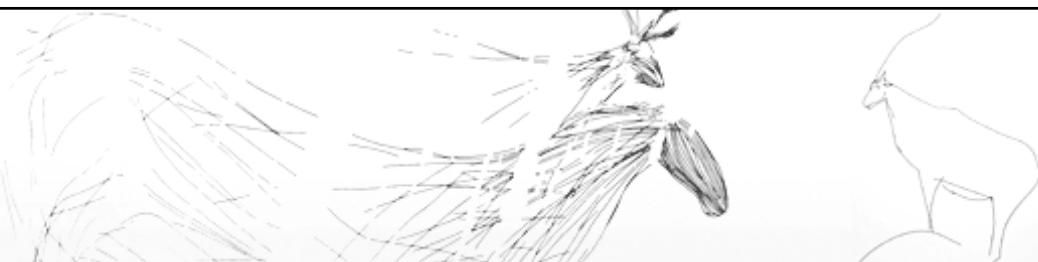


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• **CONCLUSIONS**

- 1) For the purposes of archaeology of architecture all surveying methods applied can be considered valid and can provide reliable data.
- 2) The choice of the most adequate methods to a given situation is the ethical and scientific responsibility of the professional that deals with built heritage. He has the responsibility to define the terms with which he can communicate to the service providers whenever exterior services are required.
- 3) These terms refer in first place to the clear definition of the survey method, the precision level required and type and nature of the deliverables. With this particular case study and results the authors want to give a real contribution to this matter.