



UNIVERSIDADE
DE VIGO

Close Range Photogrammetry & Terrestrial Laser: Applications to the Archaeology and Cultural Heritage

INTERNATIONAL WORKSHOP
CITY OF TOMORROW AND CULTURAL HERITAGE
POMERANIA OUTLOOK 2005



Welcome to the website of the
Close Range *Remote Sensing & Photogrammetry* Group

University of Vigo 

Fotogrametría e Teledetección Cercanas

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[Main](#)

[Members](#)

[Research](#)

[Links](#)

[Images](#)

[Vrml](#)

Last update: June 4th, 2004

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<http://webs.uvigo.es/grupotf1/>



Close Range Photogrammetry & Remote Sensing

Who?

Members

Where?

Location

What?

Research topics

How?

Research projects, support

Who?

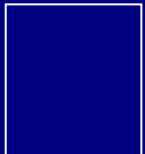
Full professors



Pedro Arias



Henrique Lorenzo



Celestino Ordóñez

PhD Students



Fernando Rial



Manuel Pereira



Alex Novo

Collaborators

Carlos Caamaño

Aida Badaoui

Javier Roca

Jaime Rodríguez

Ivan Reguera

Researcher



Julia
Armesto

Others

Politechnic University of
Catalonia (Spain)

University of Basque
Country (Spain)

Politechnic University of
Valencia (Spain)

Federal University of
Paraná (Brasil)

Estadual University of
Sao Paulo (Brasil)

Curtin University of
Technology (Australia)

Where?

University of Vigo

School of Forestry
Engineering

*Campus A Xunqueira
Pontevedra*

School of Industrial
Engineering

*Rúa Torrecedeira
Vigo*

School of Mining
Engineering

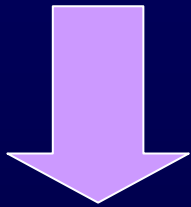
*Campus Universitario
Vigo*

*Natural Resources and Environmental Department
Cartographic Engineering, Geodesic and Photogrammetry*



What?

Close Range Photogrammetry and Terrestrial Laser



**Reverse
Engineering**

Data collection

Digital camera
Terrestrial laser scanner

Pre-processing

Software

Processing

Results

Post-processing

Applications

Reverse Engineering

Data collection

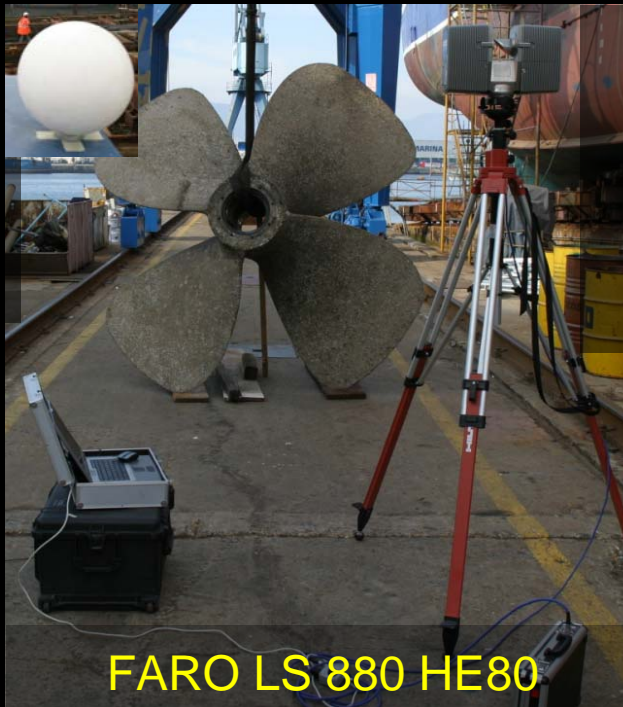
Preprocessing

Processing



Digital

Non metric - Calibrated



FARO LS 880 HE80



LEICA CYRAX 2500



Total
station

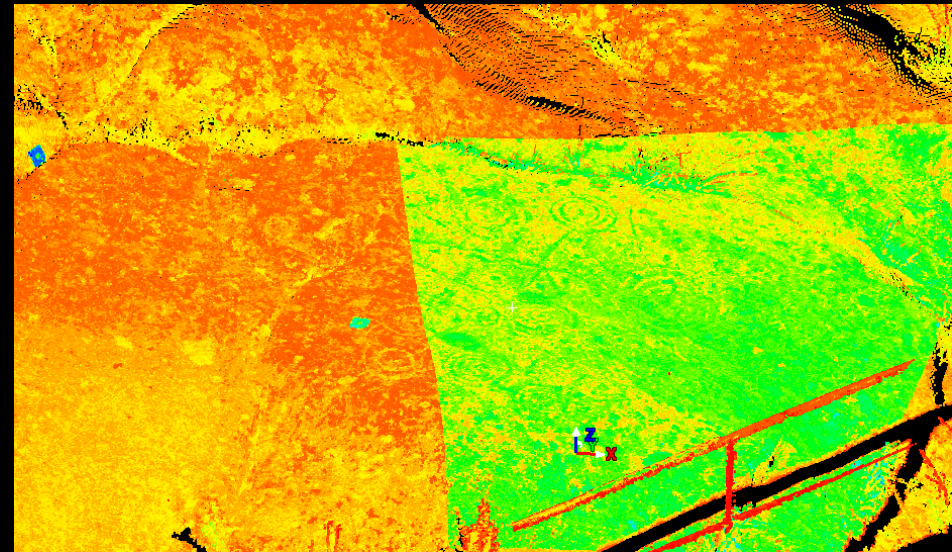
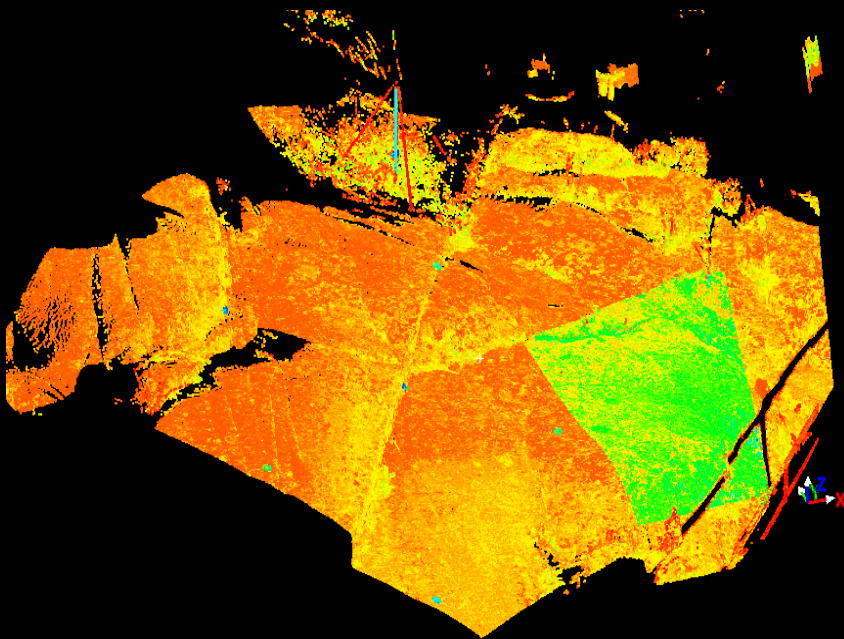
Reverse Engineering

Data collection

Preprocessing

Processing

Cloud points



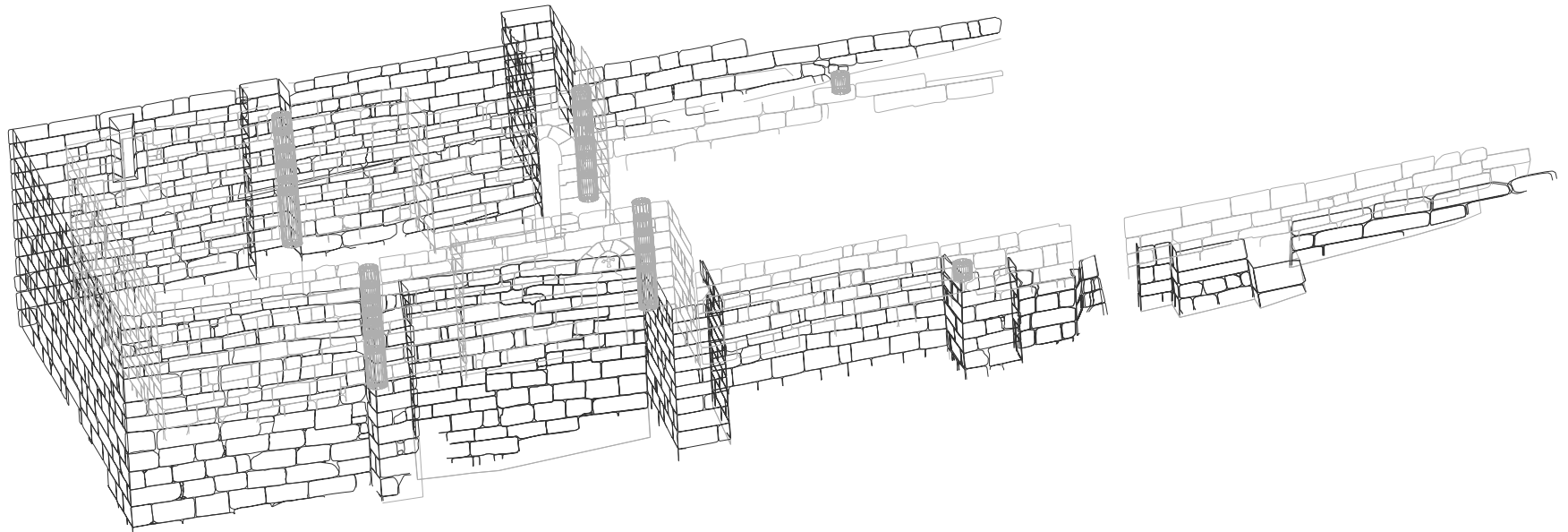
Reverse Engineering

Data collection

Preprocessing

Processing

3D wire frame models



Reverse Engineering

Data collection

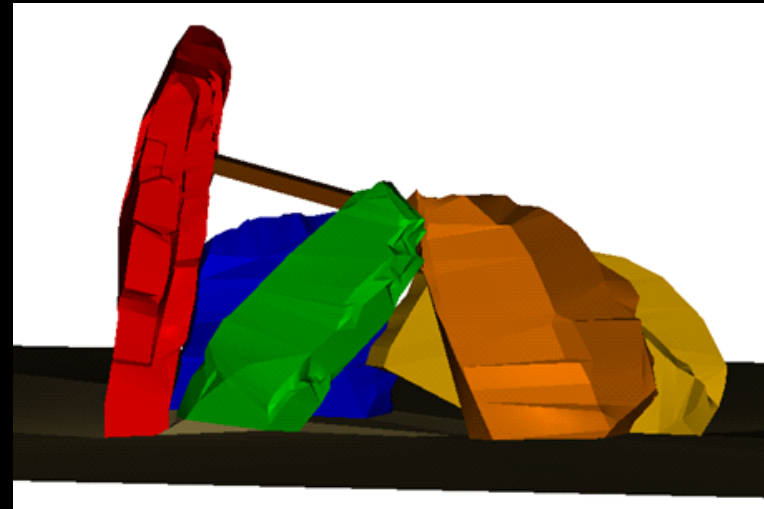
Preprocessing

Processing

3D wire frame models

3D surface models

3D texture models



Reverse Engineering

Data collection

Preprocessing

Processing

3D wire frame models

3D surface models

3D texture models

3D photorealistic textured models



Reverse Engineering

Data collection

Preprocessing

Processing

3D wire frame models

3D surface models

3D texture models

Digital Orthophotographic



Reverse Engineering

Data collection

Preprocessing

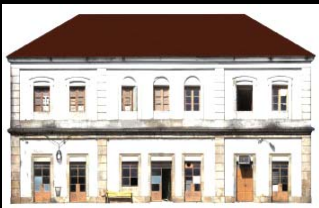
Processing

3D wire frame models

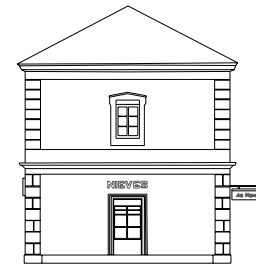
3D surface models

3D texture models

Front / top / left views & Plans



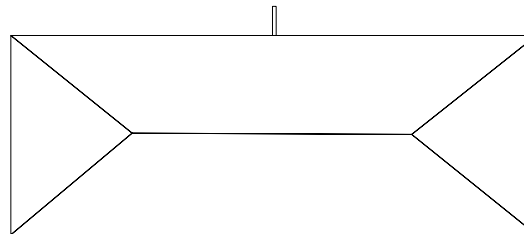
VISTA FRONTAL (A-A)



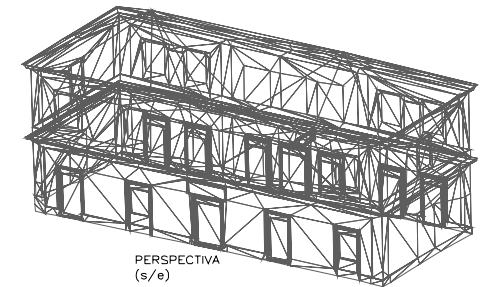
VISTA LATERAL DERECHA (C-C)



VISTA POSTERIOR (B-B)



VISTA EN PLANTA



PERSPECTIVA
(s/e)



How?

Research Projects

2000 - 2005

Cultural heritage documentation and surveying

Industrial applications

Civil construction & Building

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

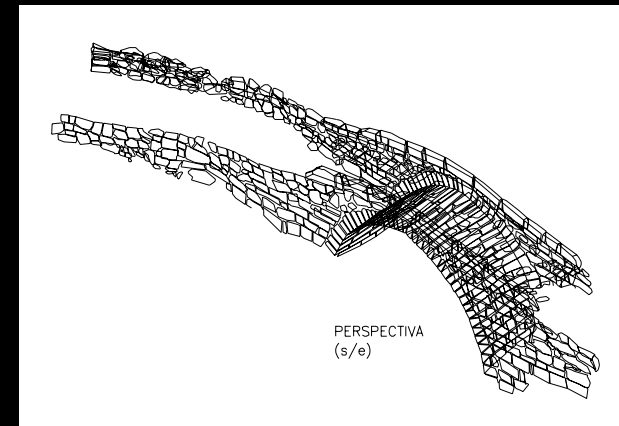
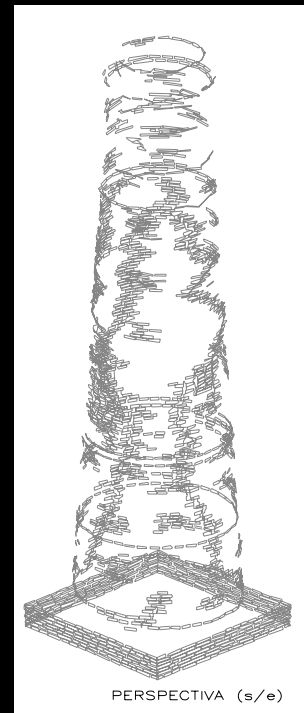
Rural building surveying through close range photogrammetric techniques

Aims



Galician agro-industrial
buildings database
elaboration using close
range photogrammetry
by simple methods

Xunta de Galicia, 2000 (Autonomous government)



XX ISPRS Congress
Vol. XXXV-B5,
pp. 1682-1750 (2004)

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

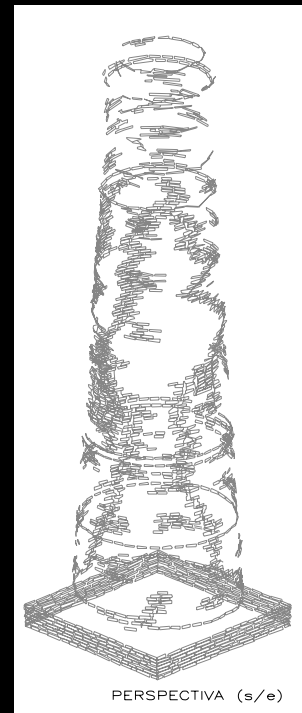
Rural building surveying through close range photogrammetric techniques

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Xunta de Galicia, 2000 (Autonomous government)



Accepted for
publication

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Rural building surveying through simple close range photogrammetric techniques

Methodology for the architectonic and archaeologic heritage characterization through terrestrial photogrammetric and radar techniques

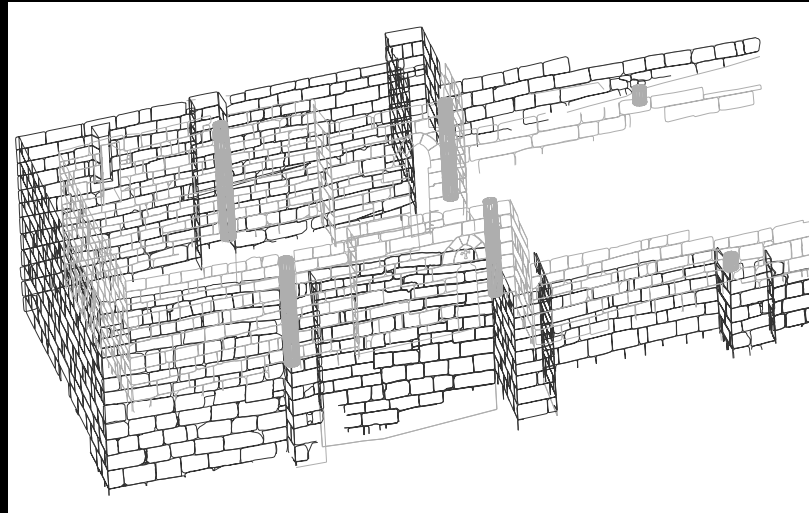
Aims

School Architecture; University of Coruña; Xunta de Galicia, 2001

Processing: wire frame model



Damage monitoring



Vol. 83,
pp. 1754-1766
(2005)

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Rural building surveying through simple close range photogrammetric techniques

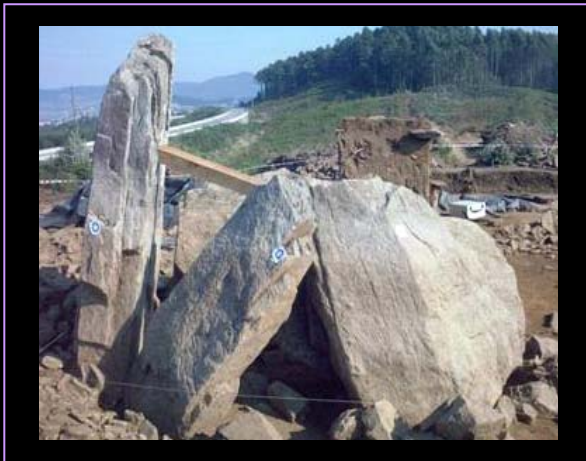
Methodology for the archyctectonic and archeologic heritage characterization through terrestrial photogrammetric

Investigation of archaeological heritage

Aims

Vigo Council, local administration, 2002

Processing: wire frame, surfaces, realistic texture models



Documentation of
archaeological site



Vol. 20, Nº 5, pp.
521-535 (2005)

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Running

Semi-automatic photogrammetric methods for building façades surveying

PROFIT Project, Ministry of Education. Industrias González S.A., 2005

Aims



Automation in façade hole
frame surveying

TROUBLES NOWADAYS

- ❌ LOW MEASUREMENT ACCURACY
- ❌ VERY SLOW METHOD
- ❌ LOST DATA
- ❌ CLARITY DATA
- ❌ GEOGRAPHICAL LIMITS
- ❌ LABORAL RISKS
- ❌ ...

Reverse Engineering

Heritage documentation

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Civil construction

Running

Semi-automatic photogrammetric methods for building façades surveying

PROFIT Project, Ministry of Education. Industrias González S.A., 2005

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Automation in façade hole
frame surveying

Solutions



- ✓ HIGHER ACCURACY
- ✓ NO LABORAL RISKS
- ✓ HIGHER PERFORMANCE
- ✓ NO DATA LOSING
- ✓ CLARITY DATA
- ✓ WAREHOUSING
- ✓ AUTOMATICAL DATA PROCESS
- ✓ NO GEOGRAPHICAL LIMITS

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Running

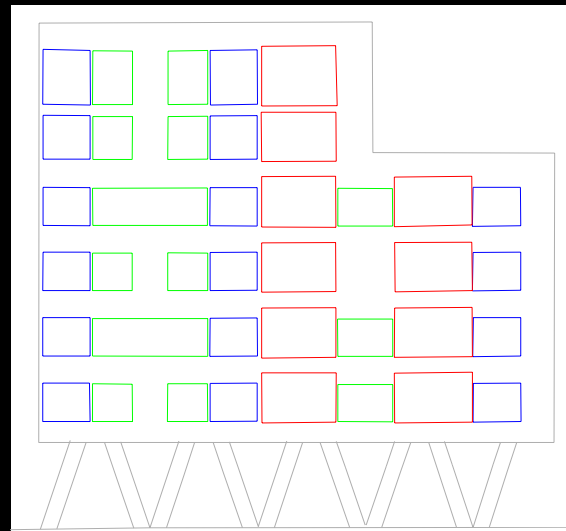
Semi-automatic photogrammetric methods for building façades surveying

PROFIT Project, Ministry of Education. Industrias González S.A., 2005

Aims



Automation in façade hole
frame surveying



International Calibration and Orientation Workshop
EuroCOW 2006

25 - 27 January 2006, Castelldefels, Spain

[Presentation](#) [Committees](#) [Topics](#) [Abstracts](#) [Registration](#) [Venue](#) [Sponsors](#)

Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Semi-automatic photogrammetric methods for building façades surveying

Running Building surveying aimed at land management (*Collaboration: U.P.Catalonia*)

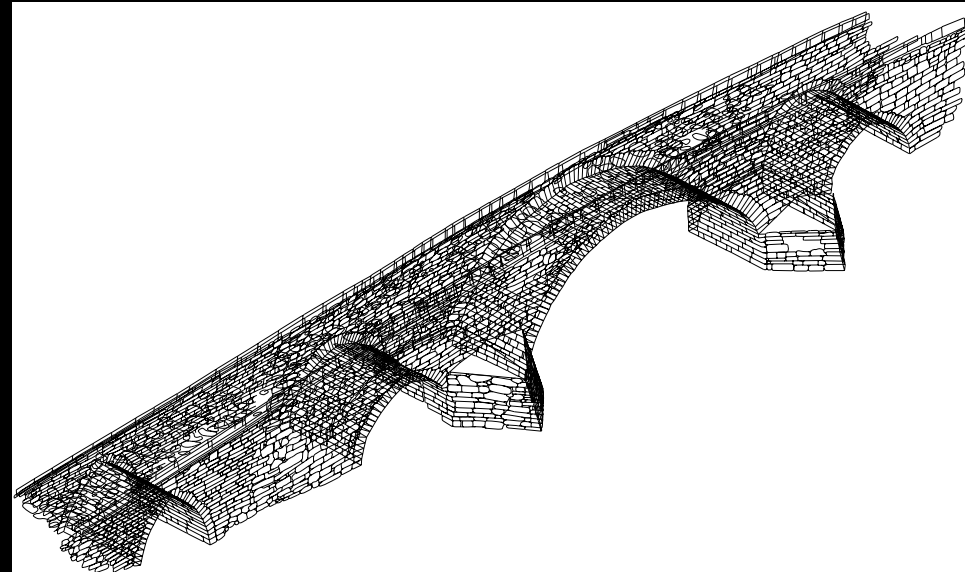
University of Vigo, 2004

Aims

Processing: wire frame model, failure analysis



Archytectural heritage surveying
and documentation



Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Semi-automatic photogrammetric methods for building façades surveying

Running Building surveying aimed at land management (*Collaboration: U.P.Catalonia*)

University of Vigo, 2004

Aims

Postprocessing: virtual reality; failure analysis



Archytectural heritage surveying
and documentation



Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Semi-automatic photogrammetric methods for building façades surveying

Building surveying aimed at land management

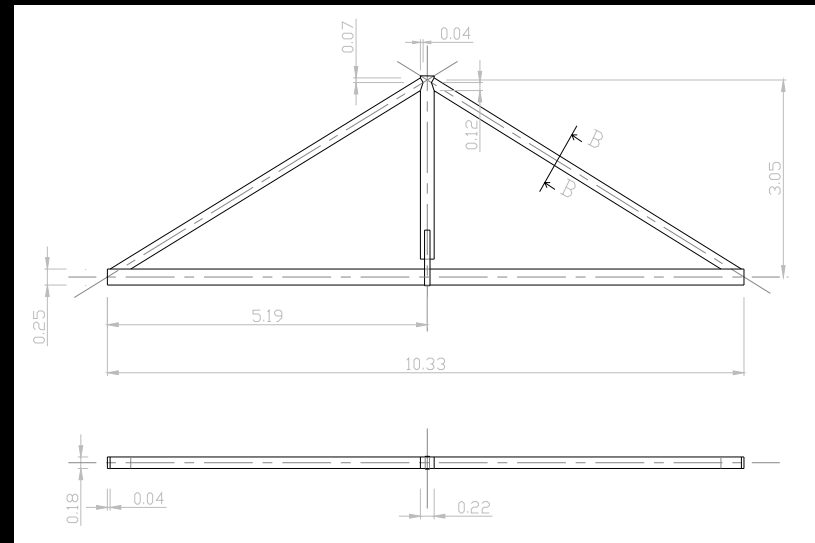
Analysis of timber structures with irregular geometry obtained by close range digital photogrammetry *Collaboration: Department of Materials Engineering, Applied Mechanics and Construction. University of Vigo*

Aims



3D modelling of built up structures

Post-processing: detailed plans; frame analysis



Reverse Engineering

Heritage documentation

Industrial applications

Civil construction

Semi-automatic photogrammetric methods for building façades surveying

Building surveying aimed at land management

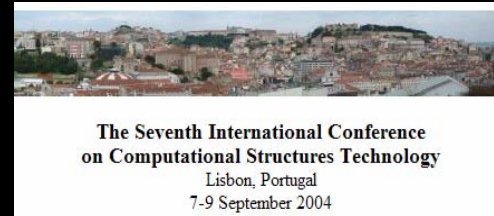
Analysis of timber structures with irregular geometry obtained by close range digital photogrammetry *Collaboration: Department of Materials Engineering, Applied Mechanics and Construction. University of Vigo*

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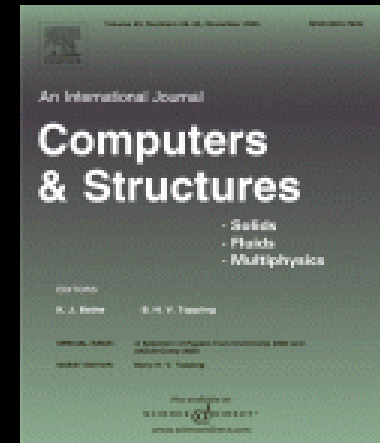


3D modelling of built up structures

Post-processing: detailed plans; frame analysis



7th Int. Conf. Comp.Str.Tech.
Paper 26 (2004)



In process review

Running

**INTERNATIONAL WORKSHOP
CITY OF TOMORROW AND CULTURAL HERITAGE
POMERANIA OUTLOOK 2005**

ACKNOWLEDGEMENTS:

- Izabela Lubowiecka
- Organising committee of International Workshop
- European community
- Cure Center
- Gdansk University of Technology
- University of Vigo