



Euromed Heritage
التراث الأورو متوسطي
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برنامج تمويل من الاتحاد الأوروبي



ANCIENT THEATRES ENHANCEMENT FOR
NEW ACTUALITIES
P R O J E C T
تعظيم قيم المسارح القديمة لأدوار جديدة

ATHENA PROJECT

Ancient Theatres Enhancement for New Actualities



Department of Antiquities
Hashemite Kingdom of Jordan

THE HASHEMITE KINGDOM OF JORDAN
MINISTRY OF TOURISM & ANTIQUITIES
DEPARTMENT OF ANTIQUITIES

Nizar Al Adarbeh, Project Manager



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ATHENA PROJECT

- Funded by the European Commission (**EC**)
- Under the **Euromed Heritage IV**
- Timeline: **2009-2013**
- Coordinator: **Department of Antiquities**



Project Consortium

COORDINATOR

- The Hashemite Kingdom of Jordan, Ministry of Tourism & Antiquities, **Department of Antiquities**

PARTNERS

- Institut Préparatoire aux Etudes Littéraires et de Sciences Humaines de Tunis. **Tunisia**
- Built Environment Research Laboratory– University of Science and Technology Houari Boumediene. **Algeria**
- Universidad Politécnica de Valencia - Instituto Universitario de Restauración del Patrimonio. **Spain**
- Dipartimento di Rilievo, Analisi, disegno dell'Ambiente e dell'Architettura (RADAAR) - La Sapienza Università di **Roma**

ASSOCIATE Partners

- CyArk High Definition Heritage Network
- Centro Progettazione e Restauro, **Regione Siciliana**
- Arab Towns Organization (ATO)**
- Instituto de Arqueología-**Mérida Spain**



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Genesis and Needs

- Ancient theatres represent one of the most **significant cultural heritage remains** of Mediterranean civilizations.
- A number of these ancient theatres are still **being used for various activities**.
- Such current uses of theatres create a **continuous impact** on theatre structures originally designed for needs very different from contemporary ones.
- Thus, the need for a **common strategy** seems to arise, involving the design, testing and implementation of a management plan.



ATHENA project objectives

- **To minimize the progressive decay** of ancient theatres in terms of physical, cultural and socio-economic aspects
- **To support the revival of theatres** as a part of a wider archaeological site or urban context
- **To establish an overall strategy** for dealing with tangible and intangible heritage aspects





Prototype sites (Theatres)

Each partner decided a theatre to be studied during the Athena project:

Jordan: Theatres of **Petra** and **Jerash**

Tunisia: The theatre of **Carthage**

Algeria: The ancient theatre of **Cherchell**

Spain : the theatre of **Merida**

Italy: The theatre of **Syracuse**





Project Work Packages

The project designed into **six work packages (WP)**:

WP1: Leader (Tunis)

Setting up the common scientific and cultural frame

WP2: Leader (Italy)

Knowledge

WP3: Leader (Jordan)

Outlining a sustainability strategy: intervention priorities and overall compatibility

WP4: Leader (Spain)

Setting up the Management Plan

WP5: Leader (Italy)

Dissemination and Capacity Building

WP6: Leader (Jordan)

Project Management and Quality control



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Activities & Results

WP 1:

-**Thesaurus** of most relevant terms affecting project activities in all languages of the project.





Activities & Results

WP 2:

- **3D digital** documentation of geometrical and quantity aspects
- **Collection and catalogue** of documental sources (documents, drawings, pictures, etc.).
- Set up of a **reference bibliography**.
- Set up of a **Multi-Dimensional Database** for each site under study.
- Publication of data complying with CyArk web protocols. **CyArk High Definition Heritage Network: www.cyark.org**





Activities & Results

WP3:

-Guidelines for **analyzing risks**
and **compatible utilization** of
Ancient theatre.





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Activities & Results

WP4:

-Set up of a **prototype of Management Plan** for each site under study.

-Ancient Theatre **Usage Manual**.

-**Guidelines** for compatible utilization.





Activities & Results

WP5:

-Hands-on training on using
3D Scanner

-Project **Website**

-Conventional **scientific
publication** of results





Activities & Results

WP6:

- Coordination** with all partners to implement the management plan
- Synchronize project results** and publications internationally with all related entities
- Capacity building on project management** for DoA staff and the staff of the other partners





3D Digital Documentation

- Survey of the Roman Theatre and Amphitheatre was carried out obtaining a **3D model** (pointcloud) acquired through an accurate sampling of the ancient structure using a **Laser 3D scanner**.
- In the week 9th -15th November 2009 the first **survey campaign** has been developed on the ancient site of Merida. 3D acquisition for the area of the theatre and of the Amphitheatre.
- First studies have started for **scientific and archaeological assessments**.
- A general prototype procedure has been outlined.



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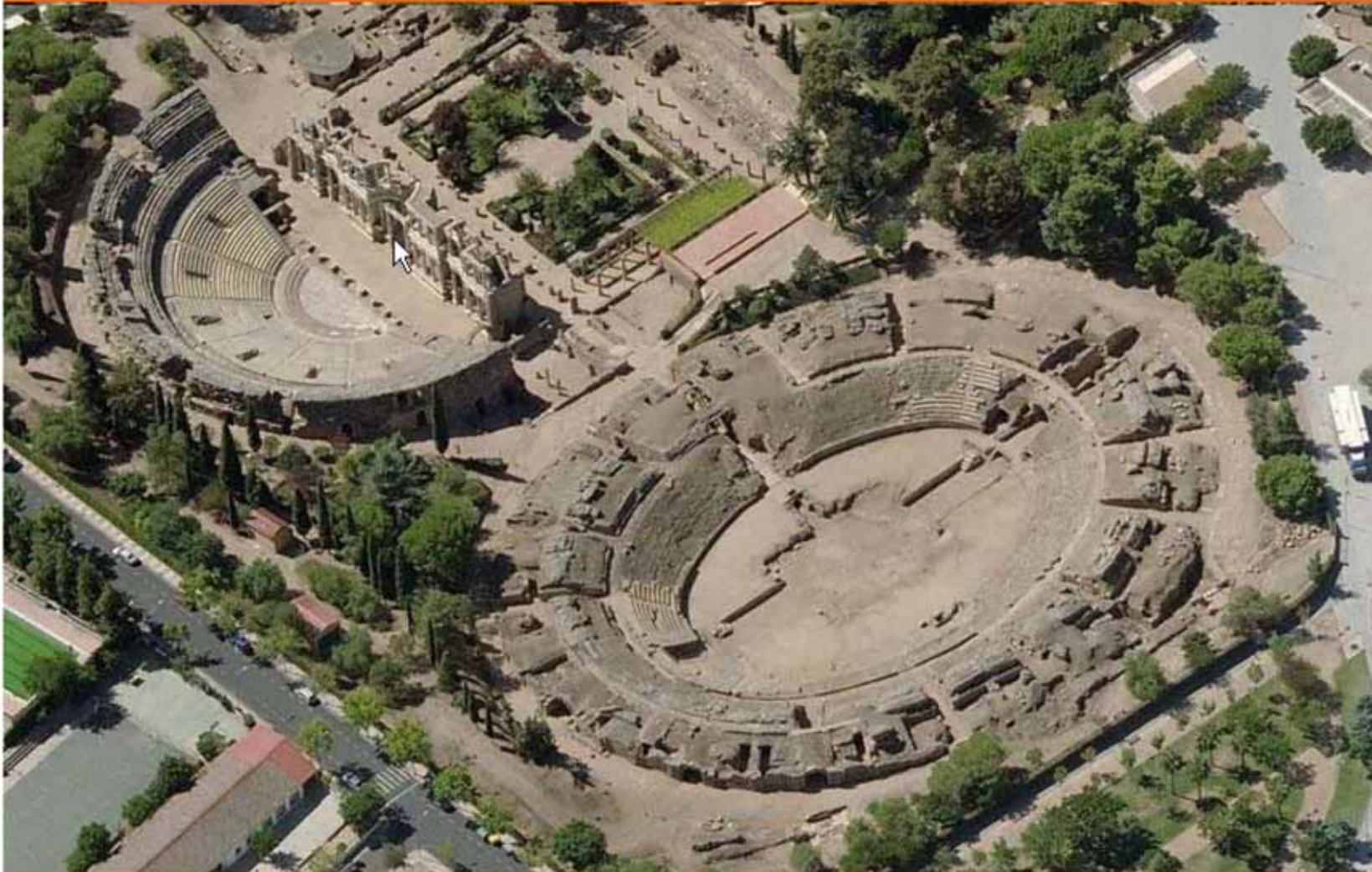


3D Digital Documentation

In this framework a number of deliverables have been produced:

- **3D digital documentation** of geometrical and quantity aspects:
- **General oriented 3D point cloud** (about 100 Mln points)
- **Topographic control network**
- **Basic 2D cartography:** (plans, vertical sections both geometric and architectural 1:100/1:50)
- **Hi res. photographic documentation**
- **Collection and catalogue of documental sources** (documents, drawings, pictures, etc.).
- **Set up of a reference bibliography.**
- **Construction of 3D Model**
- **Numeric 3D model**
- **Partial geometric 3D model**
- **Interactive 3D model** (online/offline) in 3D browsing environment (Leica Truview)
- **Set up of a Multi-Dimensional Database** for each site under study (work in progress)

MERIDA LOCATION



SAPIENZA
UNIVERSITA DI ROMA
SDRA

ATHENA 3RD GENERAL MEETING - AMMAN 3 - 4 NOVEMBER 2010
MARIO DOCCI CARLO BIANCHINI ALFONSO IPPOLITO
WP2 KNOWLEDGE : STATE OF THE ART



COMPLEX 3D SURVEYING

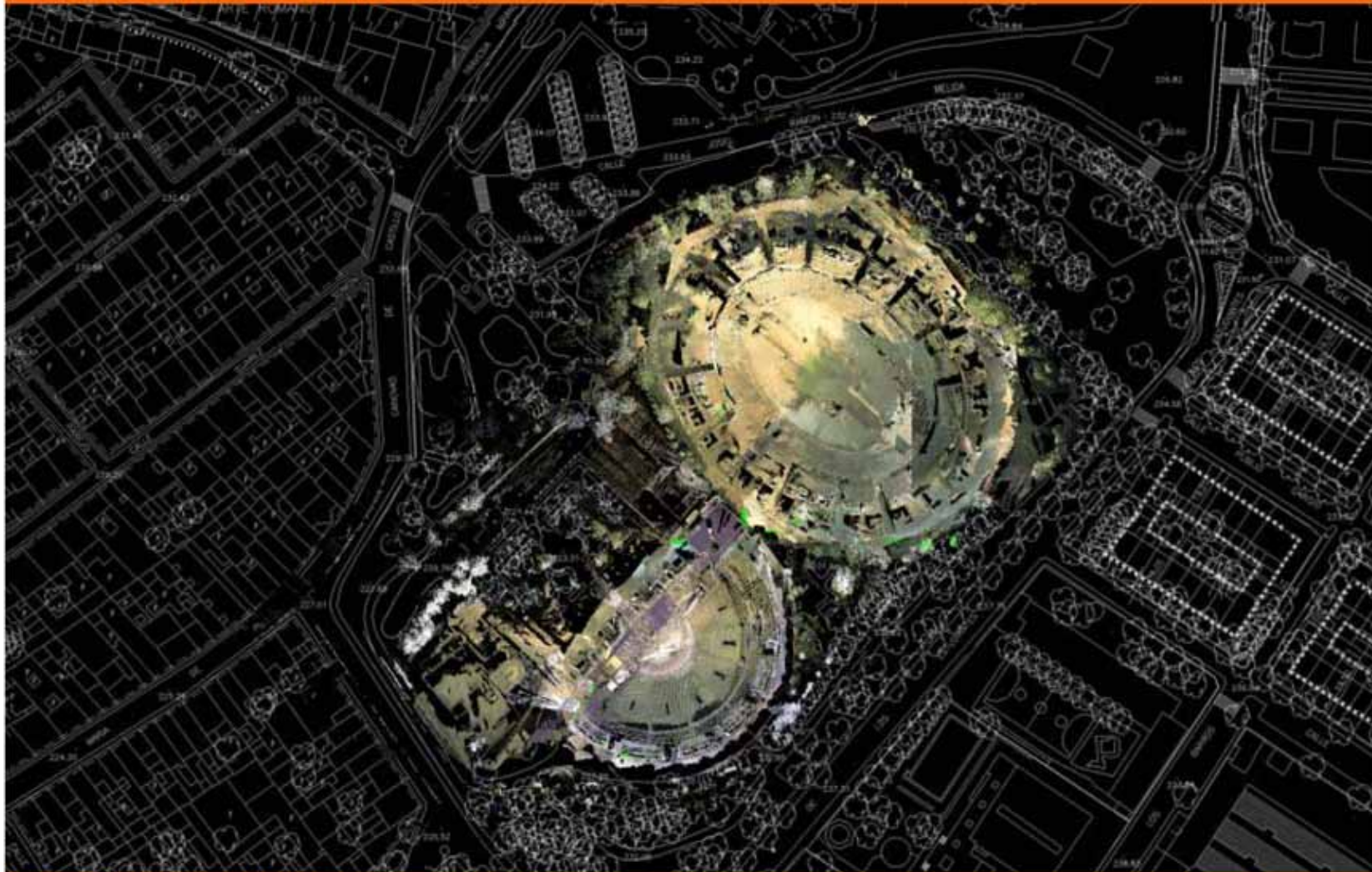
Topographic Stations 47
Number of point 250



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WP2 KNOWLEDGE : STATE OF THE ART



CONTEXTUALIZATION



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WP2 KNOWLEDGE : STATE OF THE ART



Department of Architecture
Architettura Università di Roma

2D MODELS (DRAWINGS): THE RULES

The screenshot shows the AutoCAD 2007 interface with a drawing of a theater plan and two tables. The drawing includes a section view on the left and a plan view on the right, both with red crosshairs. The tables are organized into layers.

Section Labels:

- Sezione 1-1
- Sezione 2-2
- Sezione 3-3
- Sezione 4-4
- Piano Teatro
- Piano Anfiteatro

Layer	Color	Linetype	Lineweight	Plot	Freeze	Lock	Off	On	Print	Standard
Layer di disegno default = 00	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Testi e Quote	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Linee di sezione	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Proiezioni	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Degrado	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Simboli	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Simboli 1:100	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Simboli 1:50	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard
Restrizioni: s-REF FOTO e Nuvoletta	White	Solid	0.25	Yes	No	No	No	No	Yes	Standard

PROSPETTO - GEOMETRICO

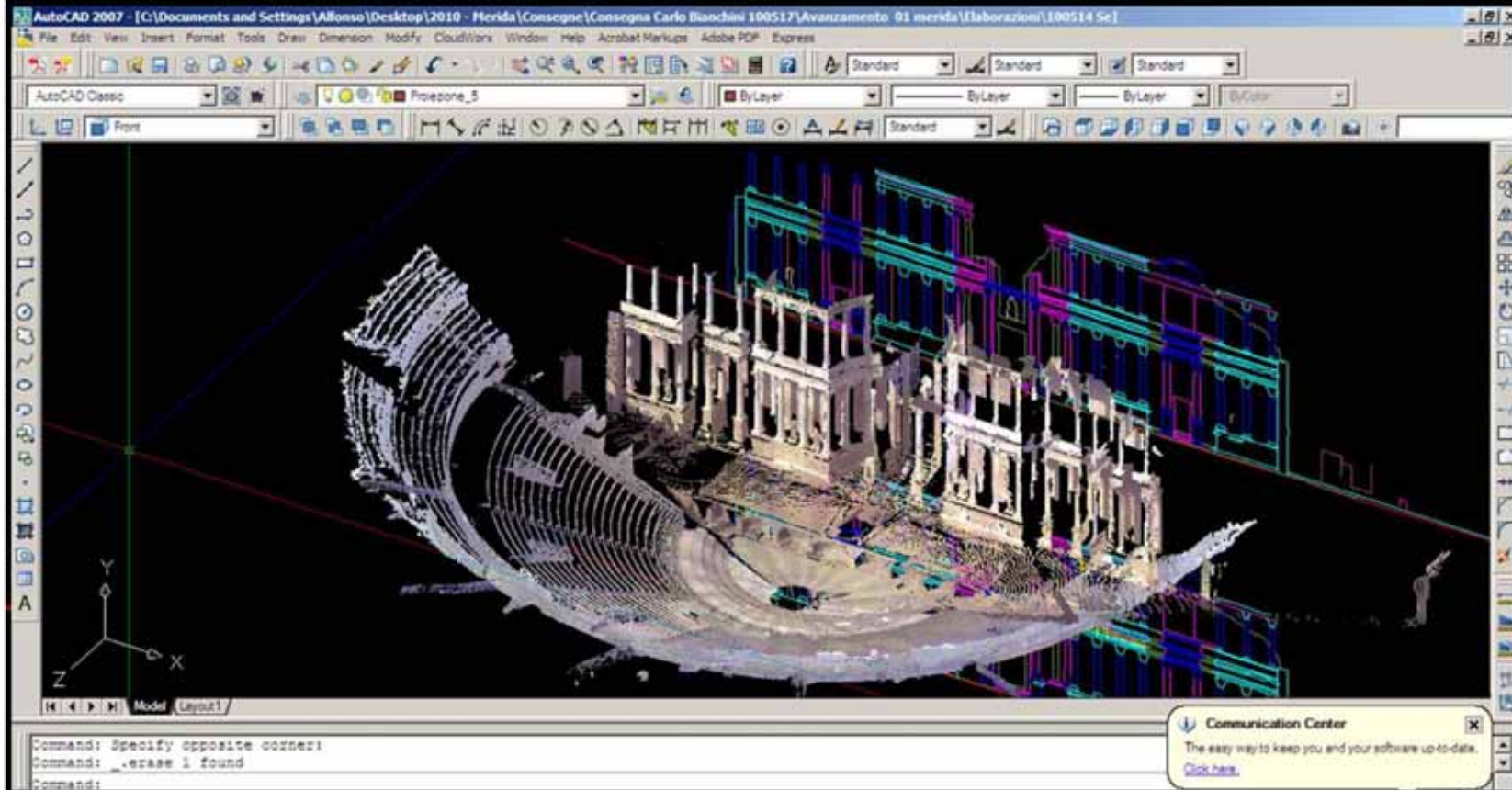
PROSPETTO - ARQUITTONICO

Command: [All/Center/Dynamic/Extents/Previous/Scale/Window/Object] <real time>:
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Command:

Manages user coordinate systems: UCS

Task Manager: Windows | Avanzamento 01merida | Dati - Blocco note | AutoCAD 2007 - [C:\D...

2D MODELS (DRAWINGS): SECTION 1- 1



2D MODELS (DRAWINGS): SECTION 3- 3



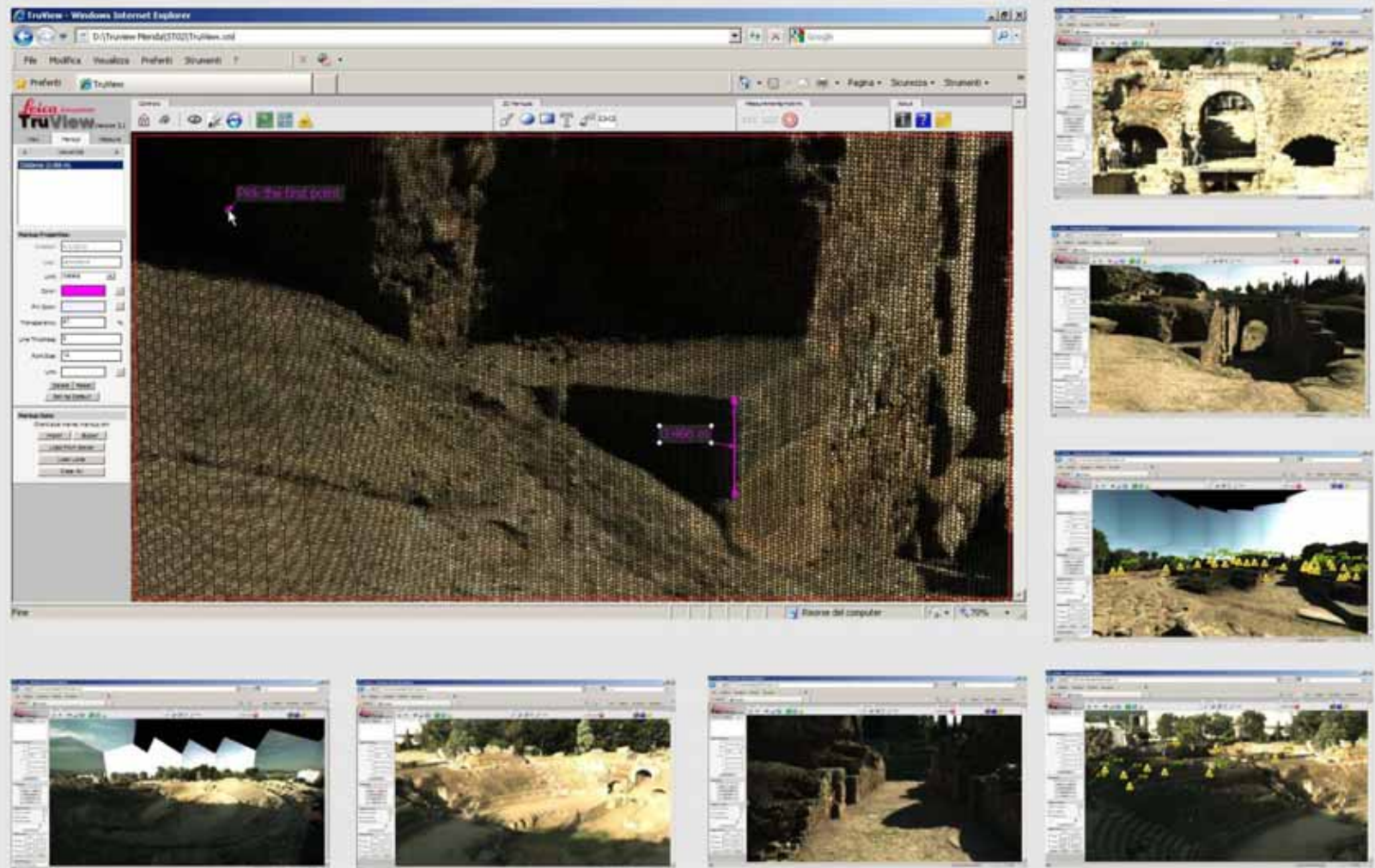
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WP2 *KNOWLEDGE* : STATE OF THE ART



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Architectural Institute of the University of Rome

3D MODEL: TRUVIEW FOR A DYNAMIC AND INTERACTIVE SURVEY





Training

- Second Athena Week in Petra and Jerash in March 2011
- Hands-on training on using 3D Scanner





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TRAINING PROGRAM THE STAFF FROM DOA
TO USE 3D LASER SCANNING TECHNOLOGY

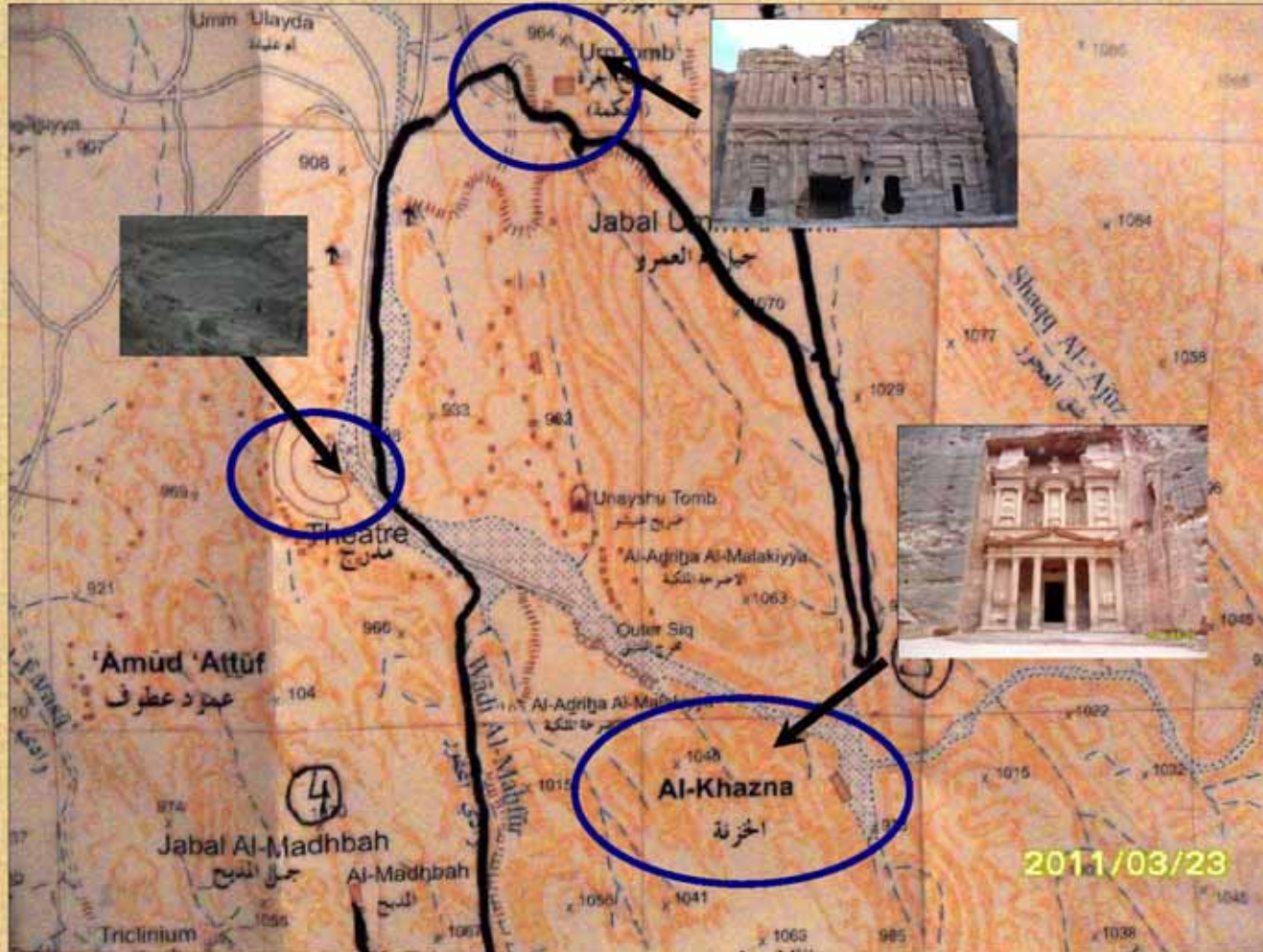
برنامج تدريب كادر دائرة الاثار العامة
باستخدام تقنية الليزر سكان



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Petra

The Royal Tombs



First Athena Week in Petra - 19 to 24 - March 2011

The DoA staff
Tawfiq Hunaiti, Jamal Safi, Mawfiq Al Fayyaz,
Asem Asfour, Qutaiba Dasouqi, Nedal Manaseer.



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Instrument



Total Station



Laser Scanner C10



Camera



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Leica Scan Station C10

Versatility, Productivity, Value



Instrument type: very high speed laser scanner, with survey-grade accuracy.

User interface: Onboard control, notebook or tablet PC.

Data storage: Integrated hard drive 80 GB (onboard hard disk) or external PC.

Camera: Auto-adjusting, integrated high-resolution digital camera with zoom video.



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**Leica ScanStation C10
 All-in-One**

The advertisement features a central image of the Leica ScanStation C10. Surrounding it are several callouts and icons highlighting key features:

- Onboard display:** A touchscreen control with a stylus and a full-color graphic display.
- Range:** 300 m.
- Field-of-View:** Horizontal: 360° (Maximum), Vertical: 270° (Maximum).
- Data transfer:** Ethernet or USB 2.0 device.
- Lighting:** Fully operational between bright sunlight and complete darkness.
- Other features:** Includes icons for '3D visualization', 'Real-time data transfer', 'Automatic target recognition', 'Automatic leveling', 'Automatic distance measurement', 'Automatic angle measurement', 'Automatic height measurement', 'Automatic slope measurement', 'Automatic area measurement', 'Automatic volume measurement', 'Automatic surface area measurement', 'Automatic volume measurement', 'Automatic surface area measurement', 'Automatic volume measurement', 'Automatic surface area measurement', 'Automatic volume measurement', 'Automatic surface area measurement', 'Automatic volume measurement', 'Automatic surface area measurement', 'Automatic volume measurement', 'Automatic surface area measurement', 'Automatic volume measurement'.

Range: 300 m.

Field-of-View:

Horizontal: 360° (Maximum)

Vertical : 270° (Maximum)

Onboard display: Touchscreen control with stylus, full colour graphic display.

Data transfer: Ethernet or USB 2.0 device.

Lighting: Fully operational between bright sunlight and complete darkness.



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The aims of the projects

Survey

Surveying

Drawings

Details

Documentations



Training Workshop

Survey



Data

2D Models

3D Models

Details

Surveying



Sketching



Top plan

Sections

Photography

Topography

Scanning



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Sketching



Photography



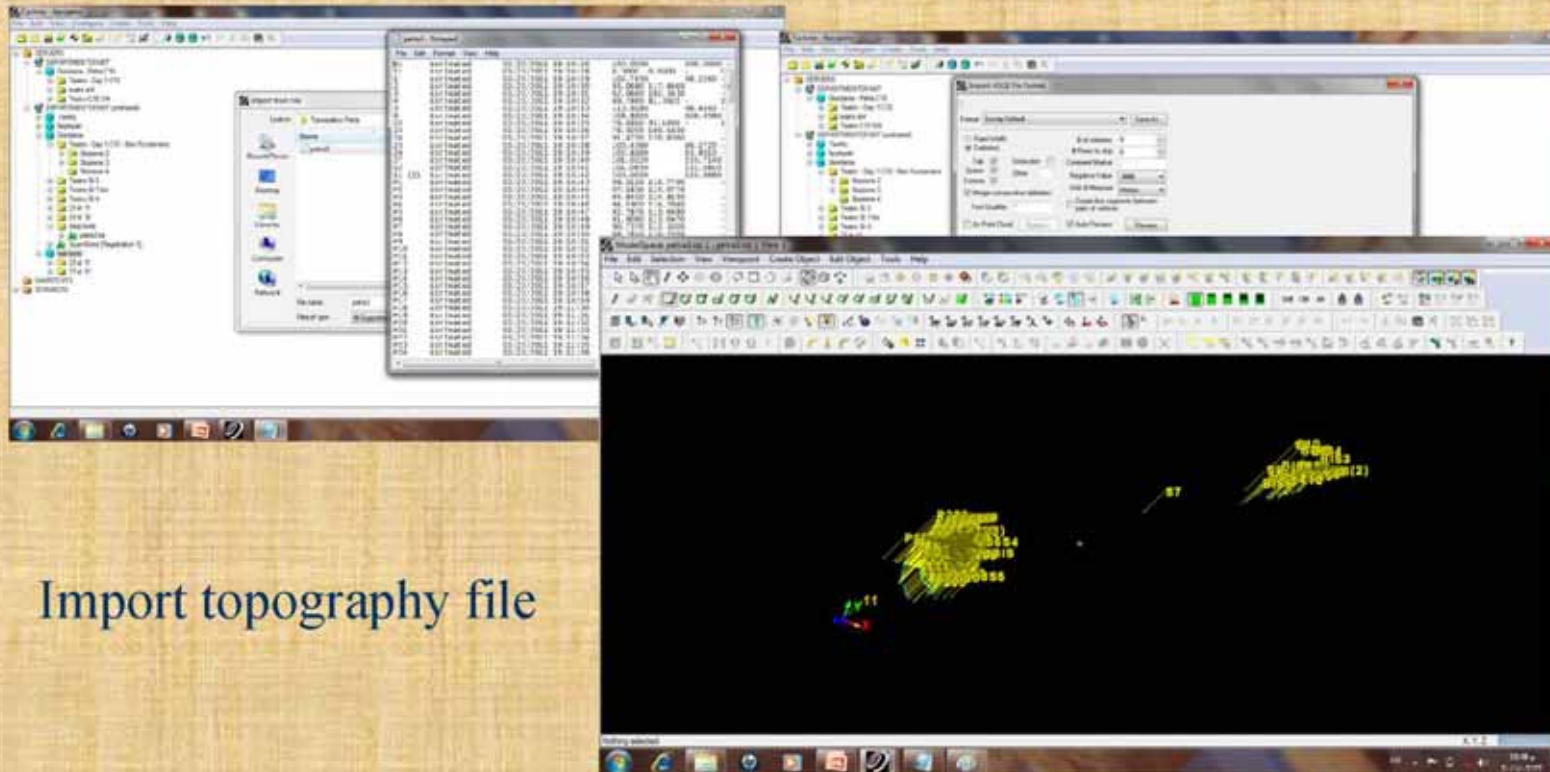
Topography



Scanning



Registration in Cyclone



Import topography file



Registration in Cyclone

The screenshot displays the Cyclone software interface for point cloud registration. The main window shows a 'Constraint List' with the following data:

Constraint ID	ScanWorld	ScanWorld	Type	Error	Weight	Error	Error Vector
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.001	(-0.001, -0.001, -0.001)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.001 m	(-0.001, 0.001, 0.001)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.001 m	(0.001, 0.000, 0.000)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.001 m	(0.001, 0.000, 0.000)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.002 m	(0.000, 0.001, -0.001)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.002 m	(0.000, -0.001, -0.002)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.002 m	(0.000, 0.001, 0.002)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.003 m	(0.002, -0.002, -0.001)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	On	1.0000	0.004 m	(-0.003, 0.001, 0.002)m
34C Auto [Targ...	Station-001.S...	petra3.bt (Lev...	Coincident: Vertex-Vertex	Off	1.0000	0.013 m	(-0.013, 0.000, 0.002)m

The bottom part of the interface shows two 3D views. The left view displays a point cloud of a structure with a red plane overlaid. The right view shows a similar point cloud with three specific points labeled 'BIS3', 'BIS4', and 'BIS6' marked with yellow dots and lines.



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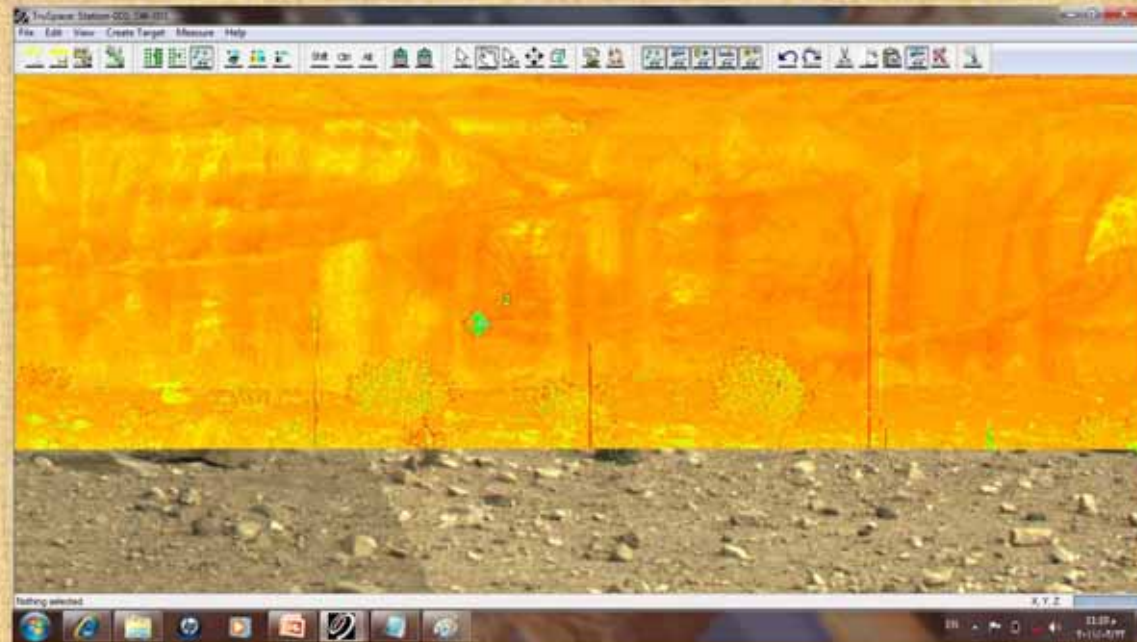
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Registration in Cyclone

Find the center
of target



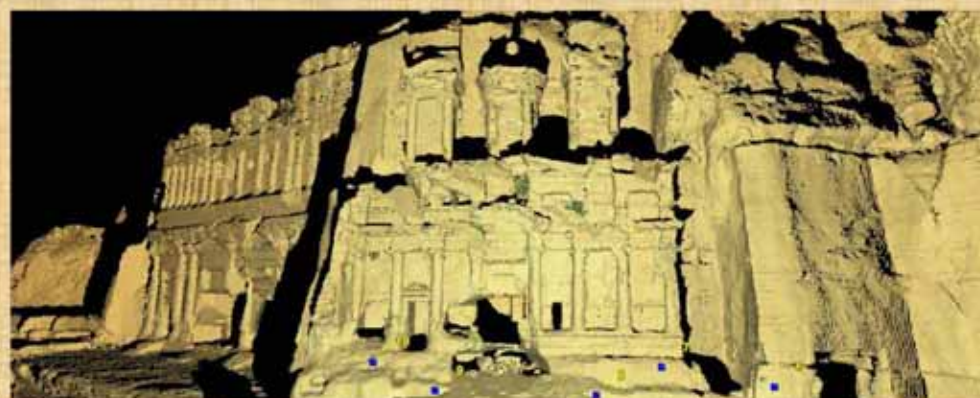
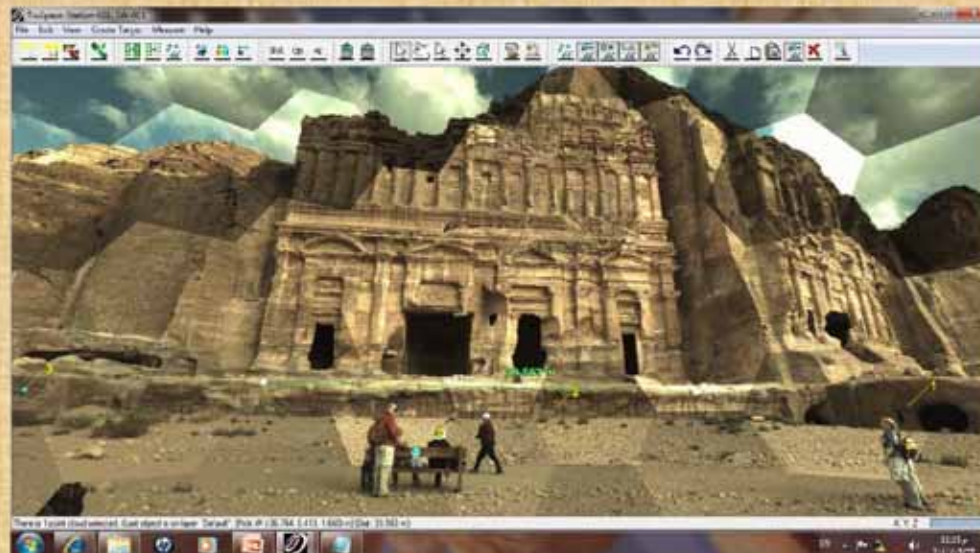


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THANK YOU

Nizar Al Adarbeh

Nizar.x1@gmail.com

Project Manager

ATHENA Project,

Department of Antiquities,

Jordan

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