



## CONTENTS AND PROJECT PARTICIPANTS

1	CONTENTS AND PROJECT PARTICIPANTS	
2	SUMMARY AND OVERALL ASSESSMENT OF PROJECT RESULTS	
4	DEVELOPMENT AND PROGRESS OF THE PROJECT	
	<b>Reports by co-organisers* and co-partners</b>	
6	BELGIUM*	University of Ghent
10	CZECH REPUBLIC	University of West Bohemia, Pilsen
14	UNITED KINGDOM*	English Heritage
18	ESTONIA	National Heritage Board of Estonia
22	FINLAND	Helsinki University of Technology
24	GERMANY*	State Authority for Culture and the Preservation of Monuments, Mecklenburg-West Pomerania
28	GERMANY*	Cultural Heritage Service Baden-Württemberg
32	GERMANY	Institute for Landscape Management, University of Freiburg
34	HUNGARY*	Baranya County Museum Authority, Pécs
38	ITALY*	University of Foggia
42	ITALY*	University of Siena
46	ITALY	University of Salento, Lecce acting for the Agency for Euromediterranean Cultural Heritage
50	LITHUANIA	Department of Lithuanian Heritage Protection
54	POLAND	Adam Mickiewicz University; Poznań Archaeological Museum and the Polish Academy of Sciences
58	ROMANIA	Institute for Cultural Memory (CIMEC)
62	SLOVAKIA	Slovak Academy of Sciences
66	EXHIBITION	Czech National Museum, Prague, Oct 2007-Jan 2008
68	WHAT ELSE?	Spin-off activities and associated events

**The complete Final Report or individual reports from partners can be downloaded from:**

[e-landscapes.com](http://e-landscapes.com) or

<http://www.muzarp.poznan.pl/EuLandscapes/EuLandscapes/index.htm>

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## **AERIAL SURVEY AND MEDIEVAL LANDSCAPES IN SOUTHERN APULIA**

### **Combining modern and traditional technology**

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### **Background and objectives**

Within the scope of the European Landscapes project the Laboratories of Ancient Topography and Photogrammetry and of Medieval Archaeology at the University of Salento aimed to apply a combination of new and traditional techniques to aid the understanding of the towns, settlements and landscapes of Southern Apulia from antiquity to the present day.

The main focus of the project in the Salento Peninsula comprised:

- The creation of specific procedures for archaeological and landscape exploration
- The combination of traditional methods of ground-based survey with aerial photo analysis
- The enlargement of the aerial photo archive with the addition of newly acquired vertical and oblique coverage of Apulia, along with studies in the use of satellite imagery
- The creation of a database and GIS environment for data management
- The training of students as research workers and conservation archaeologists in the combined use of aerial survey, field survey and satellite data
- The creation of a specific website, in both English and Italian

The project explored the archaeology of the relationship between Lecce, a pre-Roman settlement which then became a Roman colony and later the modern provincial capital, and its port at San Cataldo on the Adriatic Sea 12 km away, which managed its overseas commerce in the past. The landscape between the two is rapidly changing because of aggressive agricultural development, the urban expansion of Lecce and tourist development along the coast. Thus, the knowledge acquired within the project can be used to improve the way in which the land is to be used, making sure that the local cultural and archaeological heritage is safeguarded.

### **Aerial photography and exploration between Lecce and San Cataldo**

The project allowed the University to combine the existing aerial photo archives from the Laboratories of Ancient Topography and Photogrammetry with numerous vertical and oblique air photos produced by military bodies and private companies both in the past (1943, 1947 and 1954-55) and recently, making a collection of more than 300 photographs for the study area. During the course of the project 60 hours of flight time covered the area under investigation and other large sections of the Salentine peninsula and Adriatic coast. Aerial survey flights over the study area and its surroundings were carried out with ideal soil and sea conditions and visibility.

More than 40 days of fieldwork made it possible to cover the entire study area using systematic territorial survey. To this may be added the processing and analysis of finds and the compilation



*Field-walking survey in a typically stony area of the Salento landscape.*



*Left: An area between Lecce and the port at San Cataldo. The wheel-ruts of ancient roads can be clearly seen in the centre of the photograph, where they are cut into the exposed bedrock. Right: Rectangular cropmarks, perhaps of small square-ditched enclosures. The long cropmark towards the top of the photograph may belong to an ancient road. Air photographs in this section are by Dr Alessandro Rizzo.*

of the database. Finally, a total of 3 months of work on the Roman pier in San Cataldo made it possible to clean the structure and record it in detail.

During the field surveys traditional field-walking and survey methods were combined, when possible, with digital topographic methods. Every single topographical unit was surveyed and mapped using a GPS. In this way most of the information regarding the sites – geolocation, the descriptions of evidence and details of the surveys – were taken in digital form directly on site, drastically reducing the time spent on data entry once back in the laboratories.

Field survey brought to light 25 new sites dating mainly to Late Antiquity and the early Middle Ages, lying in the territory between Lecce and San Cataldo. Late Roman occupation and agricultural activity was largely witnessed by the discovery of potsherds of amphorae (mainly Tunisian), and African Red Slip ware, including a lamp fragment dating to the 5<sup>th</sup>-6<sup>th</sup> century AD. The survey and quantification of pottery found has, so far, indicated a quite unprecedented increase in activity some time between the 8th and the 10th/11th centuries AD, with the establishment of what may have been small farmsteads. An early medieval cemetery was also examined. Very little later medieval pottery was found, suggesting a diminution of rural settlement. Instead, the establishment of various *masserie* or farming complexes dating between the 16th and 18th centuries represents post-medieval occupation and farming.

In the area between the ancient city and the sea, near Masseria Ramanno (already known thanks to the discovery of a Roman Republican kiln site in 1997) humidity and cropmarks in the oblique and vertical aerial images allowed better definition of the settlement producing amphorae for overseas transportation. The University of Siena research group further surveyed the area, using magnetometer prospection over an area of approximately one hectare. The

evidence found made it possible to identify, with a high degree of precision, at least two kilns and a number of walled structures. The data acquired made possible the more economical planning of excavations.

Unfortunately, it proved impractical to carry out extended experiments with the satellite imagery. The geophysical work by Culture 2000 co-partners from Siena was felt to offer a more effective integration of remote sensing survey techniques into the project as a whole.

### **Work at San Cataldo and along the Adriatic coast**

The ancient port at San Cataldo is well known for the ruins of a Roman pier, yet this important monument has had little work done on it from a technical-structural point of view until now. Here, oblique-photo analysis and interpretation revealed a large L-shaped structure below water, built in 1901 out of blocks of reused stone taken from the Roman pier. The huge quantity of historical and cartographic documentation found in the archive, together with data from aerial surveys and from the work carried out directly regarding the structure, have made it possible to reconstruct the history of the port from ancient times onwards. Indeed, it was fundamental to Lecce's growth in medieval times, both for commerce and pilgrimage. Prior to 1496, it was still able to receive the future king Ferdinand of Aragon, who arrived there with three galleys.

Aerial surveys were also carried out along vast sections of the Adriatic coast, documenting some settlements that have already been mentioned in the literature, some that have had archaeological excavations carried out, and others which hitherto have had nothing published.



*Left: The remains of the Roman pier at San Cataldo, showing how the ancient structure was re-used when the modern pier was built on top of it in 1901*

*Below: The pier undergoing cleaning and recording during the study of relationships between the port and the Roman and medieval town at Lecce*





*Left: The partly-excavated settlement of Rocavecchia on the Adriatic coast. The visible structures belong mainly to the medieval period, with a massive Bronze Age defence across the neck on the right-hand side. Right: The cropmarks of rectangular structures within the urban area of a native settlement.*

These included the minor promontory of Torre Chianca, site of a small coastal settlement in Roman times; the bay at Torre dell'Orso, used for its natural caves, some of which were cult centres; and the area of Rocavecchia, an important Bronze Age, Roman and medieval settlement, where aerial survey has shown the existence of several sites visible as cropmarks.

### **Database work and GIS in present-day research**

All of the resulting information has been organised into a database with the aim of exploiting the spatial analysis capabilities of GIS. The GIS was utilised not just as an instrument for containing and organising data or producing high quality maps, but also as a system for allowing material acquired on site to interact with information on the landscape, geology, soils, elevation data and land use, all of which would have had to be sought through more laborious methods in the past.

### **Training, meetings and website**

In addition to the principal research, another result was the training of students in practical archaeological landscape studies. Throughout the project students were trained in the use of GPS in field survey, pottery studies, aerial photo analysis, archaeological excavations and basic GIS operations. Furthermore, training excavations were carried out at San Cataldo, involving cleaning the structure of sandy top soil and planning it. Six students took part in the Culture 2000 Training School at Foggia in May 2007 and two others presented talks at the final meeting of project co-partners at Prague in October 2007, when posters and other material from Salento were included in the exhibition mounted at the National Museum. Finally, a bilingual website ([www.unile.it/aerialsurvey](http://www.unile.it/aerialsurvey)) was developed with the purpose of publishing the project's first results and of creating a space for up-to-date information on the development in aerial archaeology studies. The work on the project was carried out by Veronica Ferrari, Giuseppe Gravili, Alice Medda, Alfio Merico, Maurizio Pastore and Mariangela Sammarco.

### **Final assessment**

The University feels that the project achieved extremely worthwhile results in terms of research, methodological development and student training, despite being hampered initially by local bureaucratic problems over funding and financial management. A useful contribution has been made to understanding the relationship between Lecce and its port at San Cataldo and hence to future efforts to achieve archaeological and landscape conservation in this part of southern Italy.



### HIGHLIGHTS 2004-2007

**Belgium** Air photographs uncover the battlefields of Ypres

**Czech Republic** Air survey, excavation and a grand exhibition

**English Heritage** Air photo training schools at home and abroad

**Estonia** Estonian archaeologists take to the air

**Germany (Mecklenburg-Vorpommern)** Seeing beneath the waves

**Germany (Baden-Württemberg)** Iron Age fortresses in their landscape setting

**Germany (Freiburg)** Airborne laser scanning to 'see through the trees'

**Hungary** Combining techniques to explore the Neolithic

**Italy (Puglia)** Uncovering and mapping the past through aerial survey

**Italy (Salento)** Modern techniques and a Roman harbour

**Italy (Tuscany)** Air survey, laser scanning and geophysics

**Lithuania** Raising awareness through aerial archaeology

**Poland** New discoveries and new systems for heritage conservation

**Slovakia** Stone Age monuments from the air and on the ground



### A LOST TOWN RE-FOUND

Szamotuly, in Poland is a medieval town, its originally open market square now filled with later buildings (top). Until recently historians believed that the town always occupied its present site. This view changed dramatically in July 2006 when spectacular air photographs, taken as part of the Culture 2000 project, revealed its original location at Mutowo, 2.5km away, where it had stood before a disastrous fire in the 14th century. One of the photographs is shown here (centre), rectified to fit the present-day map. In the bottom image the town's large open square, outlined by the dark marks of cellars beneath its surrounding buildings, has been plotted on the rectified photograph, along with the presumed lines of the linking streets.

