

CONTENTS AND PROJECT PARTICIPANTS

1	CONTENTS AND PROJECT PARTICIPANTS	
2	SUMMARY AND OVERALL ASSESSMENT OF PROJECT RESULTS	
4	DEVELOPMENT AND PROGRESS OF THE PROJECT	
	Reports by co-organisers* and co-partners	
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 or

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

Copyright

Copyright for the images included in the following pages of the Report lies with the institutions and individual authors named at the head of each section unless otherwise stated. Images extracted from these reports must not be reproduced in any form of publication without the express permission of the copyright holders.

ROMANIA: A FUTURE FOR THE PAST

Aerial information in landscape recording and conservation

Irina Oberländer-Târnoveanu, Institute for Cultural Memory (CIMEC), Bucharest

Background and objectives

Apart from some work by Glasgow University in recent years, aerial survey has remained virtually unused in Romania for archaeological purposes or landscape study. The Culture 2000 project has given the Institute for Cultural Memory the opportunity to promote its introduction through the study of 'historical' air photo sources, through a programme of fieldwork and through the initiation of a small programme of exploratory aerial survey in the final year of the project. By participating in the Culture 2000 project staff from the Institute have been able to learn from experienced colleagues how to use air-photography in identifying and mapping sites and in monitoring their state of preservation over time.

The Institute's contribution to the Culture 2000 project has had three main aims:

- Training of CIMEC staff and of other Romanian archaeologists in remote sensing methods in archaeology and landscape studies.
- Developing a pilot project for the recording of archaeological sites and landscapes in a chosen study area, using air photo interpretation, mapping, field survey and new aerial survey.
- Improving information about known and previously undetected sites, and drawing this to the attention of officials and cultural resource managers so as to aid future conservation and enjoyment by schoolchildren, young adults and the general public.

Training and participation in meetings

In May 2005 Culture 2000 and other funding enabled the Institute to organise a week-long international training course for 34 participants, including 6 from CIMEC, in aerial archaeology and GIS in heritage work. Experience of active aerial survey and air photo interpretation was gained at Culture 2000 training schools in the UK in 2006 and in Italy and Poland in 2007. Meetings of international experts were attended, and contacts made, in Belgium (2005), the UK (2006) and Denmark and the Czech Republic (2007). A close collaboration was established with one of Britain's foremost air photo interpreters, Rog Palmer, who conducted week-long workshops in Bucharest in 2005 and 2007, along with extended training at Cambridge in 2006.



Participants and tutors in the first Romanian training course, held at Buşteni in May 2005.

Pilot project on the Mostiștea River Valley

A study area was selected in the Mostiștea River Valley, SE of Bucharest, within the Lower Danube Basin. This is one of the most archaeologically rich areas in Romania, from early prehistory to modern times. Many archaeological sites there have been destroyed or are at risk of damage or destruction by modern development and intensive arable cultivation. Many more await discovery through the aerial techniques which have proved so fruitful in other parts of Europe. Within the study area the project had the following goals:

- To enrich the National Archaeological Record by determining the exact location of known sites and by discovering and recording previously unknown ones through the examination of aerial photographs, archive sources, digital photography and digital cartography.
- To use the collected material to compile maps of archaeological sites, monuments and landscapes and to create a related digital archive.
- To identify landscape changes in recent decades by comparing older and more recent aerial photographs.
- To make archaeological information available to the public, to cultural resource managers and to researchers through the Institute's website at <http://map.cimec.ro>.

The first stage of work comprised the acquisition, study and processing of a range of cartographic and related material – maps and cadastral plans at various scales from 1897 to 2005, orthophoto plans from 2003-2005, vertical air photographs from 1972 to 1986 (all requiring geo-referencing) and digitised satellite imagery (CORONA) from 1968-1972.

The second stage involved field survey, site recording and the collation of documentary sources (bibliographic, cartographic and photographic). Over 40 days of field survey were undertaken in the summers of 2006 and 2007. Some of the sites had not been visited since their first mention in the archaeological literature in 1923. The field surveyors identified the precise locations of the sites, recorded their present state of preservation, took GPS coordinates, made digital



Air photograph of the Malu Roșu site (centre foreground), from the first exploratory flight in July 2007.



Field visit to the Malu Roşu site, on a promontory overlooking the waters of Mostiștea Lake.



photographs of each location and marked the sites on paper maps. They also filled in site cards for subsequent transfer to the database so as to create digital archives for each site.

The third stage, in July 2007, involved hiring an aircraft and taking 200 oblique air photographs of the study area. Although July is not usually ideal for archaeological air photography this gave the opportunity to gain a better understanding of the landscape and to apply, for the first time in independent flight, the methods and skills acquired during the Culture 2000 training courses.

Within the chosen study area it proved possible to identify over 190 archaeological sites in approximately 34 localities, to record them in the database and to mark them on digital topographical maps and aerial photographs. Before the project only 13 sites were known at 11 localities in the same area. The gain from the project has therefore been enormous.

A specific example is provided by a detailed study of landscape evolution around an important (and previously excavated) Copper Age settlement at Malu Roşu on a promontory above Mostiștea Lake. Using air photographs from 1977, 1986 and 1992 it was possible to demonstrate the promontory's progressive erosion and to illustrate the impact of wetland drainage and the creation of dams and irrigation systems on the surrounding area's landscape and archaeological sites, some of which now lie hidden beneath the present-day water level.

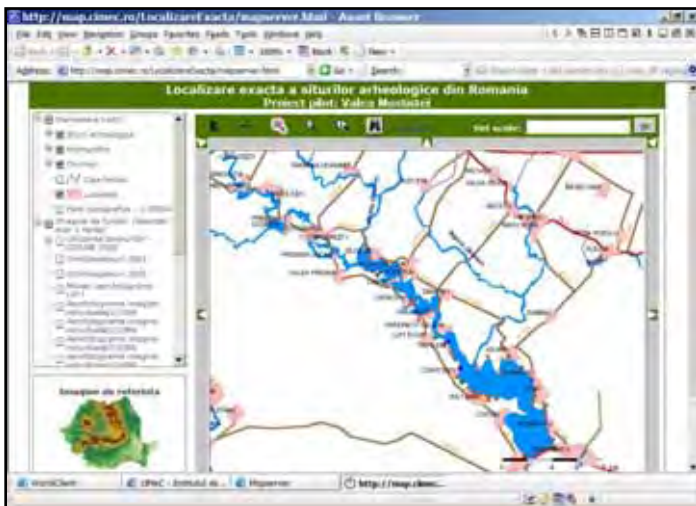
WEBGIS development

An important piece of work within the project was the development of WEBGIS methods for the collation, processing and public presentation of the resulting images and information. The system developed for the Mostiștea Valley uses Mapserver, a free internet software developed by the University of Minnesota, originally with support from NASA (which needed a way to make its satellite imagery available to the public). Mapserver software has the advantage of being open-source and highly customizable. The Institute chose to develop and customize Mapserver using ASP.NET technology from Microsoft, Microsoft SQL Server as DBMS and JavaScript.

The resulting system for the Mostiștea Valley provides tools to search, query, display and print maps and air photographs of archaeological sites from the internet through an easy-to-use interface, as well as to overlap foreground layers over a variety of background information (air photos, orthophotos, elevation models) and to measure distances and areas.

The spatial database contains:

- General data about the geography of the Mostiștea Valley (rivers, lakes, roads, elevation, land-use and land-cover) at a scale of 1:100,000 with a temporal resolution 1997-2000. The data was provided by the Ministry of Environment and Sustainable Development.
- Detailed topographical maps at scale of 1:25,000 with a temporal resolution 1978-1980, from the National Military Topography Service.



WEBGIS screen from the system developed as a principal component of the Culture 2000 project, with a typical historical map and air photos from 1977 and 2007 of the Latène settlement at Piscul Caldărean.

- Air photographs in grayscale at a scale of 1:15,000 with temporal resolution 1972, 1977 and 1986, from NCGCPRS.
- Orthophotos at a scale of 1:5000 with temporal resolution 2003 and 2005, from NCGCPRS.
- Landsat satellite imagery with spatial resolution of 30 m and temporal resolution 2000-2002, from Global Landcover Facility.
- Archaeological sites classified by period, category and archaeological culture.

The preliminary results of this development, along with further information about the system and its creation, are available on the Institute's website at <http://map.cimec.ro>.

Overall assessment of the project

The project has produced a substantial improvement in archaeological knowledge and has clearly demonstrated the potential of aerial photography, in combination with other methods, to record known sites, to discover new ones and to contribute to their future conservation and enjoyment by providing information about them to officials, cultural resource managers and the general public. The project has also enabled the Institute's staff (principally Irina Oberländer-Târnoveanu, Carmen Bem, Ionuț Șandric and Bogdan Șandric) to establish a network of aerial archaeology contacts and co-operation across Europe. Despite the modest funding there has been steady progress in learning how to use aerial photography in the investigation, recording monitoring and conservation of Romania's archaeological and landscape heritage.



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.

