

CULTURE 2000 PROJECT 'EUROPEAN LANDSCAPES: PAST, PRESENT AND FUTURE'

Chris Musson¹ and Robert Bewley²

'Through satellite imagery, airborne survey, fieldwork, geophysics and excavation, the aim of the project is to promote the exploration, public appreciation and conservation of heritage sites and landscapes across Europe.'

The purpose of this contribution is to summarise the aims and achievements of the Culture 2000 project 'European Landscapes: past, present and future' which began in September 2004 and was completed in October 2007. The project was sponsored by English Heritage in the UK, along with six co-organisers in Belgium, Hungary, Germany(2) and Italy(2). There were eleven additional co-partners in seven other countries, the Czech Republic, Estonia, Finland, Germany, Lithuania, Poland, Romania and Slovakia, plus a third organisation in Italy (a list of the participants appears at the end of the article). The budget for the three years of the project was around €900,000, just under half of it from the Culture 2000 Programme of the European Union and the rest from the participants themselves. Several of the participating organisations had already worked together on a previous Culture 2000 project in 2000/2001, under the title 'Conservation through Aerial Archaeology'. This in turn drew on the experience of earlier training schools and exchanges of expertise organised by members of the Aerial Archaeology Research Group (AARG), whose international contacts were crucial in the conception and framing of the Culture 2000 projects.³

¹ Tanyffordd, Pysgah, Aberystwyth, United Kingdom, SY23 4NE.

² Formerly at English Heritage (29 Queen Square, Bristol, United Kingdom, BS1 4ND). Now with the Heritage Lottery Commission and contactable at The Old Manse, Fore Street, Ashton Keynes, United Kingdom, SN6 6NP.

³ For AARG see <http://www.aarg.univie.ac.at>
For the Culture 2000 see <http://e-landscapes.org>

Objectives of the project

The overall aim of the recent Culture 2000 project (and of the earlier initiatives) was to increase awareness and conservation of the cultural heritage within European archaeological landscapes, especially through the use of non-destructive techniques of investigation such as aerial reconnaissance, air-photo mapping, field survey and the innovative use of satellite, airborne and ground-based remote sensing. There were nine inter-linked fields of activity, or Actions, as set out below. The project did not, however, have a single unified programme. Instead, the participants responded to their local situations, contributing to one or more of the Actions according to their individual capacities and needs.

Good progress was made in almost all of the original objectives. Among the highlights were several productive training schools, conferences and workshops, focusing on individual countries or subjects and helping to spread expertise across Europe. Despite unpredictable summer weather throughout the project several of the partners carried out successful programmes of aerial survey, along with exploratory work on the use of airborne laser scanning (lidar) and various forms of ground-based remote sensing (magnetometry, ground-penetrating radar etc). The project's central website helped to make news of the partners' activities widely accessible. Other 'outreach' efforts included the preparation of teaching packs and exhibitions. The idea of a European Centre for Aerial Survey and Conservation was developed and refined throughout the course of the project.

Action 1 Promotion of training schools, workshops and seminars

Successful training schools, with both ground-based and in-air experience for the participants, were held in Italy (twice), Germany (three times) and the United Kingdom. Ground-based workshops or seminars took place in Belgium, the Czech Republic, Estonia, Finland, Germany, Italy, Lithuania, Romania (twice) and Poland (twice). By the end of the project plans were also in hand for aerial archaeology training schools or workshops in Denmark,

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Figure 1. Training schools mounted by English Heritage and other co-partners in the project gave students practical experience in the air (top left) while also stressing the importance of pre-flight planning (bottom left) and post-flight cataloguing of the results (right).

Iceland and possibly Holland – illustrating the kind of ‘spin-off’ benefits that can accrue from a project of this kind.

Action 2 Aerial and ground-based surveys of threatened landscapes

Substantial programmes of aerial reconnaissance, mainly concentrating on plough-threatened landscapes, were conducted in southern and central Italy. Exploratory flights directed at specific aspects of the landscape were undertaken in Belgium, the Czech Republic, Estonia, north and south Germany, Hungary, Lithuania, various parts of Poland, and Slovakia. The first ‘home-based’ aerial sorties by Romanian archaeologists took place in the final few months of the project and plans are in hand for this work to continue in the coming years. In all of these countries important archaeological discoveries were made and photographs were taken of heritage sites, landscapes, townscapes and buildings for the benefit of public presentation and future conservation work.

Action 3 Air-photo interpretation and mapping of cultural landscapes

Photo-interpretation and mapping formed an important part of their programme for many of the project's participants, in particular for previously unknown sites or landscape features discovered from the air during exploratory flights undertaken within or prior to the project. Intensive 'landscape' mapping, for instance, was undertaken in southern Italy for one of the richest 'cropmark' landscapes in mainland Europe.

Action 4 Innovative surveys using air-photography, lidar and satellite imagery

The use and testing of lidar (airborne laser scanning) and other remote-sensing methods, in some cases in conjunction with traditional or multi-spectral air photography, were initiated or intensified in Germany and Italy, in the latter case with technical help from the UK. Co-partners in these countries and in the Czech Republic, Germany, Hungary and Slovakia carried out experiments in the integration of aerial techniques alongside more established ground-based methods such as geophysical prospection, field survey and sample excavation.

Action 5 The search for under-exploited air photo sources from World War II

The survival and potential value of German photo-maps and photo-mosaics from the late 1930s and 1940s were first appreciated in Poland shortly before the start of the project. They are now known to exist to one extent or another for large parts of Europe. The continuing search in Polish archives proved frustrating but some important war-time and pre-war air photographs were identified. In Belgium a carefully focused programme of archive analysis and new aerial photography revealed the importance of historical and present-day air photography in the recording and conservation of World War I and later military landscapes.

Action 6 Networking and the exchange of skills across Europe

The European network of students and specialists involved in the use of aerial survey and other forms of remote sensing continued to grow throughout the lifetime of the project, through meetings

and exchanges of various kinds and through a wide range of email contacts. New contacts were established in Iceland, Ireland, Scandinavia and Spain. Exchange visits between participants helped to share experience and develop specialist skills of various kinds.

Action 7 European Centre for Aerial Survey and Conservation

The idea of a 'European Centre' to promote aerial archaeology, remote sensing and landscape studies was developed and refined throughout the course of the project, developing over time into the concept of a flexible and self-sustaining network of 'centres of expertise', each contributing in its own way to future programmes of research, education, conservation, skills-exchange and promotion of public and political awareness about aerial archaeology, remote sensing and landscape conservation across Europe.

Action 8 Public outreach: websites, TV/radio, films and exhibitions

The project's central website, at www.e-landscapes.org, carried news of the project throughout its life. It will be maintained and developed for a further three years after the project's completion, so as to show its long-term impact within the participating organisations and countries. 'Culture 2000' pages were added by several of the participants to their own websites. The Czech participants organised the preparation of a series of TV programmes on aerial archaeology, along with a magnificent closing exhibition and seminar on the project's achievements, hosted by the National Museum in Prague in October 2007.

Action 9 Centrally-funded activities, student exchanges, support for meetings etc

Funds set aside for pan-European activities were used principally to subsidise the attendance of students at training schools, workshops, seminars and meetings of various kinds, as well as to assist the exhibition and TV work in the Czech Republic.

'Spin-off' activities

The prestige of the Culture 2000 project enabled co-partners and members of the Aerial Archaeology Research Group to initiate

or assist externally-funded activities relevant to the Culture 2000 objectives. These included, for example, four workshops or conferences in Italy, mainly funded by charitable grants or industrial sponsorship. Exciting initiatives after the end of the project will be aerial archaeology training school or workshops Denmark, Iceland and perhaps Holland, countries which have enjoyed little or no provision for aerial archaeology in recent times. Through the project's Hungarian co-organiser the first moves were also been made for possible future air survey in Syria. The participation of an American student in one of the training schools may eventually lead to an initiative in the USA, where archaeological air survey is still in its infancy.

Selected highlights from the project

The following examples illustrate the variety of objectives and practical work pursued by a just a few of the project's participants in the years from 2004 to 2007.

Belgium: World War I landscapes in Flanders

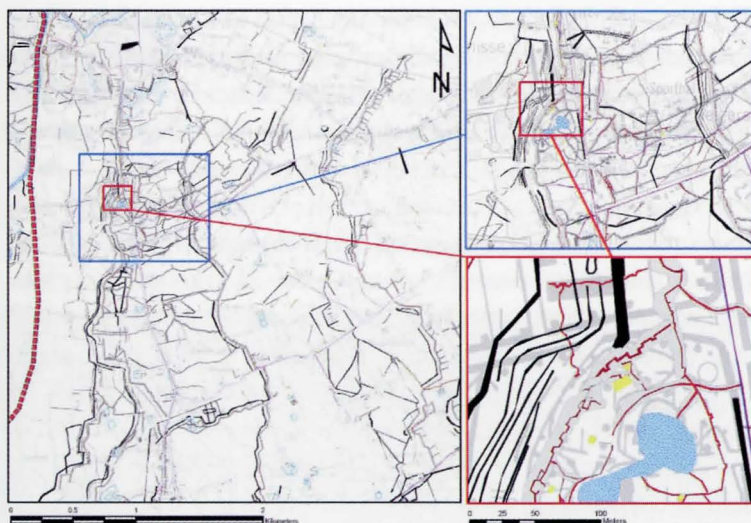
The Belgian element of the project, organised by the Department of Archaeology and Ancient History of Europe at the University of Ghent, focused on the study and use of air-photo and related ground-based evidence for Great War landscapes in Flanders. The aim was to locate and examine previously un-exploited military air photographs, to map the wartime features and examine them on the ground, to undertake new flights so as to assemble comparative photography from the present day, and to organise a workshop on these and other 'conflict' studies towards the end of the project.

From archives containing over 25,000 WW1 air photographs 950 were selected for scanning, geo-location, rectification and incorporation in a database. Ninety years after the events of 1914-18 it proved possible to gain additional information on the topography of military constructions and the surrounding terrain and to discover important features that would otherwise have remained hidden. Nine digital stereoscopic views were created from overlapping archive photographs, using specialist software. The geo-referenced pictures were used to create a detailed inventory of

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Figure 2. Air photo mapping of the German second line in Flanders during the World War I, showing the level of detail achieved by researchers at the University of Ghent in plotting the trench systems and related military works almost a century after the photographs were taken.



all visible military and other archaeological traces in the study area. Approximately 3000 separate features were identified and documented in an area of 49 km. sq., most of them belonging to the trench systems of the German second line, which were traced over a distance of more than 10 km. Numerous medieval moated sites (many of them later destroyed by post-war agricultural activity) were also recorded, along with various other features revealed by temporary flooding.

Work during the later part of the project concentrated on gaining a better understanding of the military remains and formulating a strategy for selective conservation of above-ground features and of locations which might retain valuable buried evidence.

Figure 3. Poster announcing the Ypres conference (left) and a newly-discovered WWI trench system near the Belgian coast (right).



The planned workshop, on 'Military Aerial Photography and Archaeology', organised in collaboration with the In Flanders Fields Museum, was held with great success at Ypres in October 2006. The conference papers will be published under the same title in due course.

Italy: exploratory survey, workshops, training and conservation

In Italy the project contributed to a growing amount of exploratory air survey and related work, initiated from 2000 onwards by the University of Siena in Tuscany and the University of Foggia in southern Italy. The project also involved co-operation with the University of Lecce, in the far south, where aerial studies based on pre-existing vertical photographs had already attained high levels of sophistication over the previous two decades.

The Department of Medieval Archaeology at the University of Siena, along with its newly-formed Laboratorio di Archeologia dei Paesaggi e Telerilevamento (LAP&T, Laboratory for Landscape Archaeology and Remote Sensing) at Grosseto, was able through the project's funding to intensify its work on exploratory reconnaissance, mapping and interpretation of the resulting information. The University also organised a highly successful aerial archaeology training school at Grosseto in 2006, where for the first time training was provided for pilots as well as prospective air

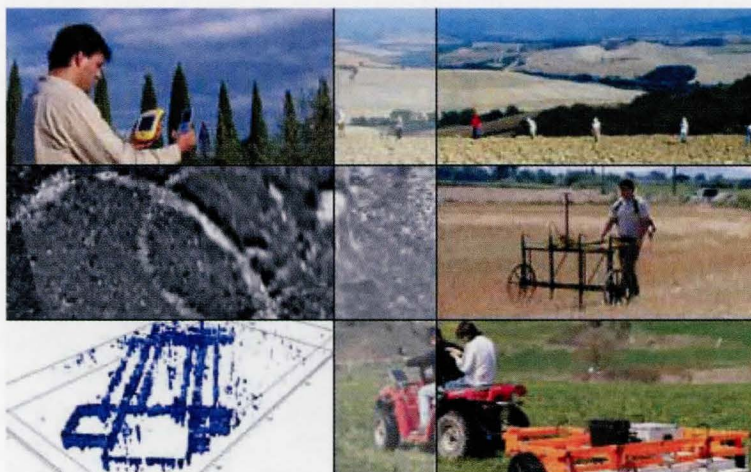


Figure 4. A major element in the University of Siena's contribution to the project was the combined use of air photography, field-walking survey (top right) and (in the rest of the images) various forms of geophysical prospection, including ground-penetrating radar, the results of which are shown at bottom left for the buildings of a buried Roman villa originally discovered from the air.

photographers and air photo interpreters. A special feature of the University's activity, however, was the way in which it managed to combine relatively small amounts of Culture 2000 money with research and sponsorship funding from outside sources, in the promotion of two international workshops on remote-sensing techniques, creating a positive impact beyond the limited resources of the University or of the Culture 2000 project alone.

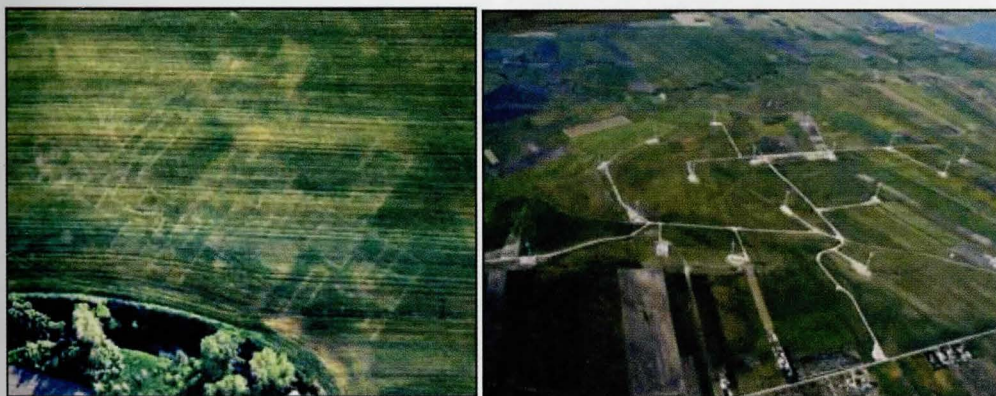


Figure 5. The crop-marked walls of a previously unknown Roman villa west of Foggia, in southern Italy (left) and the devastation caused by wind-farm construction on the site of a Neolithic and later settlement first recorded during aerial survey for the University of Foggia only two years earlier (right).

Further south in Italy the Department of Human Sciences at the University of Foggia hosted an aerial archaeology training school in 2007 and expanded its programme of oblique air photography in cooperation with Dr Otto Braasch from Germany and the Aero Club di Foggia. Every year of flying over the rich air-photo landscapes of the Tavoliere delle Puglie, at the top of the 'heel' of Italy, brought new insights and sometimes startling discoveries.

A particularly promising innovation in 2006 and 2007 was the targeting of some of the air survey programme on parts of the Tavoliere and the surrounding hills which are under increasing threat from large-scale wind-farm developments. This initiative has now been developed into a cooperative venture by the region's universities and the state heritage service to compile inventories of archaeological sites and landscapes, including those discovered from the air, as part of a comprehensive effort to achieve better public and political understanding and more effective conservation of ancient



sites and landscapes through enhancement of the region's infrastructure planning and development-control systems.

Lithuania: air photography and teaching packs

Over the past fifty years the territory of Lithuania has been photographed several times through vertical photography and the resulting photographs are reasonably easily accessible. No oblique photography was undertaken, however, during the Soviet period, but archaeological flights began again in 1996, after a gap of sixty years since the first pioneering efforts in the 1930s. The subsequent development of aerial survey work in Lithuania is discussed by Romas Jarockis in the final section of this publication, with a particular emphasis on the spectacular hill-forts which are such a distinctive feature of the Lithuanian landscape.

Figure 6. Rectified colour photographs along the intended route of a new railway line (left) and a map of 'archaeologically sensitive areas' along the route, prepared by the University of Foggia to help reduce archaeological losses during the line's construction (right).



Figure 7. Cover and illustrations from one of the education packs prepared by the Department of Lithuanian Heritage Protection as part of the Lithuanian contribution to the project.

Here, however, we would like to mention another aspect of the Lithuanian contribution to the project, highly relevant to the 'outreach' aspirations of the Culture 2000 programme. This was the preparation of education pack for schools, using aerial photographs as well as other heritage sources. A number of towns and townships, with origins in some cases going back to prehistoric times, were chosen for the preparation of these packs. The dating evidence lay in prehistoric features both within the towns or townships and in their immediate surroundings – Iron Age hill-forts, burial mounds and settlement sites, for example. A castle, a church or an estate attached to a market place were the main components from which the towns and townships developed in the Middle Ages and later. The education packs each contain historical and recent aerial photographs, other archaeological data, historical information, cartographic material, ancient paintings, ground-based photographs and of course a linking text. The information has been specially adapted for schoolchildren so as to illustrate features of the local cultural heritage and to emphasise their importance for society, both historically and in the present day. Hopefully, this initiative in introducing school-children to the archaeological heritage of their home towns will foster greater appreciation, and hence better conservation, of the historic environment in the future.

Poland: old and new resources for Poland's landscape heritage

Poland and much of the rest of Europe possesses a largely unrecognised heritage resource in the form of 1:25.000-scale photo-maps and photo-mosaics made for German military and intelligence purposes in the late 1930s and early 1940s. These show the landscape as it was before the radical changes of the post-war years. The extent of their survival, and their full historical potential, has yet to be assessed. One of the project's objectives in Poland was to identify the location, number and quality of the photo-maps and to test ways of making them more widely available, for instance as scanned images. During the (continuing) search in Poland two important air-photo archives from before and during WWII were identified, one of them regrettably as yet un-catalogued. Work continues on a database for the photo-maps



Figure 8. German air-photo maps from the 1930s and 1940s. On the left one of the photo-maps that provide a record of the Polish landscape before the radical changes of the post-war years. On the right, part of the Internet presentation of the known photo-maps in Poland.

and mosaics, held both in Polish institutions and at the archive of wartime aerial photography at the University of Keele in the UK. This remarkable collection of 'historical' air photography will soon to be made more accessible for research workers from across Europe through a move to new premises in Edinburgh under the care of the Royal Commission for the Ancient and Historical Monuments of Scotland.

Until now little money has been allocated in Poland to exploratory air photography, which has had to compete for funds with Poland's longstanding programme of ground survey, artefact collection and recording, known as the Polish Archaeological Record, or AZP. This now covers the greater part of Poland through over 500,000 entries. The existence of the AZP provides an unrivalled opportunity for Polish aerial survey to be even more effective than in other countries, adding 'shape' to sites known only from surface scatters of artifacts and revealing archaeological and landscape features where no evidence at all is visible on the ground. One of the aims of the Culture 2000 project in Poland was to carry out air photography in five regularly-ploughed (and hence archaeologically 'threatened') areas, along with mapping of the results and the creation of a database to link the aerial

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Figure 9. Szamotuly is a medieval town in Poland with an 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 by Włodek Rączkowski, of the Adam Mickiewicz University at Poznań, revealed its original location at Mutowo, 2.5km away, where it stood before a disastrous fire towards the end of the fourteenth century. One of the photographs is shown here (centre), rectified to fit the present-day map. In the bottom image the lost town's large open square, flanked by the dark cropmarks of the filled-in sunken floors or cellars beneath its surrounding buildings, has been plotted on the rectified photograph, along with the presumed lines of the linking streets. The discovery excited wide and approving comment in the general and specialist press – no bad thing for possible increases in funding and status for future aerial exploration in Poland.



and the ground-based evidence. Although limited in scope, the flying programmes produced invaluable records of known and previously unrecognised sites, including traces of Early Neolithic trapezoidal buildings, pit-alignments of the kind not previously known in Poland, and the spectacular discovery of a medieval town, lost since its destruction by fire in the fourteenth century.

Another major development in Poland was the design and testing of a database application (*Aph_Max*) for storage and analysis of the air-photo archives in various institutions. This was used initially for mass data entry of 3000 aerial photographs held at the Adam Mickiewicz University in Poznań. Through this work the project was able to add a third and highly important module to a heritage management system that has been under development for several years at the Poznań Archaeological Museum. This new module will enhance the management of air photo collections through the creation of unique files for each photograph, which can then be compared with other data sets such as text descriptions of individual sites, GIS data and so on. The database has been designed for linking with those of the AZP so as to assist

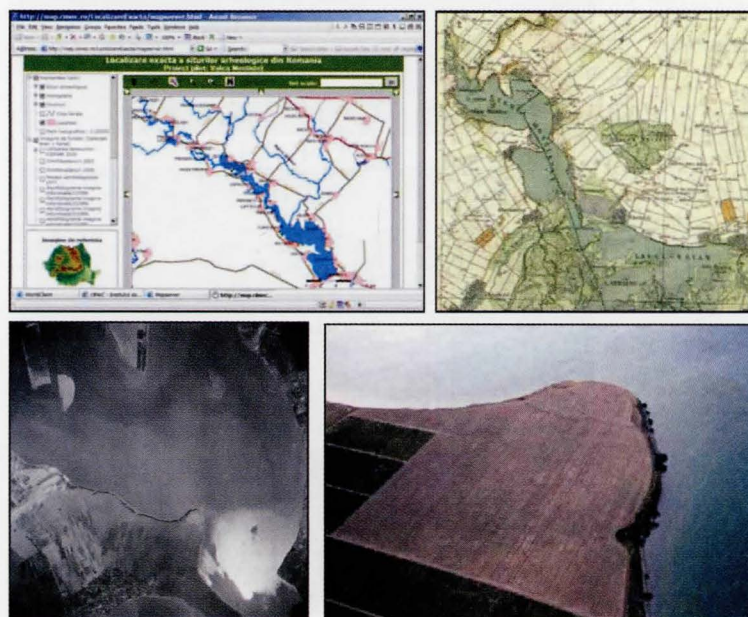


Figure 10. WEBGIS screen (top left) from the Internet-based information system developed by the Institute for Cultural Memory in Bucharest as a principal component of the Culture 2000 project in Romania. Also shown is a typical historical map (top right), along with vertical and oblique air photographs of an Iron Age promontory settlement, at lower left from 1977 and at lower right from 2007.

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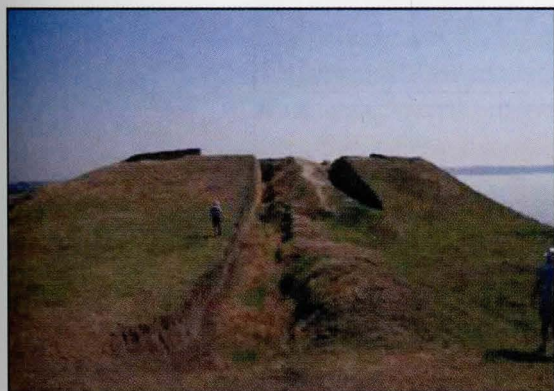
the protection and management of monuments, whether known from ground-survey or from aerial evidence.

Romania: a future for the past

Aerial survey has until recently remained virtually unused by Romanian archaeologists, whether for exploration or landscape studies. A limited programme of aerial survey in the north-west of the country, however, has been conducted over the past few years by British and Romanian researchers from the University of Glasgow in the UK. However, through the Culture 2000 project the Institute for Cultural Memory (CIMEC), in Bucharest, was able to promote the use of aerial evidence in other parts of Romania, initially through the examination and analysis of historical air photo sources but in 2007, in association with contacts made during the course of the project, through a small but potentially influential flying programme by Romanian archaeologists trained in air-survey work at Culture 2000 schools earlier in the project.

The geographical focus of the Institute's work has been in the Lower Danube Valley, archaeologically one of the richest areas in Romania from early prehistory to recent times. Many ancient sites there have been destroyed or are now at risk from modern development and intensive arable cultivation. Many more await discovery through the aerial techniques which have proved so fruitful elsewhere in Europe. By using modern computer and Internet-based methods to draw these sites to the attention of

Figure 11. Field visit by Romanian and UK archaeologists to the Malu Roşu settlement site, on an eroding promontory overlooking the waters of Mosişte Lake.



officials and cultural resource managers, as well as to the general public, the project aimed to assist their long-term conservation and future enjoyment by schoolchildren, specialists and the public at large.

In addition, more intensive study of a selected area in the Mostiștea Valley in the Lower Danube area was commenced in the early days of the project, concentrating on a pilot study of the earthworks and surroundings of an important settlement site at Malu Roșu through the analysis of landscape change recorded on air photographs taken between 1972 and 2003. The fortified settlement stands on a high and eroding terrace above Mostiștea Lake and is now under re-excavation following earlier but regrettably un-published investigations in the 1920s and in 1975. The work on the air photographic evidence contributed materially to archaeological understanding of the site itself and of the surrounding landscape.

In addition, training and information exchange formed key parts of the project in Romania, as in other countries of Europe. A week-long training course in aerial archaeology and the uses of GIS in heritage work was organised near Bucharest in May 2005 through the Culture 2000 project and the EPOCH Network of Excellence. In September 2005, during a week-long course in Bucharest, an expert from the UK (Rog Palmer) provided five Romanian archaeologists with intensive training in the interpretation of aerial photographs and this was followed up by a further visit to Romania later in the project. Culture 2000 funding also enabled Romanian students and research workers to attend meetings in Italy and the UK, one of them staying on in the UK for further training in photo-interpretation and mapping. The importance of this exchange of skills and experience cannot be under-estimated in the promotion of aerial archaeology in countries where it is still in the early stages of development.

Overall achievements of the project

These are just a few examples from the range of work undertaken by partner organisations across Europe. The project's ultimate

value, of course, will lie in its *long-term* effects in the participating countries and institutions, after the end of the Culture 2000 initiatives in October 2007. Not all the participants will be able to maintain the same level of activity in future years, perhaps. But the value of aerial survey and other forms of remote sensing will have been widely demonstrated and publicised. There will have been valuable experiments with lidar survey, in combination with aerial photography and other forms of remote sensing. Many important and stimulating workshops and conferences will have been held, including the one at Klaipėda that prompted this publication. The ever-growing exchange of advice and cooperation across Europe will have been further strengthened. Important moves will have been made towards the creation of a 'network' of centres to promote aerial survey, remote sensing and landscape studies throughout Europe. New recruits will have been introduced to the techniques and uses of aerial archaeology through a series of training schools, and the value of landscape research, by whatever means, will have been demonstrated to an expanding audience of specialists and public alike. The firm resolve of the participants at their final meeting at Prague in October 2007 was to find ways of building on the initiatives and international co-operation fostered by the Culture 2000 project 'European Landscapes: past, present and future'.

Acknowledgements

This summary draws heavily on accounts prepared by project participants for the Final Report to the European Union in December 2007. Particular thanks are due to Jean Bourgeois and Birger Stichelbaut in Belgium, to Stefano Campana, Roberto Goffredo and Valentino Romano in Italy, to Romas Jarockis in Lithuania, to Włodek Rączkowski, Andrzej Prinke and Dariusz Krasnodębski in Poland and to Irina Oberländer-Târnoveanu in Romania.

Participants in the project

The seven co-organisers of the project were: English Heritage in the United Kingdom (Project Sponsor); the University of Ghent in Belgium; the State Authority for Culture and the Preservation of Monuments in Mecklenburg-Vorpommern, in north Germany;

the Cultural Heritage Service for Baden-Württemberg in south Germany; the Baranya County Museums Authority at Pécs in Hungary; and the Universities of Siena and Foggia in Italy. The eleven co-partners were: the University of West Bohemia at Pilsen in the Czech Republic; the National Heritage Board of Estonia; the Helsinki University of Technology in Finland; the Institute of Landscape Management at the University of Freiburg in Germany; the Agenzia per il Patrimonio Culturale Euromediterraneo in partnership with the University of Salento, Lecce, in southern Italy; the Department of Lithuanian Heritage Protection; the Adam Mickiewicz University at Poznań, the Institute of Archaeology and Ethnology at the Polish Academy of Sciences, and the Poznań Archaeological Museum in Poland; the Institute for Cultural Memory in Romania; and the Institute of Archaeology at the Slovak Academy of Sciences in Slovakia.



Education and Culture

Culture 2000

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