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LANDSCAPE SURVEY AND PRESENTATION IN THE CZECH REPUBLIC

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Background and objectives

The objectives of the University of West Bohemia's contribution to the project were to encourage the use of aerial photography and other forms of remote sensing in landscape exploration and conservation. This was to be achieved through:

- Research, involving the combined use of new and innovative techniques, including new aerial survey and the study of existing air photographs of the Czech Republic.
- Education, involving the preparation of a video film and an on-line *Encyclopaedia of Aerial Archaeology and Remote Sensing*.
- Public presentation, through the preparation of a major exhibition on the role of aerial survey and related techniques in landscape exploration, analysis and conservation.

Research

Fieldwork

Fieldwork in a selected region was carried out with the use of various techniques such as air reconnaissance, surface artefact collection, geophysical survey and test excavation within an area around the legendary Hill of Říp, north of Prague. The intention was to explore the dynamics of past settlement processes in the vicinity of this 'sacred' mountain, which has legendary connections to the beginnings of Czech history in the early Middle Ages. Each year intensive aerial survey was conducted over the study area, revealing a number of previously unknown sites of prehistoric to post-medieval origin. Together with data gathered from repeated field-walking it was found that past settlement activity in this region was much more intensive than had previously been supposed. Test excavations on a double enclosure originally revealed through aerial survey produced important information about its date and function, showing it to belong to the earliest form of country feudal seat in Bohemia. The site is of particular importance because it is the first of its kind within Czech archaeology whose plan is fully preserved, in this case in the form of 'aerial' evidence. Pottery from the lower layers of the enclosure ditches and from two sunken houses in the interior dated the site to about 1150-1250 AD, the earliest stage of the High Medieval period in Bohemia.



Conjoined double enclosure discovered from the air (left) and under excavation in 2005 (right). The dating of the enclosure to the Medieval period, rather than to prehistory as expected, has had major implications for interpretation of heritage landscapes in the Czech Republic.



Left: Test excavations in the central, rectangular, part of the Ledčice enclosure, dated to the 12th-13th centuries AD. Centre: Part of the ground plan of one of the two sunken huts, with peripheral postholes, in the middle of the rectangular enclosure. Right: Geophysical survey of an oval enclosure near Vražkov.kj

Geophysical survey

Geophysical survey was mostly focused on sites identified from the air. A new type of caesium magnetometer, bought by the Department (with limited help from the Culture 2000 project), was used in a variety of situations to test its potential and to make comparisons with parallel measurement made with an earlier type of magnetometer. The experiments helped to clarify the relative potentialities, advantages and disadvantages of the two instruments in different types of terrain, geological regions and archaeological contexts. This in turn helped to refine the field methodology and to eliminate initial problems of data-collection and measurement-errors. The tests, many of them undertaken on sites originally discovered from the air, showed that the new instrument offered good possibilities for identifying sunken features; it was also capable of revealing the shape and dimensions of ditched enclosures and successfully distinguished between sunken features and production areas within a prehistoric settlement. The different but necessarily more limited capabilities of the instrument in wooded areas were also investigated.

Air photo analysis and survey

The evaluation of modern vertical air photographs was undertaken through the analysis of a collection of contemporary orthophotos of the Říp region owned by the Czech Ordnance Survey Office. This resulted in the identification of about 40 previously unknown cropmarked sites, some of which will become the subject of field-walking and geophysical survey in future years.

Digital stereo photogrammetry and the mapping of archaeological features identified by the stereo-examination of vertical air photographs became an important part of the research work, breaking new ground in a field that has not yet been systematically developed in Czech archaeology. Over the course of the project the research team, through the Department's own funds, progressively acquired the necessary equipment for this kind of work. One PC workstation dedicated to this aspect of cultural heritage research and management is now in use in the Department and this kind of work will continue after the lifetime of the Culture 2000 project. Preliminary work on the analysis of vertical aerial images was carried out within the project and the subject will soon be included as part of the aerial archaeology course provided by the Department for undergraduate students – a significant long-term gain from the project. Intensive air survey was undertaken in three areas: the Říp region (around 20 hours per year throughout the project), the Labe and Ohře river basins in central and north-western Bohemia (around 15 hours per year) and West Bohemia (around 10 hours per year). The flights produced



Cropmarks in the Říp region. Rectangular enclosure with a smaller enclosure in its interior (top left), small rectangular features (arrowed) and ring-ditch with possible grave-pit (in square). Also many other pits.

around 1500 colour and 3000 digital images, subsequently processed within the Department. In addition to newly-discovered sites, photos were also taken of known sites and monuments as well as non-archaeological features recorded for a variety of purposes (education, training in air photo interpretation etc). Spare seats in the survey aircraft were regularly taken up by advanced students of archaeology to gain practical experience in aerial survey and air photography.

Educational work and film production

Student training and E-learning

In addition to student participation in research-based flights (noted above), fifteen students each year participated in the Department's air survey training course in the central part of the Říp study area, helping to identify cropmarked sites and to photograph other features.

Distance-learning is used in the teaching of a course on aerial archaeology for students at the University in Hradec Králové in eastern Bohemia. Aimed at students unfamiliar with archaeology

and cultural heritage, this is in effect a contribution to general public education. The success of this effort gave rise to the concept of developing an *internet-based encyclopaedia of aerial archaeology and remote sensing*, freely accessible by the general public. This idea was included as a revision of the original Czech proposals for the Culture 2000 project. However, after initial experiments with database entry and design of the user interface it became clear that the work would far exceed the resources available within the Culture 2000 project. Work on the encyclopaedia has therefore been postponed to a later date.

Film production

However, the Department's main contribution in the educational field, partly funded by grants from the Culture 2000 project, was the production of a film on the history of aerial archaeology and its use in the study of European landscapes. Work on the 75-minute film included editing of footage taken from the air over the past ten years (including within the Culture 2000 project) in the Czech Republic, Germany, Italy, Poland, Slovakia and the UK. Interviews were recorded with leading figures in European aerial archaeology and a section was prepared on the work and equipment of the most important aerial archaeology institutions in northern and central Europe. Also featured in the film are the Culture 2000 training schools held in various countries. Editing work was undertaken by T. Petráň, Vice-Dean of the Prague Film and Television Academy. The film, in both Czech and English version, will be offered to the Czech TV2 educational channel (and to other outlets both inside and outside the Czech Republic). On completion the film will become a key part of the Prague exhibition noted below.

Exhibition and final meeting of project co-partners

One of the University's principal contributions to the project lay in the preparation of an international exhibition on aerial survey and related techniques in landscape exploration, analysis and conservation. This is illustrated below and in the penultimate section of the Report.

The final meeting of the Culture 2000 co-partners was held, with help from the Department, in the National Museum at Prague, on the day following the official opening of the exhibition. The meeting gave the project participants the opportunity to present their work, to discuss problems encountered during the project and to explore possibilities for future contacts and cooperation.

General assessment of the project

The Culture 2000 project allowed the Department to extend its work in aerial survey and related ground-based work, in the examination of existing air photo archives, in the use of geophysical instruments and in the preparation of a video film and major international exhibition. Attendance at a variety of meetings and the hosting of the final gathering in Prague, helped the Department to maintain and develop its contacts throughout Europe and to contribute to scientific debate.



Showcases at the exhibition in the National Museum, Prague, October 2007.

FLIGHTS INTO THE PAST

Landscape history and discoveries from the air

Exhibition at the National Museum, Prague, Czech Republic, October 2007-January 2008

International exhibition on aerial survey and landscape exploration

It was always intended that the Culture 2000 project would end with a final exhibition on aerial archaeology and the work undertaken by the Culture 2000 co-partners. This was initially programmed for London but when an offer was received, through the good offices of Dr Martin Gojda, the venue was changed to the prestigious National Museum of the Czech Republic, in the heart of Prague. The Museum's 'special exhibition' hall was only available for the three months from late October 2007, necessitating a revision of the project start and finish dates so as to run from October 2004 to 31 October 2007 (instead of 1 September 2004 to 31 August 2007). The exhibition itself was programmed for 23 October 2007 to 13 January 2008.

Preparation of the exhibition

The content and preparation of the exhibition was overseen by Dr Martin Gojda, of the University of West Bohemia, the bulk of the cost being met from the project's 'Action 9' funds. All of the co-partners contributed material to the exhibition, which was professionally designed by Jan Polasek and mounted with great skill by the Museum's exhibition staff under the leadership of V Slunečko. Introductory text and captions were presented in both Czech and English, as was a well-illustrated 32-page guide. The exhibition was opened on 23 October 2007 in the presence of the Culture 2000 co-partners, many dignitaries and a host of guests. The final meeting of the Culture 2000 co-partners took place at the Museum the following day.

The exhibition will remain in Prague until 13 January 2008. Discussions are in hand about its possible re-mounting at other venues, both inside and outside the Czech Republic.

Format and content of the exhibition

The aim of the exhibition is to acquaint the general public with the benefits of aerial survey and air photography in exploring our ancestors' past. The basic principles and methods of 'aerial archaeology' are explained, and emphasis is placed on aerial prospection as one of the most important 'non-destructive' methods of archaeological investigation. The items on display include the work of the Czech Academy of Sciences, the University of West Bohemia, key contributors to the growth of aerial archaeology throughout Europe, and of course the Culture 2000 co-partners. The exhibition also aims to draw attention to the importance of the shared archaeological heritage and the need to protect and preserve it within the historic and present-day landscapes of Europe.

Topics main topics in the exhibition are as follows:

- Discoveries from above – 'aerial' discoveries throughout Europe and the methods through which they were made
- The historic landscape – its visible as well as its hidden or half-hidden aspects
- Discovering the invisible – traditional and modern techniques of exploration from the air:
- The history of aerial survey – from balloon photography to airborne laser scanning
- What to do with the image data? – processing, archiving and understanding the aerial data
- How and where to learn about aerial archaeology – teaching and research throughout Europe
- A mosaic of European projects – the work of the Culture 2000 co-partners

Facing page: Invitation card, opening ceremony and pictures from the exhibition.





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.

