



A Sense of the Past

Studies in current archaeological applications of
remote sensing and non-invasive prospection methods

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Front cover illustration: DTM of a set of artillery forts (a later addition to the great fortified town of Terezín (north-west Bohemia, Czech Republic) which was constructed across the Labe river in the mid 19th century), a result of ALS (March 2011). The current state of the monument which has been partly levelled (forts 1 and 4) is well illustrated by this way. Also, a dense network of former trackways and linear earthworks of which some may have been connected with the fort system is apparent.

Back cover illustration: Vladař (western Bohemia, Czech Republic) DTM of extensively fortified Iron Age hillfort produced from airborne laser scanned data acquired in March 2010. The image displays perfectly the current state of the site and its individual components, such as the so-called acropolis situated in the highest part of the hillfort (coloured blue) and the fortification system of ramparts and ditches in the western and northern parts of the flat table hill.

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INTRODUCTION

Hans Kamermans, Martin Gojda and Axel G. Posluschny

We will start this editorial with a warning. This book has nothing to do with the novel *The Sense of the Past* by Henry James. Both books have (most of) the title in common and the fact that they deal with the past, but that is the only resemblance. In his unfinished novel from 1917, Henry James' protagonist travels back in time. We, archaeologists, study the past with different methods. This publication presents applications of one of our techniques: remote sensing. We use remote sensing in this book in the widest sense as *a set of scientific methods that is concerned with the measurement and interpretation of electromagnetic radiation reflected or emitted by a target from a receiver at a distance from the target*. In this way remote sensing includes the study of images made from the air and from space but also the results of geophysical techniques like magnetometry, Ground Penetrating Radar (GPR) and Electrical Resistivity Tomography (ERT).

Remote sensing is a hot topic in archaeology due to, among others, the success of Google Earth, the easy availability of satellite images, and the relatively cheap and easy to apply geophysical techniques. Recently a number of books have been published on this topic like *Mapping Archaeological Landscapes from Space*, edited by Douglas C. Comer and Michael J. Harrower (2013), *Interpreting Archaeological Topography*, edited by Rachel S. Opitz and David C. Cowley (2013), and *Archeologie a letecké laserové skenování krajiny – Archaeology and Airborne Laser Scanning of the Landscape*, edited by M. Gojda and J. John (2013).

This volume groups together papers presented at a commission 4 session at the XVI UISPP World Congress in Florianópolis, Brazil (4-10 September 2011), a UISPP commission 4 session in Leiden, The Netherlands (2nd November 2012) and at a session entitled *Advanced Propection Methods for Cultural Heritage Management – Experiences and Challenges during the EAA Annual Meeting in Helsinki, Finland* (29th August – 1st September 2012). The organisers of these sessions are also the editors of this volume.

The International Union of Prehistoric and Protohistoric Sciences (Union Internationale des Sciences Préhistoriques et Protohistoriques – UISPP) was founded on May 28th, 1931, in Bern, and integrates all sciences related to prehistoric and protohistoric development: archaeology, anthropology, palaeontology, geology, zoology, botany, environment, physics, chemistry, geography, history,

numismatics, epigraphy, mathematics and other. Research on adaptation mechanisms and human societies' behaviour dynamics are at the centre of the scientific interest of UISPP. For this aim, UISPP periodically organises a world congress of prehistoric and protohistoric sciences, on which occasion the progress of knowledge is presented and common research goals are set. For these, UISPP creates scientific commissions devoted to specialised research themes. Since September 29th, 1955 the UISPP is a member of the UNESCO associate International Council of Philosophy and Human Sciences.

The European Association of Archaeologists (EAA) is a membership-based association open to all archaeologists and other related or interested individuals or bodies. The members are working in prehistory, classical, medieval and later archaeology. In 1994 at the Inaugural Meeting of the EAA held in Ljubljana, Slovenia, the EAA Statutes were formally approved. They stipulate that the EAA was created:

- to promote the development of archaeological research and the exchange of archaeological information
- to promote the management and interpretation of the European archaeological heritage
- to promote proper ethical and scientific standards for archaeological work
- to promote the interests of professional archaeologists in Europe
- to promote co-operation with other organisations with similar aims

The session at the UISPP conference in Florianópolis was a merger of two originally planned sessions called *C23 Landscape archaeology II / GIS applications in Archaeology of Large landscapes*, a session in co-operation with CAA, of which Hans Kamermans was one of the organisers, and *C24 Landscape archaeology III / Archaeological Survey*, a session in co-operation with ArchaeoLandscapes, of which Axel Posluschny was one of the organisers. The new, unnamed session was chaired by Axel Posluschny and Hans Kamermans.

The UISPP commission 4 session in Leiden was called *New developments in the Application of Computers and Quantitative Methods in Archaeology* and organised by Hans Kamermans.

Axel Posluschny is working at the Roman-Germanic

Commission of the German Archaeological Institute as the project leader of the EU project *ArchaeoLandscapes Europe*. He is also a Steering Committee member of the international association *Computer Applications and Quantitative Methods in Archaeology* (CAA).

Hans Kamermans is Associate Professor at the Faculty of Archaeology, Leiden University in the Netherlands. His teaching and research is in computer applications in archaeology.

Martin Gojda organised the EAA session. He is Professor at the University of West Bohemia in Pilsen, Czech Republic (Head of Archaeology Department between 2005 – 2011) and at the University of Kardynal Stefan Wyszyński in Warsaw (Poland) where he teaches landscape archaeology, non-invasive methods and archaeology of Early Medieval Europe. He is also a co-ordinator of the aerial archaeology programme and curator of the archive of aerial photographs in the Institute of Archaeology, Academy of Sciences of the Czech Republic (Prague).

The book starts firmly on the ground with the application of geophysical techniques from Ireland, Norway, Greece, Poland and the Czech Republic. Then we leave the surface. The following technique is LiDAR with examples from Northern Ireland (UK), the Czech Republic and Arizona (USA). Aerial photography is presented in an example from Belgium and the use of ground spectroscopy in an example from Cyprus. The next chapter describes a German example of automated 3D-object documentation on the basis of an image set. The last two chapters are stretching the topic of remote sensing a little. The first one describes the Fuzzy Cumulative Visibility Analysis (FCVA) of Neolithic long barrows in the Danebury region in England (UK). One can argue that visibility studies are in fact part of remote sensing. We measure and interpret the electromagnetic radiation (visible light) reflected by the landscape and received by our eyes. However, whether it is still remote sensing when we do this by simulating this on a computer remains a question. The last contribution is a stranger in our midst. It describes invention and innovation processes in Prehistoric societies during the transition between the Middle and Upper Palaeolithic in Europe.

Henry James, as a writer of novels, can invent the past. In fact he knows the past; so the title of his book is *The Sense of the Past*. Scientists try to reconstruct the past but usually end up with more questions than answers. That is why our book is called *A Sense of the Past*. Maybe time travel would have given us more concrete answers on some of the topics but in the meantime these fascinating techniques give us definitely a sense of the past.

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