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Remote Sensing for Archaeological Heritage Management

Proceedings of the 11th EAC Heritage Management Symposium,
Reykjavík, Iceland, 25-27 March 2010

Edited by David C Cowley

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Airborne Laser Scan (LiDAR) of a forested area before and after filtering

(St. Anna in der Wüste, Austria). © *Michael Doneus and Klaus Löcker, LBI-ARCHPRO, Vienna*

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Foreword

*Katalin Wollák, President of Europae
Archaeologiae Consilium*

This publication is based on the 11th EAC Heritage Management Symposium held in Reykjavik during March 2010. The symposium emphasised the significance of remote sensing in exploration, identification and documentation, and in monitoring archaeological heritage in the living landscape. This topic is vitally important to heritage management, and the presentations demonstrated to the heritage experts, and scientific researchers alike, that these scientific techniques significantly enrich our knowledge of the past. Additionally, I refer to a nearly twenty year old document, the Valletta Convention of the Council of Europe, which encapsulates the principles of archaeological heritage management. Certain elements of the Convention could be updated, but the part of Article 3 that emphasizes the importance of applying, wherever possible, non-destructive methods of investigation, is as current today as it ever was.

The practice of archaeological heritage management has changed significantly over the last three decades. Besides excavation as the most common diagnostic practice the role of the different preventive techniques, such as geophysical survey, remote sensing and laboratory analysis has been increasing gradually. The papers illustrated the ways in which these techniques broaden perspectives towards a landscape approach. Therefore in those countries where both research and heritage management concentrate on individual elements of heritage, the application of remote sensing methods and the interpretation of the results is a huge stimulus to achieving a broader understanding of the historic environment.

At the symposium, which was organised within the framework of the 11th Annual Meeting of Europae Archaeologiae Consilium, 18 speakers gave presentations from eight countries. It was a special pleasure for me to have speakers (and additional authors in the publication) from the post socialist countries since in these parts of Europe aerial reconnaissance could only really be applied in practice during the last twenty years. Among the new techniques presented, the most spectacular was LiDAR (Light Detection And Ranging), also known as Airborne Laser Scanning (ALS), which offers several opportunities for archaeology. The most effective application is the exploration and mapping of features beneath tree canopy, which thus provides a way to explore such areas at a broad scale that cannot be equalled by other ground-based techniques.

The round table discussion at the end of the symposium offered speakers and participants an opportunity to talk about experiences from different countries. This discussion helped the editor of this volume to commission further articles. The diverse papers in this publication, therefore, provide detailed insights into the application of remote sensing methods in different contexts, and demonstrate the ways in which these techniques can be used for archaeological prospection, for mapping, digital recording, archiving and modelling of archaeological features and previously unknown phenomena, as well as monitoring of scheduled ancient monuments, explored sites and the historic landscape.

As archaeological excavations only shed light on a small slice of any given historical period, remote sensing offers enormous help in interpretation and reconstruction of palaeo- and present landscapes from prehistoric times to the period of the World Wars. For heritage managers, archaeologists and remote sensing experts it is essential to understand how the excavated elements are related to the historic environment. The authors represent almost the full palette of archaeology and within this volume the reader will inevitably meet certain opinions that can diverge from the position of the official heritage management in these countries.

The thoughtful reader of this volume will learn about a wide range of good practice. Although the general expectation of such symposia is to encourage the adoption of the 'best practice', each country has to elaborate its own methodology and should establish its own optimum approaches from an awareness of the existing opportunities. The articles published in this volume on remote sensing set out a professional benchmark of different approaches to support this aim, and the EAC is, therefore, delighted to publish these important papers in its Occasional Papers series.

We offer our congratulations to the contributors of the papers and I'd like to express our special thanks to Kristín Huld Sigurðardóttir for hosting the conference, to the EAC/AARG Working Party and personally to Dave Cowley for inviting the contributors and overseeing the production of this volume within a year of the symposium to be launched at the 12th EAC Heritage Management Symposium in 2011. We believe this volume will find a place in the libraries of the state heritage agencies, in universities, museums, excavation services, research centres and also on the bookshelf of the interested professional.

Budapest, 11th February 2011

Acknowledgments

The symposium on which this publication is based was funded by EAC, English Heritage, the Royal Commission on the Ancient and Historical Monuments of Scotland and the Aerial Archaeology Research Group. Thanks to the officers and staff of these organisations for their support in general, but also specifically in securing funding and helping develop the programme of lectures and in progressing this publication. Special mention is due to Dirk Krause, Martin Kuna, Chris Musson, Adrian Olivier, Rog Palmer, Bernard Randoin, Barney Sloane and Katalin Wollák. The symposium benefited from in-kind support of many organisations who provided their staff time free of charge or funded their attendance. The financial support of the Riksantikvarieämbetet (The Swedish National Heritage Board) for publication costs is gratefully acknowledged.

The symposium was held in Iceland as Eyjafjallajökull began to erupt, providing the delegates with an opportunity to view the volcano (from a safe distance) on a memorable fieldtrip. Kristín Huld Sigurðardóttir was a perfect host, ensuring a smooth-running enjoyable event, which was supported by the Icelandic Ministry Education, Science and Culture and the Archaeological Heritage Agency of Iceland.

For editorial assistance and other help thanks to Sharron Corder, Johanna Dreßler (German abstracts), Catherine Fruchart (French abstracts), Ralf Hesse, Rachel Opitz and Steve Trow; and to Erzsébet Jerem, Dorottya Domanovszky and Gergely Hős at Archaeolingua for maintaining a tight production schedule with good humour.

David C Cowley
Edinburgh, January 2011

Opening address

*Katrín Jakobsdóttir, Minister of Education,
Science and Culture, Iceland*

I would like to welcome all the participants in the EAC Symposium to Iceland. Many of you are here for the first time, while some have come to our country before. I hope we will be warm and generous hosts to you all, and that you will leave Iceland with good memories and a favourable impression of the land and its people. I know that you have a very busy schedule ahead of you for the next two days, but I hope that the field trip on Saturday will give you an opportunity to see some of the country and the work that is being done here in the field of archaeology.

Your organization, the *Europae Archaeologiae Consilium*, is devoted to the managing of Europe's archaeological heritage. After thousands of years of human habitation Europe is covered with the remains of former times, some of them more obvious than others, some of them more interesting than others, but all worth consideration and protection, at least until they have been discovered, recorded and a decision has been made on their preservation. This is a tremendous task that you have undertaken.

One of the most pressing tasks for government in our times is to balance the need for preserving our nature and heritage as well as trying to create the best possible conditions for ourselves and future generations. These objectives do not always go hand-in-hand, and a good deal of balancing is needed to meet the needs of preservation on the one hand and social evolution on the other. The development in recent decades of remote sensing for archaeological remains has made this task a great deal easier than before, as it can help us to do research without the damage and cost associated with more traditional excavation. We now appreciate more than ever how destructive excavation, however carefully it is conducted, can be for delicate archaeological sites; we may destroy more than we save – and we simply do not have the time or the financial resources to properly carry out all the excavations that we feel are needed.

The title of this symposium, *Remote Sensing for Archaeological Heritage Management in the 21st century*, points out that there are a number of methods already available and in development that are revolutionizing traditional archaeological research. The names of these methods would have sounded completely alien to archaeologists 50 years ago: Satellite imagery, aerial photography, 3D surveying, airborne laser scanning, multi/hyper-spectral data, high resolution LiDAR – to most people this still sounds more like something out of a George Lucas space-age film than the names of the tools modern archaeologists must become familiar with.

Dear guests,

As the topics of this symposium show, the future of archaeological research is already here. You, the professionals, are aware of this, but the general public is not. I hope that this symposium organized by EAC here in Iceland may serve among other things to bridge this gap, and that you may also all learn a little from each other, sharing information, visions and plans for the future benefit of all those interested in the managing of Europe's Archaeological Heritage in the future.

Reykjavík, Iceland, 25th March 2010