



# AERIAL ARCHAEOLOGY AND REMOTE SENSING FROM THE BALTIC TO THE ADRIATIC

Edited by Zoltán Czajlik and András Bödőcs

INSTITUTE OF ARCHAEOLOGICAL SCIENCES, EÖTVÖS LORÁND UNIVERSITY

AERIAL ARCHAEOLOGY AND REMOTE SENSING  
FROM THE BALTIC TO THE ADRIATIC



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Selected Papers  
of the Annual Conference of the Aerial Archaeology Research Group,  
13<sup>th</sup>–15<sup>th</sup> September 2012, Budapest, Hungary

Edited by Zoltán Czajlik and András Bődőcs



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## FOREWORD

The Aerial Archaeology Research Group (AARG) – under whose banner the papers in this volume were presented – is an organization that promotes the advancement of aerial archaeology and remote sensing techniques. AARG has provided a forum for the exchange of ideas and information for all those actively involved in aerial photography, photo interpretation, field archaeology and landscape history for the last thirty years. While there has been an emphasis on keeping abreast of the quickly changing field of aerial archaeology through the exchanges of its members on new research, there has also been the development of guidance and advice for policies that have helped to preserve archaeological sites and landscapes.

Recent advances in aerial archaeology – promoting the techniques and approaches that employ aerial photographs, satellite images, and other ‘remote’ techniques such as airborne laser scanning (ALS)/lidar/LiDAR – have been an influential force used to re-examine the archaeological sites and landscapes of many regions, such as those *from the Baltic to the Adriatic*. The present volume contains a series of selected papers from AARG’s annual conference held in Budapest in 2012, hosted by Eötvös Loránd University, and published by L’Harmattan.

It is a pleasure to introduce this publication with a foreword as all the papers have drawn on the techniques associated with aerial photography, satellite and other imagery to re-shape an understanding of the long-term human presence that has been affected by, but has also shaped the topography of the Baltic to the Adriatic region. As such, the selected papers from the conference represent innovative research being undertaken in a region at the time of the conference (in 2012). And although these techniques are being advanced in new directions every day, the present volume’s focus on the region’s archaeology that has been enhanced by these techniques should allow it to help perpetuate further research that will continue to understand the past. Like many of the papers, the knowledge of the past has been enhanced by using multiple techniques, presenting side-by-side in the field research such as walk over surveys or geophysics, alongside aerial archaeology and with remote sensing techniques such as analysing a satellite’s hyperspectral bands or extracting features from ALS data. The collective impact of these techniques results in a richer, deeper understanding of how sites and landscapes were connected to past people’s lives.

I am certain that this volume will remain a standard text for those working in the region. I congratulate and I am pleased for Zoltán and András whose hard work has put this volume together, and I also commend those contributing to this publication.

*Oscar Aldred*  
University of Newcastle  
Chairman of AARG





## Editorial preface

The creation of an Aerial Archaeological Photo Archive in the Institute of Archaeological Sciences of the Eötvös Loránd University was one of the many fruits of the eight years long Hungarian-French aerial archaeology collaboration begun in 1993, exactly twenty years ago. The research project initiated by Miklós Szabó and directed by René Goguey led to the discovery of a series of remarkable sites, which were presented to the Hungarian and international archaeological community. The first presentation was held in 1995 at the Eötvös Loránd University; concurrently with the conference, the French Institute of Hungary organised an exhibition linked to the conference and published a bilingual colour catalogue to the exhibition.

When the Eötvös Loránd University was entrusted with organising the AARG conference of 2012, our goal was not merely to provide a venue for a major international event serving as a forum for the presentation and discussion of new advances in aerial archaeology and remote sensing seventeen years after the previous similar conference, but also to learn about the many new research findings from this region. The past fifteen to twenty years have seen profound political and economic changes in the countries lying between the Baltic and the Adriatic, amongst them in Hungary too, which have provided new opportunities for archaeological remote sensing after the forced gap of over forty years and have led to a series of amazing archaeological discoveries and results following the initial delight over the first aerial archaeological photos.

The presentation of new directions in methodological research is an important part of the activities of the Department of Archaeometry and Archaeological Methodology of the Institute of Archaeological Sciences of the Eötvös Loránd University, founded ten years ago in 2003. We therefore turned to the AARG leadership and proposed that the most important new advances and research findings relevant to this region presented at the conference be published in a separate volume. To our great delight, this proposal was favourably received not only by the younger generation of researchers, but also by our older colleagues such as Zsuzsa Miklós and René Goguey, who had played an active role in reviving aerial archaeological reconnaissance in Hungary during the 1990s. We divided the volume into two major parts: the studies addressing various issues of traditional and modern research techniques are followed by studies covering various archaeological periods. It is our hope that the present volume, marking an important anniversary for us, will offer a meaningful overview of the current state of aerial archaeological research and remote sensing in East Central Europe.

The Faculty of Humanities of the Eötvös Loránd University, the Aerial Archaeology Research Group and, not least, the National Cultural Fund of Hungary played a key role in organising the conference attended by over a hundred researchers from sixteen countries, as well as in the publication of the studies with a relevance for this region. Thanks are due to the Matrica Museum of Százhalombatta for organising the excursion for the conference participants. We are greatly indebted to Tamás Dezső, Dean of the Faculty, Oscar Aldred, Chairman of AARG, and Magdolna Vicze, Director of the Matrica Museum for their enthusiastic and generous help in all matters pertaining to the conference, and to Szilvia Bartus-Szöllősi, who tirelessly dealt with the practicalities during the organisation of the event and during the conference itself.

*Zoltán Czajlik – András Bődöcs*  
Budapest, November 18, 2013



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## Conference Programme





PROGRAMME DETAILS, 13<sup>th</sup> September, 2012 - Day 1

## Local session Carpathian Basin

- 11.00–11.20 The Application of Remote Sensing Technology and Geophysical Methods in the Topographic Survey of Early Iron Age Burial Tumuli in Transdanubia  
*Zoltán Czajlik, Géza Király, Attila Czövek, Sándor Pusztai, Balázs Holl and Gábor Brolly*
- 11.25–11.45 Using Remote Sensing and Non-destructive Archaeological Methods in the Research of Roman Villas and the Ancient Landscape of Pannonia  
*Máté Szabó*
- 11.50–12.10 Roman Potaissa and its Surroundings. A view from above  
*Florin Fodorean*
- 12.15–12.35 Archaeological and Geoarchaeological Investigations at Perkáta, Forrás–dűlő Bronze Age Fortified Settlement  
*László Reményi, Ákos Pető and Árpád Kenéz*

## Knowledge production

- 13.50 –14.10 Turning Hyperspectral Pixels into Archaeological Information –  
*Geert Verhoeven, Michael Doneus, Christian Briese and Clement Atzberger*
- 14.15–14.35 ALB – Airborne Laser Bathymetry: Surveying Underwater Topography  
*Michael Doneus, Michael Pregesbauer, Christian Briese and Nives Doneus*
- 14.40–15.00 Image Processing at the Service of Archaeological Survey: a Progress Report from the Silvretta Archaeological Project  
*Karsten Lambers and Igor Zingman*
- 15.05–15.25 Beyond 3D Modeling in Archaeology – Metadata, Reliability and Scientific Visualization  
*Sorin Hermon*

## YAARG (Young AARG) session

- 15.50–16.20 Irish Early Medieval Settlement from the Air: A LiDAR Study of Counties Roscommon and Leitrim  
*Susan Curran*
- 16.20–16.40 Google Earth and Silk Road. Satellite Reconnaissance in Xinjiang  
*Emilia Smagur and Kasper Hanus*
- 16.40 –16.50 First Results of Aerial Archaeology in Harghita County (Romania)  
*András Sófalvi*
- 16.50–17.10 Remote Sensing Imagery in Archaeology: the Case Study of Heslington East  
*Jitka Jizerova*
- 17.10–17.30 Troubles with Everything: Flying over Velebit  
*Vedrana Glavaš*

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