



NFDI4Objects

Research Data Infrastructure
for the Material Remains of
Human History

TRAIL 1.2:

Archaeological Remote Sensing in the Roman Rhineland

Partner **Lead:** Matthias Lang (BCDH, University of Bonn)

Participants: Ulrich Himmelmann (Generaldirektion Kulturelles Erbe Rheinland-Pfalz), Stephanie Metz (Generaldirektion Kulturelles Erbe Rheinland-Pfalz), Henriette Senst (DAI), Frank Dührkohp (Verbundzentrale des GBV, VZG), Irmela Herzog (LVR), Erich Claßen (LVR), Karsten Schmidt (eScience-Center, University of Tübingen), Ulrike Werban (Helmholtz Centre for Environmental Research), Till Sonnemann (University of Bamberg, Institute for Archaeology, Heritage Conservation and Art History)

Contact Matthias Lang (BCDH) / matthias.lang@uni-bonn.de

Summary

To process and evaluate remote sensing data (satellite, aircraft and UAV based image information and products e.g. LiDAR) as well as geophysical sensor information in order to identify and delineate archaeological sites, a multitude of sensors, formats, strategies, workflows and teaching materials are available. Almost all of them are tailored to the specific requirements of individual monument authorities and university research projects, however, and they are not usually designed to exchange data efficiently. This concerns all phases of the data lifecycle from investigating individual sites via creating digital plans and visualisations to making the data available for research.

This TRAIL will identify best practices and evaluate deficits in data handling. The results will be summarised in a white paper, and then, modelled, tested and evaluated.

Description

There are many different strategies for handling and describing data from remote sensing and geophysical surveys, which are usually only valid for a specific institution or even for a specific project and are difficult to transfer to other projects. There are no

technical interfaces for data exchange or methods to store data long term. The specialists involved in the TRAIL will first compile a catalogue of existing strategies and approaches and then evaluate their compliance with the FAIR principles and their transferability to other institutions and research questions. The results of this research will be published in a white paper.

The action points identified by the TRAIL will then be modelled and evaluated. For this purpose, members of the TRAIL will select Roman sites in the Rhineland in the federal states of Rhineland-Palatinate and North Rhine-Westphalia and investigate these sites using remote sensing and geophysical survey. These studies will be based on data already collected in the two participating heritage authorities and at the Universität Bonn,

and will be conducted within field schools in close cooperation between the responsible heritage authorities, the participating universities and TA6.

For Roman archaeology in the Rhineland, this will provide a detailed strategy that will allow efficient and targeted recording and processing of archaeological data from remote sensing and geophysical survey. This will involve selecting appropriate tools, file formats and a toolchain based on free software components. All steps of data processing and evaluation will be comprehensively described in a white paper for the target groups (which range from official heritage management to university research) and enriched with sample datasets. To enable efficient data collection and analysis, a version of the Spacialist database system will be provided that allows for standardised data collection. A workflow of data exchange between heritage authorities and universities will also be developed in close consultation with TA4.

Relevance

Today, remote sensing data and sensor-based geophysical survey results almost always form the initial basis for space-based archaeological research. A standardised strategy for handling and processing this data is therefore highly relevant for all communities working in this environment. The white paper developed in this TRAIL will provide conceptual guidance on which archaeological fieldwork projects can build when developing their own strategies and approaches.

Deliverables

- **White paper** on the results and consequences of the environment analysis with model cases to form a basis for later blue papers and be used to specify and prioritise subsequent measures in TA1.
- **Toolchain** for processing, visualising and integrated analysis of data from remote sensing and geophysical survey from heterogeneous sources.
- **Dedicated modules within the Spacialist database system** to manage and analyse data from remote sensing geophysical survey.

Work plan

- Year 1, Month 1–5:
 - cataloguing and evaluation of existing recording, processing, analysis and storage strategies
 - evaluation of the Spacialist system for processing the data addressed here
- Year 1, Month 1–10:
 - development of standardised toolchains based on the evaluation results for the remote and geophysical sensing methods used
- Year 1, Month 1–12:
 - participating project partners in the Roman Rhineland model projects to trial and adapt the developed approach
- Year 2, Month 1–18:
 - adaptation of the Spacialist system to the formulated requirements
 - Year 2, Month 1–18:
 - development and publication of the white paper