



NFDI4Objects

Research Data Infrastructure
for the Material Remains of
Human History

TRAIL 1.1:

Directory and evaluation of existing tools, standards and data

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Summary

The TA1 work programme aims to harmonise digital documentation data and their transfer into long-term archives. The first step towards this, covered by TRAIL 1.1, is to describe the current heterogeneous state of data generation and archiving. This will create the basis for coordinated and practical optimisation and standardisation of procedures.

This TRAIL focuses on generating documentation data (during fieldwork) and the following steps, i.e. post-processing and archiving.

The aim is to compile a comprehensive inventory of software tools, standards and documentation data available or used in a set of institutions and work/subject areas, and to evaluate the suitability of the documentation data for transfer to sustainable digital archives. Based on this evaluation, TA1 will define the specific needs and measures for improving or developing documentation software, for adapting and harmonising

standards and data formats and for processing existing documentation data which, as yet, remains unarchived.

This survey of the current state of digital documentation in the institutions and work/subject areas (including harmonisation and post-processing) will provide concrete data that can be used to define, coordinate and work on common “construction sites” which will be implemented in project years 2–5. in TA1 and TA5.

Description

This TRAIL evaluates data either created during the documentation of objects or which already exists, with regard to its archivability and thus interfaces closely with services provided by TA5 on Storage, Access and Dissemination. The “evaluation tasks” of TA4 will also be taken into account, should they result in requirements for data generation.

TRAIL 1.1 incorporates documentation data (excavation, survey, topographic measurements, remote sensing, building archaeology, etc.) from the Landesdenkmalamt Baden-Württemberg, the University of Bonn and the participants in TA1, as well as the results of community surveys on the current state in various institutions/specialist areas. Based on the results of the TRAIL, the data sets to be processed within the framework of NFDI4Objects will be specified (e.g. selection for post-processing).

The aim of this TRAIL is to define the challenges and requirements that TA1 will address and to customise existing approaches to meet specific and relevant needs. It will provide a structured overview of

1. the specific advantages and disadvantages of individual methods, tools and data formats,
2. existing and missing/incomplete “linkages” of heterogeneous data (inventories),
3. requirements and criteria for archiving heterogeneous data.

This overview provides the basis for harmonising documentation data, developing workflows, and related recommendations and guidelines. Standards for archivable primary data are relevant here (see e.g. Bibby, Höke, Schäfer, Senst, Watson: “(Pre)Planning the Handling of Research Data in Antiquities for the Entire Life Cycle” <https://zenodo.org/record/4817759>). In addition, the interoperability of the documentation data generated with diverse hardware and software is addressed. Where interoperability cannot be achieved, the data (structure) in archiving should be harmonised.

The documentation data are very heterogeneous due to the use of different tools (hardware and software) and their method-specific character (e.g. GIS data excavation, image and measurement data remote sensing, 3D data, SFM). In addition, data in many existing archives are insufficiently structured. TRAIL 1.1 will map this situation to enable standardised archival storage and indexing (e.g. via metadata).

Up until now, it has hardly been possible to describe the current heterogeneous state of digital documentation. Its complexity requires a more detailed analysis, which this TRAIL will carry out.

Relevance

With regard to the research data life cycle, TRAIL 1.1 contributes to

- a) generating documentation data in the context of field research
- b) the post-processing and preparation of preparing existing, but not yet archivable documentation data
- c) processing newly generated documentation data, focusing on its use, reuse and archiving
- d) archiving documentation data.

The users and stakeholders benefitting from the results of TRAIL, and the TA1 measures it yields, include excavation directors and personnel (universities, heritage management authorities, excavation companies) as well as data curators (universities, heritage management authorities) who will be directly or indirectly involved in implementing the TRAIL.

All sub-communities or participants in NFDI4Objects who are not included in the participating TAs can be involved in data collection for the TRAIL, as long as they generate documentation data. The more diverse the data, the more representative the overview, also for the community beyond NFDI4Objects.

This links in with other NFDI consortia wherever heterogeneous documentation or research data are generated and similar solutions must be found to bring these data together in archives. Other spatial and object-related sciences in which comparable digital tools and methods are used are relevant, for example NFDI4Earth.

TRAIL 1.1 will investigate how well FAIR principles are being taken into account and implemented when documentation data is generated and managed and will develop concepts to promote these principles. Interoperability of documentation data is a key focus: what interfaces and opportunities exist and can be further developed? Where does the nature of the data make this impossible? What efforts must be made toward standardisation? Mapping the current state includes recording where data in databases are not (yet) findable, accessible and reusable.

This TRAIL is relevant for the entire NFDI network as it systematically maps often highly heterogeneous and diversely structured databases, whose content however is fundamentally matching, comparable or interrelated. The conclusions drawn from this process will enable better handling and post-processing of such data. The solutions developed on the basis of this TRAIL will be of interest to other disciplines that generate “mixed” digital documentation data.

Deliverables

TRAIL 1.1 serves to identify and evaluate the software, data formats and interfaces in use and thus shows where these can be developed and expanded. For example, the excavation surveying software Survey2GIS, which is already widely used, will be further developed to seamlessly generate archivable data. Other common surveying techniques, e.g. Structure from Motion digitisation and Tachy2GIS (in development), will be assessed for their ability to produce seamless archivable data and be adapted if necessary. TRAIL 1.1 itself does not use or develop software and interfaces. The results are shared in the Commons and will be incorporated into the Guidelines or Catalogue Services planned in TA1 (e.g. advice on the situative suitability of certain software for generating interoperable and/or archivable documentation data).

The solutions based on this TRAIL (the core programme of TA1) will also be described in the guidelines, which will contain user and application-specific assistance and recommendations (=M1.7).

Work plan

Duration: 12 months

Process:

Step 1 (Month 1–5)

- Compilation of a list of used/supported documentation tools, the data (formats) generated by them, and the file storage structures; implementation: co-applicants and participants in TA1, possibly others who are not active in TA1 and community survey
- Overview of applied documentation standards on which the tools are based or which are prescribed by them; implementation: see above
- Overview of existing digital documentation data already archived or stored in the medium term; implementation: see above; consideration of the results of the completed NFDI/SEADDA/VDL survey
- Coordination of content with the requirements of practical application and archiving with TA4 and TA5

Step 2 (Month 6–12)

- Evaluation and detailed description of the current state; identification of “common denominators”/interfaces and related needs, potential for development and options for action; implementation: co-applicants and, if applicable, participants in TA1 (including requested funded project position)

Step 3 (Month 10–12, no longer explicitly part of TRAIL, but closely linked to its results)

- Based on the mapping and evaluation of data documentation, determination of the documentation standards, data formats, interfaces and tools to be developed and concepts for application in ongoing operations; implementation: TA1 working group/consortium
- Selection of representative data sets for sample post-processing; implementation: TA1 working group/consortium

Human resources and funding

Participation:

Co-applicants and participants in TA1, possibly others who are not active in TA1; i.e. at least the disciplines represented in TA1 that generate documentation data (excavation, survey, topographic measurement, remote sensing, building archaeology, etc.); indirect participation of the specialist communities.

Positions:

The personnel requirements of TRAIL 1.1 are covered by the project positions and applicant contributions earmarked for implementing the TA1 tasks:

- Applied for: TVL E13 100% (50% software development, 50% post-processing), of which 50% (2 x 25%) is planned for implementing the pilot project (year 1).
- Applicant contribution: TVL E13 60% in total, TVL E6 20% (pilot project pro rata).

Project positions and contributions of the co-applicant Universität Bonn and the participants in TA1 after further consultation.

*FAIR*¹ RDA-F1-01M, RDA-F1-01D, RDA-A1-01M, RDA-A1-02M, RDA-A1-02D, RDA-I2-01M, RDA-R1.1-01M, RDA-R1.2-01M

TRAILS TRAIL 1.2, TRAIL 4.3, TRAIL 5.2, TRAIL 5.3.

¹ Nach Tabelle 1 von Bahim, C., Casorrán-Amilburu, C., Dekkers, M., Herczog, E., Loozen, N., Repanas, K., ... Stall, S. (2020). The FAIR Data Maturity Model: An Approach to Harmonise FAIR Assessments. *Data Science Journal*, 19(1), 41. DOI: <http://doi.org/10.5334/dsj-2020-041> cc by 4.0