E-RIHS progress towards EOSC: Developments and challenges for improving interoperability throughout the Heritage Science data lifecycle

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http://www.e-rihs.eu/e-rihs-is-coming/

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Preparation of the operation of E-RIHS ERIC and its positioning as the reference RI for the HS domain at the EU and global level.
Heritage Science

is the interdisciplinary domain of scientific study of cultural and natural heritage. HS draws on diverse humanities, sciences and engineering disciplines. It focuses on enhancing the understanding, care, sustainable use and management of tangible and intangible heritage so it can enrich people’s lives, both today and in the future.
To nourish interdisciplinary research involving heritage objects, collections, buildings and sites with the aim to improve our understanding of cultural heritage and secure transfer of it to future generations.

**Vision**

- **Object-oriented approach**
- **Interdisciplinarity and Co-creation**
- **Competencies first**
- **Interoperability of analytical procedures and data**

**Core Values**
An intersectoral community

Co-creation of knowledge and values

Researchers: Access Providers and users
Stake-holding persons

Research institutions
Universities
Museums
Cultural Institutions
Conservation Centers
Cultural and Creative Industries
Society
Levels of interoperability for co-operation and co-creation

Heritage Domain Community and Users

Heritage Science researchers

Humanities & Science specialists in the same techniques

Interoperability of instruments, analytical procedures, documentation

Semantic interoperability

Interoperability of data

Heritage knowledge communication

Object-centered approaches

Wealth of resources

Developing / adopting metadata models to document data creation processes

Developing tools for facilitating population of metadata storage models

Infrastructures

Methods

Protocols

Archives

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The legacy of E-RIHS

National and External resources (e.g. EU-funded projects outcomes)

Labs-Tech (1999-2002)
Eu-ARTECH (2004-2009)
CHARISMA (2009-2013)

E-RIHS IP (2022-2024)
IPERION HS (2020-2023)
E-RIHS PP (2017-2020)
IPERION CH (2015-2019)

Eu-ARTECH (2004-2009)
CHARISMA (2009-2013)

IPERION HS (2020-2023)
E-RIHS PP (2017-2020)
IPERION CH (2015-2019)

National and External resources (e.g. EU-funded projects outcomes)
to provide access to cutting-edge instruments and services for a cross-disciplinary community of researchers supporting advancements in heritage science

- engaging a broad range of interdisciplinary skills
- stimulates innovation in large-scale and medium-scale instrumentation, portable technologies and data science
- empower researchers, organizations and industry to develop skills, knowledge and innovation to enable the understanding and sustainable preservation of cultural heritage.
E-RIHS Catalogue of Services

https://www.iperionhs.eu/catalogue-of-services/

**SERVICE PLATFORMS**

**ARCHLAB**
Access to physical and digital (offline) data collections in European museums or conservation institutes, such as objects, technical images, samples and reference materials, analytical data and conservation documentation.

**FIXLAB**
Access to key fixed facilities for heritage science research, e.g. particle accelerators, neutron and laser sources and other non-transportable research facilities.

**MOLAB**
Access to a comprehensive selection of mobile analytical instrumentation for in-situ measurements (close-range and remote sensing) on objects, collections, buildings, and sites, allowing non-invasive investigations for complex multi-technique diagnostic projects.
FIXLAB
access to LSF and advanced laboratory facilities
MOLAB
mobile instruments for in-situ diagnostics
ARCHLAB
Scientific archives for Heritage Science
DIGILAB the new platform for E-RIHS
Data, Digital Tools and Services for Heritage Science

INTEGRATED ACCESS
Unique access point to the cat. of Services

ARCHLAB
Access to archives

MOLAB
Mobile laboratory for in-situ analyses

FIXLAB
Ion beam analyses
Neutron techniques
Synchrotron techniques

DIGILAB
e-access for Data management and digital services

DIGILAB
Gluing services of the three other platforms together for heritage object-centered research
Interoperability in focus as a driving force

**Ambition**

- Integrated access to E-RIHS services and to Heritage knowledge
- Integrating multidisciplinary and multiscale approaches towards a comprehensive study of complex heritage systems for a deeper Interpretation and effective Preservation of Heritage
- Building a gateway as a single entry point to discover all resources and research outputs for Heritage objects, sites and systems as part of the European Open Science Cloud ecosystem will create new opportunities for the unhampered flow of knowledge in the field.

- To ensure Data Quality and Open Data FAIRness
Developments to improve Interoperability

Work in progress within and after IPERION HS - T6.3 Interoperability Task

A practical approach, based on open formats and tools to **share agreed model schemas** including **critical metadata** required for documenting the HS data life cycle.

**Process:**
- *TSV Description*
- Simple Model
- JSON Schema
- Test generated forms
- Embed Semantic Mapping (future)

https://github.com/E-RIHS

https://doi.org/10.5281/zenodo.4541266
https://doi.org/10.5281/zenodo.7101169
Developments to improve Interoperability

Modelling of data creation processes and capturing metadata

(i) Draw workflow models based on concrete examples and common process patterns of the diverse categories of services;

(ii) Systematically gather information on how data is produced and managed, at each of the data-cycle stages: acquisition, processing, post-processing, analysis, interpretation and publication.
E-RIHS towards EOSC and ECCCH level of readiness and challenges

High quality data stored in local Servers

- Scientific excellence
- Expertise, innovation and best practices
- Documented protocols of data acquisition workflows
- Annotation practices
- Best practices for FAIR data
- Domain or method specific core metadata schemas
  - Ex. SEM, IRUG, MASC,
- Semantic thinking enabling interdisciplinary interpretation of data

Digital tools, services and expertise are at elementary level. A lot of “manual” work.

Challenge: Adopt existing standards and tools, to be adapted and customised to the HS Community specifics

(i) PID services, Licence management, data storage, curation services, FAIRification T&S

(ii) Data formats, Ontologies, Controlled Vocabularies, ELNs, searching tools and methods, publishing – communicating tools

(iii) HS domain - specific tools and e-services for advanced data processing and interpretation (visualization, computing, analysis, classification, AI techniques, modelling);

(iv) Virtual collaborative Research Environment with personalized dashboard
IPERION HS started to work together with OpenAIRE using services, supporting the DIGILAB platform, focused on digital access to data.

• OpenAIRE **CONNECT** to build a single entry point to access research outcomes in the field of Heritage Science
• OpenAIRE **MONITOR** to customize a service to configure a dashboard to monitor the impact of IPERION HS on the research community.