First edition of the web directory of IPERION CH instruments and databases

Loïc Bertrand, Sophie David, Serge X. Cohen, Susanna Holowati, Marie Puren, Laurent Romary, Mathieu Thoury

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IPERION CH

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D.2.3 First edition of the web directory of IPERION CH instruments and databases

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Abstract

The web directory of IPERION CH instruments and databases aims at providing researchers with information related to resources (instruments, databases and datasets) available within IPERION CH through a package of categories/metadata that help categorising them according to their different dimensions. A database model has been created.

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Table of contents

Abstract **2**

Document information **3**

Introduction **6**

1. Context **6**

1.1. Instruments 6
1.2. Databases 7
1.3. Link to the activities of WP12 and the future E-RIHS infrastructure 7
1.4. Link to the activities of WP8 7
1.5. The intended users 8
1.6. Definitions and distinctions 8
1.7. Rephrasing the extension of the web directory 9

2. Model **10**

2.1. Three main entities 10
2.2. The entities: Access Provider and Data Provider 11
2.2.1. Categories in MERIL 11
2.2.2. Other entities and attributes 13
2.3. The Dataset/Database entity 13
2.3.1. The Meta-material entity 13
2.3.2. The Meta-technique entity 15
2.3.3. The entities: Data Type, Format, Policy, Access, Location, Target Community and Publication 16

3. Browsing in the database **16**

4. Conclusion and next steps **17**

5. References **17**

Annexes **19**

Annex 1 – The Questionnaire 19
Annex 2 – List of the Access Providers of IPERION CH 20
Annex 3 – Database scheme 21
3.1. Reading of the scheme 21
3.2. Scheme 22
Annex 4 – Description of entities and attributes 23
4.1. Conventions 23

4.2. The Access Provider entity 23
4.2.1. Attributes 23
4.2.2. The Hosting Organisation entity 24
4.2.3. The Funding Source entity 24
4.2.4. The Type of Use entity 24
4.2.5. The Scientific Domain entity 24
4.2.6. The Type of Access Provider entity 25
4.3. The Data Provider entity 25
4.3.1. Attributes 25
4.3.2. The Research Institution entity 25
4.3.3. The Status entity 26
4.3.4. The Expertise entity 26
4.3.5. The Publication entity 26
4.3.6. The Research Service entity 26
4.3.7. The Data Type entity 26
4.3.8. The Format entity 27
4.4. The Dataset/Database entity 27
4.4.1. Attributes 27
4.4.2. The Meta-material entity 27
4.4.3. The (Meta-)technique entity 28
4.4.4. The Target Community entity 30
4.4.5. The Policy entity 30
4.4.6. The Access entity 30
4.4.7. The Location entity 31
4.4.8. The Publication entity 31
Annex 5 – The Wayforlight web site 32

Introduction

This report aims at presenting the approach and the work done related to the IPERION CH web directory, which is described in the Technical Annex (p. 29) as follows: "preparing and maintaining a web directory of IPERION CH instruments/databases, which could also function as an extension of the MERIL portal of European RIs". The creation of the web directory is one of the tasks of the Access Board, which is also described under WP2-Task 2.1 (cf. Technical Annex p. 29). The WP2 deliverable "First edition of the web directory of IPERION CH instruments and databases [M12]" (Technical Annex, p. 72) has to be submitted by April 30th. The work has been coordinated by CNRS-IPANEMA.

First, we will give an overview about the context to explain more precisely our approach (instruments and databases, links to activities of other WPs, intended users, definitions, aim). Then, we will present the database model, based on an Entity Relationship model (§ 2. and Annexes 3 and 4), and in particular the categories that will be integrated and that are based on:

- The questionnaires collected in the frame of the Data Management Plan (DMP) (called hereafter the "Questionnaire" cf. Annex 1).
- Our analysis of existing portals describing or allowing access to shared infrastructures, such as MERIL (portal.meril.eu), Wayforlight (www.wayforlight.eu) and CERIC (www.ceric-eric.eu).
- The re3data project (www.re3data.org), which is a directory of research data repositories (currently more than 1.500, consulted on 21.04.2016). This project presents very clearly and well referenced the metadata and values it uses.
- Existing lists (they will be introduced in the sections where they are relevant).

1. Context

A web directory is a catalogue of web sites. As it will be clarified through the upcoming pages, our efforts have shown the interest to extend the work, in the frame of IPERION CH, to datasets, and more generally, in the future, to all types of resources of IPERION CH.

1.1. Instruments

Concerning the instruments, certain of them are described on the respective web sites of the responsible institution. E.g. the BNC web site: www.bnc.hu, or more precisely: www.bnc.hu/?q=node/7. Those instruments can also be described within a specific project as, for example, on the Wayforlight web site that is linked to the European CALIPSO project: www.wayforlight.eu. Another example is the CERIC ERIC web page that lists all instruments available within the consortium: www.ceric-eric.eu/index.php?n=Users.Facilities.

It is important to note that, in the cases of Wayforlight or CERIC, the described instruments are mostly of the same kind:

- On the Wayforlight web site, information about the beamlines of synchrotrons and European Electrons Lasers participating in CALIPSO are available.
- On the CERIC ERIC web site, the first set of categories is related to their trans-national access (TNA) procedure: the procedure is based on the opposition between "Facilities providing access only to multiple instrument proposals" and "Facilities providing access to multiple and also to single instrument proposals".

The second categorisation is made by geographical information (according to the beamline locations). The last list consists of the facilities' beamlines.

An interesting fact is that, in both cases, categorisations/descriptions are firstly devoted to beamlines and not to facilities.

Analysing those web sites is useful to easily gather certain types of information; anyhow, it is also important to be able to establish a link between the instruments and their associated technique(s). Furthermore, it is crucial to keep in mind that many other instruments than synchrotrons and lasers are used in the field of Heritage Science. Therefore, the web directory has to integrate a diversity of instruments that does not yet exist on any other web site.

1.2. Databases

As for the databases, the results of the Questionnaire show that in fact very few databases exist. Focusing only on the databases would have provided too little content. That is why we have preferred to take into account information about the datasets and databases, that we received from the data providers. Once the quantitative question solved (we have information about 88 datasets and databases), another series of problems comes up:

- few datasets or databases are available online;
- not all data are digitised;
- for a large number of datasets or databases, several difficulties linked to the format, storage, availability, access, etc. have still to be solved.

As a consequence, the web directory cannot only be a catalogue of web links to databases or datasets. On another hand, we can transform the information collected through the Questionnaire into categories/metadata that will afterwards be organized in a database making it possible to classify, find and identify the databases and datasets of IPERION CH.

1.3. Link to the activities of WP12 and the future E-RIHS infrastructure

WP12 has to produce a "Database on CH conservation and research institutions and stakeholders (M18)" (cf. Technical Annex of IPERION CH p. 70).
a) This deliverable is expected to be implemented by autumn 2016. Hence, in common agreement with WP12, the extended implementation of the web directory will be done in the context of WP12. Consequently, this step focuses on the conceptual design of the web directory.
b) A clear link between data of the web directory and those of the database provided by WP12 has to be established from now on.

1.4. Link to the activities of WP8

WP8 is expected to realise activities, such as "Organisation/presentation/sharing of analytical scientific data (raw spectra, chemical maps/images etc.)" from case studies (cf. Technical Annex of IPERION CH p. 55). The web directory concept that we are presenting could be a first tentative in this frame, and results from WP8 activities could later on be added.

1.5. The intended users

At this stage, the main target group for the use of the web directory are researchers. Those might be researchers participating in the IPERION CH project as well as external researchers.

The type of information is useful within the IPERION CH project, and also outside. It will help researchers to:

- Get a better overview about the partners' resources, to get inspired by best practices, etc.
- Provide more thorough information to the communities about available resources and to help researchers accessing those, especially through the TNA procedure.

Once all information about CH conservation and research institutions and stakeholders collected, the second target group using the database could be research institutions, funding agencies and cultural institutions.

1.6. Definitions and distinctions

The following terms are important for the overall understanding of this report; therefore, we have provided specific explanations.

Database
We use this term in its strictest sense. A *database* is a collection of items: raw and analysed data, publications, reports, etc. They are organised through a specific model (hierarchical model, relationship model).

Dataset
A *dataset* is a collection of raw or analysed data.

Data provider
The *data provider* is an instrument (which includes the team that helps to operate instrument) and/or a laboratory group and/or museum department, and/or a cultural institution group, etc. that produces data. These data can be put together into one/several datasets or databases. The data provider is also the responsible entity to give access to a dataset/database. In certain cases, access to the datasets or databases can be subject to specific constraints and restrictions (intellectual property, embargo, etc.).

Access provider
Access providers are infrastructures that offer a wide range of services that provide access to one/several instruments and/or integrate one/several data providers. In IPERION CH, an access provider may be a cultural institution, a museum, a laboratory, a technical platform, a facility[1], etc. The term of *access provider* identifies precisely the role of IPERION CH partners.

Hosting organisation
The access providers are hosted by *hosting organisations*, which host the infrastructure or its coordination centre. *Hosting organisation* is also used in MERIL. Keeping this entity will allow to link our work with the future database of WP12.

[1] Onwards, access providers and facilities are used as synonyms.

It is crucial to make the below listed distinctions.
1/ Distinction between access providers and data providers:

1. The data providers produce data, but they do not systematically provide access to them within the community.
2. Certain access providers do not offer instruments (museums, institutions), but give access to their data (through their data providers).

2/ Access providers and the IPERION CH partners
As the IPERION CH partners are diverse (different kinds of instruments, different kinds of institutions, etc.), it is important to have a "body" which allows us to deal with them in a unified way. The notion of *access provider* plays this role.

3/ People and competences
When we speak about instruments, we first consider an object that has been designed to accomplish a certain task, operation, etc. We barely consider the teams or the groups that make this instrument work. Once again, it is important to associate people (and their competences) to be able to deal with the diversity of IPERION CH partners. So, data providers are first considered as groups of people, linked to instruments (beamlines, lasers, neutron instruments) or institutions (museums, cultural institutions, etc.).

The IPERION CH project counts 19 access providers that are listed in Annex 2.

1.7. Rephrasing the extension of the web directory

According to this context, it is important to rephrase the extension of the web directory.
a) A database of instruments, databases and datasets made available by data providers of the IPERION CH project has to be conceived.

b) The problems outlined through the Questionnaire (digitisation, storage, access format, etc.) lead to the need of creating a package of metadata that will help to categorise the datasets/databases.

c) Once created, this database has to be compatible with the database that will be produced within WP12. That means that a clear connection between instruments and datasets/databases and the CH conservation and research institutions and stakeholders has to be established.

Taking all that into account, we have chosen a bottom-up approach starting from the resources provided by the IPERION CH partners. Therefore, a wide range of data received through the Questionnaire will be reused.

The main objective of the web directory can be summarised as follows:

Provide researchers with information related to resources (instruments, databases and datasets) available within IPERION CH through a package of categories/metadata that help categorising them according to their different dimensions.

2. Model

We have used the Entity Relationship model to model our database[2]. The result is illustrated through a scheme in Annex 3, § 3.2. The entities and attribute values are specified in Annex 4.

Given the purpose of our work, and for the sake of simplification, as the descriptions of databases and datasets will be the same (in terms of metadata), we will identify a unique entity dataset/database.

2.1. Three main entities

The following section gives an overview about the three main entities we have chosen, explaining briefly their relation with the other entities[3].

1) A **dataset/database** is produced / made available by a data provider; it can be related to one or several specific materials; data grouped into one set can consist of one or several types of data of one or several formats; these data can be produced with one or several techniques via one or several instruments; the data is of interest for one or several communities, they are located, and they are accessible according to several conditions. One or several publications can be associated to the data.

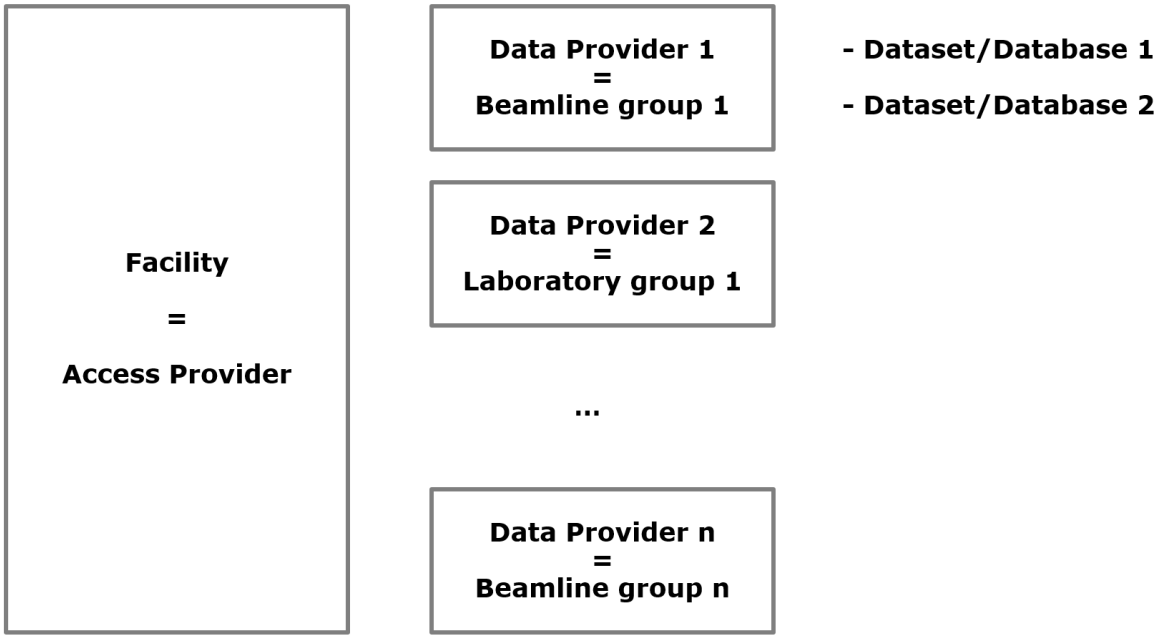
2) The **data provider** has an operational status. He produces data of one or several types of one or several formats. He is responsible to provide access to the community to one or several datasets/databases. He depends upon an access provider. He has expertise in one or several fields and can offer services. He might have national or international collaborations. One or several publications can be associated to the data provider.

3) Being a facility, the **access provider** is of a specific type (virtual, distributed, single-sited). Its activities are related to one or several scientific fields. Its users might come from the private and/or scientific sector. An access provider is hosted by a hosting organisation.

[2] We express our gratitude to Luis Arean (IPANEMA) who contributed with fruitful discussions.
- An entity [in the Entity Relationship model] is a concrete or abstract thing from the perceived reality, for which we want to keep information. An entity exists autonomously. Each entity has specific properties, which are called attributes.
- A relation is a connection between two or more entity occurrences, for which we want to keep information.
- An attribute is a characteristic or a quality of an entity or of a relation. It can take one or several values.
- A value is a symbol, which represents an elementary fact.
In the scheme (Annex 3, § 3.2.), we have not indicated the primary keys. And only essential attributes have been indicated.
These 4 definitions have been adapted from M. Boughanem, http://www.httr.ups-tlse.fr/pedagogie/cours/bd/ea.pdf.

[3] These three main entities are marked in blue in Annex 3, § 3.2.

The scheme below illustrates these levels of organisation:



To identify our entities, attributes and their values, we were departing from the categories or metadata proposed by the MERIL portal, the Wayforlight web site, the project re3data, several lists established in the frame of the LABS-TECH and EU-ARTECH projects, several lists which have been established within CNRS-IPANEMA, descriptors of two journals, and lastly the responses to the Questionnaire.

Each entity will be described in the following sections.

2.2. The entities: Access Provider and Data Provider

2.2.1. Categories in MERIL

The MERIL portal is an inventory of openly accessible Research infrastructures (RIs) in Europe from diverse scientific domains such as archives, statistical offices, biobanks, satellites and particle accelerators. According to MERIL, a Research infrastructure can be defined as follows:

"A European Research Infrastructure is a facility or (virtual) platform that provides the scientific community with resources and services to conduct research in their respective fields. These research infrastructures can be single-sited or distributed or an e-infrastructure, and can be part of a national or international network of facilities, or of interconnected scientific instrument networks."[4]

This description is mainly adapted to IPERION CH's access providers. But our objective being to indicate the production and access level, as well as to provide resources instead of general infrastructure descriptions:

- The MERIL categories we have chosen (actually, most of them) will be distributed between the three entities: Hosting Organisation[5], Access Provider and Data

[4] http://portal.meril.eu/converis-esf/static/about#More. Consulted 07.04.2016.

[5] Henceforth we use capital letters when we make reference to the entities of the database.

Provider. One category is linked to the three entities ("contact person"). Others can be linked to several entities (e.g. "scientific domain" is appropriate for hosting organisations and access providers). Finally, certain categories are rather linked to the hosting organisation characterisation (e.g. "funding source"), the access provider characterisation (e.g. its type), whilst others relate to the Data Provider entity (e.g. "(operational) status").

- It will be necessary to add other entities/attributes helping to describe the techniques, formats, policies, access, type of materials, etc.

The list below shows the categories we have chosen from the MERIL portal (www.esf.org/fileadmin/Public_documents/MERIL/MERIL_Portal_Principles_v.04.03.14.pdf). They are separated according to whether they will constitute entities or attributes in the web directory database (cf. Annex 3, § 3.2. and Annex 4):

Entity: Access Provider

Name of the Attribute	Name in MERIL		In relation with (entities)	Name in MERIL
AccessProviderName	Full Name		Type of Access Provider	Type of RI
AccessProviderAcronym	Acronym		Scientific Domain	Scientific Domain
AccessProviderContactPerson	Contact person		Type of Use	Type of Use
AccessProviderLocation	Location		Hosting Organisation	Hosting Organisation
AccessProviderCountry	Location			
AcessProviderWebsite	Website			
AccessProviderDescription	Description			
AccessProviderPicture	Picture			
AccessProviderNationalUsers	National Users			
AccessProviderEuropeanUsers	European Users			
AccessProviderExtra-EuropeanUsers	Extra-European Users			

Entity: Data Provider

Name of the Attribute	Name in MERIL		In relation with (entities)	Name in MERIL
DataProviderName	Full Name		Scientific domain	Scientific domain
DataProviderAcronym	Acronym		Research Institution	- Networks and International RI Memberships - Cluster
DataProviderContactPerson	Contact person		Status	Status
DataProviderWebsite	Website			
DataProviderDescription	Description			
DataProviderPicture	Picture			
DataProviderNationalUsers	National Users			
DataProviderEuropeanUsers	European Users			
DataProviderExtra-EuropeanUsers	Extra-European Users			

"Funding source", as mentioned above, will be linked to the Hosting Organisation entity.

Following elements from the MERIL portal have not been integrated:
A/ "Keywords" – "RI Categories" – "Grand societal challenges":

- Collecting at this stage (free) keywords is not a priority.
- The category does not target the field of Heritage Science (cf. the 71 RI categories in MERIL, cf. portal.meril.eu).
- The proposed values are not relevant to the field (cf. values for the category "Grand societal challenges").

B/ Equipment
As mentioned above, "equipment" covers parts of what we call Data Provider.

2.2.2. Other entities and attributes

It has seemed appropriate to us to add other entities or attributes that are more specifically linked to the IPERION CH project and/or the future infrastructure E-RIHS.

A/ The Access Provider entity
Concerning the Access Provider entity, it is important to specify to which platform(s) it belongs. The attribute PlatformName will have the following values: ARCHLAB, FIXLAB, MOLAB, to which could in the frame of E-RIHS be added DIGILAB and EXPERTLAB.

B/ The Data Provider entity
As mentioned above, we want to highlight the people that operate the instruments and/or that generally produce data, and their competences.

That is why:
a/ The DataProviderType attribute mentions groups of people, possibly related to an instrument or an institutional entity (beamline group, laboratory group, museum group, etc.).
b/ It is relevant to relate the Data Provider entity to different entities representing the Data Provider competences:

- The Expertise entity: a Data Provider always has an expertise but not always it is offered as a service; this information should be accessible.
- The Publication entity (which is also related to the Dataset/Database entity). This is another way of representing the expertise of the Data Provider.

As it produces data, the Data Provider entity must be related to the Data Type entity, which indicates the type of data that the Data Provider is supposed to produce.
The Data Type entity will also be related to the Dataset/Database entity. And the data formats will be linked to the data types.

2.3. The Dataset/Database entity

Following entities are linked to the Dataset/Database entity:

- Meta-material
- Meta-technique
- Data Type => Format
- Policy
- Access
- Location
- Target Community
- Publication

In the next parts, our choices in relation to particular entities with specificities will be explained.
One of the important elements to take into account is the number of items among the existing controlled vocabulary. Indeed, too many items can harm the project's operational capability, "losing" the Access Provider/Data Provider or users.

The attributes of the Dataset/Database entity will be presented in Annex 4, § 4.4.

2.3.1. The Meta-material entity

For this entity, we have analysed two sources:

- the CAMEO database;
- the list of materials which has been set up in the framework of the LABS-TECH and EU-ARTECH projects, which has been refined within CNRS-IPANEMA.

CAMEO

The CAMEO project - *The Conservation and Art Materials Encyclopedia Online* (cameo.mfa.org/wiki/Main_Page), led by the Museum of Fine Arts Boston, gives access to several databases and collections. One of these deals with materials, and we will describe it briefly.

First, one has to keep in mind that CAMEO has had closed links with some European projects in Heritage Science: in 2006, the Museum of Fine Arts in Boston developed a collaboration with EU-ARTECH (*Access, Research and Technology for the conservation of European Cultural Heritage*), a collaboration which had been renewed in 2010, when the project CHARISMA (*Cultural Heritage Advanced Research Infrastructures*) was launched. At stake of this collaboration was, amongst others, the development of the international perimeter of CAMEO, with the translations of material names. As IPERION CH is in line with both projects, and due to the fact that linguistic aspects are relevant dimensions in the European Union, we considered it to be interesting to further explore the content of the database and to analyse to which extent this information would be (easily) reusable.

The database of materials gathers various information on ancient and contemporary materials, which can be found in artistic or archaeological objects, in objects relevant for anthropological analysis, or in architectural complexes.

It gives access to more than 10.000 terms (exactly 10.373, consultation on 07.04.2016), for which we have a description/definition, terminological information (synonym, equivalent), translations of each term (in languages including French, Spanish, Italian, Portuguese, German, Dutch, Greek, Polish, Hungarian), and a list of bibliographical references. In some articles, additional information can be provided (for example, the article "Lead": Other properties / Hazards and Safety / Additional information; the article "Acajou": Additional images, etc.).

It is worth repeating that we have first to categorise 88 datasets/databases (even if this number will increase in the future). In this context, the number of terms in CAMEO is a major obstacle for its reuse in the framework of the web directory: The dimension of precise and granular distinctions is too small.

That is why we have chosen to retain a list of meta-materials instead of materials. Hence, we analysed the list of materials provided within the project LABS-TECH.

Projects LABS-TECH and EU-ARTECH – Update

The projects LABS-TECH and EU-ARTECH (the list has been established by Jean-Louis Boutaine) have provided a list of 19 meta-materials names, plus the value *Other*.

The number of names has an order of magnitude so that data providers and users can look at or use them easily.

After 2009 (at the end of the project EU-ARTECH), and until 2014, Loïc Bertrand and Marie-Angélique Languille have refined the list. In 2011, it has been published in Bertrand *et al*., 2011. From 2014 until now, it has been continuously updated, integrating systematic analysis of the publications. This work allows to refine some

names, and also to add new names, which are of particular interest for E-RIHS, that includes palaeontology. Ultimately, we have decided to keep this last list[6].

2.3.2. The Meta-technique entity

Wayforlight

Regarding the entity Meta-technique, we have first inspected the Wayforlight web site (www.wayforlight.eu), which has been set up in the framework of the CALIPSO project. The techniques are gathered in a list of meta-techniques, what make the use and access easier. In the end, we have 8 names of meta-techniques, covering 45 technique names. Yet, we cannot reach a consensus with this classification[7].

In any case, it lacks other techniques, which are displayed by the access providers of IPERION CH, and which are not related to synchrotrons or lasers.

However, we will get back to this in the next section, as a query by technique seems to be very interesting.

Projects LABS-TECH and EU-ARTECH

The second list that we have analysed has been set up in the framework of the projects LABS-TECH and EU-ARTECH (the list has been established by Jean-Louis Boutaine). It gathers 66 terms[8].

This list covers the whole field of Heritage Science. Nevertheless, it has not been updated since 2009: a certain amount of techniques, such as OCT, NMR, STXM, etc., are lacking. Besides, in the framework of our project, the number of items is too high and in consequence not easy to use.

A categorisation of the techniques has also been suggested, but once again, it is difficult to reach a consensus. The generic terms do not refer to the same type of properties. For instance, the following different elements are on the same level: the aim of the technique: "Dating", the interaction mode with the material: "Ion beam analysis", the property of non-destructiveness, what we analyse: "Surface techniques analysis", etc.

We have also looked at other lists and classification (classification proposed by Régert *et al*., 2006; descriptors used by the Journal Analytical Chemistry or by the Journal of Archaeological Science). Anyhow, due to a lack of time, we are not able to suggest a finalised categorisation of these terms. We have started to figure out ways, which could be fruitful: in terms of "type of information associated to the materials", "approach with/without contact", "invasive/non-invasive approach", etc.

This work will be continued, in order to be finalised by the phase of implementation of the web directory.

In the scheme of the database (cf. Annex 3, § 3.2.), we have kept the term Meta-technique, because it is our objective. However, in the Annex 4, § 4.4.3., we present a list of techniques (and not meta-techniques), i.e. the list established by Jean-Louis Boutaine, though it is incomplete.

[6] Cf. Annex 4, § 4.4.2.

[7] Besides, the proposed classification is certainly not always coherent, as we find *IR Microscopy* at the same level as *Medical Application*.

[8] Cf. Annex 4, § 4.4.3.

2.3.3. The entities: Data Type, Format, Policy, Access, Location, Target Community and Publication

All following attribute values of the entities stated below have been obtained from the Questionnaire, possibly merged with other lists, and from the re3data project; some of them have been rephrased in order to have a more generic and operational character.

A/ The Data Type entity
More than 30 names have been collected from the Questionnaire's analysis. We have chosen more generic terms, which cover all cases, and which are used in the Digital Humanities (text, sound, image, etc.), or suggested in the re3data project (structured graphics). The value *Other* allows to cover unexpected cases[9].

B/ The Format entity
The potential values of the attribute FormatName come from the Questionnaire and analyses of Marie Puren. The values we kept are indicated by type of data[10].

C/ The Policy entity
The potential values of the attribute Dataset/DatabasePolicyType have been adapted from the re3data categories. The value *Other* allows to cover unexpected cases[11].

D/ The Access entity
The potential values of the attributes Dataset/DatabaseAccessType and DataAccessRestriction come from the re3data project. The value *Other* allows to cover unexpected cases[12].

E/ The Location entity
The Location entity refers to the "place" where we can access data. The potential values of the attribute LocationName come from the Questionnaire[13].

F/ The Target Community entity
The potential values of the attribute TargetCommunityName result from analyses of Marie Puren[14], which have been merged with a list established by Loïc Bertrand (2015). The value *Other* allows to cover unexpected cases.

G/ The Publication entity
We have added the Publication entity, an issue which has not be addressed within the Questionnaire. The potential values of the attribute PublicationReference are bibliographical references[15].

3. Browsing in the database

Keeping in mind the aim of this project, namely having access to the resources which are made available by IPERION CH partners, and considering our scientific field, it seems totally appropriate to enter in the database by the name of a meta-material or a meta-technique (when the list will be available).

[9] Cf. Annex 4, § 4.3.7.
[10] Cf. Annex 4, § 4.3.8.
[11] Cf. Annex 4, § 4.4.5.
[12] Cf. Annex 4, § 4.4.6.
[13] Cf. Annex 4, § 4.4.7.
[14] Cf. Annex 4, § 4.4.4.
[15] Cf. Annex 4, § 4.4.8.

The result of this first query would be a list of datasets/databases (names of dataset or database), corresponding to the proposed research criteria: all datasets and databases that deal with Textile for instance. The data provider of each dataset or database could be associated at this stage already.

A browsing system using filters would allow limiting the search, through entities such as Access, Data Type, Format.

The dataset or database could be represented in the form of a sheet with different tabs, which would present the associated information. This sheet model could also be used to organise the presentation of data providers and access providers.

This browsing system is briefly described. It is broadly based on the Wayforlight web site, which displays very clearly and effectively lots of information. In order to have more concrete ideas, see Annex 5.

4. Conclusion and next steps

On the basis of the definitions and distinctions we established basically about *dataset, database*, *data provider, access provider,* we have indicated the aim of our project: providing researchers with information related to resources (instruments, databases and datasets) available within IPERION CH through a package of categories/metadata that help categorising them according to their different dimensions.
To do so, we have analysed different portals/web sites, the documentation of the re3data project, several lists (established within the LABS-TECH project, the EU-ARTECH project, the CAMEO project, CNRS-IPANEMA; as well as descriptors of journals), and we have reused the results from the Questionnaire. The result is a database model, based on an Entity Relationship model. This model will be implemented in a few months.

We will use the upcoming months to:

- Create a list with meta-techniques departing from the list of techniques we already have at our disposal.
- Adopt the attribute values amongst all IPERION CH partners.
- Reflect upon possible ways to integrate other resources such as project proposals submitted by scientists applying to use the facilities in the frame of TNA.

5. References

Bertrand, Loïc, Robinet, Laurianne, Thoury, Mathieu, Janssens, Koen, Cohen, Serge X., Schöder, Sebastian, Cultural heritage and archaeology materials studied by synchrotron spectroscopy and imaging, Applied Physics A, 2011, DOI 10.1007/s00339-011-6686-4.

Bertrand, Loïc, Languille, Marie-Angélique, List of meta-materials, Working document, IPANEMA, 2009-2014.

Bertrand, Loïc, List of domains, Working document, IPANEMA, 2015.

Bertrand, Loïc, List of meta-materials, Working document, IPANEMA, 2016.

Boutaine, Jean-Louis, List of materials, EU-ARTECH project, 2009.

Boutaine, Jean-Louis, List of techniques, EU-ARTECH project, 2009.

CERIC ERIC, www.ceric-eric.eu.

Meril database, www.portal.meril.eu.

Régert, Martine, Guerra, Maria-Filomena, Reiche, Ina, Physico-chimie des matériaux du patrimoine culturel – Partie 1, Techniques de l'Ingenieur, P3780, 2006, p. 1-21., <halshs-00470092>.

Romary, Laurent, Bertrand, Loïc, Holowati, Susanna, David, Sophie, Data Management Plan, Deliverable 2.1, IPERION CH Project, 2015.

re3data project, www.re3data.org.

Roadmap ESFRI 2016, http://www.esfri.eu/roadmap-2016.

Wayforlight, www.wayforlight.eu.

Annexes

Annex 1 – The Questionnaire

The Data Management Plan (DMP) of IPERION CH (DMP, Romary *et al*. 2015) was one of the project's first deliverables provided to the European Commission. It has been submitted on December 30th 2015.

We sent two questionnaires to all partners of IPERION CH to conceive the DMP:

- "One survey about general data management practices in each facility (12 questions) about: number of data sets, reference contact person, data property and access, cost estimation for data management, volume and lifetime of the data.
- A more detailed survey for each homogeneous data set within each facility (30 questions) about: data set description, standards used, metadata information, access, sharing, archiving, security and protection, references" (DMP, p. 8)

Additional results have been received throughout the beginning of 2016, leading to the fact that we dispose today of all the needed information about the Data Providers and 88 datasets/databases.

The Questionnaire's results were analysed by Laurent Romary and Marie Puren.

This information is very relevant for the categorisation of instruments, databases and datasets accessible in the frame of IPERION CH.

Annex 2 – List of the Access Providers of IPERION CH

1	**BM**	The British Museum	UK	ARCHLAB
2	**BNC-WIGNER**	Magyar Tudomanyos Akadémia Wigner Fizikai Kutatóközpont	HU	FIXLAB
3	**C2RMF**	Centre de recherche et de restauration des musées de France	FR	ARCHLAB
4	**C2RMF**	Centre de recherche et de restauration des musées de France	FR	FIXLAB
5	**FORTH**	Foundation for Research and Technology Hellas	GR	MOLAB
6	**CNR**	Consiglio Nazionale delle Ricerche	IT	MOLAB
7	**IPCE**	Instituto del Patrimonio Cultural de España	ES	ARCHLAB
8	**KIK-IRPA**	Koninklijk Instituut voor het Kunstpatrimonium	BE	ARCHLAB
9	**LRMH**	Laboratoire de recherche des monuments historiques	FR	MOLAB
10	**MTA Atomki**	Magyar Tudomanyos Akadémia Atommagkutató Intézet	HU	FIXLAB
11	**NCU**	Uniwersytet Mikołaja Kopernika Toruń	PL	MOLAB
12	**NG**	The National Gallery	UK	ARCHLAB
13	**OPD**	Opificio delle Pietre Dure	IT	ARCHLAB
14	**PRADO**	Museo Nacional del Prado	ES	ARCHLAB
15	**RCE**	Ministerie van Onderwijs, Cultuur en Wetenschap - Rijksdienst voor het Cultureel Erfgoed	NL	ARCHLAB
16	**RWTH**	Rheinisch-Westphälische Technische Hochschule Aachen	DE	MOLAB
17	**SMK-CATS**	Statens Museum for Kunst - Centre for Art - Technological Studies and Conservation	DK	ARCHLAB
18	**SOLEIL**	Synchrotron SOLEIL	FR	FIXLAB
19	**SPK**	Stiftung Preußischer Kulturbesitz-Staatliche Museen zu Berlin-Rathgen Forschungslabor	DE	ARCHLAB

Annex 3 – Database scheme

3.1. Reading of the scheme

Entities and attributes

- Entities are indicated in the boxes. The name of each entity is outlined in the first line with bold text in the first box. The attributes are indicated in the second line.
- Entity names start with capital letters. All nouns that are part of this name start with a capital letter, e.g. Data Type, Type of Use.
- An attribute name is composed by compound words, each of them starting with capitals, e.g. DataTypeName, TypeOfUseName.

Relations

- Relations are indicated by arrows. The relation names are written along each arrow.

Cardinalities

- The cardinalities are specified at the extremities of each relation.
- For the sake of clarity, we have kept those relations where one of the cardinalities is either (0,1) or (1,1) if the minimum of the smallest pair and the maximum of the other pair is not (0,1) or (1,1).

Types of the attributes

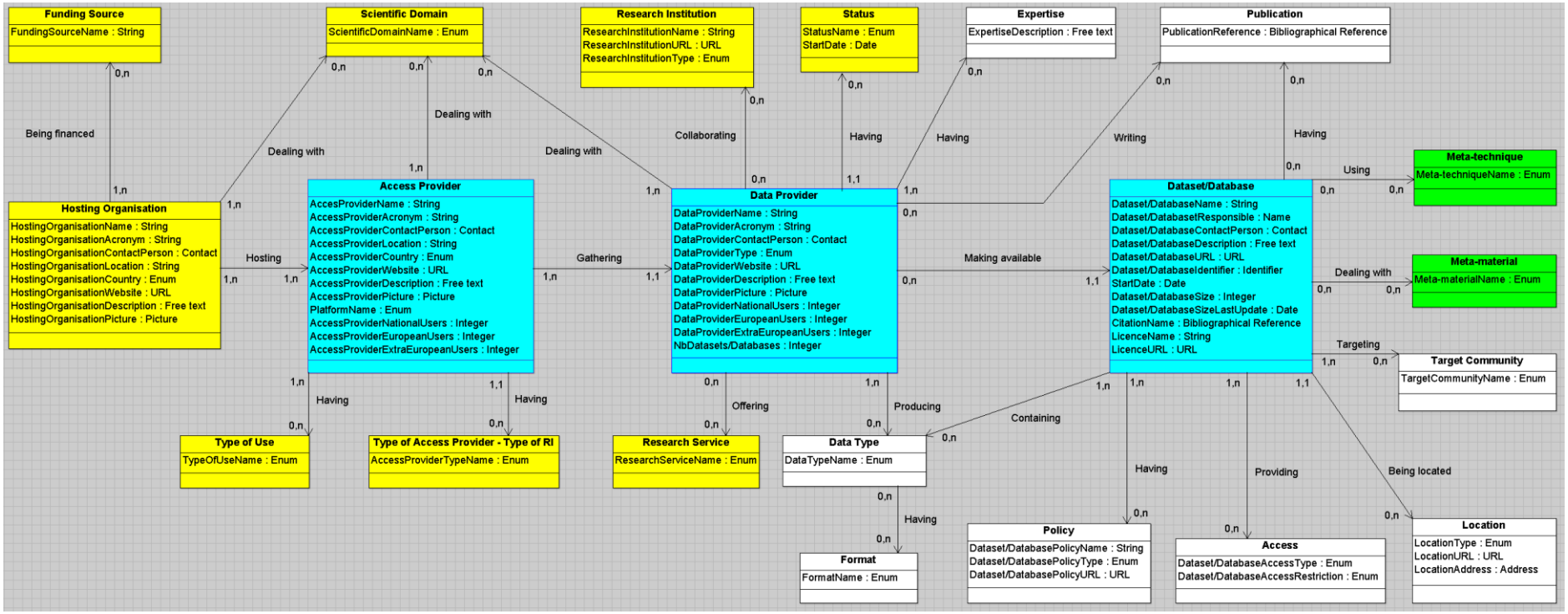
- String, Free text, Enum(eration), Integer, Picture (for images), URL, Address, Name, Contact, Bibliographical Reference, Date, Identifier.

Colours

- Our three main entities are marked in blue (cf. above).
- Yellow entities refer to categories that exist also in the MERIL portal. Some of the MERIL entities have been transformed into attribute and in consequence not marked in yellow.
- Green entities are those through which a query in the data base will be made.

The scheme has been created with the software ArgoUML (v0.34).

3.2. Scheme



Note: when we connect the database above to the database on "CH conservation and research institutions and stakeholders" (WP12), the cardinalities of some of the relations between the entities might be reviewed, as well as the relations between some of the entities.

Annex 4 – Description of entities and attributes

4.1. Conventions

In line with the notation system proposed by the re3data project, we adopt following conventions for the attributes:

1/ Notation of minimum and maximum instance number of the attribute
- 0-1 no instance or one instance maximum
- 0-n no instance or multiple instances
- 1 one single instance
- 1-n at least one instance or multiple instances

2/ Controlled vocabularies
- 1* if an attribute value is linked to a controlled vocabulary from the MERIL portal
- 1 if an attribute value is linked to a controlled vocabulary

3/ Other constraints

4.2. The Access Provider entity

4.2.1. Attributes

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
AccessProviderName	1	String		
AccessProviderAcronym	0-1	String		
AccessProviderContactPerson	1	Contact		
AccessProviderLocation	1	String		
AccessProviderCountry	1	Enum	1	
AccessProviderWebsite	1	URL		
AccessProviderDescription	1	Free text		max. 200 words
AccessProviderPicture	0-n	Picture		max. 3
PlatformName	1-n	Enum	1	
AccessProviderNationalUsers	0-1	Integer		
AccessProviderEuropeanUsers	0-1	Integer		
AccessProviderExtraEuropeanUsers	0-1	Integer		

Controlled vocabulary for AccessProviderCountry

See ISO 3166-1 alpha-2

Controlled vocabulary for PlatformName

ARCHLAB
DIGILAB
EXPERTLAB
FIXLAB
MOLAB

4.2.2. The Hosting Organisation entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
HostingOrganisationName	1	String		
HostingOrganisationAcronym	1	String		
HostingOrganisationContactPerson	1	Contact		
HostingOrganisationLocation	1	String		
HostingOrganisationCountry	1	Enum	1	
HostingOrganisationWebsite	1	URL		
HostingOrganisationDescription	1	Free text		max 200 words
HostingOrganisationPicture	0-n	Picture		max. 3

Controlled vocabulary for HostingOrganisationCountry

See ISO 3166-1 alpha-2

4.2.3. The Funding Source entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
FundingSourceName	1-n	String		

4.2.4. The Type of Use entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
TypeOfUseName	1-n	Enum	1*	

Controlled vocabulary for TypeOfUseName

Research/Science
Private/Industrial

4.2.5. The Scientific Domain entity

Also related to the Hosting Organisation entity and to the Data Provider entity.

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
ScientificDomainName	1-n	Enum	1*	

Controlled vocabulary for ScientificDomainName

Information Science and Technology
Biological and Medical Sciences
Earth and Environmental Sciences
Physics, Astronomy, Astrophysics and Mathematics
Chemistry and Material Sciences
Engineering and Energy
Social Sciences
Humanities and Arts

4.2.6. The Type of Access Provider entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
AccessProviderTypeName	1	Enum	1*	

Controlled vocabulary for AccessProviderTypeName

Virtual
Single-sited
Distributed

4.3. The Data Provider entity

4.3.1. Attributes

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
DataProviderName	1	String		
DataProviderAcronym	0-1	String		
DataProviderContactPerson	1	Contact		
DataProviderType	1	Enum	1	
DataProviderWebsite	1	URL		
DataProviderDescription	1	Free text		max. 200 words
DataProviderPicture	0-n	Picture		max. 3
DataProviderNationalUsers	0-1	Integer		
DataProviderEuropeanUsers	0-1	Integer		
DataProviderExtraEuropeanUsers	0-1	Integer		
NbDatasets/Databases	1	Integer		

Controlled vocabulary for DataProviderType

Beamline group (synchrotron)
Instrument group (neutron)
Laboratory group
Laser group
Library group
Mobile instrumented vehicle group
Museum group
Other

4.3.2. The Research Institution entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
ResearchInstitutionName	1	String		
ResearchInstitutionURL	1	URL		
ResearchInstitutionType	1	Enum	1	

Controlled vocabulary for ResearchInstitutionType

National
International

4.3.3. The Status entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
StatusName	1	Enum	1*	
StartDate	1	Date		

Controlled vocabulary for StatusName

Operational
Being upgraded

4.3.4. The Expertise entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
ExpertiseDescription	1	Free text		max. 200 words

4.3.5. The Publication entity

Also related to the Dataset/Database entity.

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
PublicationReference	0-n	Bibliographical Reference		max. 5

4.3.6. The Research Service entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
ResearchServiceName	0-n	Enum	1*	

Controlled vocabulary for ResearchServiceName

Access to a technology
Access to a laboratory
User support
Training

4.3.7. The Data Type entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
DataTypeName	1-n	Enum	1	

Controlled vocabulary for DataTypeName

Database
Image
Raw data
Sample
Sound

Structured graphics
Text
Other

4.3.8. The Format entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
FormatName	1-n	Enum	1	

Controlled vocabulary for DataTypeName

Data Type	FormatName : values
Database	Oracle format – SQL – XML – *Other*
Image	BMP –ENVI – IRS – JPEG – PNG – RAW – TIFF – WMF – *Other*
Raw Data	D – DAD – JCAMP-DX – LIS – NetCDF – NEXUS – NGS – ProcSpec – SEQ – SP – SPC – WFM – WXD – ZVI – *Other*
Sound	OPUS – SPX – *Other*
Structured graphics	IPJ – SPA – *Other*
Text	ASCII/TXT – CSV – DOC – DOCX – JAVA – MS – RTF – RTX – *Other*
Other	*Other*

4.4. The Dataset/Database entity

4.4.1. Attributes

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
Dataset/DatabaseName	1	String		
Dataset/DatabaseResponsible	1	Name		
Dataset/DatabaseContactPerson	1	Contact		
Dataset/DatabaseDescription	1	Free text		max. 200 words
Dataset/DatabaseURL	0-1	URL		
Dataset/DatabaseIdentifier	0-1	Identifier		
StartDate	1	Date		
Dataset/DatabaseSize	1	Integer		
Dataset/DatabaseSizeLastUpdate	0-1	Date		
CitationName	1	Bibliographical Reference		
LicenceName	0-1	String		
LicenceURL	0-1	URL		

4.4.2. The Meta-material entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
Meta-materialName	0-n	Enum	1	

Controlled vocabulary for Meta-materialName

ArchaeologicalHumanAndAnimalRemains
CeramicsAndTerracota

Cosmetics
Fossil-Animal
Fossil-Hominoid
Fossil-Misc
Fossil-Plant
Gemstone-SemiPreciousStone
Glass-Enamel
Ivory-Bone
Leather-Parchment
Metal-CopperBased
Metal-IronBased
Metal-Misc
Metal-Precious
Painting-Easel
Painting-Misc
Painting-MuralAndRockArt-Sculpture
Painting-Panel
PalaeoEnvironnmentalProxies-Misc
PalaeoEnvironnmentalProxies-Sediments
PalaeoEnvironnmentalProxies-Speleothems
Paper-Drawing-Papyrus-Inks
PigmentsUnsupported
Plastics
Stained Glass
Stone-BuildingMaterials
Textile
WoodenObjects
Other

4.4.3. The (Meta-)technique entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
TechniqueName	0-n	Enum	1	

Controlled vocabulary for TechniqueName

Accurate Colour High Resolution Digital Photography
AFM Microscopy
Atomic Absorption Analysis (AAA)
Atomic Emission spectrometry (ICP-AES)
Carbon 14 Accelerator Mass Spectroscopy (AMS) Dating
Chemical Ionisation Chromatography (CI-MS)
Classical Visible Light Digital Photography
Classical Visible Light Silver Emulsion Photography
Contact Angle measurement
Differential Thermal Analysis (DTA / TG / DTG)
Diffractometry
Digitisation & Image Archiving
Electron Impact Mass Spectrometry (EI-MS)

Electron Microprobe
Environmental monitoring
Environmental Natural Weathering Tests (Outdoor)
Environmental Scanning Electron Microscopy (ESEM)
Environmental Weathering Tests (Chambers)
Fluorescence Spectrophotometry
Gas Chromatography - Mass Spectrometry (GC-MS)
Gas Chromatography (GC)
High Performance Liquid Chromatography (HPLC)
High voltage (150 < HV < 450 kV) X-ray Radiography
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
Infrared Reflectography Electronic Camera
Infrared Silver Emulsion Photography
Infrared Spectrometry
Infrared Spectrometry Microscopy
Ion Chromatography
Laser Ablation Mass Spectrometry
Liquid Chromatography - Electrospray Ionisation (LC-ESI-MS-MS)
Low Angled Photography
Low HV (<150kV) X-ray Radiography
Materials hydric behaviour measurement
Mercury Porosimetry
Microbiological analysis
Mössbauer Spectrometry
Neutron Activation analysis
Nuclear Reactions (PIGE - PIGME)
Particle Induced X-ray Emission (PIXE)
Particle size analysis
Powder Diffractometry
Pyrolysis Gas Chromatography - Mass Spectroscopy (Py-GC-MS)
Pyrolysis Gas Chromatography (Py-GC)
Raman Spectrometry
Reflection Light Microscopy
Rutherford Backscattering Spectrometry (RBS)
Scanning Electron Microscopy (SEM)
Scanning Infrared Reflectometry
Specific Surface Area Measurement (BET)
Spectro-Photo-Colorimetry
Standard Colorimetry
Surface corrosion rate measurement
Synchrotron radiation examination
Thermoluminescence Dating (TL)
Thin layer Chromatography (TLC)
Transmission Electron Microscopy (TEM)
Transmission Light Microscopy
Ultra-Sound Testing
Ultraviolet Fluorescence Microscopy
Ultraviolet Fluorescence Photography
Universal Mechanical Testing
Visible & Ultraviolet Spectrometry

X-ray Fluorescence Analysis - X-ray Tube - Laboratory Fixed Instrument
X-ray Fluorescence Analysis - X-ray Tube - Portable
X-Ray Induced Photoelectron Spectrometry (XPS)
Other

4.4.4. The Target Community entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
TargetCommunityName	1-n	Enum	1	

Controlled vocabulary for TargetCommunityName

Anthropology
Archaeology
Architecture
Art History
Conservation and restauration sciences
History
Methodology
Palaeoenvironment
Palaeontology
General public
Other

4.4.5. The Policy entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
Dataset/DatabasePolicyName	1	String		
Dataset/DatabasePolicyType	1-n	Enum	1	
Dataset/DatabasePolicyURL	1	URL		

Controlled vocabulary for Dataset/DatabasePolicyType

Access policy
Data policy
Metadata policy
Terms of use
Other

4.4.6. The Access entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
Dataset/DatabaseAccessType	1	Enum	1	
Dataset/DatabaseAccessRestriction	0-n	Enum	1	

Controlled vocabulary for Dataset/DatabaseAccessType

Embargo
Open access
Restricted

Controlled vocabulary for Dataset/DatabaseAccessRestriction

Registration
Institutional membership
Other

4.4.7. The Location entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
LocationType	1	Enum	1	
LocationURL	0-1	URL		
LocationAddress	0-1	Address		

Controlled vocabulary for LocationType

Web site
Physical site

4.4.8. The Publication entity

Name of the Attribute	Instance	Type	Controlled vocabulary	Other constraints
PublicationReference	0-n	Bibliographical Reference		

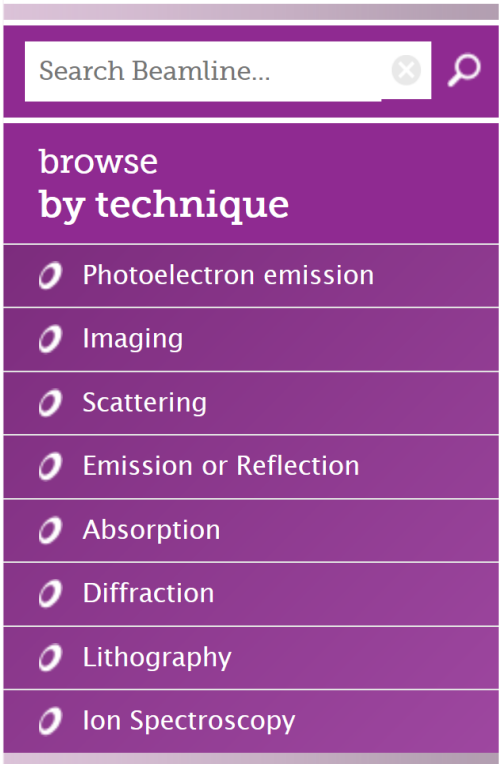
Annex 5 – The Wayforlight web site

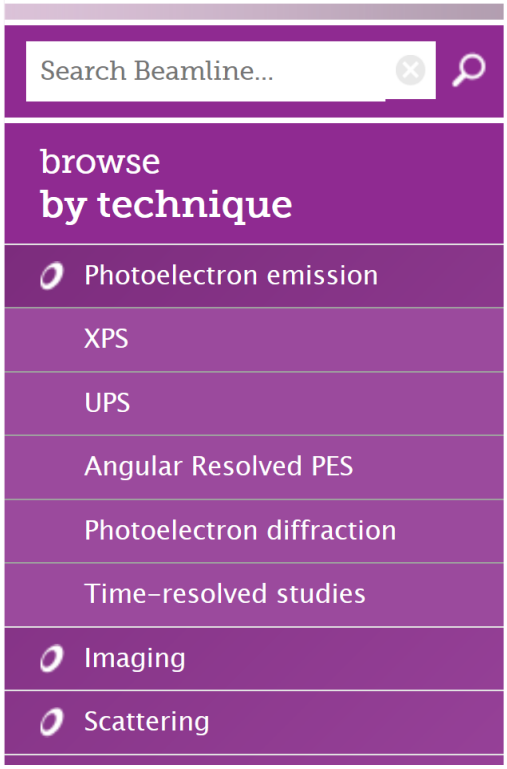
Consulted 26.04.2016

Browsing the database

Three possibilities:

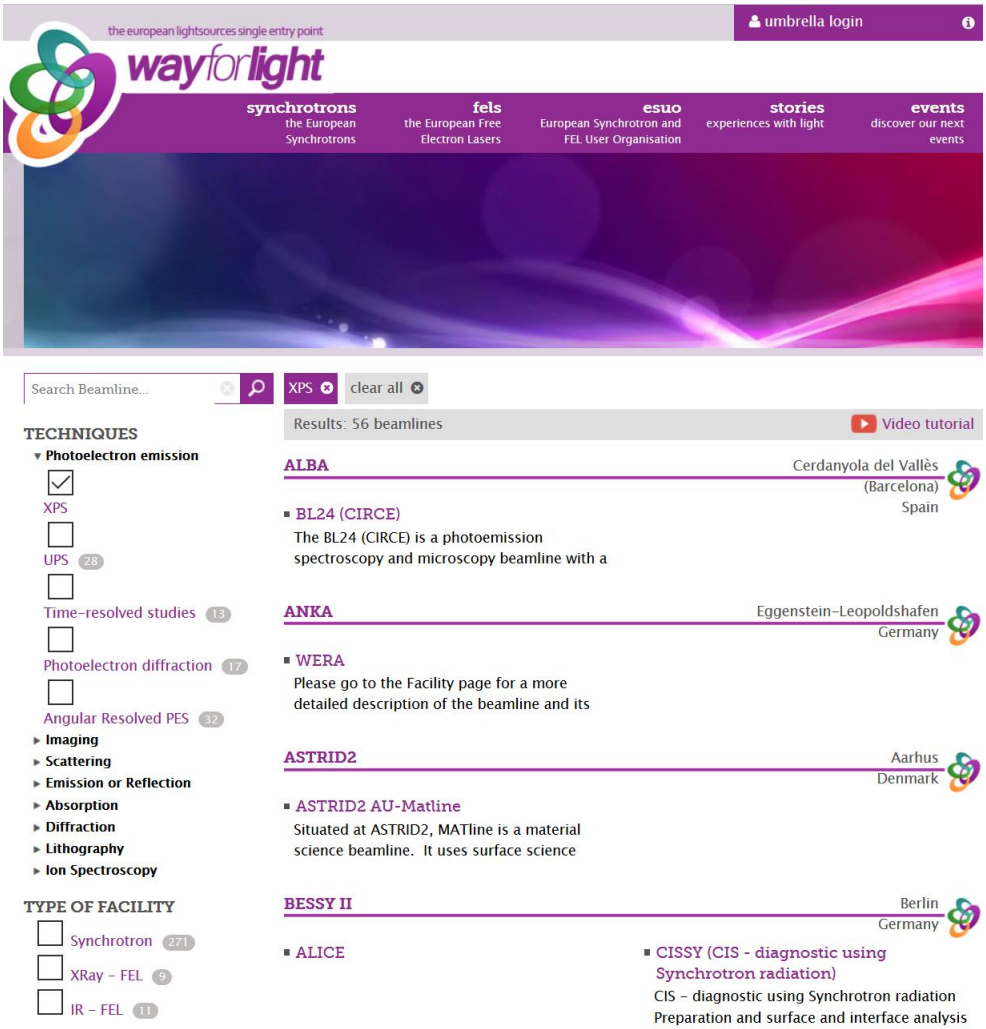
1. Name of a beamline: "*Search Beamline*".
2. Or name of a meta-technique: "browse by technique". For instance, "Photoelectron emission".
3. Possibly, one more specific technique can be chosen. For instance, for "Photoelectron emission" => XPS, UPS, Angular Resolved PES, etc.



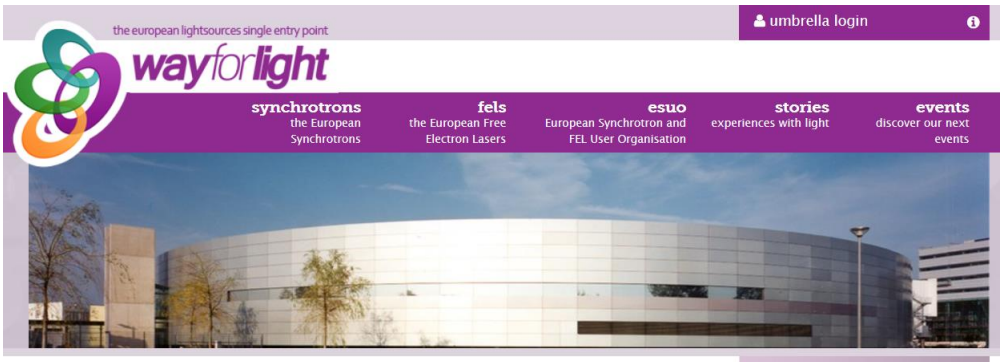


Results

1) A list of beamlines, gathered under each facility. Beamlines and facilities are linked to more detailed information.
2) Further browsing and filtering, on the left:
    a) Number of beamlines providing XPS and other techniques
    b) Access to other meta-techniques (and techniques)
3) Further browsing, in the centre:
    c) Access to the description of a beamline
    d) Access to the description of a facility



Result
The beamline is described through a sheet (possibly with tabs).



You are in: Home / Synchrotrons / BESSY II / SAXS (ASAXS/GISAXS)

BESSY II

SAXS (ASAXS/GISAXS)

general | photon source | monochromator | endstations

Small Angle X-ray Scattering

The SAXS instrument is designed for Anomalous Small Angle X-ray Scattering (ASAXS) and also for Grazing Incidence SAXS (GISAXS). A combination of both techniques is possible. The ASAXS instrument is a moveable station at the monochromatic branch of the 7T-MPW beamline (more information about the 7T-MPW beamline can be found here).
The main features of the SAXS instrument construction (patented) are an optical bench that can be tilted and a continuously varying sample-detector distance. Both movements are independent and automated. An edge welded bellow system between the sample position and the area detector is a main construction detail. Installed references allow easy and fast positioning without losing the alignment. Available area detectors are currently a low-noise gas delay line detector and a Mar CCD 165. The entire instrument can be moved easily in and out of beam position on an own air cushion system.
Monitor counters and diodes for absorption measurements are critical components for successful ASAXS measurements. Therefore, the instrument has different windowless diodes to measure the beam intensity after the sample and an ionization chamber is used as beam monitor, thereby allowing precise transmission measurements with accuracy better than 10^{-4}.

Energy Range	Min = 3.8 Max = 27.5 [eV]
Spot Size On Sample Hor	Max = 300 [um]
Spot Size On Sample Vert	Max = 300 [um]
Divergence Hor	Max = 5.1 [mrad]
Divergence Vert	Max = 0.56 [mrad]

SAXS website »

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TECHNIQUES

Scattering
- Small angle scattering

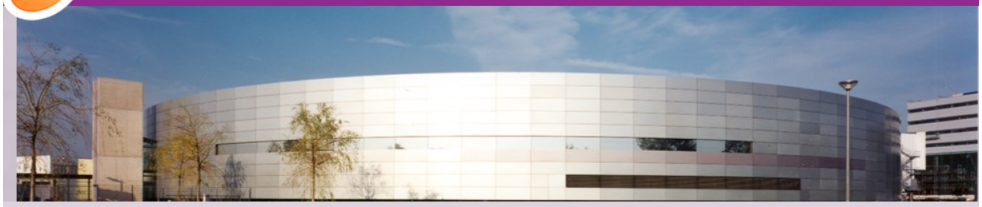
Result
Information about the facility (access provider).

the european lightsources single entry point

wayforlight

umbrella login

synchrotrons the European Synchrotrons | fels the European Free Electron Lasers | esuo European Synchrotron and FEL User Organisation | stories experiences with light | events discover our next events



You are in: Home / Synchrotrons / BESSY II

BESSY II

BESSY II applications

- Insight into inner magnetic layers
- Messages from Space
- Graphene towards 2D superconductivity
- Hydrogen stability in hydrogenated amorphous carb...

BESSY II events

- BESSY II – Imaging Workshop

BESSY II beamlines
browse by techniques

- Photoelectron emission
- Imaging
- Scattering
- Emission or Reflection
- Absorption
- Diffraction
- Lithography

The third generation storage ring BESSY II is in operation since 1999 and provides ultrabright photon beams from the long wavelength Terahertz region to hard X-rays with complete control of the energy range and the polarization of the radiation. The facility is operated by the Helmholtz-Zentrum Berlin. ALINAC (LINear ACcelerator) injecting into the full energy synchrotron boosteris currently under commissioning, in preparation of the implementation offull top-upmode scheduled for the second half of 2012. In order to further improve the stability of the beam,a fast orbit feedback systemwill be implemented in 2012. With its more than 50 beamlines, BESSY II offers a multi-faceted mixture of experimental opportunities: unique undulators provide circular and rotating-linear polarization; world record energy resolution (e.g. > 100.000 at 60 eV) has been demonstrated by BESSY II beamlines. Experimental facilities include state-of-the-art x-ray microscopy, x-ray polarimetry, spectromicroscopy, high-resolution photon and electron spectroscopy, nanotechnology (e.g. x-ray lithography), and pump-probe spectroscopy with temporal resolution ranging from 50ps down to 100fs at the uniqueslicing facility. Recently, HZB has extended its suite of state-of-the-art experimental chambers for the studies of liquids by the new measuring chamber for x-ray emission spectroscopy of free micro-liquid jets,LiXEdrom. The combination of brightness and time resolution makes BESSY II the ultimate microscope for space and time, since both femtosecond time and picometer spatial resolutions are available.

Photon beam parameters	BESSY II
Energy [GeV]	1.72
Current [mA]	300
Circumference [m]	240
Number of bending magnets	32
Number of straight sections in use	14

CONTACTS

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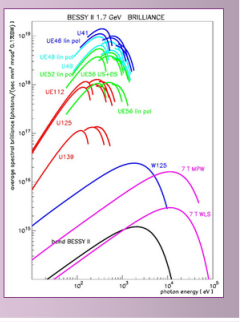
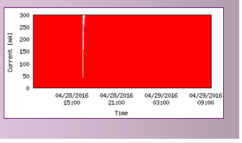
BESSY II brilliance



BESSY II beamstatus