



# Euphrosyne : the digital platform transforming New AGLAE data into digital heritage

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New AGLAE FR3506

**IT-FR cooperation in heritage science - Vth edition**

Human-centered approach for cultural heritage in digital transition: disciplines talking to each other

Naples, Suor Orsola Benincasa University

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# (New) AGLAE is a unique large scale facility

What are the problems with New AGLAE data ?

The *Euphrosyne* project

#Investigation

#Conception

#Construction

#Coming next ?

Conclusion



- In Palais du Louvre
- Only European ion accelerator 100% dedicated to HS
- 30 years of data compiled on artworks

AGLAE turns into New AGLAE in 2017

- Automation of the beamline (24h/24)
- Development of multi-detection imaging system  
→ 2,6 M€ public investment (50 k€ / year for functioning)
- 1,7 To → 8,7 To of data/year



MINISTÈRE DE LA CULTURE

Liberté  
Égalité  
Fraternité



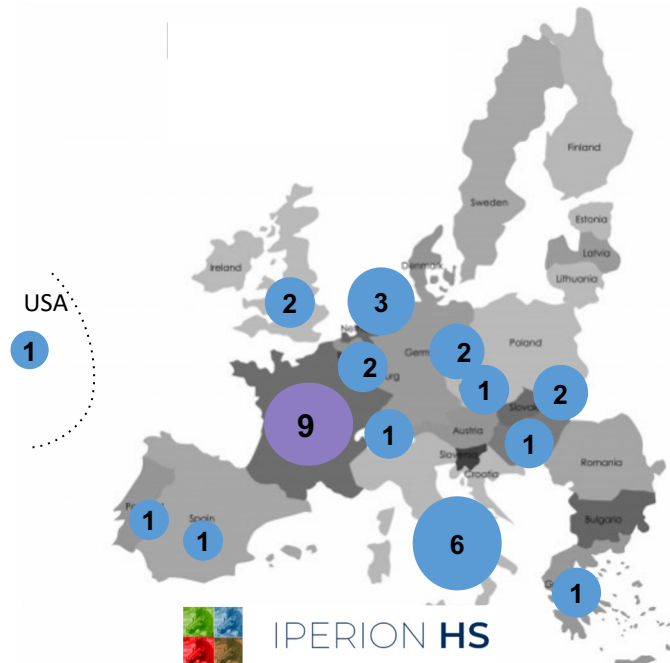
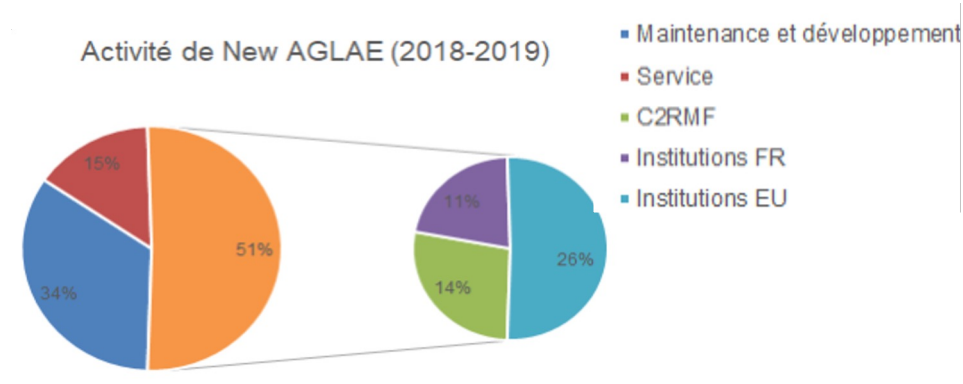
# Who are New AGLAE users ?

What are the problems with New AGLAE data ?

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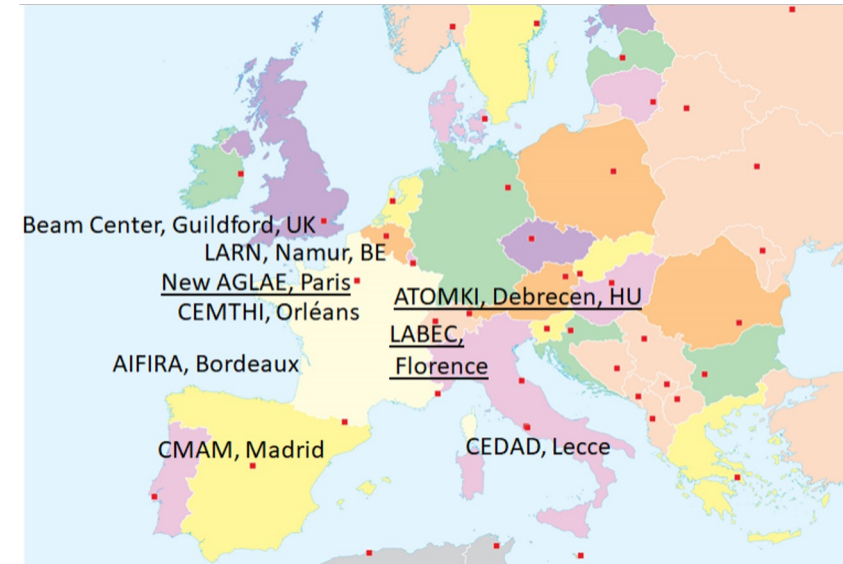
Conclusion

Service : ~80 demands from ~20 museums of France  
 National Research: 9 institutions in France



# What is New AGLAE ecosystem ?

Other ion accelerators working on HS in Europe



European Research Infrastructure for Heritage science



Integrating Platforms for the European Research Infrastructure on Heritage Science



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# 2,62 M€ to automate the New AGLAE facility but...



## ...a prehistoric management of heritage science data...

- During the 1st lockdown: no access to data and data processing tools  
→ remote access to New AGLAE servers through a for the AGLAE team users: wetransfer or hard disk



## ...a devoted AGLAE team but a lot of frustration...

- An appreciated software suite but not communicable to users
- A lot of time and data are lost in the transmission of data between users and the AGLAE team



## ... in a context where EU pushes into open science

- no-one knows the data exist and is accessible even though it is digital heritage
- some datasets are not reusable without the researcher who made the measurements

What are the problems with New AGLAE data ?

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# *Euphrosyne* : a digital platform for the New AGLAE (FIXLAB/DIGITAL) users



An iterative approach starting by an analysis of the users' needs to optimize the impact of the tool.

## #Chapter1 : investigation (01-04/2021)

- 1** Analysis of the context and of the existing - understanding of the data lifecycle - user mapping.
- 2** Interviews of users to identify needs and constraints
- 3** On-line questionnaire to spread the study to ~30 potential users and to quantify the potential impact of the project.
- 4** Synthesis of the quantitative study - 1st elements for a solution
- 5** Creation of an action plan (iterative process to reach the solution with the necessary needs).

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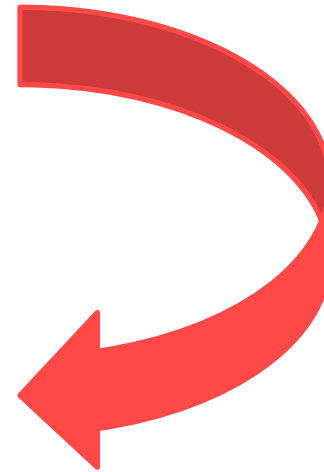
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# Objectives

- To make data and process software remote accessible for FIXLAB users
- To make data produced by New AGLAE usable within DIGILAB



**F**indable   
**A**ccessible   
**I**nteroperable   
**R**eusable 

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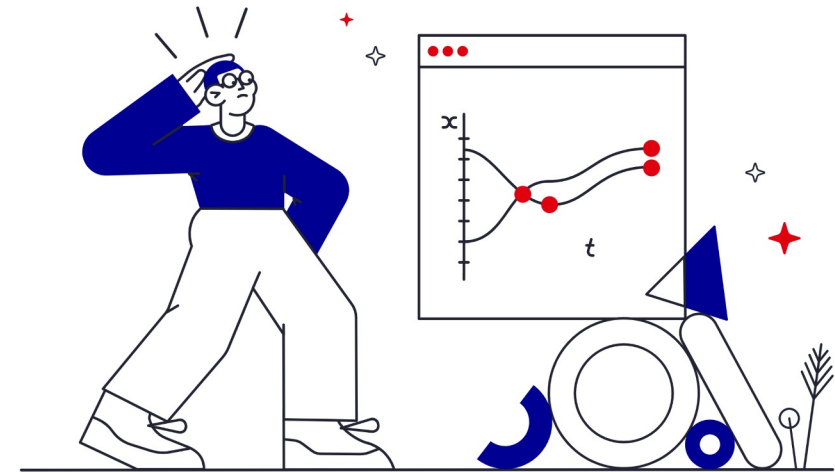
# *Euphrosyne* : a digital platform for the New AGLAE (FIXLAB/DIGITAL) users

#Chapter2 : Conception (04-07/2021)

## The perfect solution

Proposing a unique interface  
enabling to discover, search for and  
process the experimental data.

Technically impossible: the software  
suite used to process the data is not  
conceived for a multi-user server  
environment.



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# The alternative solution

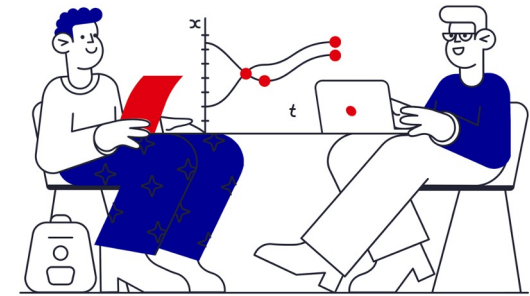
## **1** A remote access to data and New AGLAE tools for FIXLAB users

Use of the processing software suite as if the users are physically at the facility.

Rigorous management of users' access rights and shared use of resources.

Replication/exportation of data between the cloud data and the access server to tools.

HDF5 seems to be a good format to manage both data and metadata.



## **2** An open documentary database for DIGILAB users

### **Discovery**

Shows the results of previous IBA thanks to metadata harvesting in meta search engines (Europeana, etc.)

### **Reference & Reuse**

Correctly indexed and cataloged, the IBA data can be reused by anyone and valorised in other research programs.

### **Interoperability**

Interconnection with existing or future database : use of the semantic web tools (linked (semantic web, linked data, ontologies).



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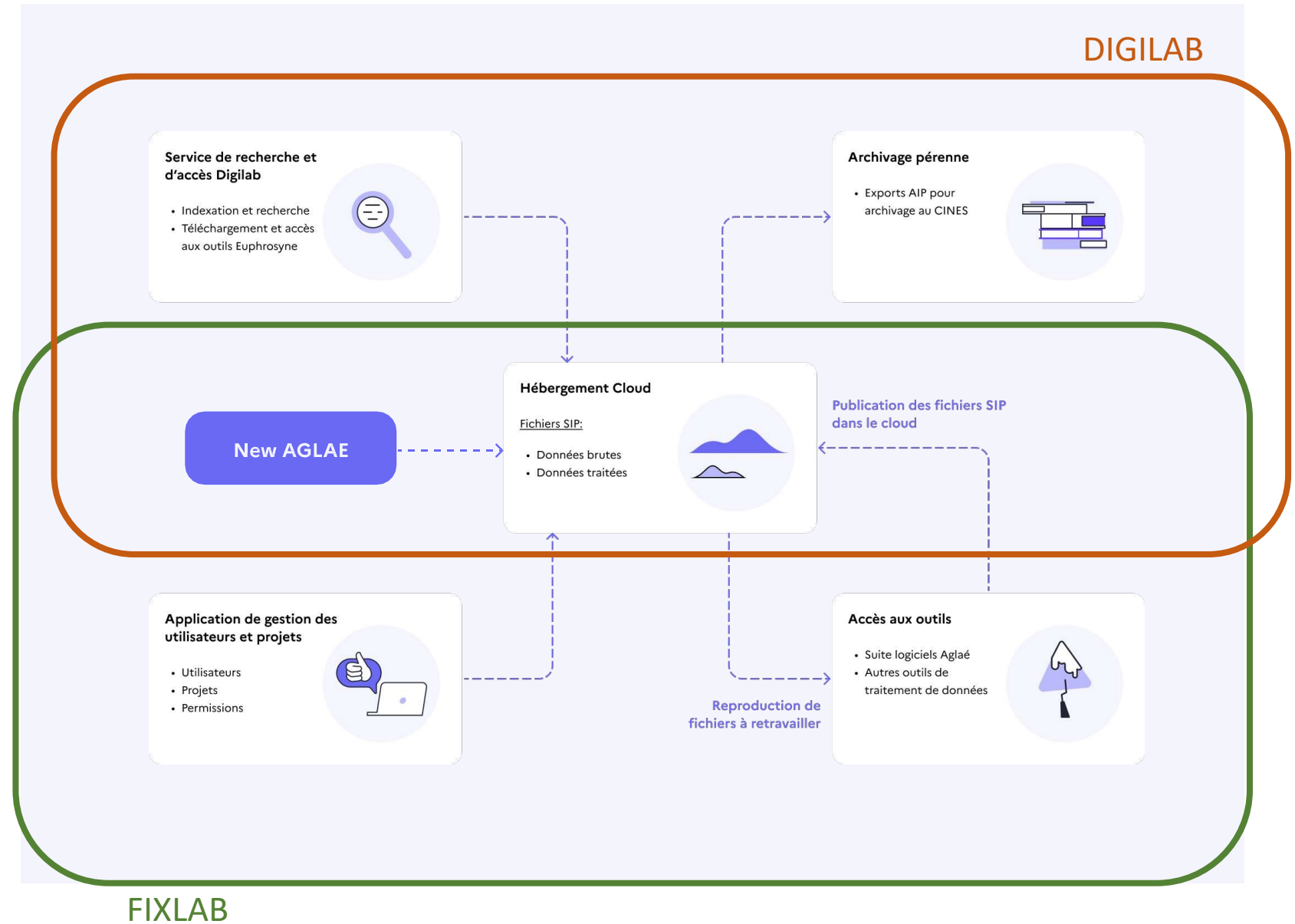
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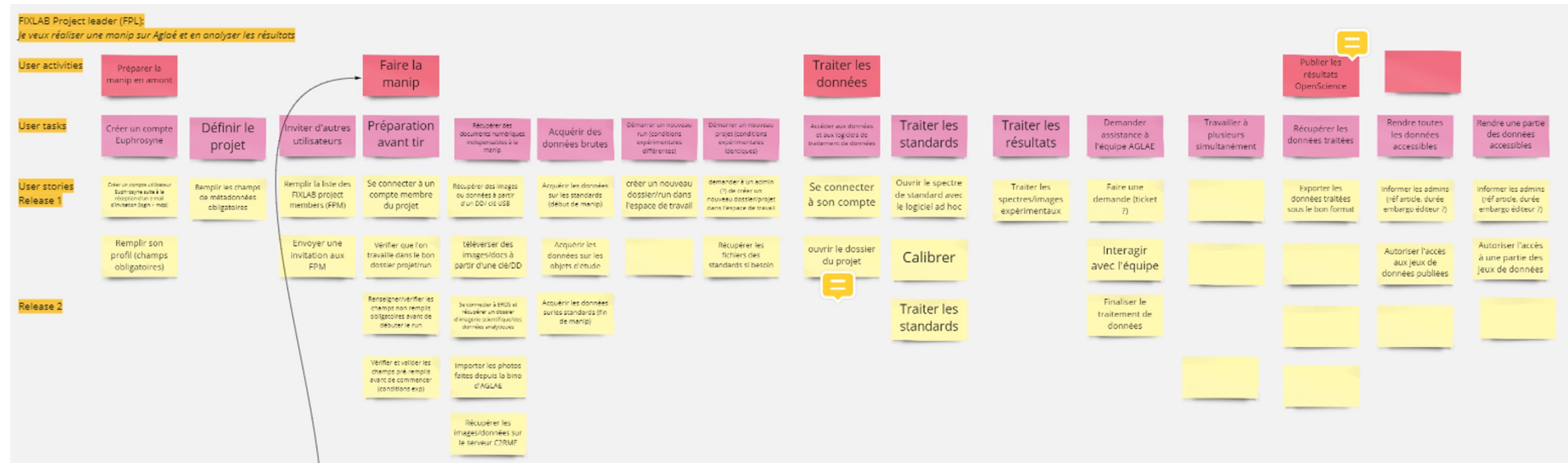
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# Conception of the Euphrosyne platform users' management service

## Definition of the users' processes and their interactions with the system



- FIXLAB administrator
- FIXLAB Project Leader
- FIXLAB Project Member
- DIGILAB Administrator
- DIGILAB Project Leader

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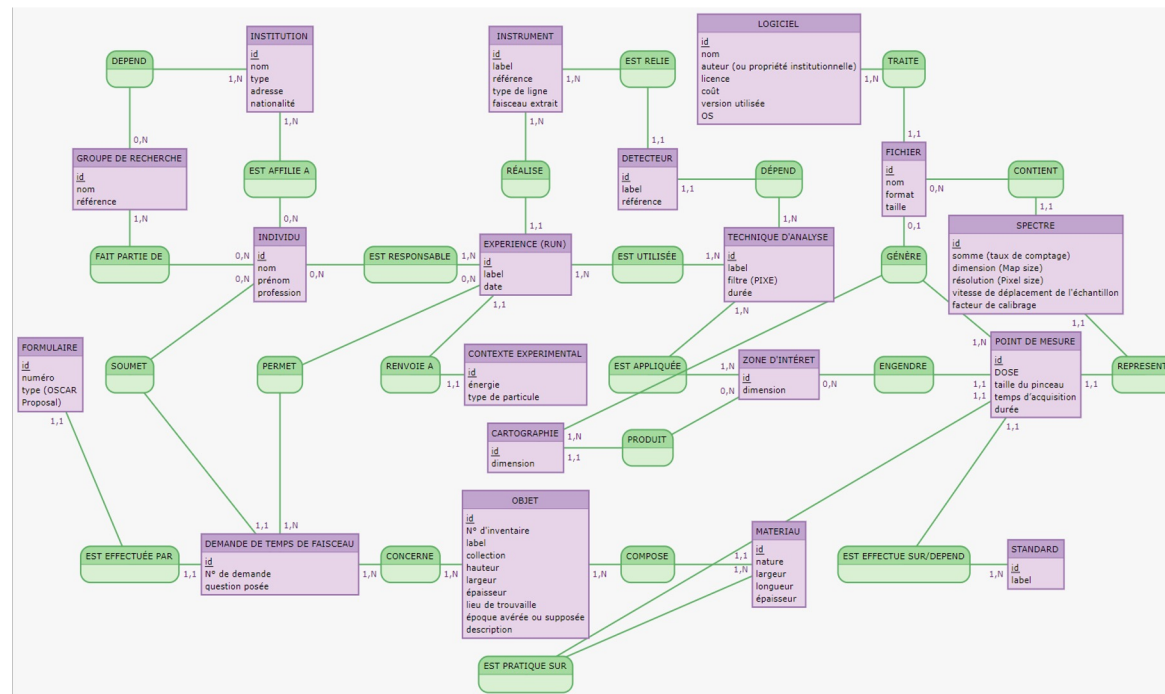
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# Data Models

- Restitution of data and metadata flows
- Conceptual model : definition of entities and of their connections
- Relational model: structuration of the database for computerisation



- New AGLAE semantic data model: CIDOC-CRM & BCO
- Longterme sustainability integrated in the Euphrosyne platform conception following the OAIS model (Open Archives Information System)

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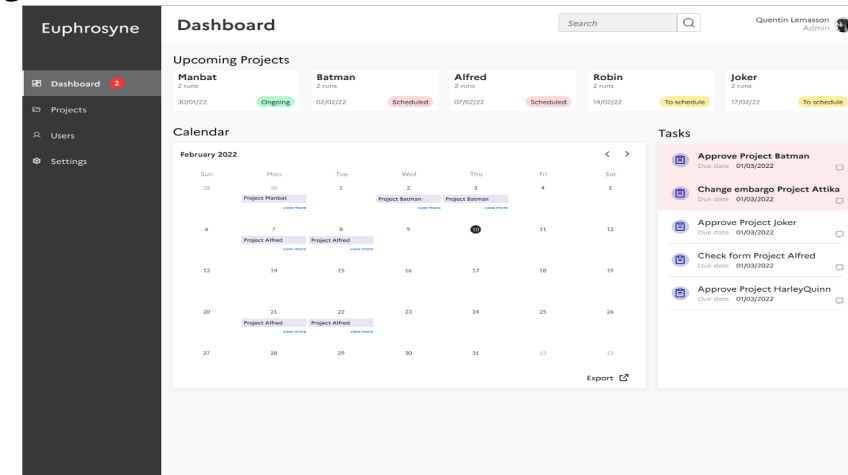
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# *Euphrosyne* : a digital platform for the New AGLAE (FIXLAB/DIGITAL) users

#Chapter3 : Construction (07/2021-03/2022)

- 1 Focus on the FIXLAB part (without forgetting DIGILAB !)  
→ give the tool to the users the soonest
- 2 Development and design of the *Euphrosyne* prototype
- 3 Tests of the interface with users  
→ fast modification
- 4 On March 18th 2022: prototype online  
***Euphrosyne 1.0*** given to French FIXLAB users  
- prototype in French

100% of FIXLAB users don't need hard disk anymore !



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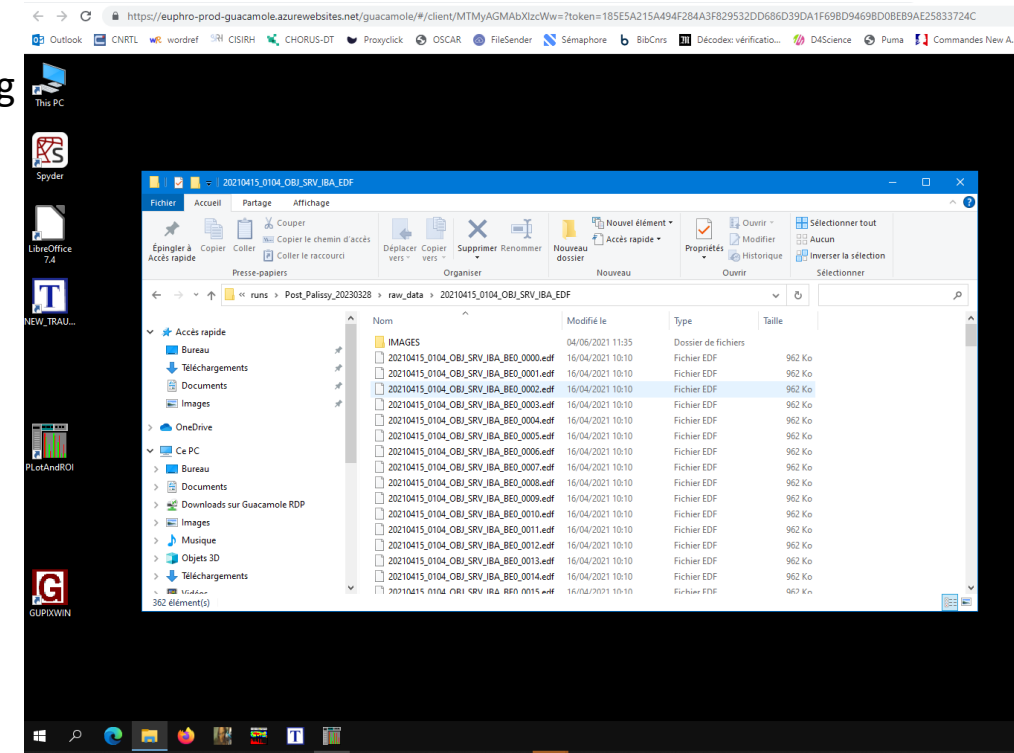
## #Chapter3 : Construction (03-12/2022)

- 1 Development and commissioning of virtual machines (VM) : 2 types
  - 1 « basic » VM (8 cores - 32Go RAM) for single spot processing
  - 1 « bigger » VM (20 cores - 80 Go de RAM) for imaging
  - FIXLAB admin (=AGLAE team)

- 2 Software installation for PIXE/PIGE processing getting rid of licensed software

- 3 On December 22nd 2022: Euphrosyne 2.0 online for French FIXLAB users
  - Access to VM with software suite for PIXE/PIGE processing

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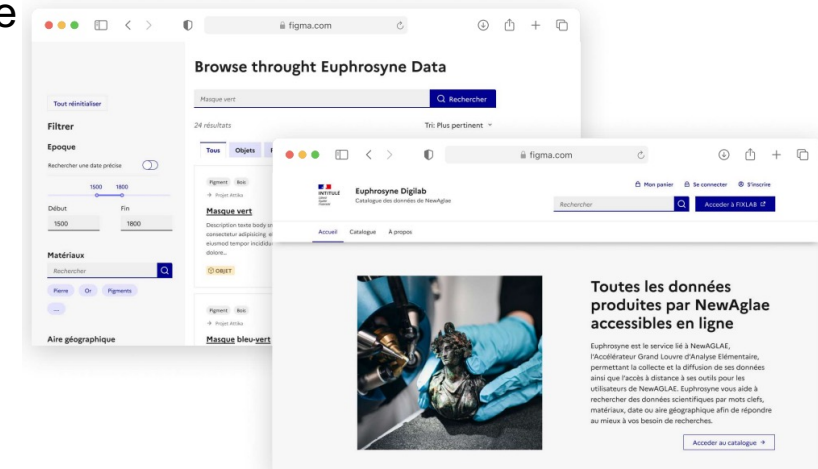
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## #Chapter3 : Construction (01-06/2023)

- 1 Debugging and Fixing with the users
- 2 Interoperability: link with the EROS platform (C2RMF artwork labels database)
- 3 Transition to HDF5 data format (undergoing should be effective in July)
- 4 Work on the future DIGILAB Euphrosyne interface with the New AGLAE users



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## CONCLUSION

- Making New AGLAE data FAIR is neither easy nor simple
- Euphrosyne platform is operational for FIXLAB users since March 2022 and gets ameliorated step by step
- Until now it cost ~300k€ (12% of the New AGLAE budget)
- iterative process is particularly adapted to the project
- collaboration with archivists is essential

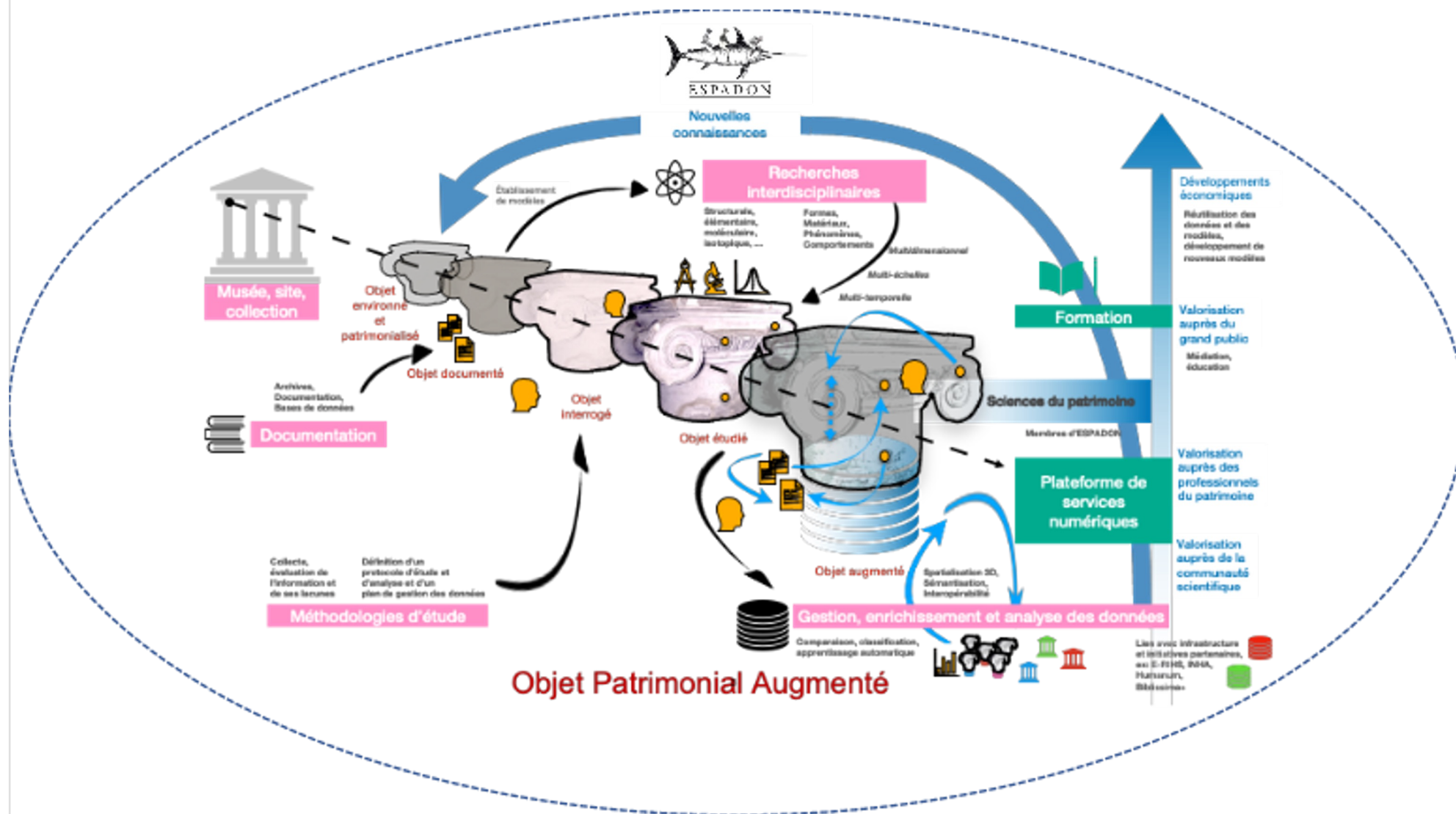
## Perspectives

- FIXLAB users' experience from the proposal for New AGLAE beamtime; link to E-RIHS digital platform.
- Finalizing the FAIRification process → essential step: digital experimental notebook to develop (needs of users already collected, benchmark done: no ideal existing solutions)  
→ **Euphrosyne 3.0** coming soon ?

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# Thanks for your attention!

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