



# Data Strategy - the future of the ExPaNDS and PaNOSC projects

**LEAPS Plenary- 21/10/2021**

**Presenters: Andy Götz (ESRF) + Patrick Fuhrmann (DESY)**

**Contributors: Sophie Servan (DESY), Jordi Boderia (ESRF)**  
on behalf of PaNOSC + ExPaNDS partners



PaNOSC and ExPaNDS projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreements 823852 and 857641, respectively.

# Quick reminder : The Projects Cheat Sheet



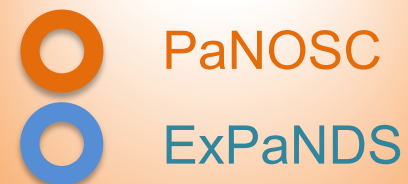
EU Call	HORIZON 2020 INFRA-EOSC-04	HORIZON 2020 INFRA-EOSC-5B
Description	Cluster of ESFRI PaN Sources	EOSC PaN Data Services
Partners	ESRF, ILL, ESS, EU-XFEL, CERIC-ERIC, ELI-DC, EGI	DESY, ALBA, DLS, ELETTRA, EGI, HZB, HZDDR, Max IV, PSI, Soleil, UKRI
Observers	GEANT EU-DAT National RI's	
Linked 3 <sup>rd</sup> Party	DESY STFC CESNET	
Start – End (Duration)	2018-12-01 – 2022-11-30 [4 Years]	2019-09-01 – 2023-02-28 [ 3 ½ Years]
Coordinators	A. Götz, G. Bodera	P. Fuhrmann, S. Servan
Budget	12 M Euros	6 M Euros
Home Page	PaNOSC.EU	ExPaNDS.EU
Twitter	@PaNOSC_eu #PaNOSC	@ExPaNDS_eu #ExPaNDS
GitHub	github.com/panosc-eu	Github.com/expands-eu



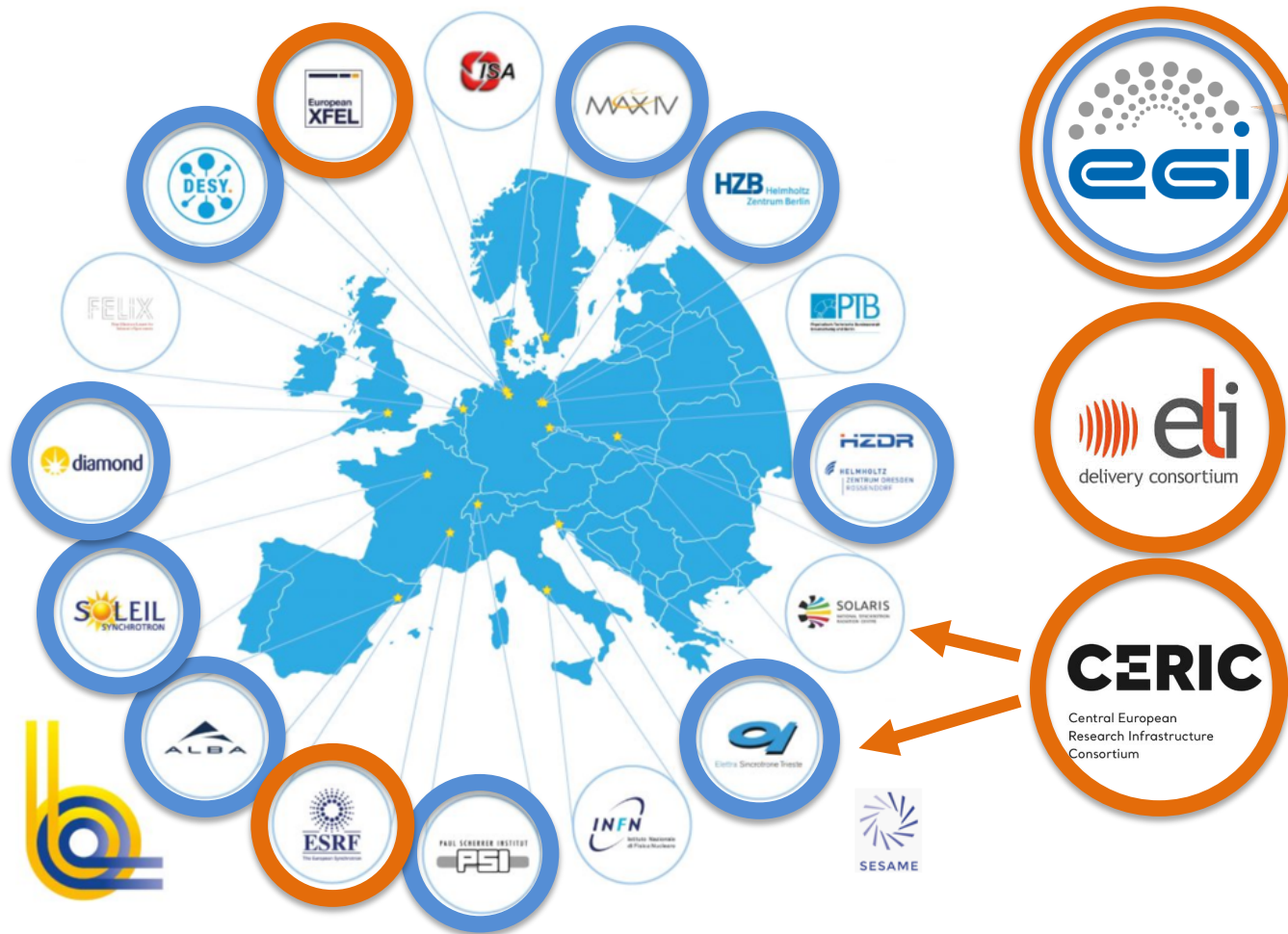
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# PaN facilities covered by PaNOSC/ExPaNDS



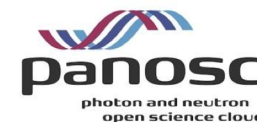
## Photon (LEAPS)



## Neutron (LENS),



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# EOSC Partnership Structure

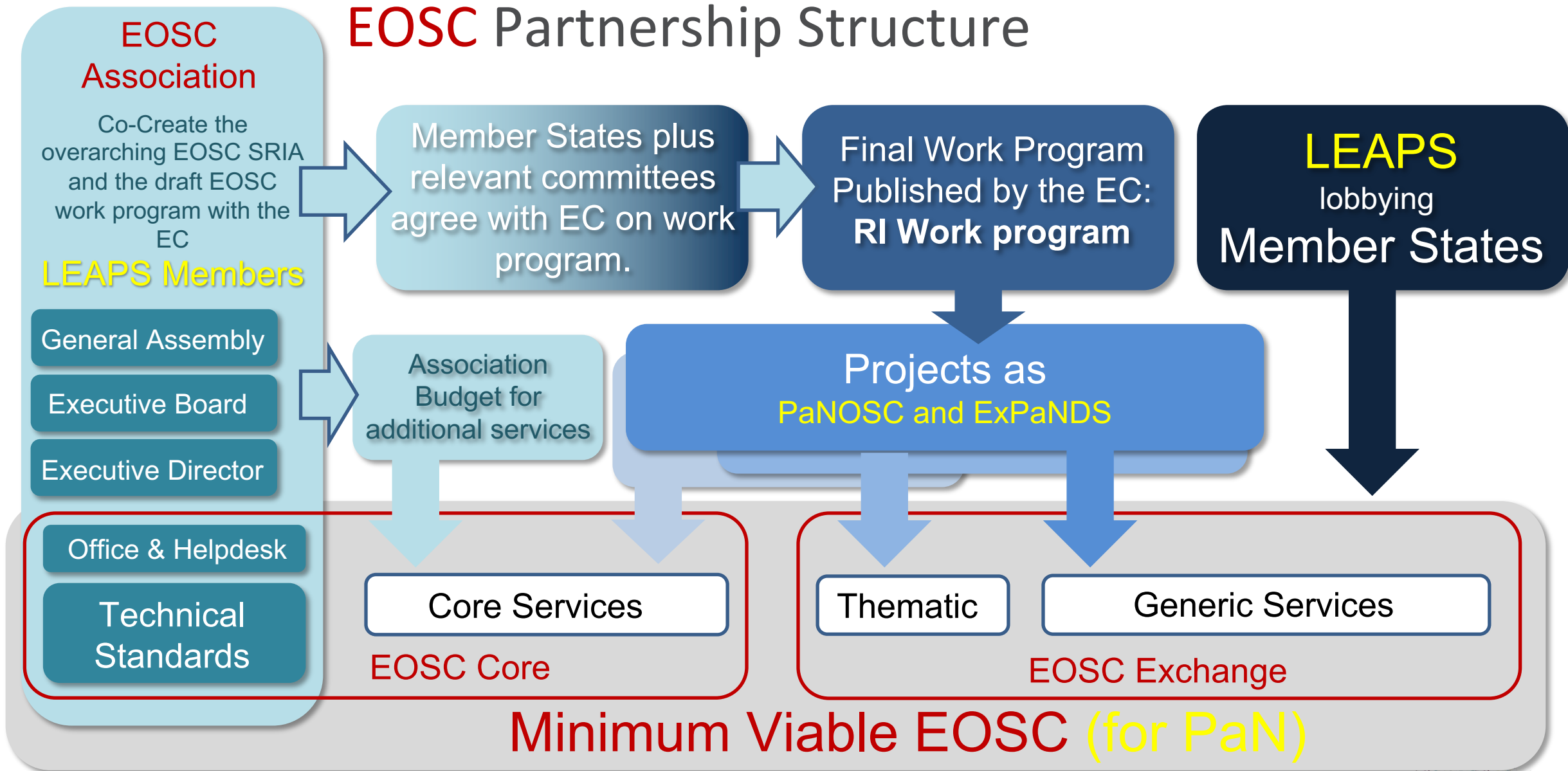
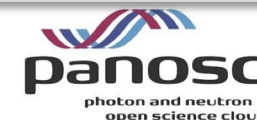
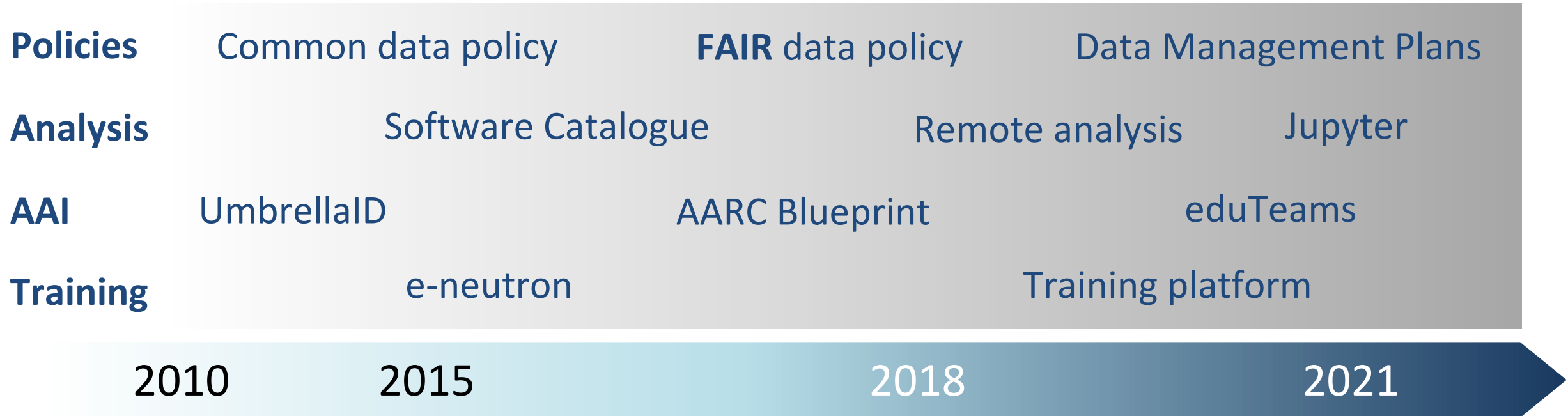


Image inspired by a presentation of: Karel Luyben: President of the EOSC Association

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# Evolution of PaN with respect to EU projects.



pandata<sub>europe</sub>

pandata<sub>ODI</sub>

SINE  
2020

EUCALL

CALIPSOplus

panosc  
photon and neutron  
open science cloud

ExPaNDs  
European Open Science Cloud Photon  
and Neutron Data Services

Caterina's Talk

EOSC Future  
DAPHNE  
4NFDI

DiTARI  
And more  
Proposal

LEAPS  
INNOVATION

panosc  
photon and neutron  
open science cloud

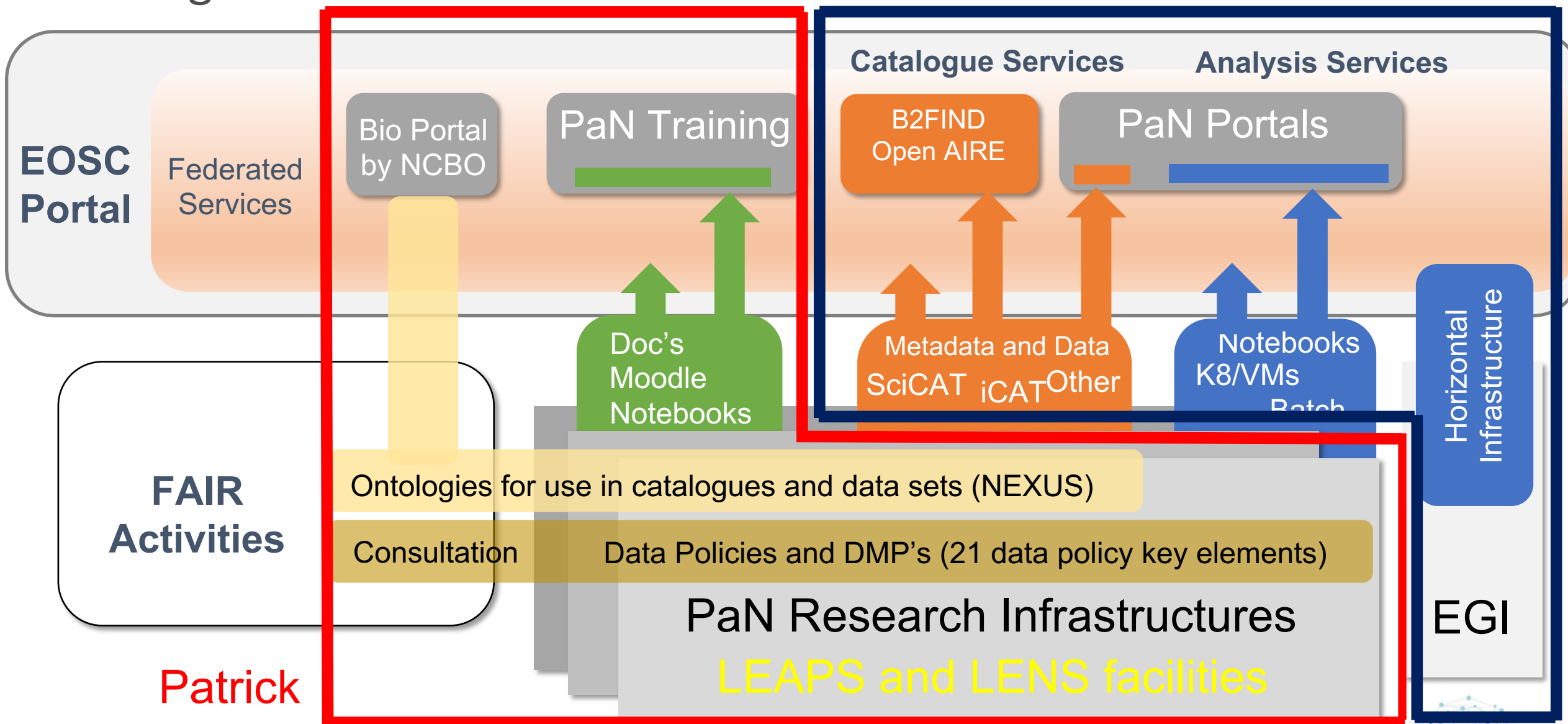
ExPaNDs  
European Open Science Cloud Photon  
and Neutron Data Services



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# The Big Picture of EOSC in PaNOSC and ExPaNDS

Andy



Patrick



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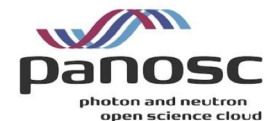
# What did we achieve and what will we have achieved until the end of our projects?

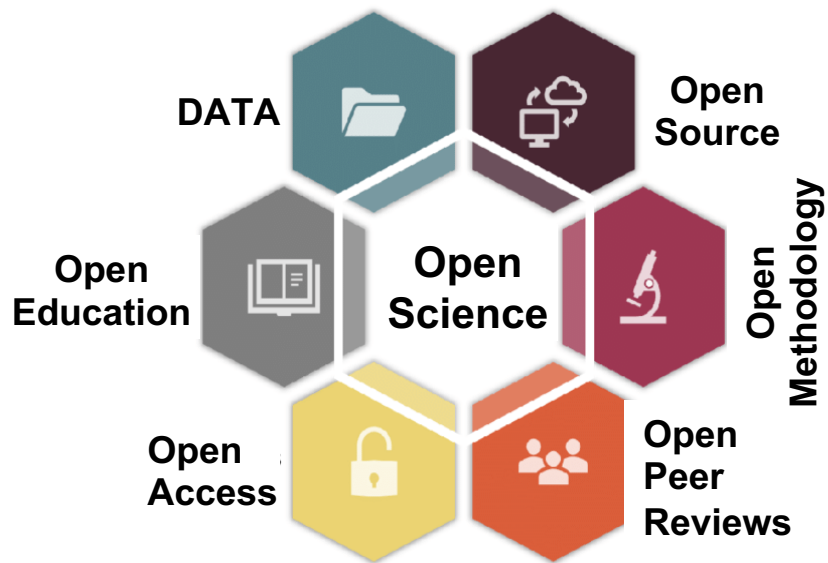
# RESULTS

## Volume I



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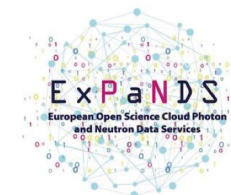
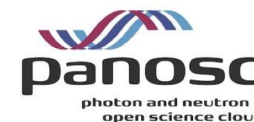




Open Science:  
Open Data, FAIR Data Policies, PIDs, DMPs .....



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# Why are we involving ourselves into those policies?

The ultimate goal is **Open Science**

Accelerates scientific findings, as it:

- Allows verifiable results;
- Allows to easily find relevant data;
- Reduces the download-data barrier;
- It allows to re-use data from other groups or to find data not yet analyzed or published by the original authors;
- We can benefit from similar sciences using synergies;
- More examples later in Andy's talk;
- Essentially avoiding statements like
  - “**The original data can be provided by the author on request!**”

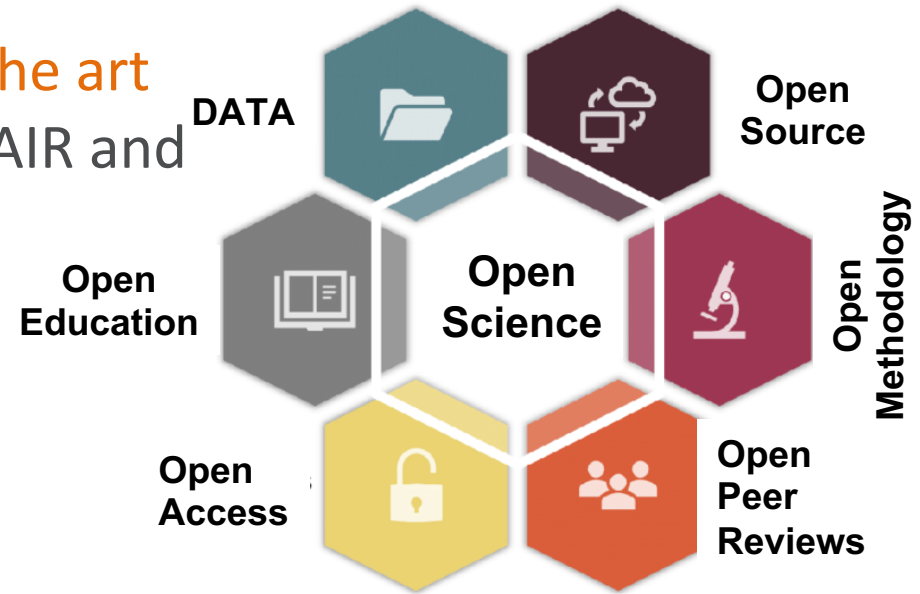


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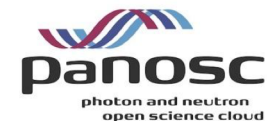


# Why are we involving ourselves into those policies, and why **by means of the European Commission**?

- The Commission provides us with **established, state of the art frameworks** to evaluate and implement Data Policies, FAIR and DMP, PID, by funding
  - **EOSC** with
  - specialized projects like **FAIRsFAIR** and
  - by supporting international organizations like **RDA**.
- provides specialized funding for
  - Activities to agree on **common standards between the facilities**
    - **Caterina's** quote from this morning 'working together makes us stronger'
  - Activities helping us to make our services **cross facility portable and Cloud-ready**
- However EC is making **Open Science a condition**.
  - No free lunch!



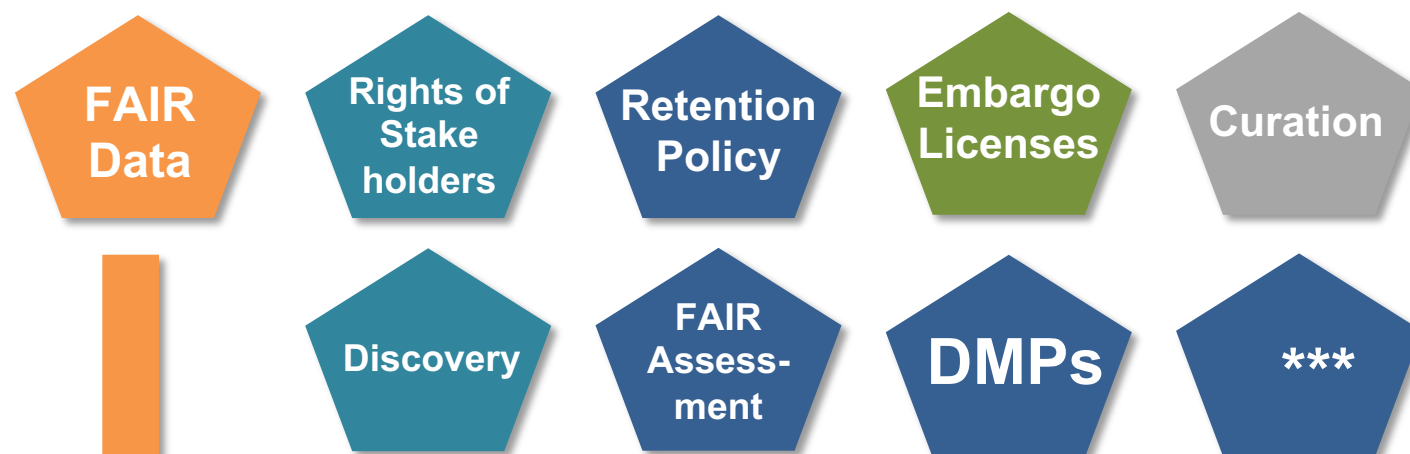
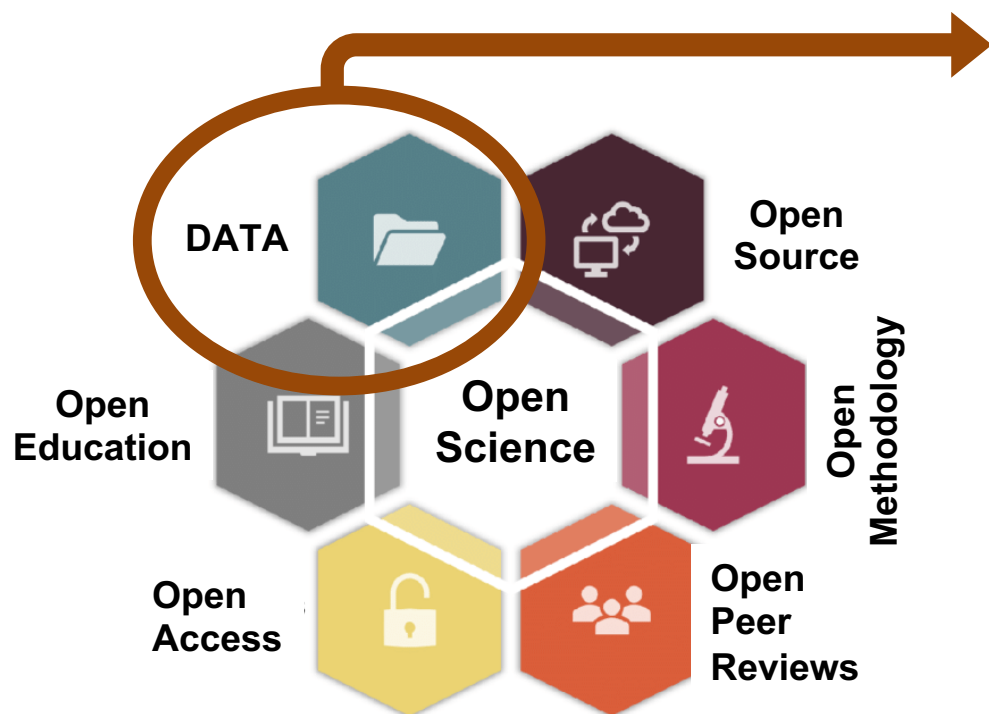
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# From Open Science to FAIR data.

DOI: 10.5281/zenodo.5205825

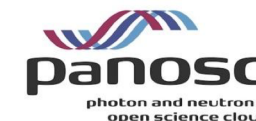
## Elements of the Data Policy Framework



- ✓ Global Unique PIDs
- ✓ Contextual Metadata, following community standards (Ontologies)
- ✓ Open Access Protocols (Data, AAI)
- ✓ Human and machine readable access to data and meta data.
- ✓ Standard Fileformats



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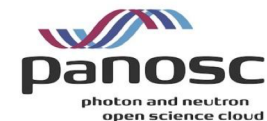
Our contribution to Data Policies, DMPs and FAIR data handling.

We provide

- **Data Policy Framework** for easy adoption in not so complex cases
- **Data Policy Guidebook** to compose a customized, more complex Data Policy.
- **Per Facility consultation**
  - We provided the Data Policy Guidebook to the facility responsible person.
  - We provided a facility by facility consultation and discussed the Guide Book.
  - We collected feedback and redesigned accordingly.
  - We help and monitor the implementation of the Policies at the facilities.
- Help on permanent **FAIR assessment** of the facilities
  - We provide guidelines on how to continuously verify FAIRness of the beamline data taking process, the meta data and the repositories.



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**RESULTS**



**FAIR  
Data**

Open  
Education

Open  
Access

**DATA**

Open  
Science

Open  
Source

Open  
Methodology

Open  
Peer  
Reviews

# Meta Data Ontologies, Keywords, Catalogues and File Formats

photon

Showing 1 of 1099 Sort: Search Rank ▼

## PaN Experimental technique (PANET)

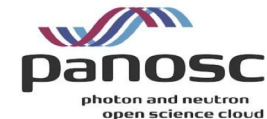
The PaNET ontology provides a taxonomy and thesaurus of photon and neutron (PaN) experimental techniques, based mainly on accelerator-based light sources and neutron facilities

Uploaded: 6/19/21

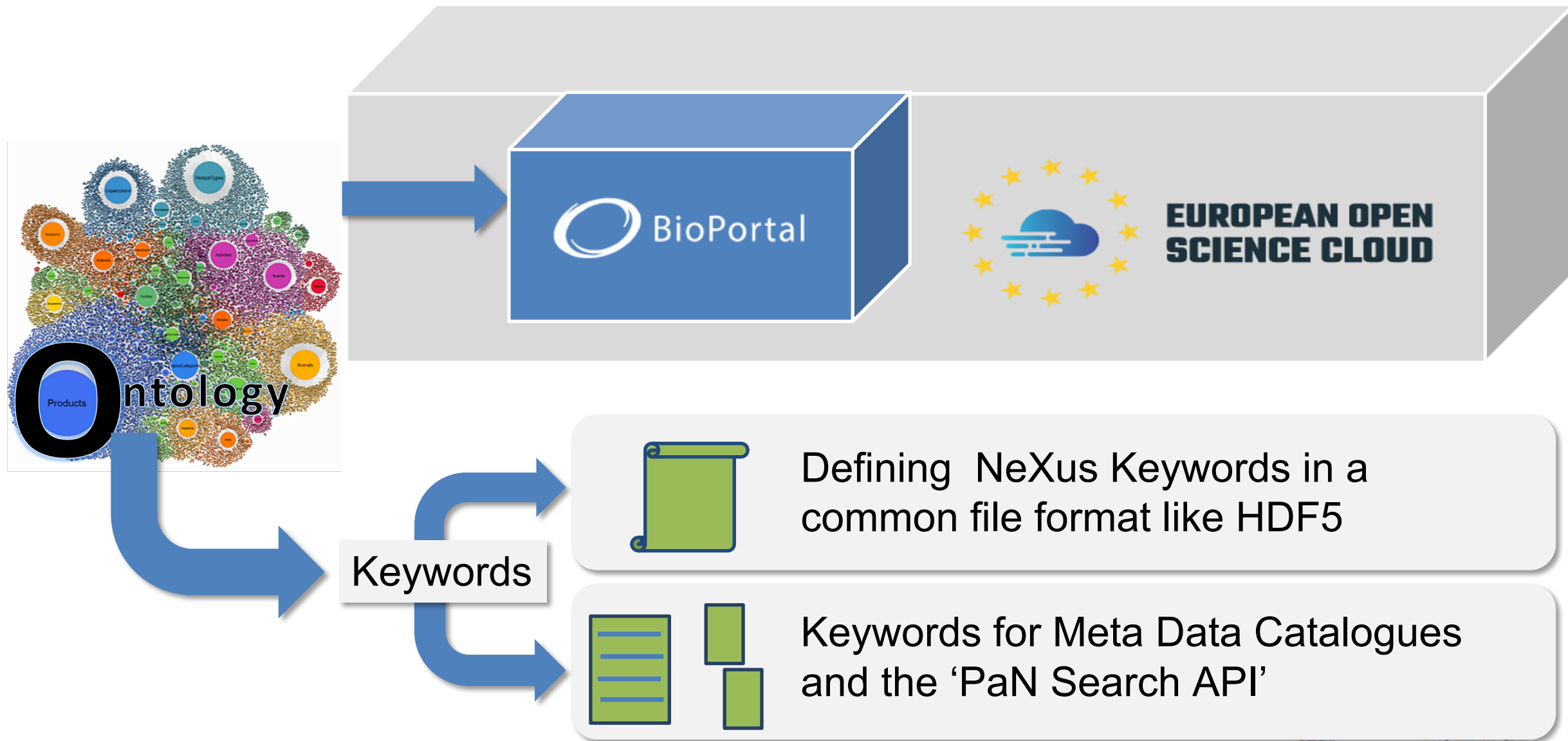
classes  
**379**



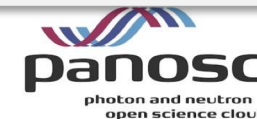
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# Meta Data Ontologies and their consequences



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# Our contribution to Ontologies, NeXus formats and catalogue definitions

Summary Classes Properties Notes

Jump to:

- dataset
- Person
- photon and neutron technique**
  - defined by experimental physical process
  - defined by experimental probe
  - defined by functional dependence
  - defined by purpose
    - characterize excitations
    - chiral determination
    - drug fragment binding
  - imaging
    - absorption contrast imaging
    - coherent diffraction imaging
    - cold neutron imaging
    - diffraction imaging
    - fluorescence imaging
    - high-resolution neutron imaging
    - holography
    - microscopy
    - neutron transmission radiography
    - obtain 3D spatial map
    - obtain high resolution spatial map
    - phase contrast imaging
    - scanning probe imaging
    - single-shot imaging
    - UV circular dichroism imaging
    - x-ray birefringence imaging
  - x-ray imaging
  - x-ray refraction imaging
- manufacturing technique

- Worked on a common ontology for different techniques in PaN;
- Checked 'keywords' for duplication in other sciences and searchability;
- Modelled our Ontology into the BioPortal;
- Working on making the BioPortal (not our service) available through the EOSC Portal;

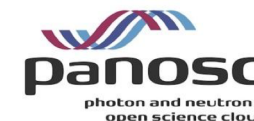


EUROPEAN OPEN  
SCIENCE CLOUD

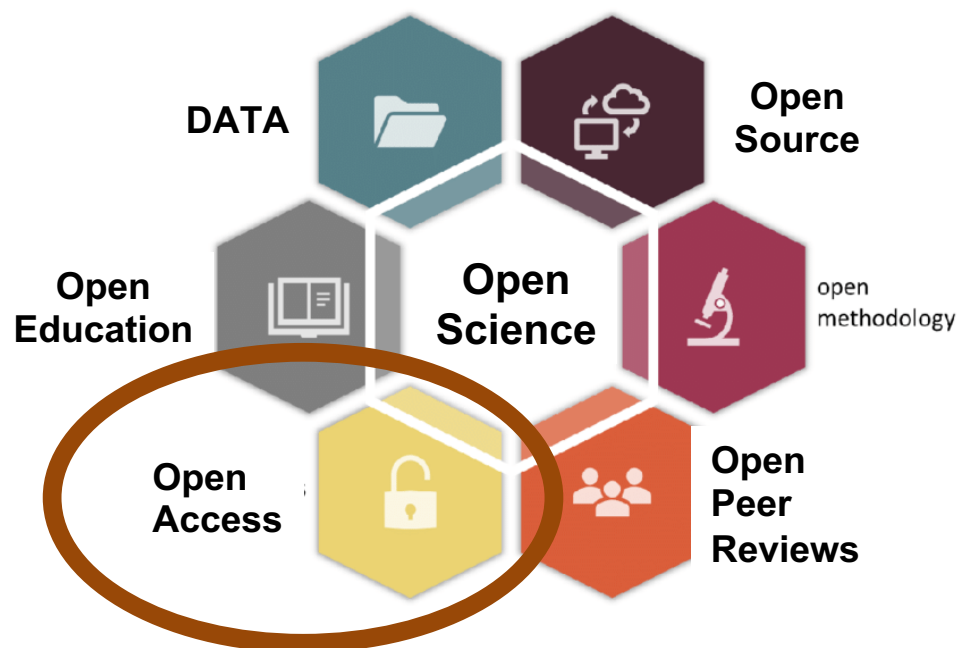
- Publishing hints for catalogues to pick up the right keywords from our ontology;
- Involved in the NeXus definitions following our ontology. (NIAC Involvement).



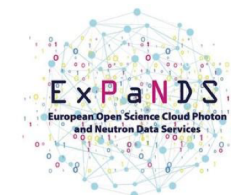
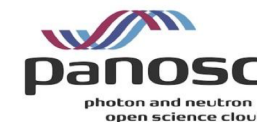
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# Prerequisite for open access : The common AAI



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# PaN and EOSC Core service: Authentication and Identity Management (AAI)

- Originally

- Scientist needed a different identity at each facilities to access their services.
  - Lots of passwords to remember and to loose
  - Difficult with cross facility services.



- UmbrellaID

- Scientist only needs one identity with UmbrellaID (on top of home identity)
- 'Catch all' identity providers are no longer state of the art and not trusted.



- Now: eduTeams [GEANT service] (in progress)

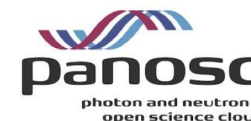
- Scientist only needs the **one identity** from his/her home facility!
- **Single Sign On**: for cross facility services (data orchestration and automatic analysis)
  - One service can use another services somewhere else on your behalf!
- **Less Prison Time**: Legal Issues for IdPs and Services are sorted out (AARC Blueprint)
- **Security**: We are part of the European wide CERT system.



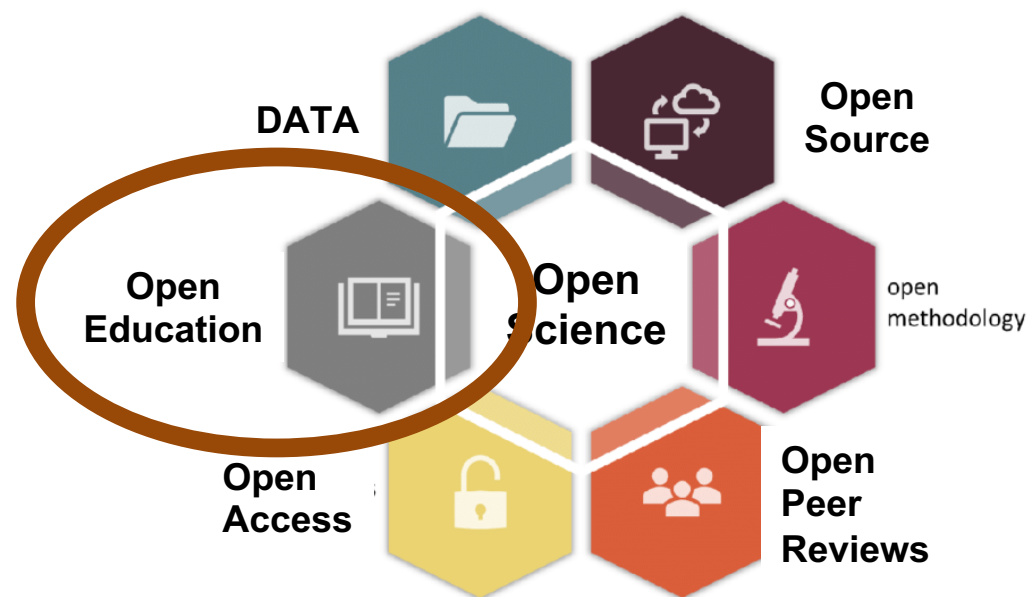
- EOSC-Future -> Science agnostic AAI

- Scientist can use his home Identity for **different sciences**
- PaN can co-utilize services from other sciences: e.g. Data Hub and Data Lakes.

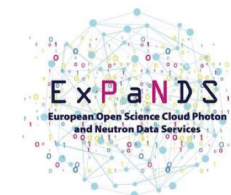
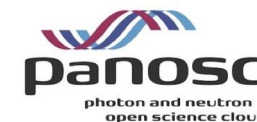
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# Training and Learning Platform

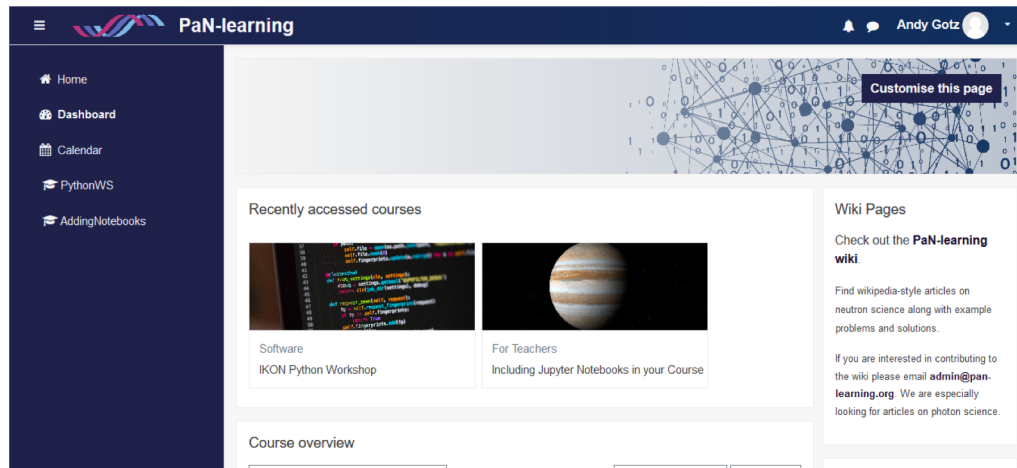


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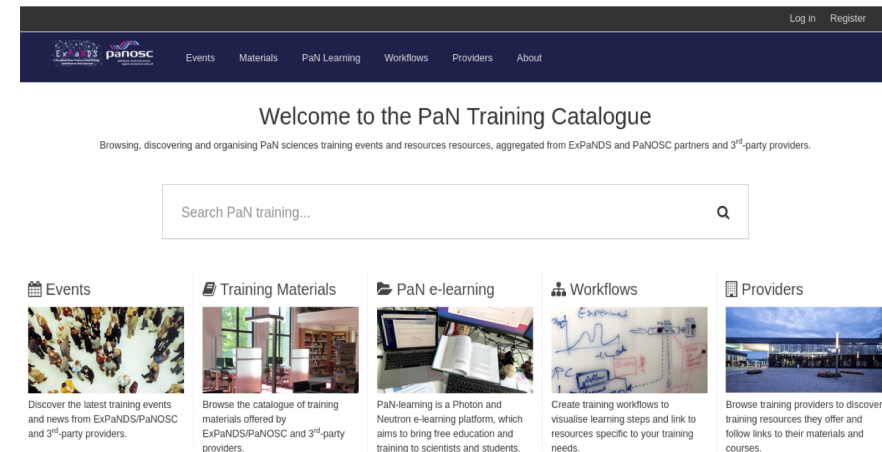


# Training and Learning Platforms

- A centralized platform for collecting our highly distributed knowledge, documents and teaching material
  - which was identified at the facilities as important and missing.
- One can see golden thread in the current disparity of content.



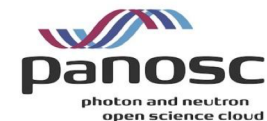
<https://pan-training.hzdr.de/>



<https://pan-learning.org>



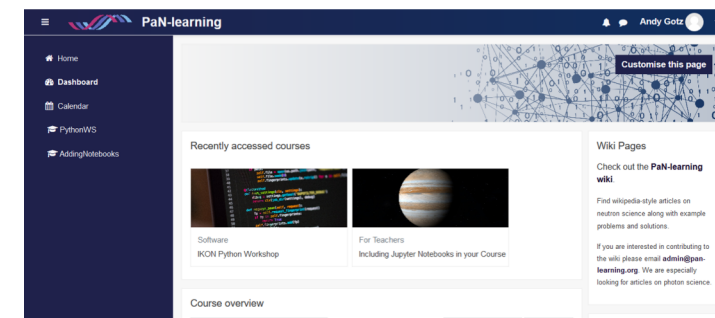
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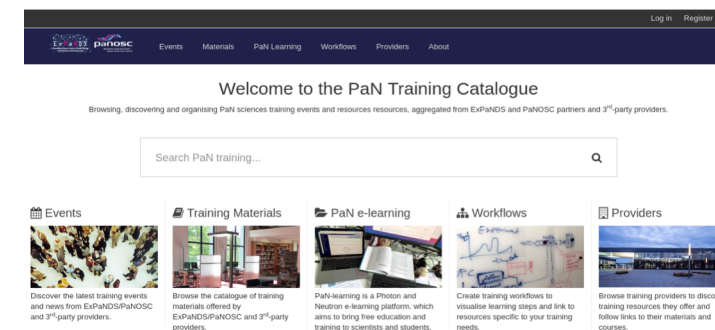


## Our contribution to the teaching and learning platform.

- We evaluated available, **state of the art technologies for teaching and data collection platforms.**
- We introduced a PaN training platform to
  - **create/store** courses and to
  - **collect** existing material.
- We are re-using successful projects developed by
  - **Elixir (TeSS)** and
  - **SINE2020** e-neutrons.



<https://pan-training.hzdr.de/>



<https://pan-learning.org>

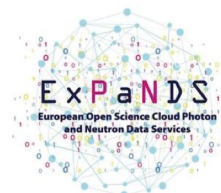
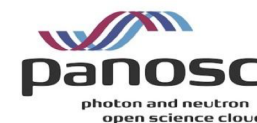


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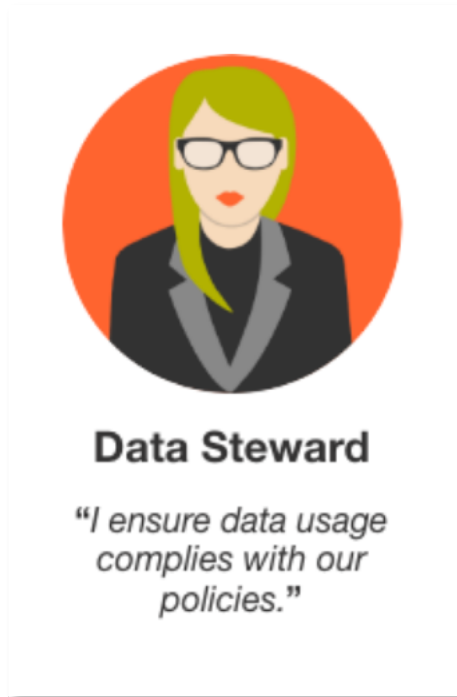
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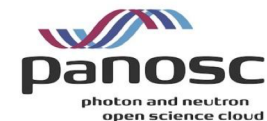
# What do we need from the LEAPS (and LENS) partners

**Data Steward.** Falling between the cracks of library and domain science

- To make sure the **ontologies**, as bases of our **NeXus rendering** and **catalogue entries** are followed up upon and regularly updated;
- The Data **Policies**, FAIR rules and DMP are **up to date**;
- **Data Handling at the facility** is following the **Data Policies** and DMPs;
- Provides regular beamline and dataset **FAIR assessment**.
- Involved in **international groups** on definitions and **standards**, like RDA, NIAC and national initiatives.
- Role: “Ensures data usage complies with our policies”



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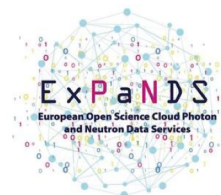
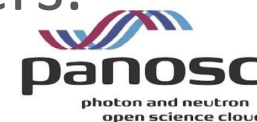


# What do we need from the LEAPS and LENS partners

- Teaching and Learning Platform
  - Sustained installment of the two platforms;
  - Teaching and training material from the facilities to be harvested or added to those platforms.
- AAI
  - Connect the facility services to the PaN proxy system(s);
  - Fees might apply for GEANT or EGI to support our AAI.
- Data Management
  - Further evaluation of DM solutions for data transfer;
  - Stay in touch with professional DM projects like ESCAPE ,DOMA etc.;
  - Possible fees e.g. for GlobusOnline, EGI DataHub or others.



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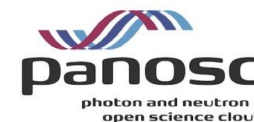
# What do we need from the LEAPS and LENS partners

Apply for EOSC Association membership ....

either through your facilities, national science associations or your country!



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# Moving on with

# RESULTS

## Volume II and Andy



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