

**E x P a N D S**  
European Open Science Cloud Photon  
and Neutron Data Services

# **PaN, PaNOSC and ExPaNDS**

**Achieving a Photon and Neutron community federated cloud in the EOSC.**

**2<sup>th</sup> Nov, 2020**

**Presenter: Patrick Fuhrmann**

**Authors: With contributions from PaNOSC and ExPaNDS folks.**



These projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 823852 and No. 857641

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# What are Photon and Neutron Facilities?

## Photons

### Synchrotrons



### Free Electron Lasers



### Conventional Lasers



## Neutrons

### Neutron Reactor Sources



### Spallation Source



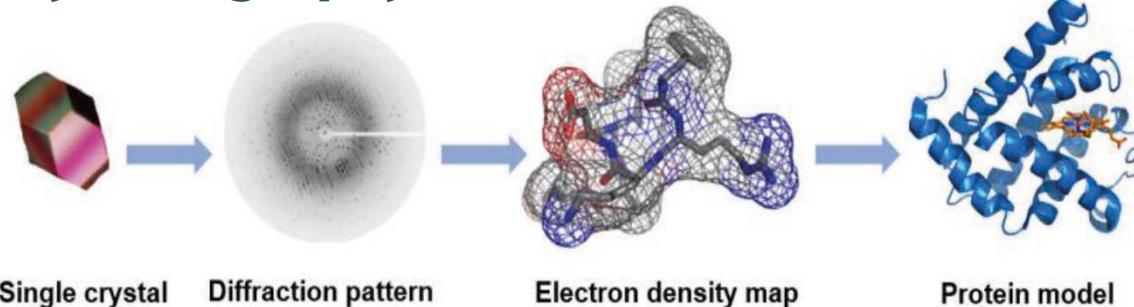
Images borrowed from Facility Webpages @ ESRF, Eu-XFEL, Petra III, SwissFel, ELI, ESS, ILL-E x PanNDs

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# What can you do with Photon Neutron Beams?

## Conservative Crystallography



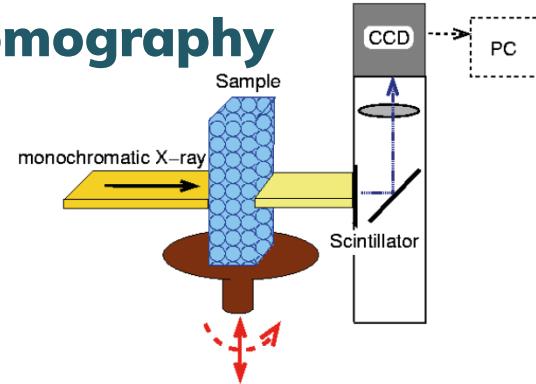
Single crystal

Diffraction pattern

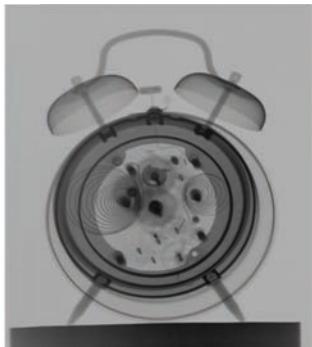
Electron density map

Protein model

## Photon Tomography

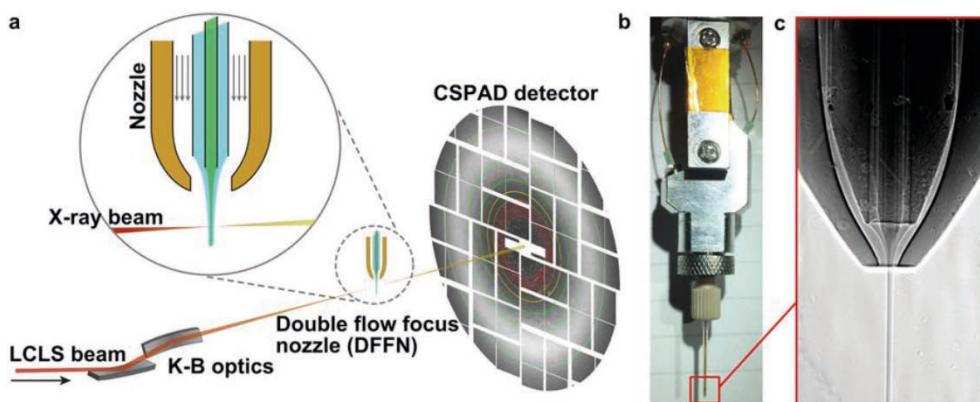


## Neutron Tomography



A new Neutron Radiography / Tomography / Imaging Station DINGO at OPAL

## Serial Crystallography



Thanks to Frank Schünzen for a lecture in PaN Physics

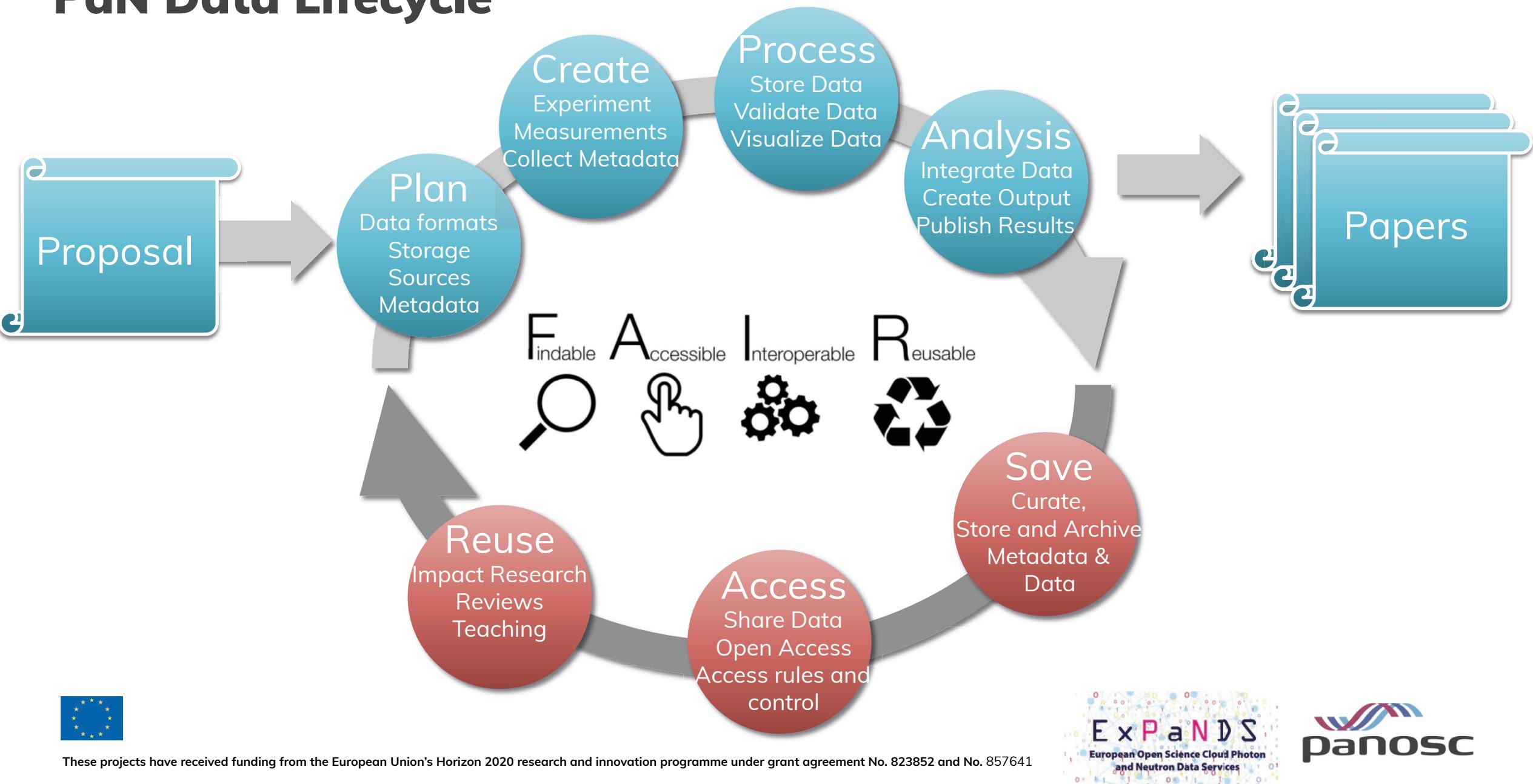
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Plasma Physics, Quantum Physics ,  
\*\*\*\*\*

See [Lightsources.org](https://lightsources.org)



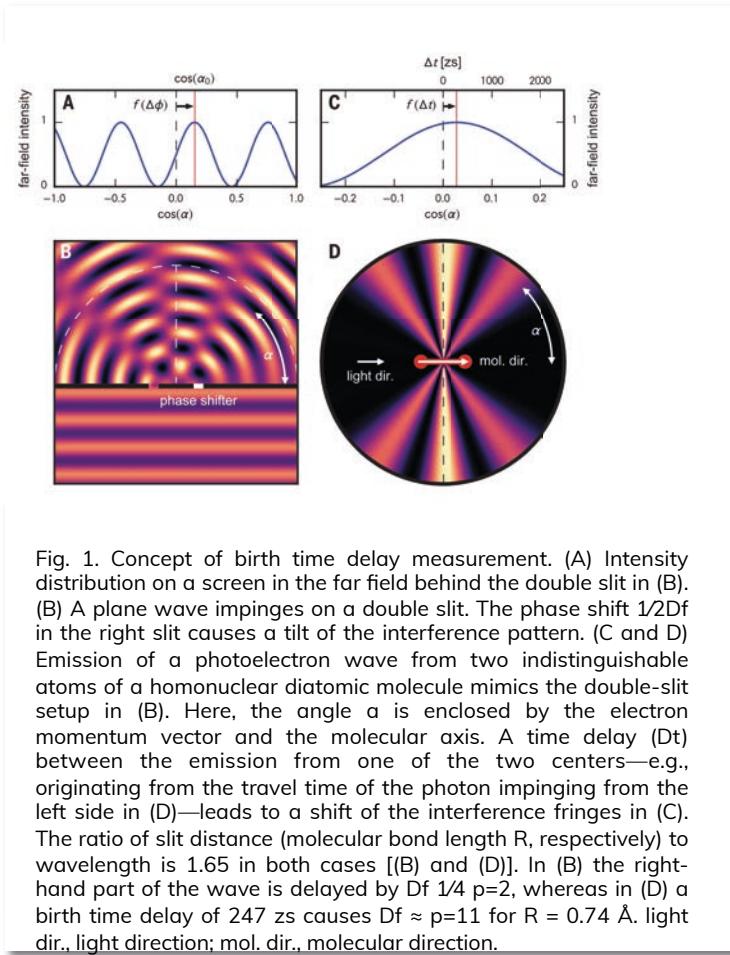
# PaN Data Lifecycle



# Recent example of state of the art Photon Science @ PETRA

III

Zeptosecond birth time delay in molecular photoionization, Sven Grundmann, ...., Florian Trinter et al.



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June 18, 2020

Dataset Open Access

## Zeptosecond Birth Time Delay in Molecular Photoionization

Grundmann, Sven

These datasets are supplement to the publication of the same title.

Files (284.4 kB)

Name	Size
Fig2_data.txt	257.8 kB
md5:dc8986f4cc4529650f8932b8c7583e59	
Fig3_data.txt	26.6 kB
md5:f367578243fadce987bb1b48d3c74147	

Download

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Publication date: June 18, 2020

DOI: DOI 10.5281/zenodo.3899920

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Research Data . Dataset . 2020

## Zeptosecond Birth Time Delay in Molecular Photoionization

Grundmann, Sven;

OPEN ACCESS

Published: 18 Jun 2020

Publisher: Zenodo



# Another example : Support of Cultural Heritage

Institute: ESRF, Scientist: M. Cotte, Conservation of old Paintings, “Last Supper by L. Da Vinco”

Courtesy : Andy Götz, ESRF

- **Request**

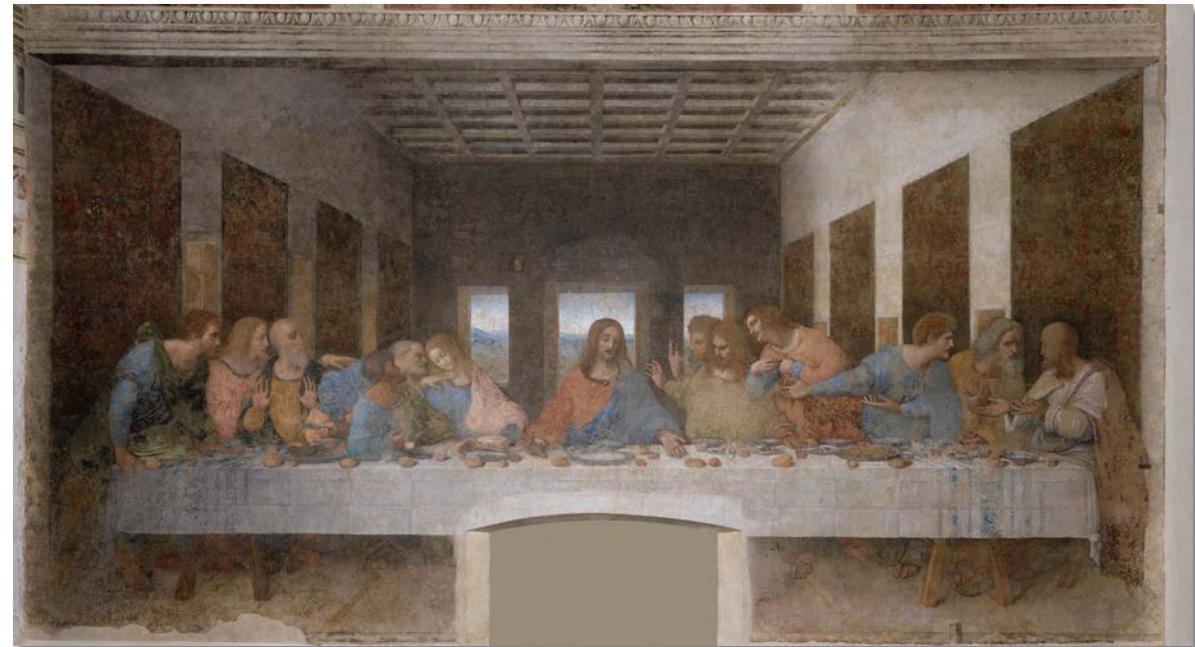
- Prepare data reduction scripts as Jupyter notebooks for non-expert users

- **Demonstrates**

- Jupyter notebooks
- Data Portal
- HDF5 data format
- Software Catalogue

- **Linked to**

- Any community in need of standard data reduction scripts in a standard data format.



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# The projects : PaNOSC and ExPaNDS



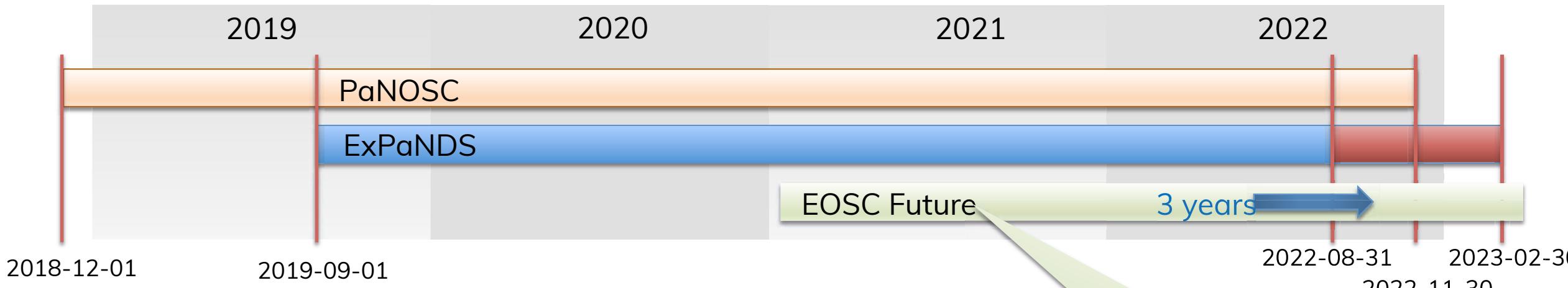
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# PaNOSC and ExPaNDS cheat sheet

## Timeline

EOSC Association



## Core data

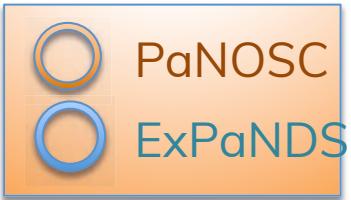
	PaNOSC	ExPaNDS
Call	INFRAEOSC 04	INFRAEOSC 5B
Budget	12 M Euro	6 M Euro
Number of Partners/ Facilities	7 / 5 ESFRI	11 / 10 National
Start	2018-12-01	2019-09-01
End	2022-11-30	2022-08-31 / 2023-02-30

EOSC Future will unlock the potential of European research through a vision of Open Science for Society.

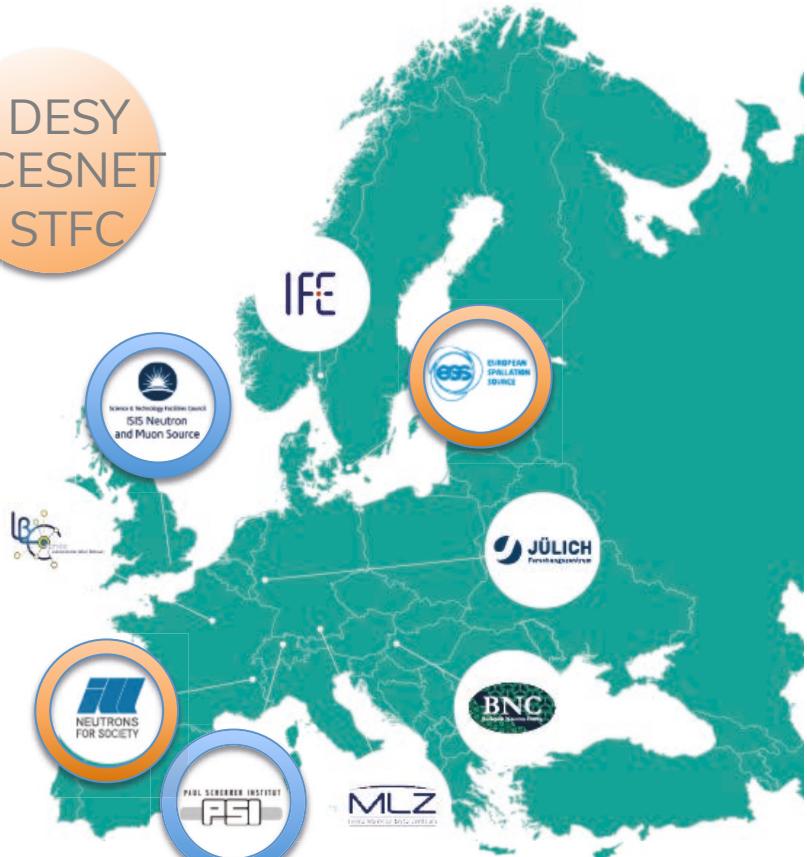


# PaN facilities covered by PaNOSC/ExPaNDS

## Photon (LEAPS)



## Neutron (LENS)



Stolen from Helmut Dosch

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ExPaNDS  
European Open Science Cloud Photon and Neutron Data Services

panosc



# EOSC , EGI and horizontal infrastructures



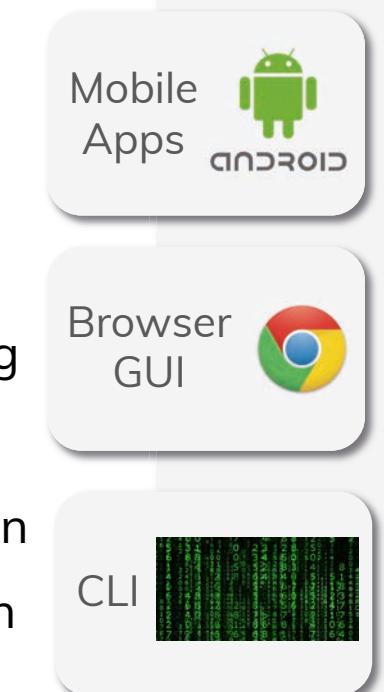
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# Linking publications, data and infrastructures: The PaN Portal.



- Search for publications
- Get corresponding data
- Enrich the meta data with your metadata
- Get more data matching meta data
- Find infrastructure to run publication algorithm on collected datasets.



A  
P  
I

Portal Engine (backend)

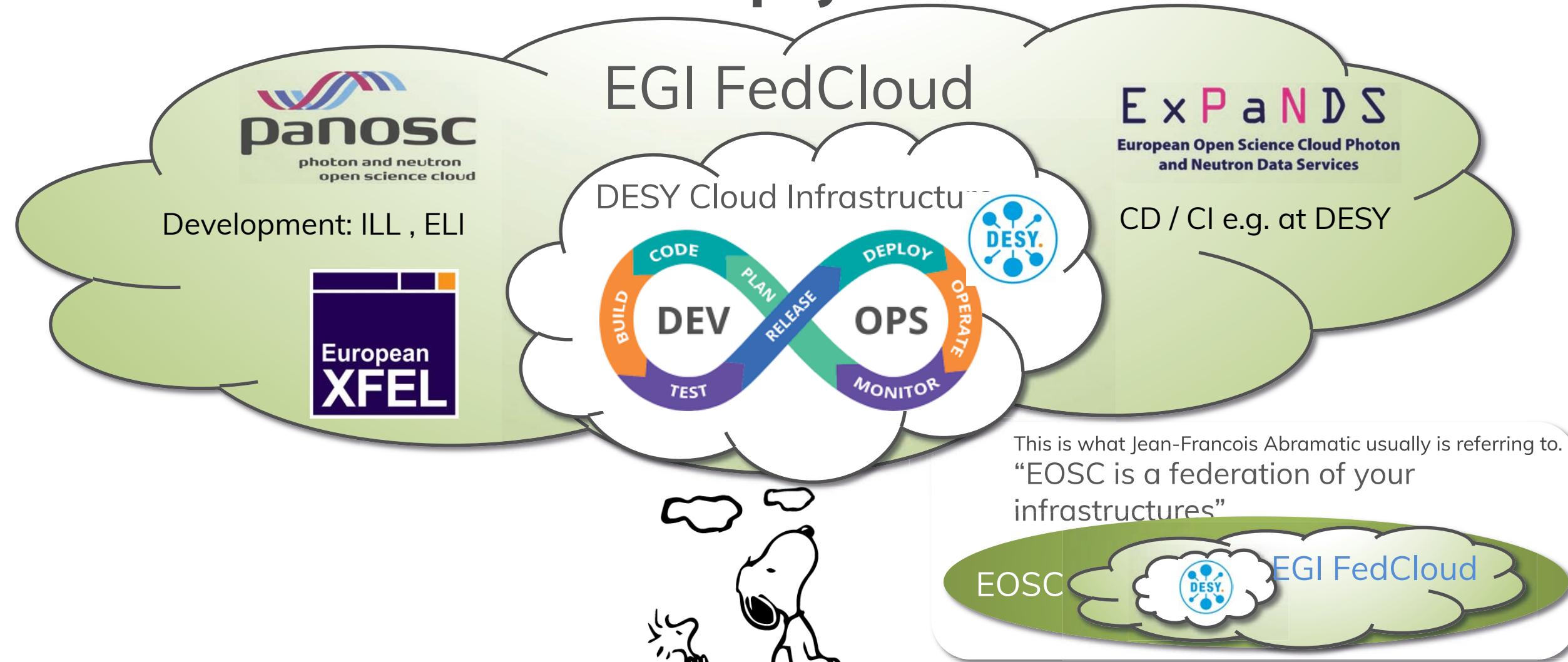
## Facility



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# ExPaNDS and PaNOSC contributing to horizontal infrastructure deployment



DevOps Image: Courtesy : Software Group at US Airforce

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# And the show for you today is .....

Brian Matthews

Enabling our facilities to produce FAIR data.

Alun Ashton

Federated services accessible through the 'PaN portal'.

Nazaré Guimard / Thomas Holm Rod

Sharing knowledge with the open PaN e-learning platform.

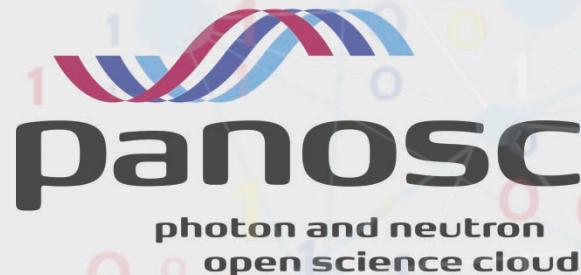
Andy Götz

Remote access to PaN facilities instruments and services, including data transfer.



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# FIN

Further Reading ....

[www.panosc.eu](http://www.panosc.eu)

[www.expands.eu](http://www.expands.eu)



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