

Photon and Neutron Open Science Cloud

# The PaNOSC Project

R. Dimper – on behalf of the Consortium  
30 January 2019



**Call:** Horizon 2020 InfraEOSC-04

**Partners:** ESRF, ILL, XFEL.EU, ESS, CERIC-ERIC, ELI-DC, EGI

**Description:** cluster of ESFRI Photon and Neutron sources

**Observers/non-funded:** GÉANT, EUDAT, national RIs

**Linked 3<sup>rd</sup> parties via EGI:** DESY, STFC, CESNET

**Status:** Started 1/12/2018

**Github:** <https://github.com/panosc-eu>

**Home page:** <https://panosc.eu>

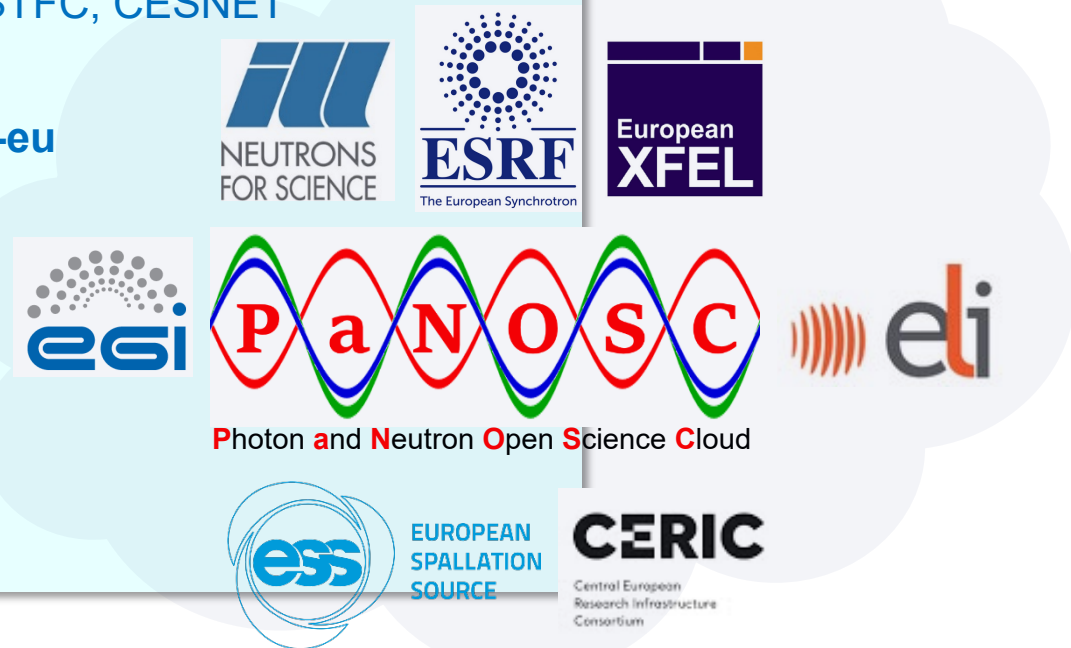
**Twitter:** @PaNOSC\_eu #PaNOSC

**Budget:** 12 M€

**Coordinator:** ESRF

**Started:** 1/12/2018

**Duration:** 4 years

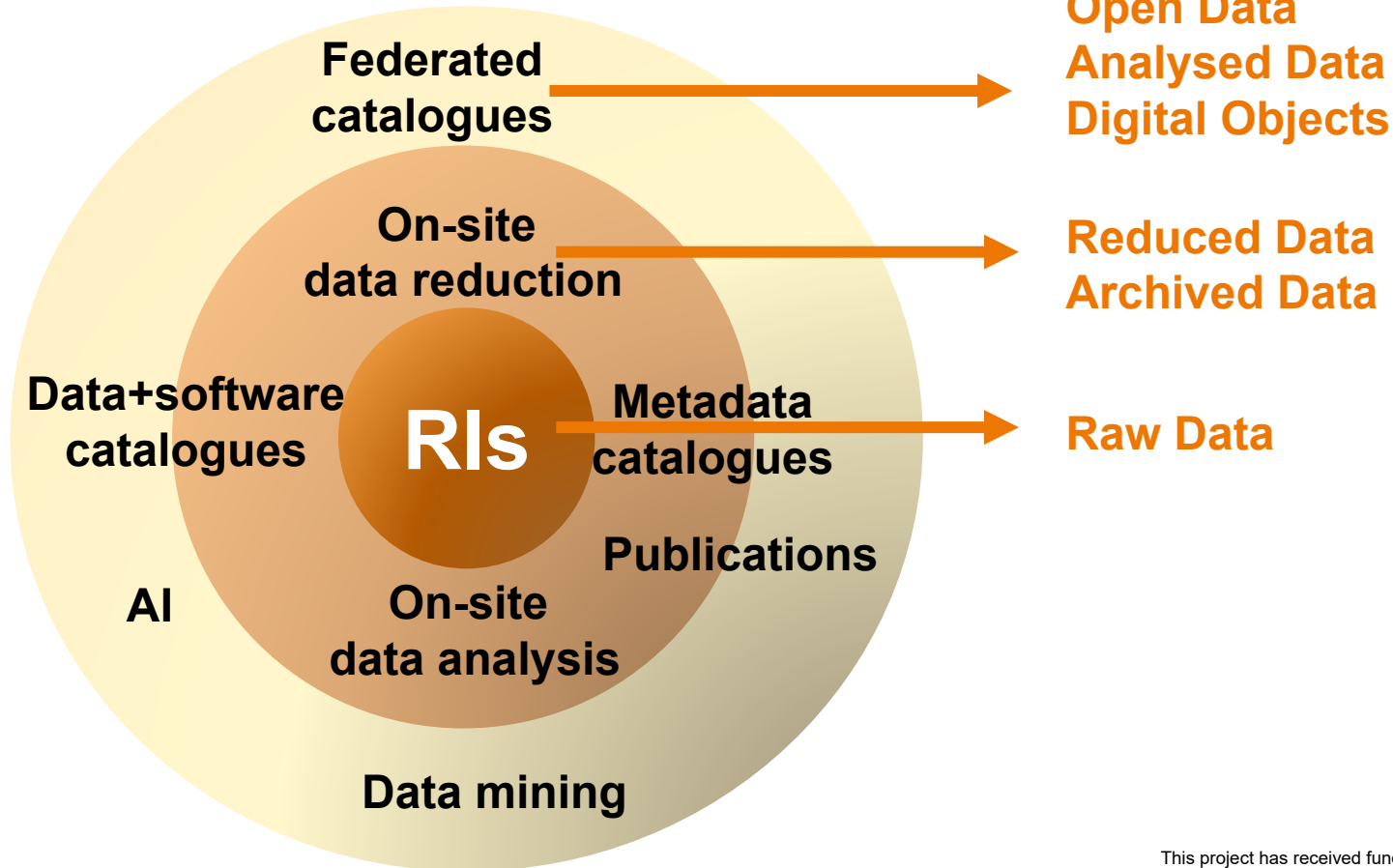


**Why** – Unify the fragmented research data landscape with a common data policy framework and coherent set of services for data at the RIs and through the EOSC to give scientists better tools to fully exploit their data and facilitate the use of open data.

**Opportunity:** provide coherent set of services for data reduction and analysis to scientists to fully exploit their data and to promote Open Data and Open Science.



## Data is our Product!



# Why – to enable Open Science

**“Open Science is transparent and accessible knowledge that is shared and developed through collaborative networks”**

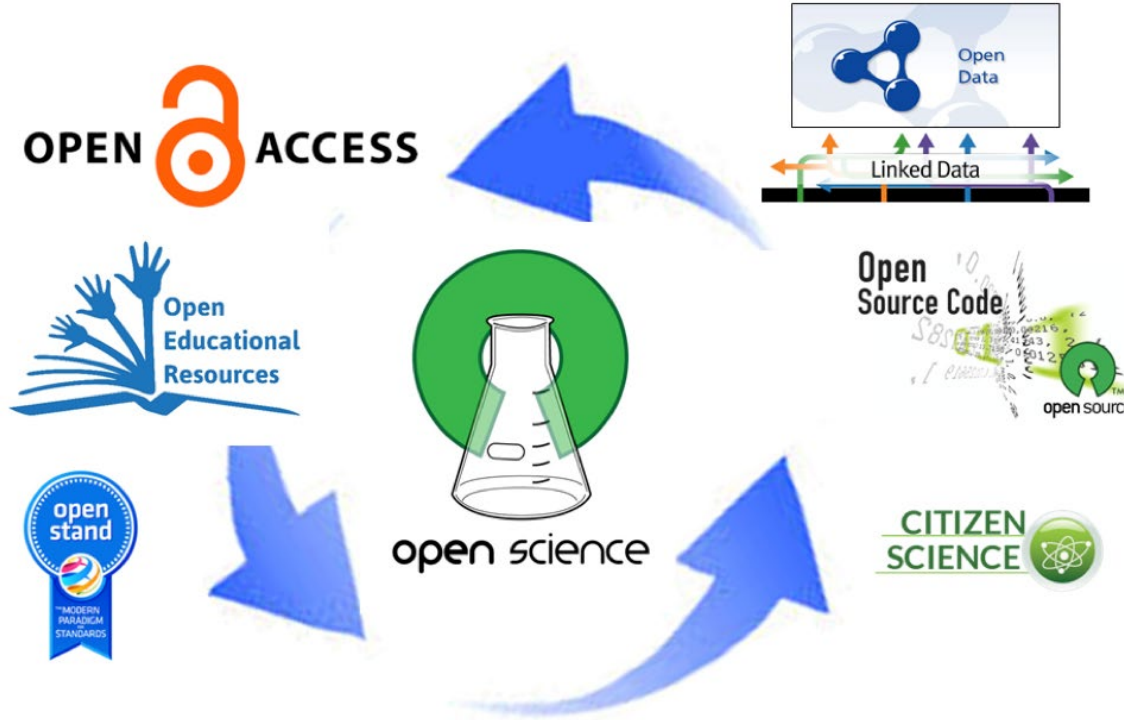
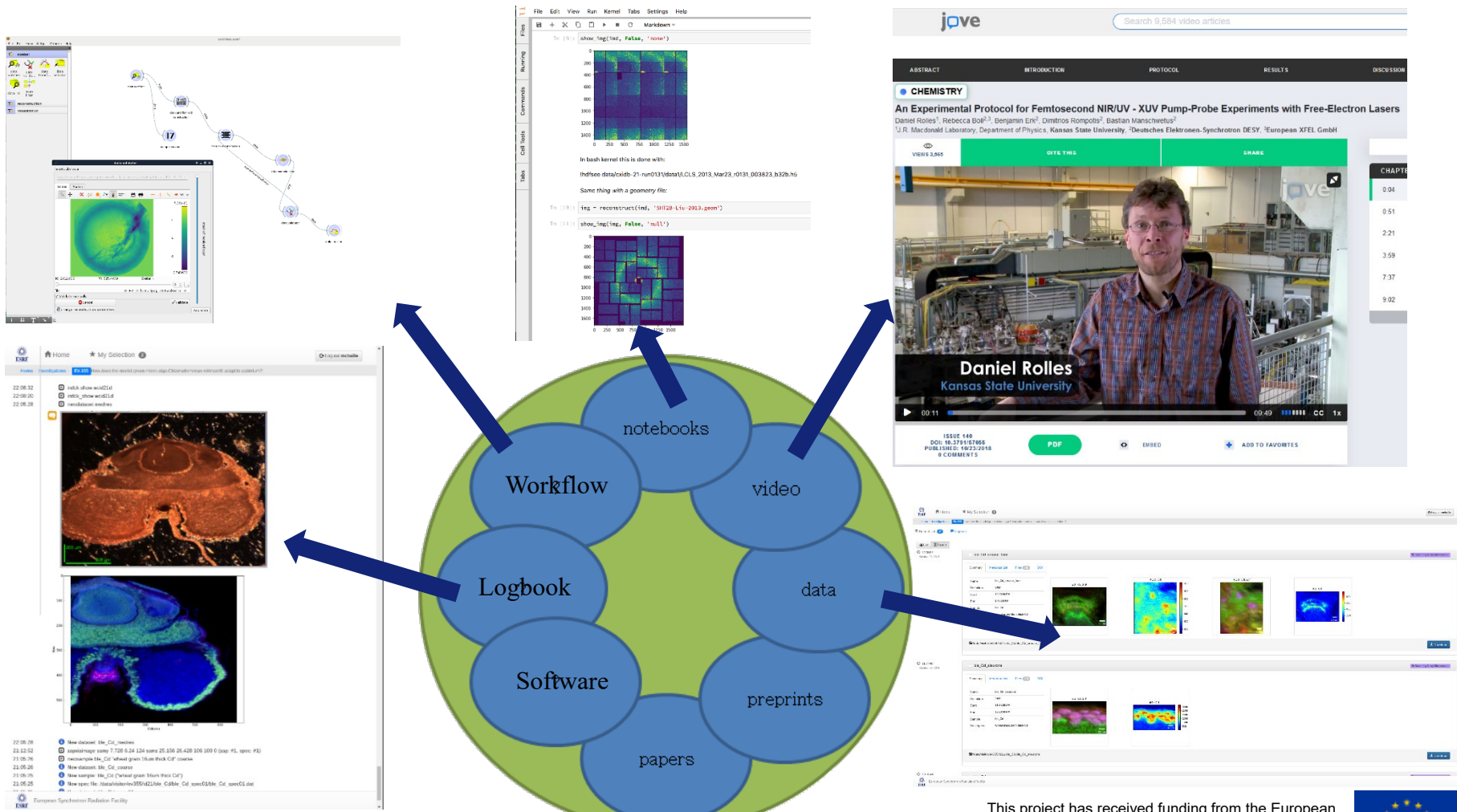


Image Source: <http://www.sci-gaia.eu/osp-enab/>



# Why – to link all scientific data and output together

Image Source: <http://michaelnielsen.org/blog/the-future-of-science-2/>



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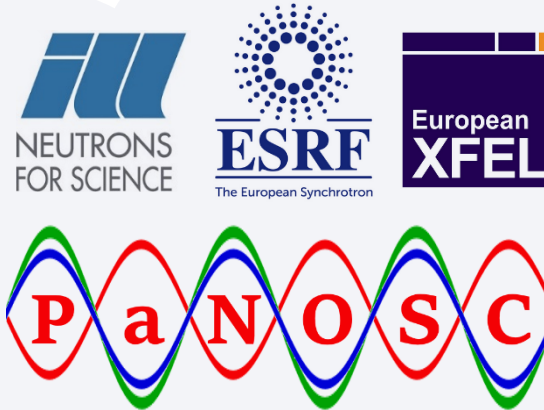
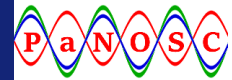


**Who** – Photon and Neutron Open Science Cloud (**PaNOSC**) made up of photon and neutron RIs on the ESFRI roadmap and ERICs (CERIC-ERIC, ELI, ESRF, ESS, Eu-XFEL, ILL), pan-European e-infrastructures (EGI – as a partner-, GÉANT, EUDAT, and OpenAIRE) and national RIs and PRACE host members as observers.

**Opportunity:** first time synchrotrons, neutron sources, FELs, + lasers will work together with e-infrastructures to unify fragmented approach to open data management.



# PaNOSC Partners – ESFRI projects



Photon and Neutron Open Science Cloud



EUROPEAN SPALLATION SOURCE

CERIC

Central European Research Infrastructure Consortium



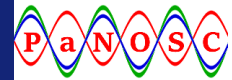
ESFRI

European Strategy Forum on Research Infrastructures





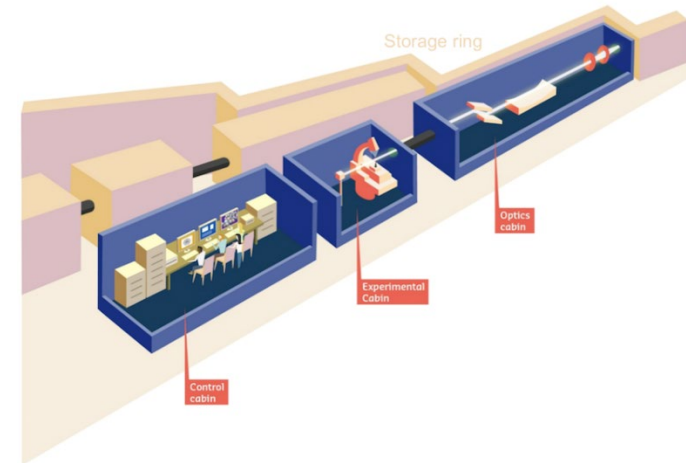
# PaNOSC Partners – ESFRI projects



	ILL	ESRF	CERIC	XFEL	ELI	ESS
Operating since	1972	1994	2014	2017	2018	2022
Users/year	1200	6000	500	850	100	(100)
Beamlines	40+	45	40+	5	20+	20+



**ESRF + ILL (Grenoble, France)**



**Beamline experimental station**

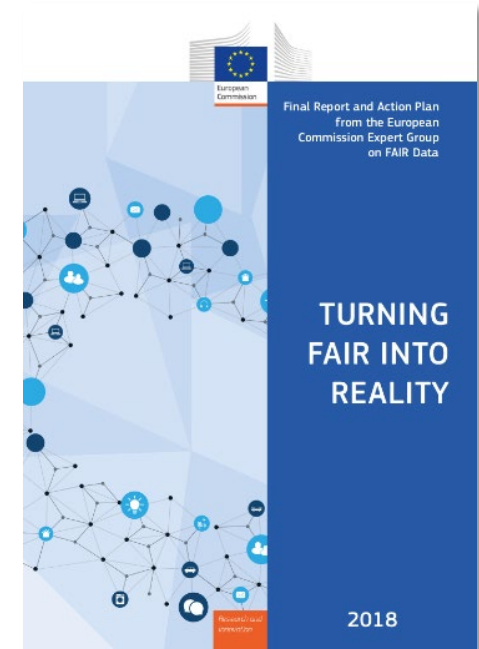


**What – PaNOSC** provides petabytes of curated data from thousands of applied and basic science experiments annually and the analysis software for many fields ranging from materials and life sciences to cultural heritage and palaeontology.

**Opportunity:** leave data at source so users can access them remotely without having to export them and promote the re-use of datasets.

Provide FAIR data to the EOSC for re-use.

- How to make FAIR reality?
- How to make the EOSC reality?
- How to make Open Science reality?
  
- PaNOSC will build on and help make FAIR, EOSC and Open Science become reality for the Photon and Neutron community



**How – PaNOSC** will build on the experience with Open Data policies from PanData and existing metadata catalogues, extend existing Jupyter notebook services and remote desktop, generalise simulation, link data and services to EOSC.

**Opportunity:** build on existing experience to fast track new RIs, enhance existing catalogues with help of experts, develop a cross-catalogue search mechanism, generalize notebooks + remote data analysis and link all this to the EOSC to build the EOSC from the bottom up through with e-infrastructures.



	ILL	ESRF	CERIC	XFEL	ELI	ESS
Data/year 2018	0.2 PB	8 PB	1 PB	3PB	< 1 PB	0
Data/year 2023	<b>0.6 PB</b>	<b>50 PB</b>	<b>15 PB</b>	<b>100 PB</b>	<b>10 PB</b>	<b>&lt; 1 PB</b>
Data Policy 2018	2011	2016	2014(3/8)	2017	in prog	2017
Data Policy 2023	2011	2016	<b>2019</b>	2017	<b>2019</b>	2017
Metadata catalogue 2018	Local	lcat	Local	myMdC	No	SciCat
Metadata catalogue 2023	Local	lcat	<b>lcat</b>	myMdC	<b>[TBD]</b>	SciCat
Metadata definition 2018	Nexus	Nexus	custom	myMdC	?	Nexus
Metadata definition 2023	Nexus	Nexus	<b>Nexus</b>	<b>Nexus</b>	<b>[Nexus]</b>	Nexus
DOI 2018	yes	yes	no	yes	no	yes
DOI 2023	yes	yes	<b>yes</b>	yes	<b>yes</b>	yes

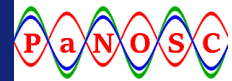


	ILL	ESRF	CERIC	XFEL	ELI	ESS
Open Data 2018	Yes	Yes	No	Yes	No	No
Open Data 2023	Yes	Yes	Yes	Yes	Yes	Yes
Data Services 2018	Pilot	In progress	Remote	In progress	?	In progress
Data Services 2023	Prod	Prod	Prod	Prod	Prod	Prod
Common data API 2018	No	No	No	No	No	No
Common data API 2023	Yes	Yes	Yes	Yes	Yes	Yes
User training 2018	No	No	No	No	No	No
User training 2023	Yes	Yes	Yes	Yes	Yes	Yes





# PaNOSC Stakeholders – EIROforum



 = PaNOSC partner



CERN

ESA

EUROfusion

ESO

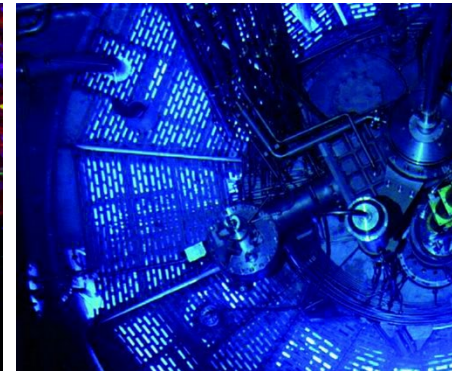
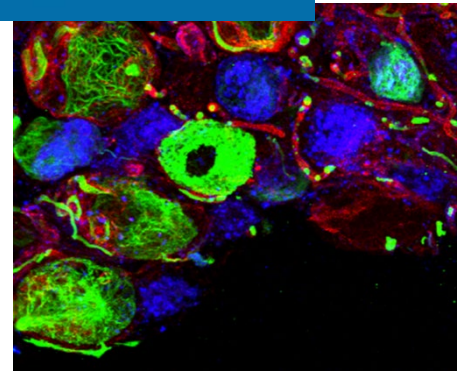
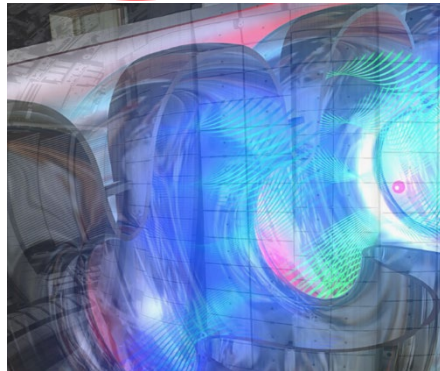
 Eu-XFEL

 ESRF



EMBL

 ILL



= PaNOSC partner



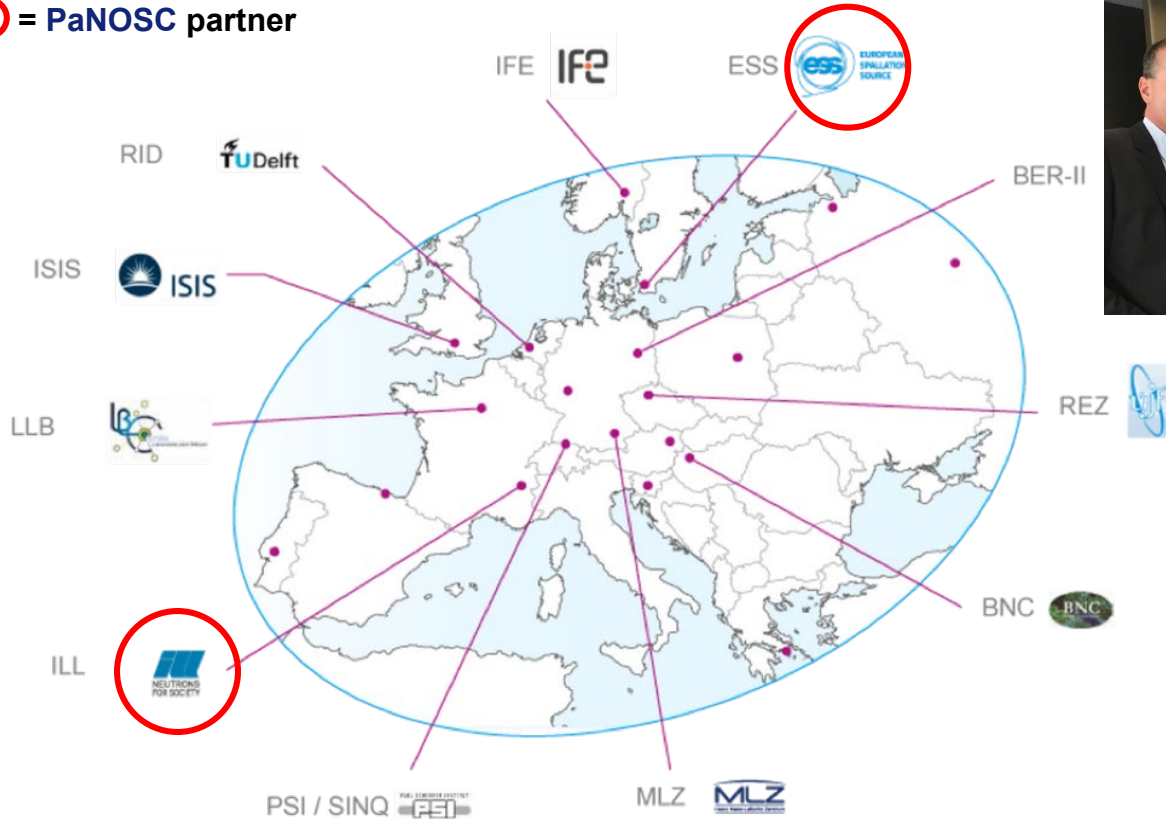
**LEAPS launch event in Brussels 13-Nov-2017**

PaNOSC is complementary to LEAPS and preparing the LEAPS IT road map in particular for data analysis services





= PaNOSC partner



- 1. FAIR data** – more difficult to implement than most believe
  - ✓ Implementing an electronic logbook as part of the RICH metadata capture
  - ✓ Promote use of Jupyter notebooks and workflows to capture data analysis
- 2. Integration** - services linked by a supported federated identity scheme covering the research life cycle where users access data, software, IT capacity and the expertise for performing analysis
  - ✓ GEANT will help PaNOSC by hosting AAI, ESFRIs to provide expertise
- 3. Hybrid model** - should not compete with but rather profit from user friendliness and innovation of commercial service providers
  - ✓ PaNOSC will procure and integrate commercial services
- 4. Provenance, citation and use of data & software**
  - ✓ Train users to cite DOIs and provide Open Data
- 5. Business model of how to provide services to all scientists and general public**
  - ✓ ESFRI Photon and Neutron RIs have funding for Users who come to the source, **we do not have funding for providing services for using Open Data**



## PaNOSC's objectives are to:

1. **Participate** in the construction of the EOSC by linking with the e-infrastructures and other ESFRI clusters.
2. **Make** scientific data produced at Europe's major Photon and Neutron sources fully compatible with the FAIR principles.
3. **Generalise** the adoption of open data policies, standard metadata and data stewardship from 15 photon and neutron RIs and physics institutes across Europe.
4. **Provide** innovative data services to the users of these facilities locally and the scientific community at large via the EOSC.
5. **Increase** the impact of RIs by ensuring data from user experiments can be used beyond the initial scope.
6. **Share** the outcomes with the national RIs who are observers in the proposal and the community at large to promote the adoption of FAIR data principles, data stewardship and the EOSC.

