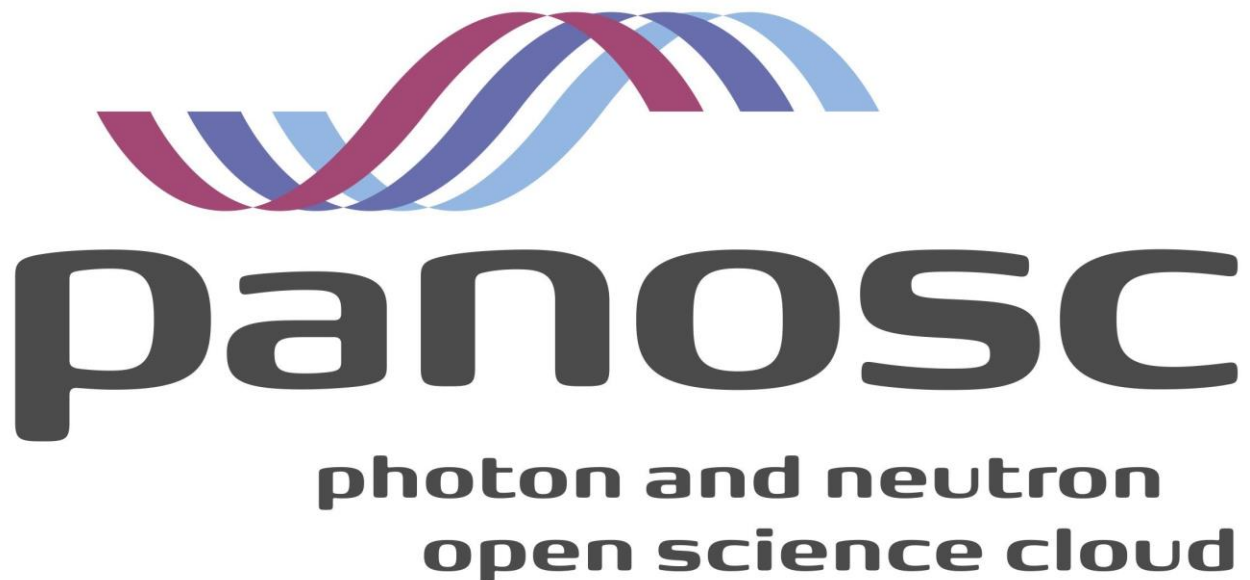


PaNOSC
Photon and Neutron Open Science Cloud
H2020-INFRAEOSC-04-2018
Grant Agreement Number: 823852



Report of annual workshop 1



Project Deliverable Information Sheet

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Introduction

This document is a summary of the progress achieved in the project since the last management report (D1.3 Mid-year summary 1). As such, this document will provide an update on the project status, a summary of the annual meeting and a report from the Executive Committee.

Executive Summary

The Photon and Neutron Open Science Cloud (PaNOSC) project is funded by the H2020-INFRAEOSC-04-2018 call with Grant Agreement Number: 823852. The project started on 1st December 2018 and has been running now for approximately one year.

Overall the project is advancing according to plan. Partners and stakeholders are meeting regularly to move the project forward and with deliverables being submitted on time. Most of the planned recruitments have taken place and the on-going activity can be followed up in PaNOSC's main document repository: <https://github.com/panosc-eu/panosc>.

Summary of annual meeting

PaNOSC's annual meeting took place in Trieste (Italy) from Monday 4th to Thursday 7th November. The first two days were focused on presentations from work package leaders (WP), invited experts and sharing information about FAIR (Findable, Accessible, Interoperable and Reusable) data and data policies at each partner site while the two last days were reserved for work sessions for each work package.



Figure 1: 1st PaNOSC Annual Meeting group picture

All the presentations and slides for the first two days are available on the website of the event:

<https://indico.esrf.fr/indico/event/36/timetable/#20191104.detailed>

1st day

The agenda for the first day was as follows:

Topic	Speaker (s)	Schedule
Welcome by host + Project Coordinator	Roberto Pugliese & Andrew Götz	14:00-14:15
WP1 - Project Management and Coordination	Jordi Bodera Sempere	14:15-14:35
EOSC Governance + Sustainability	Rupert Lueck	14:35-15:00
WP 9 - Communication and Dissemination	Nicoletta Carboni	14:00-15:20
WP 3 - Data Catalogue Services	Tobias Richter	15:20-15:40
FAIR Data @ CERIC-ERIC	Roberto Pugliese	15:40-16:00
Coffee break		
ExpANDS sister project to PaNOSC	Knut Sander	16:30-16:50
WP 4 - Data Analysis Services	Hans Fangohr	16:50-17:10
WP 5 - Virtual Neutron and X-ray Laboratory	Juncheng E	17:10-17:30
FAIR Data @ ILL	Jean-François Perrin	17:30-17:45
Report from RDA 14	Ornela De Giacomo	17:45-18:00
EOSC + PaNOSC - discussion session	Andrew Götz	18:00-18:30
Free time		
Dinner		

The PaNOSC's annual meeting started Monday 4th November at 14:00h with a welcome address by Roberto Pugliese (WP7 leader) in the name of the hosting CERIC-ERIC organisation. This was followed by a brief introduction

of the agenda and plans for the next few days by Andrew Götz (PaNOSC Coordinator).

The second presentation was by Jordi Bodera Sempere, WP1 leader, who explained the current status of the project and quickly reviewed the overall planning. This was followed by a financial report for internal consumption that compared the current and forecasted expenditure. Jordi also highlighted that further work on Key Performance Indicators (KPIs) and establishing collaboration with other cluster projects is required during 2020.

Rupert Lueck, Co-chair of the EOSC Governance and Sustainability within the Executive Board Working Group talked about the EOSC Governance structure, its working groups, history, tasks and interactions. He then explained more in detail the work performed in the EOSC Sustainability activity, how it is organised, commented on the Strawman report and offered to collaborate and learn from PaNOSC's WP7 - Sustainability activities.

The next talk was given by Nicoletta Carboni (WP9 leader) who explained all the work that is being done in the communication work package. She showed interviews that have been done, interaction and attendance with many events and stakeholders, reminded the audience of the targets and goals of the WP she is leading, and the deliverables and joint actions that all PaNOSC members should engage with. Nicoletta finished her presentation with a proposed action plan (which was received very positively by the audience) and a reminder for the upcoming events.

Tobias Richter (WP3 leader) continued with a presentation on the Data Catalogue Services, starting with the basic functions, comparing the features of the catalogue technologies used at each Research Infrastructure (RI) within PaNOSC and following with a reminder of the tasks in the WP.

He explained how a Federated Search API could work and explained how important (and difficult) it is to capture experimental metadata. His presentation ended with an outlook at the milestones and deliverables to come, with his assessment that 2020 will be the busiest year for WP3.

Roberto Pugliese (WP7 leader) talked about FAIR data at CERIC-ERIC before the coffee break. His presentation started with an introduction to CERIC and its facilities which was followed by the changes in their data policy in order to ensure that data is FAIR and how it will be implemented. Roberto also showed interesting information explaining the relationships between beamtime and publication and what could it be done to increase the ratio between number of publications and beamtime.

Knut Sander (ExPaNDS Coordinator) introduced the ExPaNDS project to the audience and explained the similarities with and differences to PaNOSC. After explaining the context of ExPaNDS within the other INFRAEOSC 5-projects he then continued with a comparison between work packages and stressed the importance of continuing the collaboration on the level of Work Packages and of direct contacts between the WP leaders. In addition he proposed a participation of PaNOSC in governance bodies of ExPaNDS and to further consolidate the collaboration on an overall level. He listed the six main areas so far identified for collaboration and how ExPaNDS plans to cooperate with the EOSC governance bodies.

Hans Fangohr (WP4 leader) presented the status of the WP4 - Data Analysis Services, with their vision for data analysis in PaNOSC within the EOSC. He then explained the challenges, solutions needed to overcome different practical and historical aspects of data analysis at the different RIs. He continued with a list of RIs staff collaborating, the ongoing activities to finalise with the two main technologies to offer remote data analysis being remote desktops and Jupyter Notebooks.

Juncheng E (WP5 leader) followed with his talk about the WP5 Virtual Neutron and X-ray Laboratory, listing the participant staff from the RIs, the objectives of the WP and why simulation services are important at RIs. He followed with the WP roadmap showing the simulation services to be offered and their features. The WP tasks, milestones and deliverables were explained before finishing with a summary of what's coming up next.

Jean-François Perrin (WP6 leader) talked about FAIR scientific data at the ILL, showed how many users different European RIs share and the fact that accessible data will be very useful. He then showed the ILL's data portal, data transfer technologies used, metadata definitions, Data Analysis as a Service (DaaS) offered and a tool called PUMA-BI that is used to rank similarities between proposal documents, experiments and scientific articles. He finished his presentation with the open question of how to measure the impact of open data at RIs.

Ornela de Giacomo (WP7 contributor and Deputy Executive Director of CERIC-ERIC) reported on the RDA meeting in Helsinki at the end of October in the last presentation of the day. She explained what were the main topics raised in the meeting (including the need to better collaborate with other cluster projects) and also talked about the different working groups within the EOSC Executive Board.

At this point of the day we were running late, so the discussion session planned was replaced by a talk about the PaNOSC EOSC Vision Statement from Andy Götz (PaNOSC Coordinator) and the services EOSC must provide in order to generalise the adoption of FAIR data at RIs and provisioning of remote data analysis services. An interested discussion session took place on the vision statement and what are the key EOSC features which make it compelling.

2nd day

The agenda for the second day was:

Topic	Speaker (s)	Schedule
WP 6 - EOSC Integration	Jean-François Perrin	08:00-08:20
EOSC Federating Core	Dale Robertson	08:20-08:40
AAI for PaNOSC	Christos Kanellopoulos	08:40-09:00
WP 7 - Sustainability	Roberto Pugliese	09:00-09:20
Cloud service procurement	Rudolf Dimper	09:20-09:40
Accessing EGI cloud resources	Tiziana Ferrari	09:40-10:00
Coffee		
Reproducible big data analytics: the EGI solution	Giuseppe La Rocca	10:30-10:50
WP 8 - Staff and User Training	Thomas Rod	10:50-11:10
FAIR Crystallographic data	Brian McMahon	11:10-11:30

FAIR Data @ ESRF	Andrew Götz	11:30-11:40
FAIR Data @ EuXFEL	Hans Fangohr	11:40-11:50
FAIR Data @ ELI	Florian Gliksohn & Birgit Plotzeneder	11:50-12:00
FAIR Data @ ESS	Jonathan Taylor	12:00-12:10
Data Management & Analysis: The challenge of complexity and how to attack it	Michael Bussmann	12:10-12:30
Lunch		
PaNOSC Portal	Jamie Hall	14:00-14:20
WP 2 - Data Policy and Stewardship	Andrew Götz	14:20-14:40
Progress and challenges ahead - discussion		14:40-15:10
Coffee	Executive Board Meeting	15:10-16:30

The second day started early in the morning with a presentation by Jean-François Perrin (WP6 leader) on the activities of the WP he is leading. He explained the tasks, focusing on Authentication and Authorisation Infrastructure (AAI) and Data Transfer, outlining in detail the approach that will be followed for AAI and the available options for the Data Transfer which are the two main open activities in the WP.

Dale Robertson (EOSC-hub T2.3 Governance and Sustainability Task Leader) continued with a remote presentation on the proposals for the EOSC Federating Core. She explained the two broad categories of resources (service portfolio and federating core) and the tiers in the federating core. Then she went through feedback and clarifications obtained to date and the benefit the EOSC will generate.

The third presentation of the day was by Christos Kanellopoulos (Senior Trust and Identity Manager at Géant) on the topic of AAI for PaNOSC. Christos started his presentation introducing Géant, its members, partners and services offered to then move into how AAI could work for the EOSC and how Géant is supporting PaNOSC with AAI.

A presentation by Roberto Pugliese (WP7 leader) on WP7-Sustainability followed. Roberto started summarising the tasks and deliverables of the WP, continuing with a list of "internal milestones" that could be used to follow-up progress in this WP. He then listed a potential list of costs for PaNOSC and open questions that remain regarding the inputs of the cost model, metrics to measure added-value and any other metrics that could be interesting.

Rudolf Dimper (ESRF's Executive Board member in PaNOSC) made a presentation about Cloud Procurement (Task 6.8 in the PaNOSC's proposal) and explained his understanding of the procedure and past experiences with EU projects like HNSciCloud in which cloud resources were procured according to EU funding rules. His presentation led to an interesting exchange on how the rules for procurement have recently changed and approaches that could be followed for Task 6.8. The coordinator raised the point that cloud resources in the PaNOSC project are considered as Other Indirect Costs and therefore need to follow the ESRF (as task lead) purchasing rules.

The next presentation was by Tiziana Ferrari (EGI Foundation Technical Director) on the EGI federation and federated compute capacity available,

the services EGI can offer and the resources available for PaNOSC through linked third parties. She then moved on EGI's tiered architecture in EOSC and possible funding models.

After the coffee break Giuseppe La Rocca (EGI Foundation Senior User Community Support and Outreach Expert) did a presentation on Reproducible big data analytics: the EGI solution. He explained why Open Science is advantageous as it will increase publications and reproducibility. Giuseppe then introduced how the EGI solution for supporting Open Science was used in a real use case from the SeaDataNet project. In the SeaDataNet use cases, datasets were stored on the EGI infrastructure and made transparently accessible using the Onedata SW stack. The EGI Jupyter notebooks was used to analyse the SeaDataNet datasets and plot the surface temperatures of the Black and the Baltic seas.

Thomas Rod (WP8 leader) presented an update on the WP8 Staff & User Training. He showed the different tasks, the approach that will be followed and resource distribution between partners for WP8, including planned workshops and a video by Linda Udby (Associate Professor at the Niels Bohr Institute) on how e-neutrons.org works (e-neutrons will be renamed and the platform reused for PaNOSC).

Brian McMahon from the International Union of Crystallography(IUCr) talked about how the FAIR principles are understood for crystallography and the fact that data in science has a very large scope (covering raw data, annotations, referenced data, processed data, etc.). Brian then explained the Crystallographic Information Framework and the variety of data managed by it.

The presentation of FAIR @ ESRF was made by Andrew Götz (WP2 leader and PaNOSC Project Coordinator). He focused on an example of Open Science at the ESRF, showcased the progress in implementation of the Data Policy in ESRF's beamlines, metrics (datasets curated, experiments with open data, experiments to be released from embargo, etc.), the data repository, e-logbook, archiving and workshops partially sponsored by PaNOSC (OASYS school, HDF5).

Hans Fangohr (WP4 leader) presented FAIR data at European XFEL (EuXFEL), showing where the EuXFEL is regarding FAIR data and how PaNOSC work will help. Hans also explained work done towards FAIR, including research of container based solutions for deployment and archival of software environments, interactive widgets embedded in Jupyter Notebooks, collections of analysis recipes in notebooks, and contributions to open source packages such as introduction of virtual data sets to the Python interface to HDF5 files.

Florian Gliksohn and Birgit Plotzender (ELI staff and PaNOSC contributors) shared the stage to present FAIR data at ELI. The presentation started with Florian introducing ELI, its facilities, the principles that will underpin the future data policy of the soon-to-be established ELI ERIC and challenges ahead to implement it. Birgit continued the presentation and reflected on the balancing act of keeping both scientists and users "happy", ensuring reliability and efficiency in the areas of data acquisition, transfer and data analysis working. She gave a few examples of on-going developments and challenges at ELI Beamlines.

FAIR data @ European Spallation Source is the presentation that followed by Jonathan Taylor (ESS Executive Board member for PaNOSC) and Tobias Richter (WP3 leader). The current situation of ESS was explained, its data policy, data catalogue, logbooks and a recent workshop on Data Curation.

The last presentation before the lunch break was by Michael Bussmann (spokesperson for Data Management and Analysis at Helmholtz), titled Data Management & Analysis: The challenge of complexity and how to attack it. Michael introduced the Helmholtz Association and gave some examples of challenges faced due to very high volumes of data, pointing out that data reduction will become more and more important.

Jamie Hall (PaNOSC Contributor from ILL) made a presentation about the PaNOSC Portal he has been working on after the lunch break. This portal will be a common interface to access services offered through WP4 (Jupyter Notebooks and remote desktop environments), with AAI provided by WP6 and capabilities to search data provided by WP3. He explained how it could be deployed, architecture approaches that could be followed and current work being done.

Andy Götz (WP2 leader) presented a status report on the WP2 Data Policy and Stewardship. He reminded the audience of the objectives, tasks, deliverables and KPIs for the WP, updated on GDPR, FAIR organisations that could help us and updated everyone on the Data Policy Framework at PaNOSC's RIs, including best practices and data management plan templates.

The presentations were followed by a closed session of the Executive Board.

Workshops during day 3 and 4

The third and fourth days of the PaNOSC Annual Meeting were closed work sessions:

WP2 session

The first day of the WP2 session focussed on the update of the PaNdata data policy framework. This is one of the main deliverables of WP2. The whole day was spent revising and updating the existing framework. The PaNdata framework has been very successful and has been adopted by 15 photon sources as the basis for their data policy. In view of this result the WP2 members decided not to rewrite the PaNdata data policy framework from scratch but to revise and update it to take into account developments in scientific data management since 2010 (mainly FAIR and GDPR) and experience from the partners in adapting the framework. The session was very efficient and by the end of the first day a first draft was almost completed. The working document is available on the PaNSOC google drive here:

<https://drive.google.com/open?id=1e3KtN0agkKWEK1DtEEw1KW2l9Ne9Odkj>

The next steps for the PaNOSC data policy framework are:

- polish this draft and submit it for the Milestone due end of November 2019
- share the draft with all partners in PaNOSC and ExPaNDS for their feedback,

- do a comparison of draft with the FAIR recommendations to ensure that all those which need to be covered are covered
- submit the draft to FAIRsFAIR and other data policy experts for their feedback

Day 2 of the WP2 session of the PaNOSC annual meeting focused on Data Management Plans (DMP). Heike Görzig (IT Specialist in DMPs at Helmholtz-Zentrum Berlin) presented the work she has been doing in DMPs, showcasing a tool that could be used to build DMPs for an experimental proposal. Her presentation kicked-off an interesting exchange of opinions and experiences at different sites regarding DMPs, knowledge the users have about the data volumes that they will generate, how proposals for beamtime are processed, etc.

At the end of the session there was consensus that:

- more can and should be done regarding DMPs at RIs
- users do not always have all the information for a DMP at the time of submitting the proposal
- users often will require support from RI's staff in order to complete a DMP
- DMPs should be easy to populate and their contents machine readable
- DMPs should be used to assess the value of proposals and what to do with the data after the experiment
- the Research Data Management Organiser ([RDMO](#)) tool by the Potsdam Institute is a promising candidate for implementing the DMP template tool in WP2.

WP3 session

All partners were represented, with the exception of ESRF. ExPaNDS had representatives from PSI, HZB, STFC/ISIS and Elettra. The workshop started with updates on ongoing activities from the PANOSC partners and a ExPaNDS news, since their kick off meeting.

The draft documents for the upcoming milestones (2 external, 1 internal) have been migrated to Google Docs to finalise any input from partners and for review. The distribution of the remaining work on these was agreed and a final deadline set to mid-November. Both external milestones - on API and NeXus surveys - should be made useful for ExPaNDS partners.

On Wednesday afternoon WP3 held a joint session with WP4 and WP6 to agree on the scope for the WP4 data portal. The draft search API was found to be a good and timely fit for the WP4 implementation plans to start with a mockup of the portal. Better understand of the authentication mechanisms offered by WP6 was achieved. The initial roll out to partners should be done in time for more detailed work to fulfil the authentication needs.

Thursday morning was devoted to a closer look at the proposed federatable search API. ESS had prepared a "hackathon" style exercise to play with the API for a detailed inspection. HZB presented some ideas and wishes for the interface. Most of the relevant points were already addressed by the presented proposal. Some suggestions are being taken into account in the text iterations. In some cases the evaluation would follow.

For February WP3 and ExPaNDS WP3 agreed to hold a joint meeting in Lund to disseminate the search API and establish an agreed way forward. A similar joint meeting with community science experts on the NeXus ontology is also in planning.

WP4 session

The WP4 session was attended by participants from PaNOSC and a few representatives from ExPaNDS. Giuseppe La Rocca gave a detailed introduction of the EGI Notebook and Data hub vision, Jamie Hall outlined the first design and ongoing work towards the Portal, Robert Rosca and Thomas Vincent showcased a first reproducible science case study, Franz Lang described the data analysis services available at ISIS, and Carlos Reis reported on efforts to provide remote access to tools that allow exploration of hdf5 data files. These scheduled presentations were mixed with extended design discussions, brainstorming and exchange of facility specific information and requirements. Participants also took part in a joint meeting with WP3 and 6, and a separate discussion with WP8. Agreed challenges are the creation and deployment of a portal to link data search, access and exploration, and the creation of reproducible science case studies.

WP6 session

The WP6 session took place the 6th of Nov and was well attended with at least one representative per partner. We focused on discussing further details about the approach to be followed for AAI set up and options open for data transfer.

Jean-François Perrin and Christos Kanellopoulos went in detail about the current situation and next steps required. The consensus during the work session is that the AAI approach suggested by Christos (adding a proxy transparent to the user then expand UmbrellaId in integrating more Identity providers like eduGAIN or ORCID, and increase the number of attributes) is feasible and would work.

Regarding the data transfer, it is not yet clear at this stage what would be the best solution for each uses cases (transfer between data centers for bringing data to analysis services, transfer in order to archive experimental data and transfer driven by users to their home lab after or during an experiment).

Giuseppe La Rocca and Marco Simone presented the status of pilot for the transfer between data centers use case. Ian Johnson and Philippe Le Brouster explained the progress made in the realisation of the archival use cases.

It is now necessary to complete these pilots and clarify what are the costs and performance of each possible solution. Data transfer is an important area of work that needs to be solved as soon as possible.

WP5-WP8 session

The session took place in the morning and early afternoon of November 6th,

2019 and detailed minutes can be found in the PaNOSC GitHub repository at: <https://github.com/panosc-eu/panosc/blob/master/Work%20Packages/WP8%20User%20Training/WP4-5-8/WP5-8%20meeting%20at%202019%20annual%20PaNOSC%20meeting.md>

Aljosa Haffner and Nicoletta Carboni (CERIC-ERIC), Juncheng E (EuXFEL), Mousumi Upadhyay Kahaly (ELI) and Alexandre Stefanov, Mads Bertelsen, Peter K Willendrup, and Thomas H. Rod (ESS) participated in the WP5-8 session.

The meeting started with a status update from Thomas H. Rod regarding WP8 followed with a discussion on how to get the right people involved from the different facilities and the issues that currently exist. According to plan, not much has been done so far, but Thomas is a bit concerned about getting the right people in place before the work package picks up and also the strong dependencies to other work packages. Commitment from scientists at ESRF and ILL are still missing, although names have been suggested. EuXFEL is committed through the WP4 leader. Although the WP4 leader was not able to participate in this meeting, a WP8 took part in a discussion with WP4 in the WP session.. The WP5 participants from ELI and CERIC-ERIC committed to also help out with developing training material for WP8. Specifically, the ELI representative also teaches at a university, which can be exploited for this work package. It was agreed to continue working on getting the right people at the facilities involved (i.e. scientists) and to organize a face-to-face meeting in the spring together with ExPaNDS. This meeting should be used to set the path forward incl. the training workshops to come.

The status update on WP8 and associated discussion were followed by ESS demonstrating the existing simulation capabilities in e-neutrons.org as well as the capabilities to run the entire data workflow from ray-tracing simulations (using McStasScript developed in WP5), over data reduction to data analysis in a Jupyter notebook (the same was demoed at the WP4 meeting).

The above demonstration was followed by presentations by CERIC-ERIC on the OASYS software, EuXFEL for SIMEX, and ELI for computational modelling applicable to ELI experiments, e.g. TDDFT. These presentations were followed by a discussion on how to best integrate simulations for the photon sources into the e-learning platform. The tentative conclusion was that EuXFEL would be pretty straightforward to integrate by using SIMEX. The synchrotrons are more complicated, but a solution could be to integrate OASYS to SIMEX, which is integratable with the e-learning platform and Jupyter technology, but more investigations are required.

WP5 session

The WP5 session was attended by the following participants from PaNOSC partners: Juncheng E from EuXFEL, Mads Bertelsen from ESS and Aljosa Haffner from (CERIC-ERIC)

Juncheng E gave an introductory talk about the structure and scientific applications of SimEx, a start-to-end simulation platform for advanced photon sources. Mads Bertelsen presented an introduction to McStas, which showed its capability to simulate neutron scattering instruments and experiments. Mads also talked about his works on McStasScript, a python API for McStas users to control the simulation parameters via python

scripts rather than editing enormous C-like statements respectively. Aljosa Haffner contributed a presentation about OASYS, a synchrotron radiation beamline simulator, in the WP8-5 joint meeting. Participants discussed the possibility to integrate the synchrotron source simulation modules OASYS into SimEx. In the open discussion session, the KPIs of WP5, EOSC service integration and WP5 workshop in Q1 2020 are discussed. Participants provided comments and feedback on the collaboration and checked the upcoming tasks, milestones, and deliverables. It is agreed that the collaboration needs to be strengthened among participants. Which measures to take depends on the platform integration strategy, which requires more discussion and a clear definition.

Project status

Summary of progress

PaNOSC started on 1st December 2018 and will execute for four years until 30th November 2022 with a grant of 11 957 187€ from the European Commission

So far PaNOSC has submitted all the deliverables and milestones that were due.

Some PaNOSC partners have struggled to recruit staff for working on the different WPs, but the situation is improving over time as posts are filled. Answers to an internal questionnaire showed that WP leaders are not worried at this stage about their capacity to work on the project and to deliver according to the grant agreement.

WP1 - Management progress summary

During the first year of execution of PaNOSC, the WP1 team has been busy ensuring that communication is working between all work packages and partners and the project is fully operational, in particular:

- Organising the Project Management Committee meetings and issues notes of them
- Maintaining mailing lists
- Encouraging the use of the issue log in GitHub, reviewing it often
- Reminding partners of upcoming deliverables and milestones
- Supporting PaNOSC collaborators as/when required
- Interacted and informed the Executive Board of the project status
- Produced an internal list of milestones in order to better track progress of each WP
- Produced a set of initial KPIs, refined and improved during the annual meeting and that will be put in place very soon
- Produced an internal financial report to compare actual and forecast expenditure levels
- Engaged with ExPaNDS and established areas for collaboration between projects
- Ensured PaNOSC representatives attend EOSC and FAIR related events

All partners remain engaged in the project and actively collaborate with each other while delivering as per grant agreement.

WP2 - Data Policy and Stewardship progress summary

The main progress achieved so far is:

- analysis of the landscape of existing data policies of PaNSOC partners and externally
- contact with the EOSC FAIRsFAIR project and selection of one of the PaNSOC data repositories (ESRF) for certification as FAIR
- sporadic meetings on data policy

- first draft of the PaNOSC data policy framework (Milestone 2.1)
- analysis of the DMPs landscape and needs and agreement to try the DMP tool from the Potsdam Institute RDMO - <https://rdmorganiser.github.io/en/>

WP3 - Data Catalog Services progress summary

The ramp up of activities is more or less in line with the planned schedule for the work package. The initial tasks revolve around aligning the goals between partners, identifying the solutions needed and the best technical options. This work is on a good way after the first year and did not require the full resources needed in the upcoming implementation phase. The integration of ExPaNDS into the plans was unforeseen. This "sister" project is aiming to adopt many of the deliverables, like the search API as part of its own success strategy. While this adds some amount of resources, it may also lead to an extended discussion and decision phase as the two project may need to enter another alignment phase.

The first of the two tasks that have started in the first year addresses the datalogue exposure to EOSC, namely the deployment of a metadata harvesting endpoint at all partners, as well as the development of a search API that can be federated and offers domain specific search capabilities. Here the landscape of existing solutions at partners has been surveyed and options identified (for the harvesting) or drafted up from scratch (search API). Everything is going according to plan.

The second active task, around the NeXus metadata schema, has also started with a survey of current practises at partner facilities. The preliminary results of the survey was that a fully automatable and complete mapping of metadata would not be needed in order to achieve a useful search dictionary of terms. There has also been a drive to get more partners involved in the decision making around the NeXus file format by joining the NeXus International Advisory Committee (NIAC). ELI has joined the NIAC, so that now half of the facilities have a representative there.

WP4 - Data Analysis Services progress summary

WP4 is focused on remote data analysis using the Jupyter ecosystem and remote Desktop technology. All facilities have embarked on the provision of these services; some have functional remote desktop services (of different types) and JupyterHubs, others are in the prototype stage. Significant amount of work has started - jointly with Work Package 3 - to design a portal from which such data analysis services can be started.

These infrastructure activities are supported by a range of activities to support remote data analysis, including access and exploration of data in hdf5 files, exploring suitability of containers for reproducible software environments, and starting the packaging of software into containers. We have started to gather scientific use cases which will serve as the prototype examples for remote data exploration.

Challenging points include

- (i) Research facilities have created their own data, metadata, computing and data analysis infrastructures over years and decades. In this project and partly in this work package, we try to homogenise

some of this with comparatively limited resources; we thus need to be realistic about what can be achieved.

(ii) We are working towards the EOSC which is somewhat undefined. We are thus designing solutions for constraints that are somewhat unknown, while trying to prepare each facility to connect to these solutions. Given the EOSC project, there is no way around this but it poses somewhat unusual project management challenges. On the positive side, we can engage in iterative refinement with key players of EOSC hub, such as EGI.

(iii) We are driving technology ahead that is slightly ahead of the main stream data management culture: many scientists are not aware of FAIR data or do not see this as sufficiently important to seriously engage with this. We aim to put together FAIR and reproducible scientific use cases as a demonstrator, and it is unclear how many scientists we can successfully engage at this stage.

(iv) A challenge will be to develop and deploy a portal that can connect and be integrated with the different infrastructures of each institution.

WP5 - Virtual Neutron and X-ray Laboratory progress summary

WP5 is on track to fulfill the milestones and deliverables as planned. The planned MS5.1 was completed earlier this year and D5.1 is under review by the management committee. However, the long-lasting hiring problem still existed. Task 5.2 has not reached the expected state due to the absence of the task leader from ESRF and 5.3 may also be behind schedule due to the same hiring problem in ILL.

Hiring:

EuXFEL: Juncheng E has joined EuXFEL to work on WP5 in July 2019. Carsten Fortmann-Grote has left EuXFEL on Feb. 28, 2019, and now works as a 10% part-time employee of PaNOSC since May 01, 2019.

ESRF: No hirings currently.

ESS: Mads Bertelsen started as a postdoc on Jan. 01.

CERIC-ERIC: Aljosa Hafner started from Jun. 17.

ELI: Mousumi Upadhyay Kahaly started from Apr. 01.

ILL: No hirings currently.

Milestones and deliverables:

- **MS5.1 - Simulation codes in PaNData Software Catalog**

The simulation API SimEx was added to the Pandata Software Catalogue in fulfillment of PaNOSC milestone MS5.1 in April 2019. All other software packages which are foreseen to be employed in WP5 had already been added to the Pandata Software Catalogue, previously.

- **D5.1 - Prototype simulation data formats as openPMD domain specific extensions including example datasets**

OpenPMD (<https://github.com/openPMD/openPMD-standard>) is a standardized hierarchical organization of (meta)data for fields and particles. It is independent of file format and provides the extensibility to support application-specific domain extensions. As one important step to reach the interoperability between different modules as well as the harmonization of the APIs, the standards of openPMD domain extensions for various parts of start-to-end simulation for photon and neutron simulations are drafted for:

- Molecular Dynamics Simulation (Juncheng, EuXFEL)
- Coherent Wavefront Propagation (Carsten, EuXFEL)
- Neutron raytracing (Mads, ESS)
- Photon raytracing (Aljosa, CERIC-ERIC)

The detailed descriptions of these domain extensions can be found in the drafted D5.1 report, which was submitted to the management committee for the first review in November.

Internal PaNOSC collaboration:

- **With WP4:**

A weekly coordination meeting at EuXFEL has started because of the willing to combine experimental data and simulation inside user-friendly application frameworks. The latest topic is to analyze simulation results with methods provided in WP4 to check the data format compatibility between WP4 and WP5.

- **With WP8:**

The WP8 leader Thomas Rod has a strong link with WP5 through WP5 VTC meeting. On the WP5-8 joint meeting in the annual meeting, WP5 and WP8 exchanged information with each other.

Next step:

A WP5 workshop for WP5 members and related other PaNOSC WP members to have a stronger collaboration in early 2020 is under preparation.

Juncheng from EuXFEL is working on the developments of SimEx required by T5.1 and D5.2, and also the WP5 workshop preparation planned in early 2020.

Mads from ESS is working on the python interface to McStas, which is now named MacStasScript (<https://github.com/PaNOSC-ViNYL/McStasScript>). The jobs are important to fulfill the requirements of Task 5.4 and Deliverables 5.2 and 5.3.

Aljosa from CERIC-ERIC is learning and using OASYS, which is an essential part of T5.2 and T5.3.

WP6 - EOSC Integration progress summary

AAI

In July 2019, after a year of specification and preparation work, the UmbrellaID management formally approved the introduction of eduTEAMS in the UmbrellaID infrastructure, the extension of the number of users' attributes and more generally welcomed the collaboration with GÉANT. In September 2019, GÉANT set up the eduTEAMS instance of UmbrellaID. We are currently integrating a limited set of pilot services using both SAML and OpendID Connect protocols.

By the end of 2019, information should be provided to the service providers of the community in order to complete the transition to the new infrastructure by February 2020, before extending the list of IdPs to eduGAIN and ORCID.

Data transfer

Remote Data analyses using Jupyter notebook services of another provider

To support pilot activities in WP6, EGI jointly organized, with the ESCAPE and XDC H2020 projects, a Data Management Workshop. During this workshop Data Management¹ experts introduced the solutions that are developed (or will be developed) in the context of these projects. As a result of this workshop WP6 members identified three different scenarios for helping scientists of a data facility to perform remote data analysis using Jupyter notebook service provided by a third-party provider.

EGI, CERIC-ERIC and CESNET-MCC are progressing with the allocation of the resources and the set-up of the infrastructure for supporting the Data transfer pilot based on the Onedata software stack.

The infrastructure for supporting this pilot is currently composed of:

- no.1 instance of OneZone hosted at CESNET-MCC with 2 vCPU cores, 16GB of RAM and 80GB of local disk.
- no.1 instance of Oneprovider with LUMA at CERIC-ERIC with 16 vCPU cores, 32GB RAM, 40GB+ local disk. This oneprovider will export some datasets in read-only mode via NFS, LUMA service xpmaps local user account to Onedata global account.
- no.1 Kubernetes Cluster + Helms to host the users' Jupyter notebooks (configuration in progress).
- no.1 instance of Oneprovider hosted at CESNET-MCC with a cache to process the CERIC-ERIC datasets (configuration in progress).

By the end of the year (2019) the pilot should be open for intensive tests. These evaluations will allow to understand the benefits and limits of such model.

WP7 - Sustainability progress summary

WP7 is on track to fulfill the milestones and deliverables as planned. Task 7.1 has produced a stakeholders database as foreseen in the planning (MS7.1). The database of stakeholders will be used to involve stakeholders and get feedback via targeted questionnaires and interviews. The feedback from stakeholders will allow us to address the other tasks. An operational version of the database will be available by the end of 2019. For the end of 2019 we foresee to define also the survey platform. The "Stakeholders for Photon and Neutron Community EOSC" report due for May 2020 is currently in preparation.

Task 7.2 "Metrics and cost for the Photon and Neutron community EOSC" has started as planned. We are currently working at the analysis and development of a cost model and to the definition of metrics for the evaluation added value of the services provided to the community.

The defined metrics will be computed by facility information management systems like PUMA (used at ILL), VUO (used at CERIC-ERIC) and others.

¹ <https://indico.egi.eu/indico/event/4698/>

According to the project plan Task 7.3 "Business model for Photon and Neutron EOSC" will start in December 2019 and Task 7.4 "Sustainability plan for the Photon and Neutron EOSC" will start in 2020.

A critical aspect of the current development in WP7 is the definition of clear and auditable costs model of the PaNOSC infrastructure capable of clearly distinguish the costs of building, maintaining the infrastructure including personnel, hardware, consumables and travels, taking into account also the effects of the Moore Law which reduces the costs of the hardware but also increase the efficiency of detectors which in turn increase space requirements. The cost model should be able to include the contributions coming from different initiatives funded by diverse agencies.

Another critical aspect is the definition of metrics that clearly evaluate the impact of and measure precisely and irrefutably the added value of the PaNOSC infrastructure. In other terms it is not sufficient to count the number of publications produced by the research infrastructure and monitor its evolution in time as this cannot be completely attributed to the implementation of the PaNOSC. On the contrary data reuse requests to open data sets clearly measure something that is solely due to the PaNOSC infrastructure. Such complexity cannot be faced without an iterative process that progressively refines the proposed models and metrics with the feedback received from the stakeholders. The next step is hence to engage with stakeholders to get their input and feedback. We are developing a questionnaire about cost and metrics to send to the stakeholders to collect feedback and improve our proposals.

WP7 needs to participate in the EOSC Sustainability Working Group to contribute feedback from the PaNOSC community. The EOSC-Hub has requested WP7 to help produce a cost-benefit study of the EOSC.

WP8 - Staff and User Training progress summary

According to the plan, only Task 8.1 has formally started. Task 8.1 is about migrating the e-neutrons.org to ESS and change the domain name to also accommodate for photons. Initial steps have been taken in this direction, but most of the effort will be put into Q1, 2020. Due to only Task 8.1 being in progress, the work so far has almost solely been performed by ESS, which has had weekly meetings in 2019. ESS has seconded Linda Udby, Associate Professor at University of Copenhagen and Research Engineer Peter K. Willendrup at Technical University of Denmark in order to assist with the development of the e-learning platform. Dr. Udby and Mr. Willendrup are the major developers of e-neutrons.org that will form the basis for the e-learning platform in PaNOSC.

Beginning with 2020, the other facilities will start to become involved, most noticeably ELI, and there are also dependencies to other work packages. It is therefore critical at this point to get the other facilities and the right people at those facilities (e.g. scientists) involved. This has been discussed at a video conference in October and at the WP5-8 and WP4 sessions at the annual meeting. Minutes from the video conference and the WP5-8 session can be found in the GitHub repository at the following links, respectively:

- [https://github.com/panosc-eu/panosc/blob/master/Work%20Packages/WP8%20User%20Training/MeetingMinutes/2019-10-10 VC.md](https://github.com/panosc-eu/panosc/blob/master/Work%20Packages/WP8%20User%20Training/MeetingMinutes/2019-10-10%20VC.md)

- <https://github.com/panosc-eu/panosc/blob/master/Work%20Packages/WP8%20User%20Training/WP4-5-8/WP5-8%20meeting%20at%202019%20annual%20PaNOSC%20meeting.md>

Representatives from ILL and ESRF are still missing, but both facilities have reaffirmed their commitment to the work package.

Although Task 8.1 is the only task in progress, discussions related to the other tasks have taken place, specifically on how to integrate Jupyter and simulations for the photon sources into the e-learning platform. Solutions have been identified (see e.g. minutes from WP5-8 session at the annual meeting), but more investigations are required to confirm that they are indeed viable solutions.

The WP8 leader participated in the ExPaNDS kick-off meeting and had a dedicated session with members of the analogue work package in ExPaNDS. It was agreed to align effort going ahead and to begin collecting information about existing teaching material in the P&N community. This has been initiated at a GitHub page in the PaNOSC GitHub repository; <https://github.com/panosc-eu/panosc/blob/master/Work%20Packages/WP8%20User%20Training/TrainingMaterials/urls.md>

The plan going ahead is to start to have monthly meetings with all partners and to organize a face-to-face meeting for the spring 2020 jointly with PaNOSC and with representatives for all partner facilities. Only ESS and ELI have major efforts in WP8, whereas the other partners have nine person months of effort or less dedicated to WP8. ELI tentatively plans to recruit a person for WP8 in addition to using existing staff.

WP9 - Outreach and Dissemination progress summary

During the 1st year of the project, all planned deliverables in WP9 have been submitted on time, and namely:

- **D9.1 - PaNOSC Communication and Dissemination Plan**

The document is confidential and made available on the PaNOSC drive used to share confidential documentation. It includes both the communication strategy and its implementation plan, identifying actions, tools and target groups addressed, according to the project's stage of implementation, e.g., linking the communication with the task(s) in progress.

The list of stakeholders has been identified in coordination with WP7 - Sustainability. Below is a graphical representation of the audiences to be addressed and to engage with for the whole duration of the project.

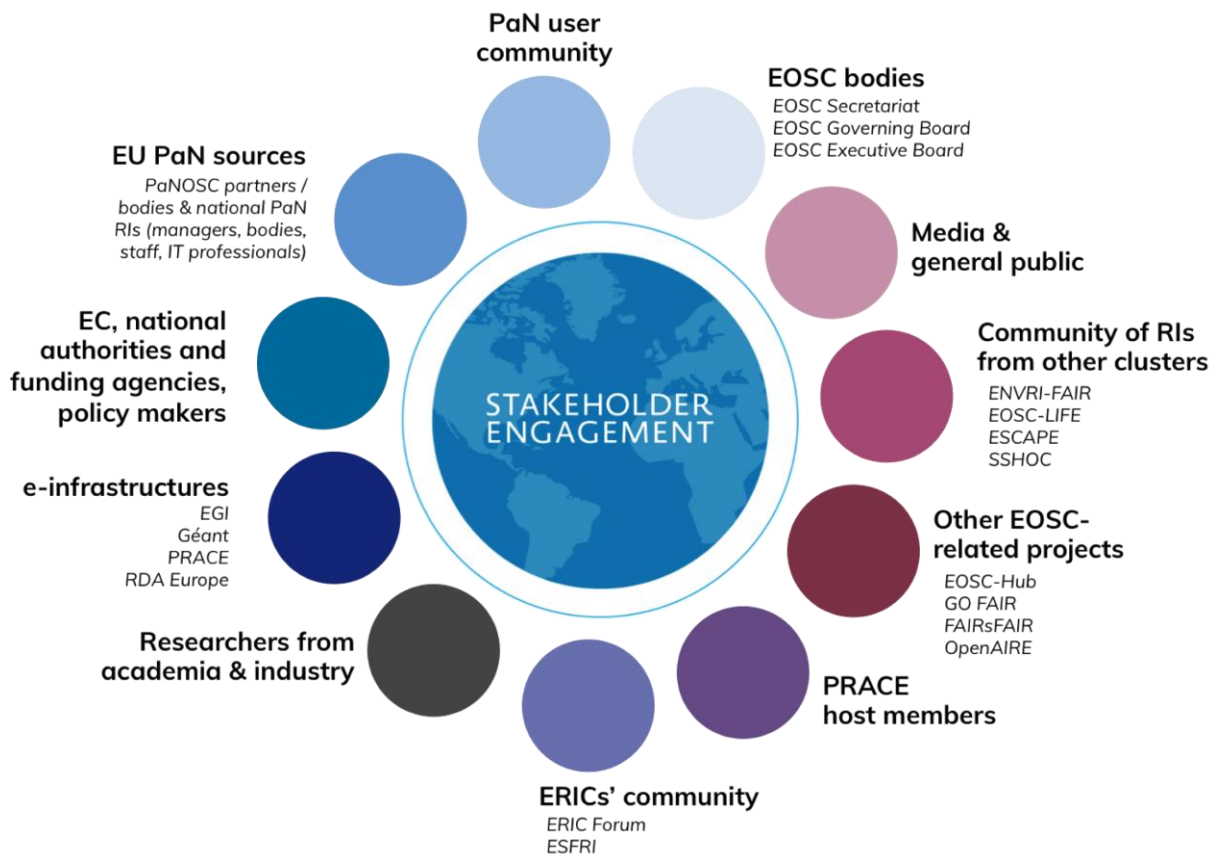


Figure 2: PaNOSC stakeholders

- **D9.2 – PaNOSC website**

Published in June 2019, the PaNOSC website has been populated with content in all sections, with the exception of those which need other deliverables to be published first. This is the case of the training material, or of all the services under development for federated data search, data analysis and data storage, as well as for simulation of scientific experiments.

New sections of the website have been created in the 2nd half of the year, i.e.:

- **Video** section, including video-interviews with representatives from the EOSC / PaNOSC community >> <https://www.panosc.eu/video/>
- **Women in Science** section, including articles and/interviews with women scientists, managers and/or software developers involved in the construction of the EOSC or in practicing open science >> <https://www.panosc.eu/women-in-science/>
- **Presentations** section >> <https://www.panosc.eu/presentations/>
- **Events' calendar** >> <https://www.panosc.eu/events-calendar/>
- **User meetings' calendar** (not public) shared with PaNOSC and ExPaNDS contributors, to have an overview of the events to be attended in order to engage with the PaN research community.

- **D9.3 – PaNOSC repository for internal communications**

Tools for internal communications have been set up at the early start of the project, to ensure a proper flow of information within the partnership, and the storage of the working documents and deliverables produced throughout the project:

- **GitHub repositories** to store project’s docs and manage the project and its team:
 - PaNOSC (<https://github.com/panosc-eu/panosc>), on common issues and general info about PaNOSC
 - Issues (<https://github.com/panosc-eu/panosc/issues>), for discussion on all PaNOSC issues.

Other repositories:

- **Google Drive and Docs** to store and share working documents, and to edit them collaboratively.
- **CERIC drive** – to store and share confidential documents related to the project.
- **PaNOSC on Confluence** >> <https://confluence.panosc.eu>

OTHER ACTIVITIES IN WP9:

In 2019, we collaborated with the EOSC Secretariat for the realization of a video released during the session “Open Science is the new normal” held at the Research & Innovation Days organized in Brussels on 24-26 September by the European Commission. PaNOSC testimonials in the video included:

- Alessa Gambardella (Rijksmuseum Amsterdam / ESRF user)
- Jonathan Taylor (European Spallation Source – ESS / PaNOSC team)
- Aljoša Hafner (CERIC-ERIC / PaNOSC team)

The full video interviews with Aljoša Hafner and Alessa Gambardella on the benefit of open science and open data for the scientific community have been produced in the frame of PaNOSC and published on the project’s online channels (website and social media). More interviews with PaNOSC contributors will be published in the upcoming months.

The experience with the EOSC Secretariat has favoured collaboration with other clusters in communicating the advantages and value-added of the EOSC. In the frame of PaNOSC, similar and new initiatives fostering interaction between EOSC projects are foreseen in the future.

External communication tools implemented and materials realized include:

- Social media channels (Twitter: @panosc_eu / YouTube: PANOSC EOSC – <https://www.youtube.com/channel/UC7ULx4C40CbKlpAp0Xtd4wQ>)
- Rollups – <http://bit.ly/2CVmBYr>
- Posters – <http://bit.ly/2OjCb5i>
- Graphic templates for powerpoint presentations, posters, rollups, badges
- Events (see table below)

LIST OF ATTENDED EVENTS		
EVENT'S NAME	DATE	LOCATION

ESFRI RIs and EOSC Workshop	30 January 2019	London - UK
ESCAPE kick-off meeting	7-8 February 2019	Annecy - France
FAIRsFAIR kick-off meeting	14-15 March 2019	Amsterdam - The Netherlands
EOSC-hub week	10-12 April 2019	Prague - Czech Republic
EGI Conference	6-8 May 2019	Amsterdam - The Netherlands
LEAPS-IT, CalipsoPlus + UmbrellaID	13-15 May 2019	PSI, Villigen - Switzerland
EOSC-hub week	10-12 April 2019	Prague - Czech Republic
EGI Conference	6-8 May 2019	Amsterdam - The Netherlands
LEAPS-IT, CalipsoPlus + UmbrellaID	13-15 May 2019	PSI, Villigen - Switzerland
"Dashboarding with project Jupyter" workshop	3-6 June 2019	Paris - France
Jupyter for Science workshop	11-13 June 2019	Berkeley - USA
Joint EOSC project meeting	9-10 September 2019	Brussels - Belgium
2 nd LEAPS plenary meeting	18-20 November 2019	PSI, Villigen - Switzerland
LIST OF ORGANIZED EVENTS		
EVENT'S NAME	DATE	LOCATION
1 st PaNOSC OASYS School	14-16 May 2019	Grenoble - France
WP3 kick-off meeting	May 2019	Copenhagen - Denmark
WP4 kick-off meeting	25-26 June 2019	Schenefeld - Germany
HDF5 European Workshop for Science and Industry	17-18 September 2019	ESRF, Grenoble - France
WP3 face-2-face meeting	18-19 September 2019	ILL, Grenoble - France
h5py code camp	19-20 September 2019	ESRF, Grenoble - France
PaNOSC 1 st Annual Meeting	4-7 November 2019	CERIC-ERIC, Trieste - Italy

Also, one publication specifically about PaNOSC goals, progress and expected outcomes was accepted at ICALEPCS19. The publication, "Enabling open science for photon and neutron sources" is available at this link >> <http://icalepcs2019.vrws.de/papers/tubp102.pdf>. A more comprehensive list of contributions by PaNOSC representatives at ICALEPCS19 can be found here: <https://www.panosc.eu/news/first-panosc-publication-released-at-icalepcs19/>

To ensure PaNOSC and ExPaNDS are aligned in their communication, a set of joint actions have been identified and implemented since ExPaNDS' kick-off in September 2019:

- Share of deliverables and useful resources for communications/outreach
- Common mailing list, with all communications/press officers from PaNOSC and ExPaNDS partners, to exchange news, info about events and projects' advancements, useful resources, etc.
- Use of a joint common events' calendar
- Mutual support on social media
- Mutual promotion of results, events and activities of both projects
- Joint use of the e-learning platform developed in PaNOSC WP8 (once available)
- Joint planning of similar events (e.g., Jupyter workshops or similar)
- Joint attendance of user meetings to raise awareness about the projects, and to involve and engage potential and future users of tools / technologies / services developed in the frame of the two projects.

The work in WP9 has proceeded in strong link with all other WPs, and namely:

- **WP1 - Management.** Regular exchanges have taken place with the project coordinator, also through participation in meetings of the Project Management Committee
- **WP2 - Data Policy and Stewardship.** Commitment in WP9 is expected once the PaNOSC data policy framework will be updated (M18), and the guidelines for DOIs, long term archiving and FAIR data, GDPR and other legal aspects of federating data, will be created (M24).
- **WP3 - Data Catalogue / WP4 - Data Analysis Services / WP5 - Virtual Neutron and X-ray Laboratory (VINYL).** Activities for the promotion of the meetings, workshops and events organized in the frame of the various WPs have been carried out in WP9, through the realization of graphic material, the publication of news posts, and their distribution via the partners' newsletters and online channels, including social media. When required, follow up activities have taken place, to inform the stakeholders about the outcomes in the different WPs, and to distribute training material when available.
- **WP6 - EOSC integration.** An action has started, to highlight and disseminate an important result achieved in the WP, i.e. the integration of UmbrellaID with Gèant eduTEAMS. Further collaboration between WP6 and WP9 is expected later on in the project's implementation, once integration of PaNOSC services into the EOSC will start.
- **WP7 - Sustainability.** WP9 has supported the work in WP7 for the identification of stakeholders. Stronger links will be set once deliverables in WP7 will need to be disseminated.
- **WP8 - Staff and User Training.** The action for collecting training material at PaN facilities has just started, by contacting lecturers at the past Hercules schools. Further commitment in WP9 is expected for the promotion of the e-learning platform, of training events, courses and material.

Comparison between actual and planned project status

As of 13th of November 2019:

- All due deliverables have been submitted
- All due milestones have been submitted
- All partners are engaged in the project
- Partners are underspending
 - This is understood to be the case due to lead times for recruitment
- All tasks due to start have started

PaNOSC is therefore in a good position to start its second year of execution and will surely submit high quality deliverables on time that will make a difference to the EOSC and the PaNOSC users community.

Risks

The risks identified during the proposal stage were reviewed and assigned owners during the first few months of project execution. Since then, there has not been much activity in the risk management area.

The Executive Board provided detailed guidelines for risk management that will be implemented during the second year of execution for the project.

Changes

PaNOSC does not foresee changes to the project planning or allocation of resources/funding between partners at this stage, however continuous monitoring of the project will continue to ensure that if the situation requires changes to the project these are controlled and the stakeholders informed.

Report from Executive Board

The PaNOSC's Executive Board (EB) met on three occasions during the first year of the project, including the last meeting, which took place during the Annual Meeting in Trieste:

- 1st EB meeting - 16 January 2019 - Grenoble
- 2nd EB meeting - 29 April 2019 - Video Conference
- 3rd EB meeting - 05 November 2019 - Trieste

For all three meetings the quorum was reached, some of the EB members not being able to attend have nominated representatives.

The following points were discussed and decided during these meetings:

1st EB meeting

- The governance model of the project was presented by the project coordinator. Although the Consortium Agreement (CA) defines a yearly EB meeting, this was judged insufficient and the members of the EB decided that at least one additional meeting by video conference shall be held. A specific mailing list was set up for the EB and it was collectively decided that e-mail solicitations shall be answered within one week.
- The EB unanimously elected R. Dimper (ESRF) for one year as chair of the EB.
- The EB decided that an annual reporting by the PMC is sufficient.
- The status of the project was discussed. PMC have to take place at least once per month according to the CA, but more frequent meetings are felt necessary to guarantee that work is progressing well. The presence of the WP leaders has been made mandatory at least once per month.
- The planning of the deliverables was discussed and the EB proposed to the Coordinator to advance some of the deliverables to avoid pile-ups.
- Further discussion points concerned the GDPR, the departure of the WP5 leader and how to make sure that this has no negative impact on the WP, and the date of the 1st annual meeting.

2nd EB meeting

- The Project Coordinator gave an overview of the project status. He reminded that it is important not only to be attentive to the deliverables deadlines, but also to the milestones. He suggested to ask for intermediate milestones allowing for a better progress follow-up. He also recalled the objectives of PaNOSC and linked them

to possible weaknesses which needed to be addressed. He went on and outlined two of the risks from the risk register: not enough engagement of the partners to the project and the lack of user engagement.

- At the 2nd EB meeting it was known that the ExPaNDS project is funded and would start in September. The EB discussed how to align the work and make sure that both projects develop synergy. This has in the meantime led to many exchanges and the two projects due indeed work closely together.
- It was furthermore discussed that cooperation with the other cluster projects is also important. It was suggested inviting the other cluster coordinators to the Trieste annual meeting.
- The EB requested the PMC to liaise with FAIRsFAIR as the preferred FAIR expert.
- The EB requested the PMC to develop a plan on how to engage with users and other projects.

3rd EB Meeting

- The meeting started reviewing previous recommendations and found that three out of five recommendations can be closed. The two remaining recommendations are linked to risk management and user involvement, and they are both kept open.
- The EB discussed the 1st year financial report showing an underspending at most of the partners and upcoming project review meeting Brussels, which is likely to be scheduled in six months' time. The EB proposed that WP leaders are already made aware of the review meeting and start thinking of the presentation material.
- The project coordinator stated that he felt now a higher level of engagement from the partners. He hopes that outstanding recruitments can rapidly be concluded such that the work programme does not suffer from a lack of human resources.
- The deliverable planning was discussed and the EB noted that six deliverables will be due in six months and this will coincide in addition with the project review meeting in Brussels. The EB encouraged the project coordinator to bring some of the deliverables slightly forward.
- The participation and/or collaboration with the future INFRAEOSC-03 and 07 projects was discussed to see how PaNOSC could fit into these calls and to which extent PaNOSC should actively seek participation.
- The cluster projects were asked to write a short position paper outlining their expectations from the EOSC. This paper will be

presented at the EOSC Symposium in Budapest on 26-28 November. The project coordinator will circulate a draft of this paper for feedback.

- The EB discussed possible venues for the next annual meeting. A. Weeks proposed that ELI-BEAMS in Prague could host the meeting and the EB gratefully accepted this proposal.
- The EB unanimously elected Thomas Tschentscher (EU-XFEL) as the next chair of the EB for duration of one year. His mandate started immediately after the 3rd EB meeting.

Next steps

PaNOSC is entering its second year of project execution, which will be busier than the first. Most of the recruitment has been done and the partners are in a good position to start this challenging year.

During the next twelve months 10 deliverables (on top of the three due on month 12 of the first year) and 6 milestones (4 milestones due in month 12 as well) will be due. PaNOSC's target expenditures will stand at 4.6M€. Most work packages will start new tasks or increase their workload as early ground work has already been completed during this first year.

While not originally included in the proposal, collaboration with ExPaNDS and other cluster projects financed through the same call will become more important. RIs in Europe need to work together to share their experience and outcomes during this critical phase of defining and building the EOSC to offer FAIR data.