



## Overview

### PITHIA-NRF Project

*PITHIA-NRF is a Research Infrastructure project funded by the European Commission Horizon 2020 Programme, aiming at building a distributed network that integrates into a unified research environment all key observing facilities, data collections, data processing tools, and prediction models dedicated to ionosphere, thermosphere and plasmasphere research. Through the integration of different assets, the project offers R&D services to expert and early-career researchers and to software and instrument development professionals, enabling leading edge research and fostering innovation.*

*PITHIA-NRF has the ambition to become the European hub that will act as facilitator for coordinated observations, for data processing tools and modelling advances, and for software and data-products standardization, and will advise on the transitioning of models to operations providing e-Science supporting tools so that models can reach the desired accuracy and standards.*

*This e-newsletter aims at communicating to all stakeholders the project developments, specifically regarding the TransNational Access programme, the e-science services, the Training, Dissemination and Communication Activities and potential for collaboration within the Innovation Framework of the project.*

*– Dr. Anna Belehaki, Coordinator of the PITHIA-NRF project*

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Plasmasphere Ionosphere  
Thermosphere Integrated  
Research Environment and  
Access services: a Network of  
Research Facilities

### PITHIA-NRF Project

PITHIA-NRF aims at building a European distributed network that integrates observing facilities, data processing tools and prediction models dedicated to ionosphere, thermosphere and plasmasphere research.

### PITHIA-NRF Newsletter

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## Project News

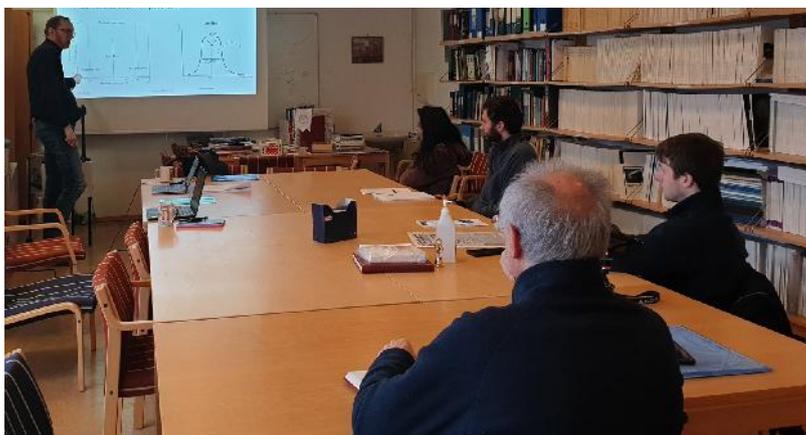
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### The TransNational Access Program

One of the objectives of the PITHIA-NRF project is providing effective and convenient access to the best European research facilities for observations of the upper atmosphere, including the plasmasphere, ionosphere and thermosphere. This access is organised through the TransNational Access (TNA) programme, giving an opportunity to external researchers and other users to perform their projects together with one or more of the consortium nodes.

During the first year of the project, the TNA centre was established to help coordinate these efforts, and in July 2021 the first TNA call for projects was launched. In this call, we received fourteen applications from users from eleven different countries, for access to seven of the nodes. Twelve of these applications were accepted in the review process and are presently in the stage of discussions and arrangement of the projects. Most of the users opted for physical access to individual nodes. Remote access was more popular with users from more distant countries such as Russia and India. One of the accepted users dropped out, but the others are getting ready to actualise their projects with the help of individual nodes, with the first users running their projects already in March 2022.

Submissions for the second call have closed in March and will now be evaluated. There are two annual TNA calls planned for the coming years of the PITHIA-NRF project, six calls in total. Hence, many more new users will be able to enjoy the possibilities offered by the PITHIA-NRF nodes in the coming years.



*TNA access user training at the EISCAT Tromsø site.*

### Bring PITHIA-NRF and EOSC Together

Facilitation of Open Science is one of the main objectives of PITHIA-NRF. An action line within the project is building bridges with the European Open Science Cloud (EOSC) which aims to provide European researchers, innovators, companies and citizens with a federated and open multi-disciplinary environment to publish, find and reuse data, tools and services.

Connection of PITHIA-NRF with EOSC is ensured by EGI, a member of the consortium and one of the main providers in EOSC. EGI is a federated e-Infrastructure, set up to provide advanced computing services for research and innovation and actively supporting the EOSC.

PITHIA-NRF will be interfaced with EOSC on several levels:

- The e-Science Centre is built from several components and services that are available to research communities via EOSC.
- The e-Science Centre will be made available as a service within EOSC, enabling researchers to discover data and applications from the PITHIA facilities.
- The PITHIA data interoperability work takes input from the EOSC interoperability efforts that happen in the various EOSC Advisory Groups.

EGI is helping the consortium implement the IT service standard (FitSM) for customer-driven delivery which is already used in the EOSC. FitSM is the reference framework being used in many large-scale EC-funded projects. It defines the procedures to organise and manage the portfolio of services that they offer for researchers and other stakeholders. One FitSM training to the PITHIA-NRF community has already been given, and additional training will be offered in later years of the project.

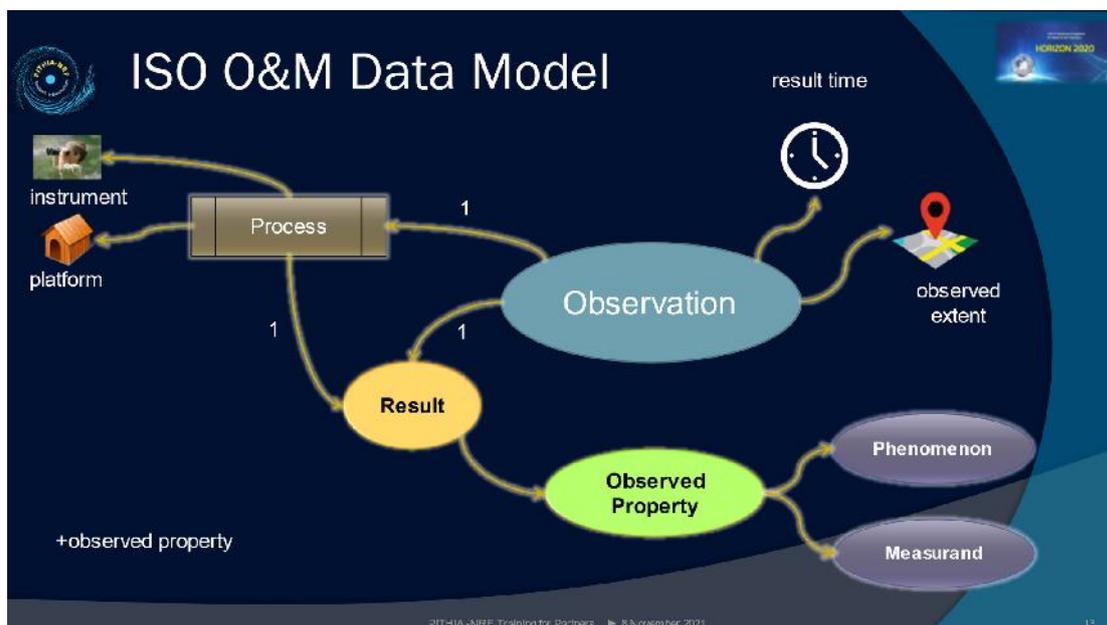
## Project Achievements

### Highlights from the 1st Training for Partners Workshop

The Training for Partners Workshops are conceived to ensure a close interaction between the e-Science Centre developers and the infrastructure operators and model providers. The training addresses the use of the tools for registration of data and models in PITHIA-NRF as well as IT management standards. The first workshop was organised by INGV as a virtual event on 8 and 9 November 2021 and was attended by 53 members from the consortium.

The first part of the workshop comprised talks addressing technical aspects of the e-Science Centre. Anna Belehaki (NOA) gave an introductory talk about the project, stressing the importance of the training workshops. Gabriele Pierantoni (UOW) went through the general ideas and plans concerning the design and implementation of the e-Science Centre and explained the various user roles—scientific user, data, model, or application owner—and the offered functionalities within the centre.

Ivan Galkin (BGD) explained the standards for data model and domain ontology, stressing the importance of standardisation when registering resources in the e-Science Centre. Finally, Tamas Kiss (UOW) highlighted the differences between scientific and technical metadata and provided various examples of technical metadata related to data sources, models, and services. The talks are available as part of the project’s training material via a [dedicated web page](#) on the project’s website.



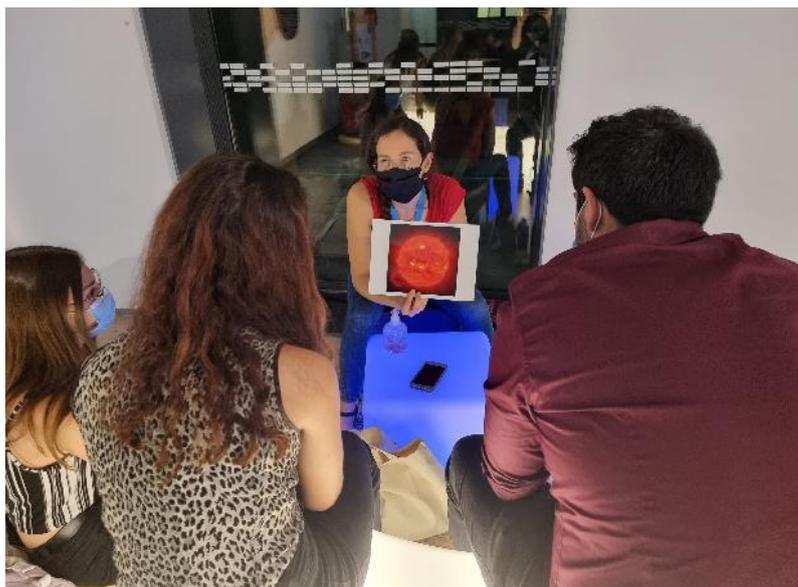
Sketch of the proposed data ontology as presented during the talk “Standardisation: data model and domain ontology.”

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The second part of the workshop was dedicated to a round table discussion between developers and providers, during which a representative from each node and from each provider reported features, peculiarities, and foreseen issues. This resulted in the establishment of a dedicated team for the development of a roadmap for the e-Science Centre and the planning of the second training workshop, that will be held at the end of March 2022.

## Outreach Work: Speed searching at the European Researchers' Night

Aurélie Marchaudon and Frédéric Pitout of IRAP took part in the Speed Searching event, which consists of a ten minute discussion with a small group of visitors. Four small groups follow each other and meet different scientist during one hour. The visitors' goal is to guess the research topic of the scientist they discuss with. To help them, each scientist brought an object. Aurélie brought her mobile phone to introduce possible disruption of radio signal during space weather events; Frédéric brought an old 200 NOK note with Birkeland on it to tackle Sun-Earth connection.



*Aurélie Marchaudon at the European Researchers' Night in Quai des Savoirs, Toulouse, Sept. 24th 2021 (credit: Lucas Cousinet).*



*Frédéric Pitout at the European Researchers' Night at Quai des Savoirs, Toulouse, Sept. 24th 2021 (credit: Sandrine Tomezak).*

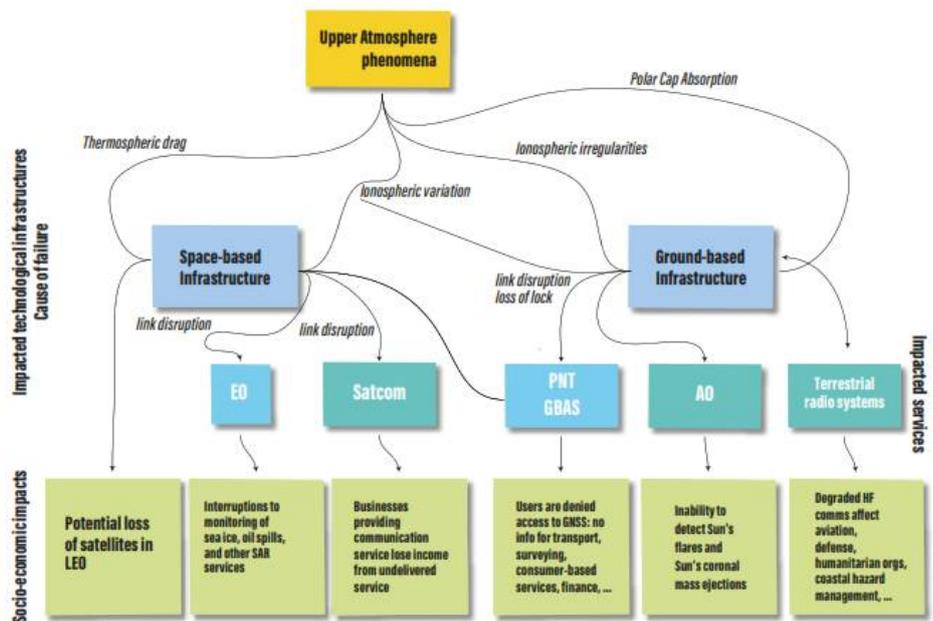
Frédéric shares his impressions: “most of the public I met knew what an aurora borealis is but could not explain it. They were not aware at all of the nastier effects of extreme solar events. Some interesting questions about the Sun’s influence on our everyday life. It’s nice to talk to a very small group of people but ten minutes flies very fast! All in all, visitors showed interest and curiosity, it was a very enjoyable experience.”

# Upcoming Events

## First Innovation Day

The first Innovation Day will take place on June 22. This will be a hybrid event with an in-person meeting in Rome and possibility for remote attendance. More information can be found on the [project website](#).

On the side figure, a mind map summarising the socio-economic impacts of the upper atmosphere effects is presented.



Mind map summarising the socio-economic impacts of the upper atmosphere effects

## 44th COSPAR Scientific Assembly 2022

PITHIA-NRF will participate to the 44th COSPAR Scientific Assembly 2022. The following presentations have been submitted:

- Belehaki, A. and PITHIA-NRF team, “PITHIA-NRF: Plasmasphere Ionosphere Thermosphere Integrated Research Environment and Access Services: a Network of Research Facilities”, COSPAR-22 PSW.4: Space Weather Information Architecture and Innovative Solutions, 44th COSPAR Scientific Assembly 2022, Athens, Greece, 16-24 July 2022
- Kiss, T., G. Pierantoni, I. Galkin, A. Belehaki, D. Kagialis, D. Chan You Fee, “Sharing Datasets and Models for Ionosphere, Thermosphere and Plasmasphere Research”, COSPAR-22 PSW.4: Space Weather Information Architecture and Innovative Solutions, 44th COSPAR Scientific Assembly 2022, Athens, Greece, 16-24 July 2022
- Häggström, I., A. Belehaki and PITHIA-NRF team, “PITHIA-NRF Transnational Access Programme and funding possibilities”, COSPAR-22 PSW.5: COSPAR International Space Weather Action Teams (ISWAT): Progress and Plans, 44th COSPAR Scientific Assembly 2022, Athens, Greece, 16-24 July 2022

## Imprint

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