



PITHIA-NRF

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



# First High Profile Meeting

## Introduction

Anna Belehaki, Project Coordinator

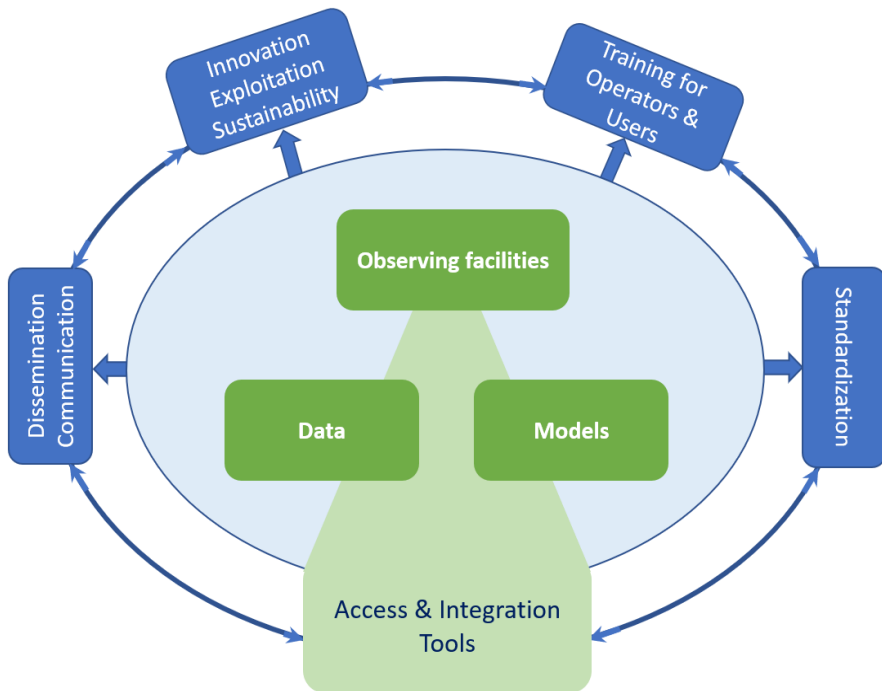
High Profile Meeting

Brussels, 14 March 2023



# Overview & Ambition

**PITHIA-NRF has the ambition to facilitate the development of validated prediction models and its transition from research to applications**



Europe operates excellent observing facilities and is extremely well-placed in developing ionospheric, thermospheric and plasmaspheric models.

However, more is needed to:

- Support the interoperable use of observing facilities;
- Develop standardized processes that lead to FAIR data and data-products;
- Facilitate the use of scientific models' concepts for experimentation purposes;
- Support space applications developers to implement innovative projects.

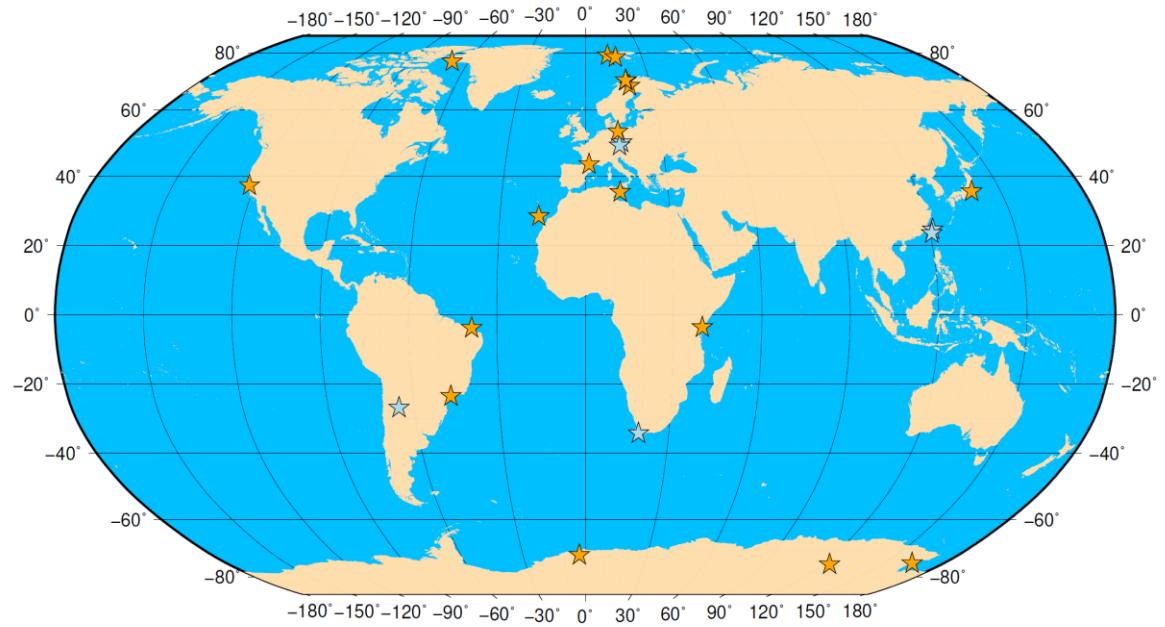
... and all these need to be more reliable.

To achieve this challenge, the scientific research community requires support from a **structured research infrastructure** organized to provide **transnational research services**, including **access** and **standardization**.

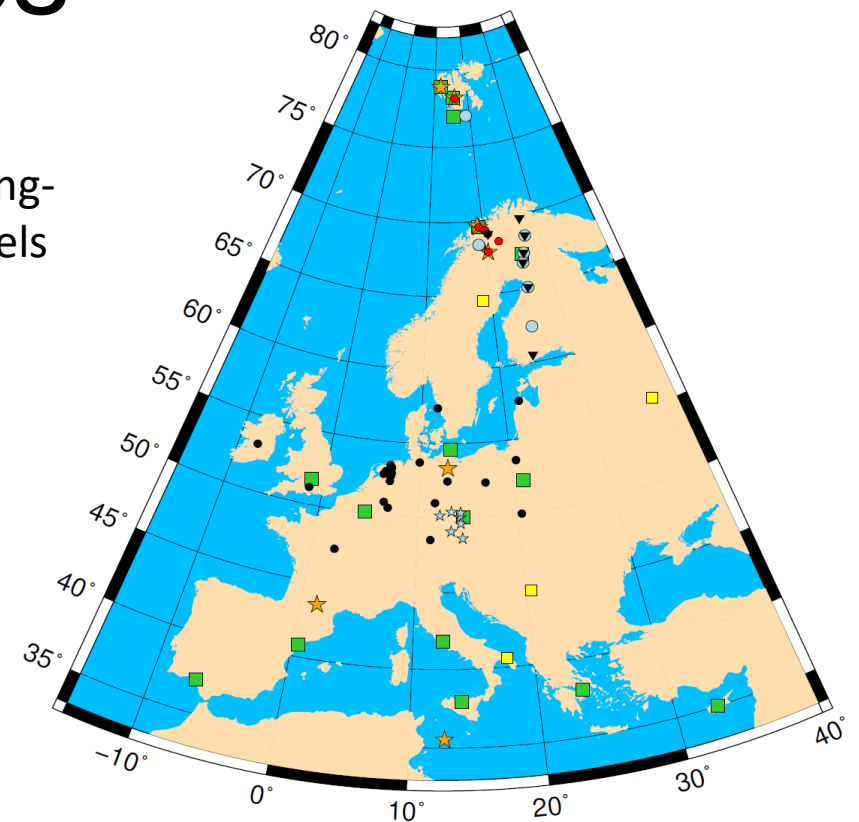


# Observing facilities

PITHIA-NRF participating organizations offer access to observing facilities, long-term observational data from ground-based and space experiments, and to models



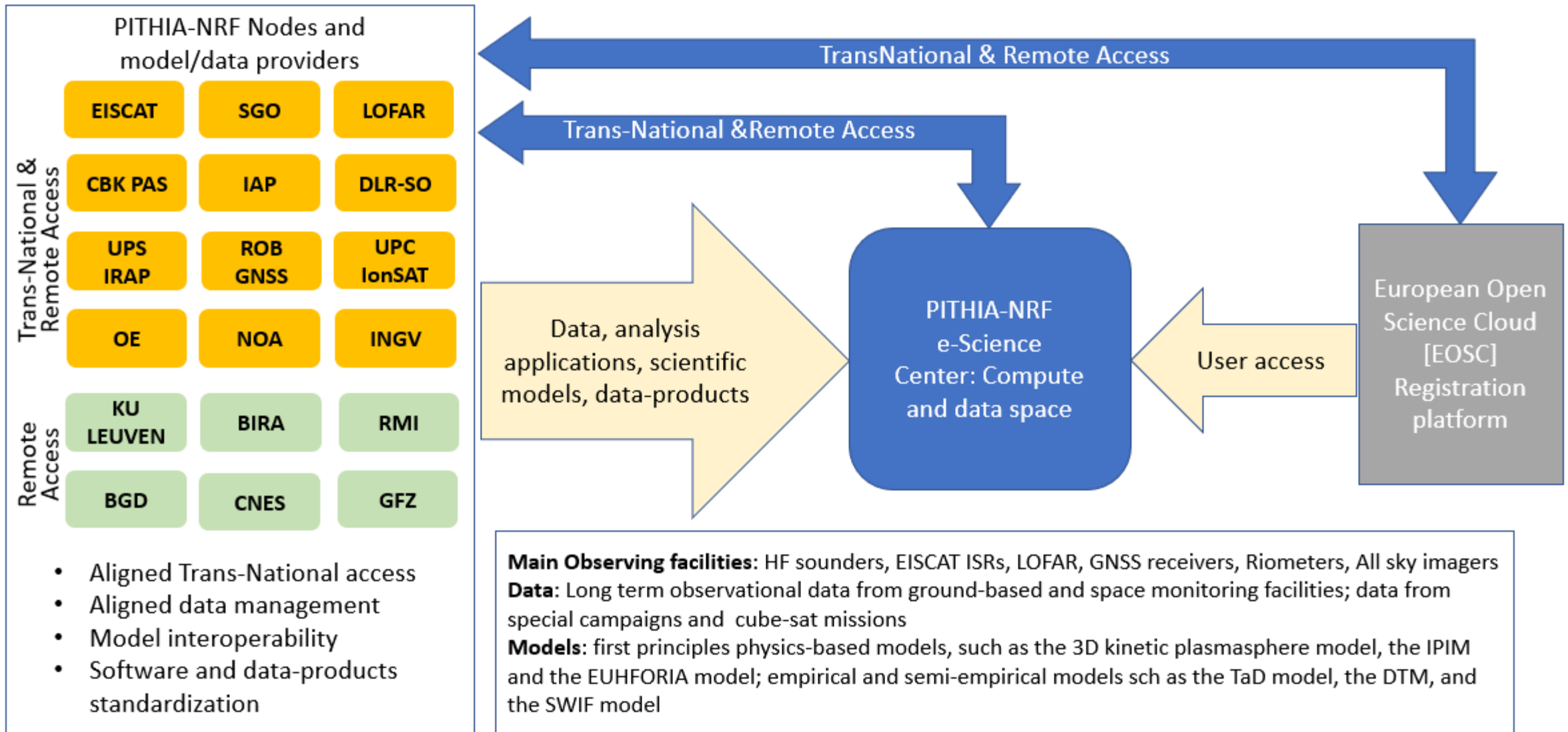
The World map shows GNSS high sampling rate and CDSS sites only.



- ionosondes with real-time data delivery ■
- ionosondes without real-time data delivery ■
- IAP CDSS transmitters and receivers (on both maps) ★
- INGV + DLR GNSS scintillation receivers (on both maps) ★
- EISCAT transmitters and receivers light blue circles: SGO riometer chain ●
- SGO pulsation magnetometer chain ▼
- LOFAR sites and sites associated with LOFAR ●



# Integrating facilities, data and models





# PITHIA-NRF data quality and data management



## Data quality

**Scientific Quality** : Data Quality Flag, Scientific Relevance

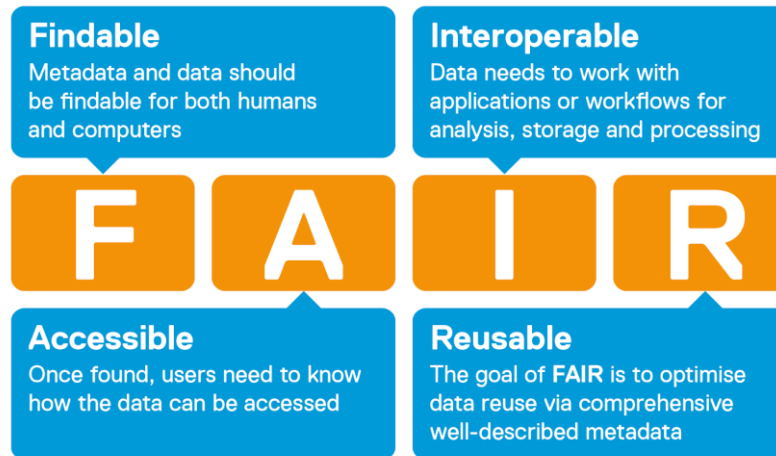
**Quality of Metadata** : Usage, Scope, Provenance, Persistence, Standardization, Interoperability, Quality, Earliness, Availability

**Quality of Data Resources** : Quality of data generation, Quality of data repository, Quality of data usage

## Compliance to FAIR

## Data management

The focus is on FAIRness.



The basic PITHIA-NRF data collections are assessed against a full list of FAIR data maturity model indicators.

Our ambition is to bring PITHIA-NRF facility nodes to achieve FAIRness, through the e-science center.




# PITHIA-NRF e-Science center





## Search & Browse


  
Search Data Collections


  
Browse Metadata

## Admin Functionalities

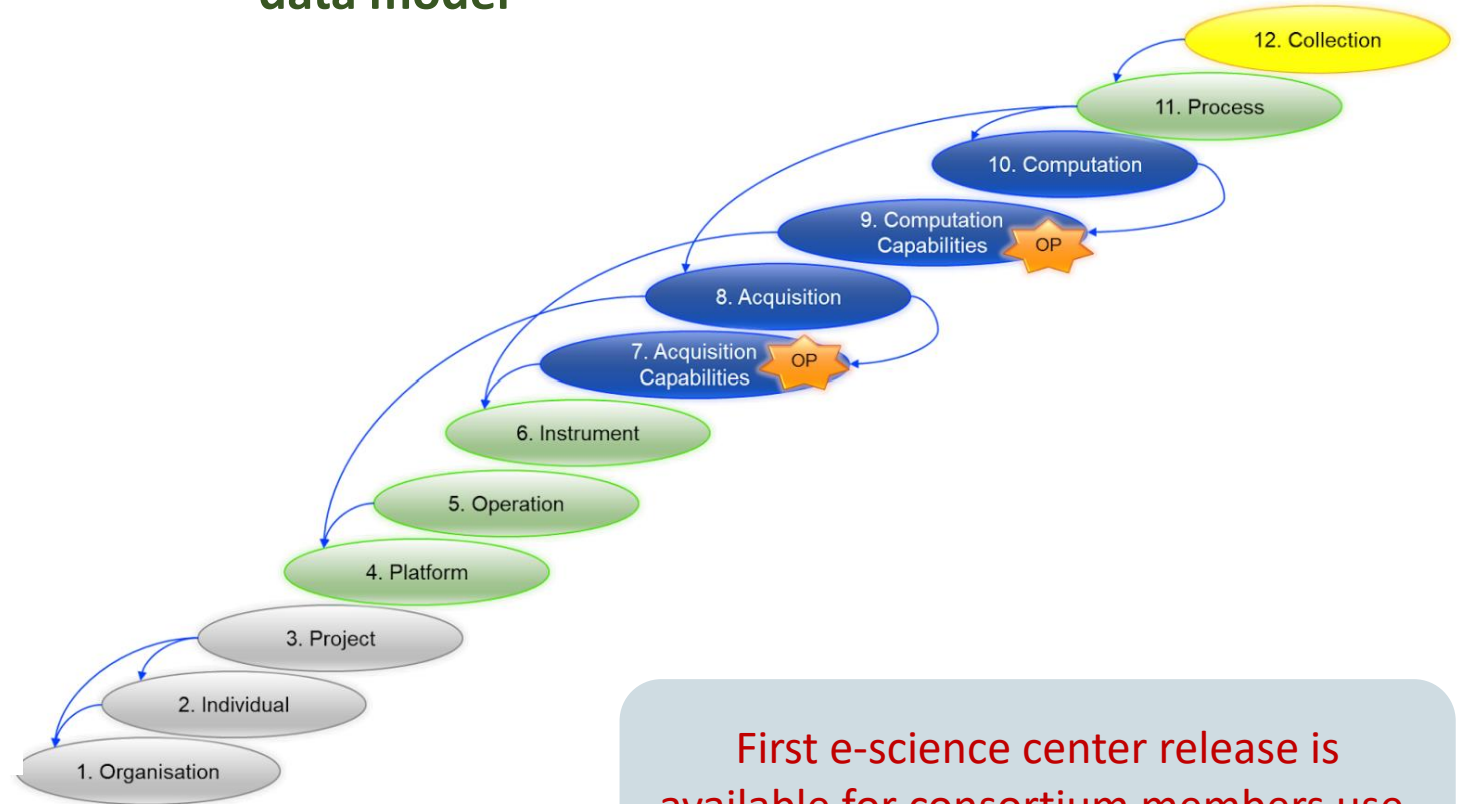
  
Register & Manage Metadata

  
Metadata Registration Guide

  
Metadata Models

  
Space Physics Ontology

## 12 STEPS of Registration based on the ESPAS ISO 19156 data model



First e-science center release is available for consortium members use. ~350 XML files are registered

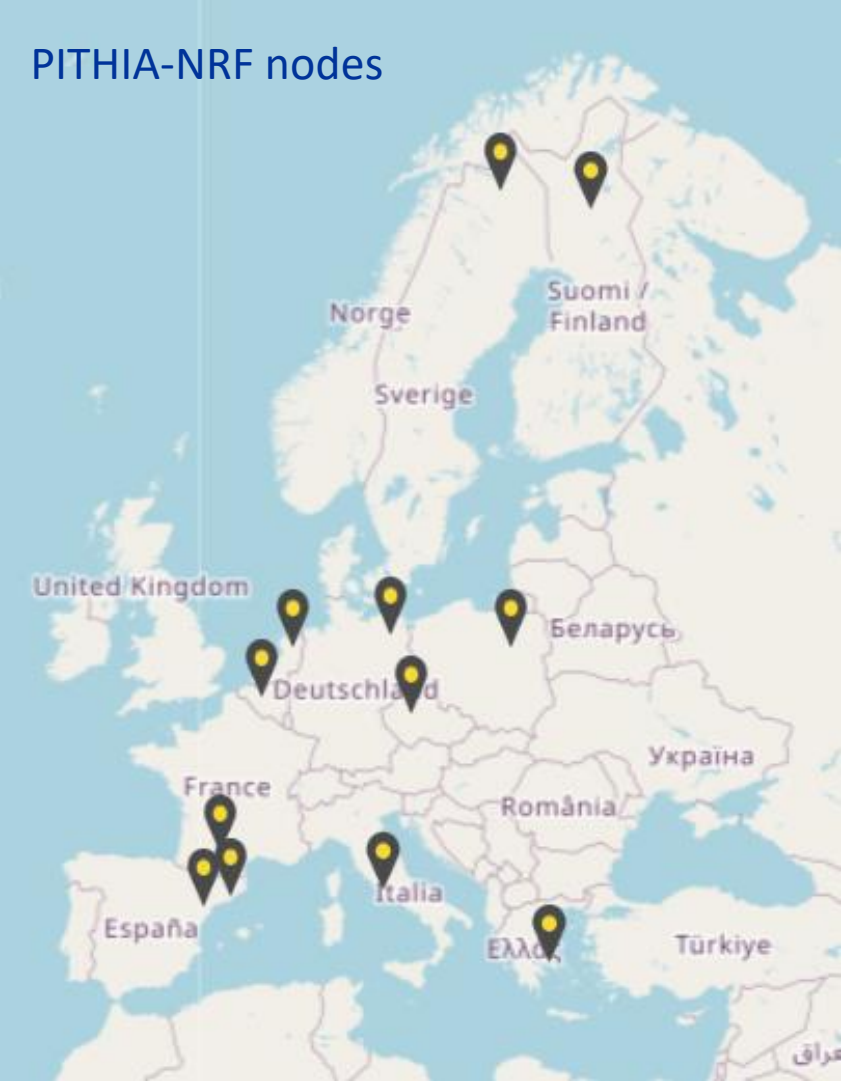




# TransNational Access

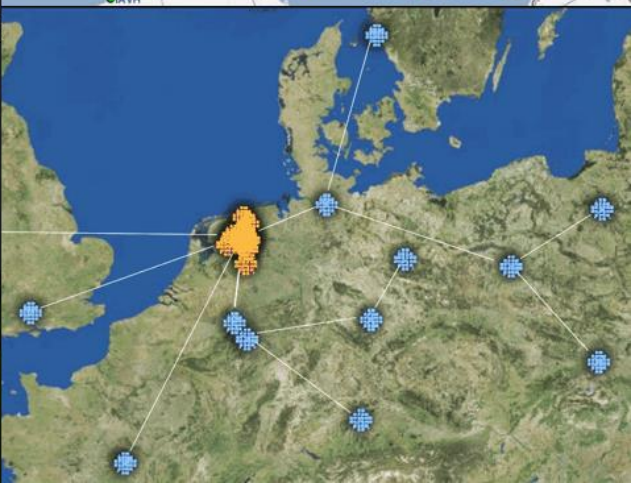
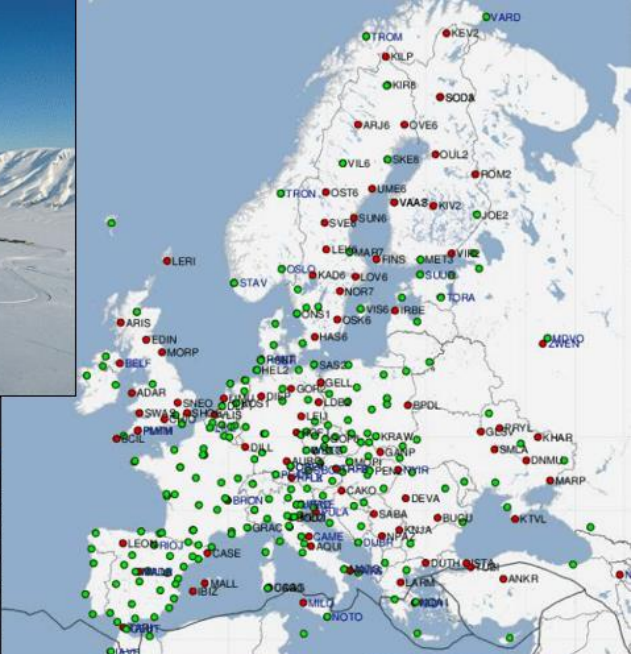
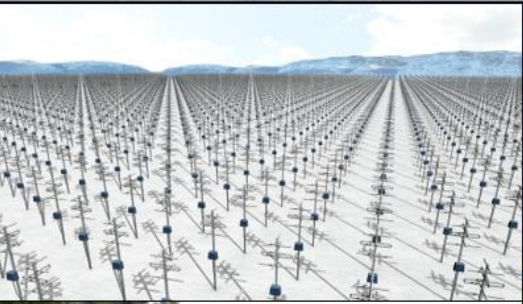


PITHIA-NRF nodes



## TNA Calls

- First TNA Call
- Second TNA Call
- Third TNA Call
- Fourth TNA Call





# Supporting actions for the TNAs



## PITHIA-NRF WOOS

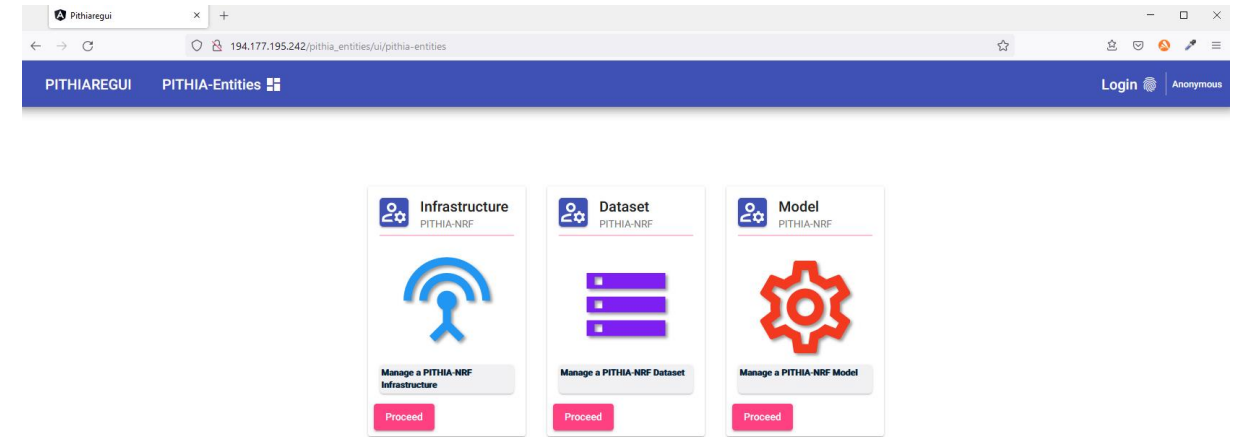
Workshops on Optimization of Observing Strategies:

- 1<sup>st</sup> WOOS (18 May 2021) - online
- 2<sup>nd</sup> WOOS (20&21 June 2022) - hybrid

Decisions are taken regarding:

- Research priorities within each node
- Joint experiments among several nodes
- Organization of special observing campaigns
- Development of knowledge books

## PITHIA-NRF knowledge books



<https://pithia-nrf.eu/pithia-nrf-users/knowledge-book>





# PITHIA-NRF Training & Innovation



## Training for Partners Workshops

### TPW#1

The 1st Training for Partners Workshop was organised on 8&9 November 2021 with the participation of 53 members from the PITHIA-NRF beneficiaries and third parties.

You can find more about the 1st Training for Partners Workshop [here](#).

### TPW#2

The 2nd Training for Partners Workshop was organised on 28&29 March 2022 with the participation of 53 members from the PITHIA-NRF beneficiaries and third parties.

You can find more about the 2nd Training for Partners Workshop [here](#).

### TPW#3

PITHIA-NRF organises the **Third Training for Partners Workshop (TPW#3)** on 26-28 September 2022. The workshop will be held in **ASTRON, Dwingeloo, the Netherlands** and it will be **hybrid**. The local organiser is [NWO-I](#).

The TPW#3 will focus on the e-Science Centre updates, the ontology updates, the integration, and the Data Management Policies and FAIR data maturity assessment.

You can find more about the 3rd Training for Partners Workshop [here](#).

### TPW#4

PITHIA-NRF organises the **Fourth Training for Partners Workshop (TPW#4)** on 16 March 2023. The workshop will be held in **RMI, Brussels, Belgium** and it will be **hybrid**. The local organiser is [IRM/KMI](#).

You can find more about the 4th Training for Partners Workshop [here](#).

### TPW#5

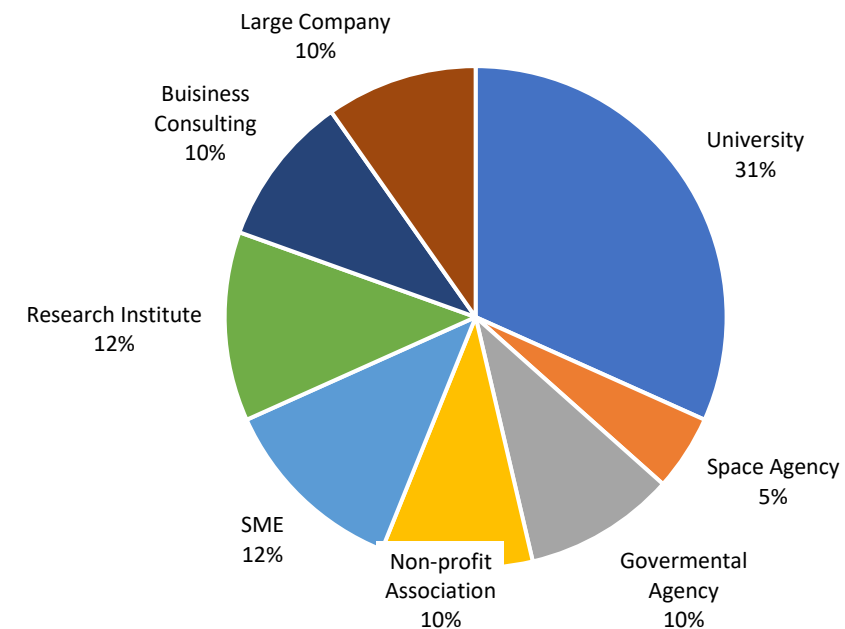
It is planned to take place in month 30 of the project.

## Innovation Days

PITHIA-NRF services mitigating the socio-economic impacts of the upper atmosphere effects.



- Use the TNA tool for developments
- Use the e-science center to register data
- Use the e-science center as data source





# PITHIA-NRF Plans for the 2<sup>nd</sup> period

## Joint Research Activities

- Improve the functionalities of the e-science center for data mining and interaction between models
- Register as many as possible data collections from the project beneficiaries and external providers

## Trans National Access Activities

- Issue more open TNA calls – improve the advertisement
- Organize more users' meetings
- Encourage and support users to publish their results

## Networking Activities

- Intensify Integration following EOSC and community standards
- Optimize further the observing strategies between complementary experiments in the network nodes
- Develop the sustainability plan in coordination with the exploitation and innovation groups
- Encourage further involvement of network stakeholders to innovative developments
- Actively involve young researchers through access and training
- Strengthen links with other projects and international programmes



# Thank you for your attention!

**WEB:** <https://www.pithia-nrf.eu>



The PITHIA-NRF project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101007599