# I.FAST 5th and Final Project Meeting

# Future EC Calls for accelerators

*José M. Pérez, on behalf of TIARA Collaboration,*
*2025-10-22*

# Outline


## 1. TIARA

1.1. Short introduction of TIARA

## 2. WP2025

2.1. Proposal submittied to WP2025 calls from the Accelerator community
2.2. WP2025 and EC Strategy indications

## 3. Trends and expectations in the short future

3.1. Expectations for the WP2026-2027

## 4. Summary of main messages

# 1. TIARA

| Instituion | Short name | Country |
|---|---|---|
| Commissariat à l'Energie Atomique et aux Energies Alternatives | CEA | France |
| European Organization for Nuclear Research | CERN | International |
| Centre National de la Recherche Scientifique | CNRS | France |
| Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas | CIEMAT | Spain |
| Stiftung Deutsches Elektronen-Synchrotron | DESY | Germany |
| European Spallation Source | ESS | International |
| GSI Helmholtzzentrum für Schwerionenforschung GmbH | GSI | Germany |
| Istituto Nazionale di Fisica Nucleare | INFN | Italy |
| Paul Scherrer Institut | PSI | Switzerland |
| Science and Technology Facilities Council | STFC | UK |
| Uppsala Universitet | UU | Sweden ➔ Scandinavia |
| Instytut Fizyki Jadrowej – Krakow | IFJ PAN | Poland |
| RIGA Technical University | RTU | Latvia ➔ Baltic Region |

- Representative actors on Acc Sc & Tech at Europe.
- An open list! Keen to accept new members.

- TIARA mision: provide support to coordinate the European accelerator technology developer community, particularly on EC-funded projects.
- Over 15 years of joint work and coordinated activities.
- The TIARA strategy is based on existing research field roadmaps.
- The backbone of TIARA strategy is the European Particle Physics roadmap and is expanded with the other research fields strategic agendas.

# 2. WP2025

## 2.1. Proposal submitted to WP2025 calls from the Accelerator community

**Destination INFRASERV**
**(EU supported transnational access to research infrastructures. Strengthened access programmes of pan-European RIs)**

**HORIZON-INFRA-2025-01-SERV-02.**
**Research infrastructure services to enable R&I addressing main challenges and EU priorities**

- PRISMAP+ (Thierry Stora, CERN)

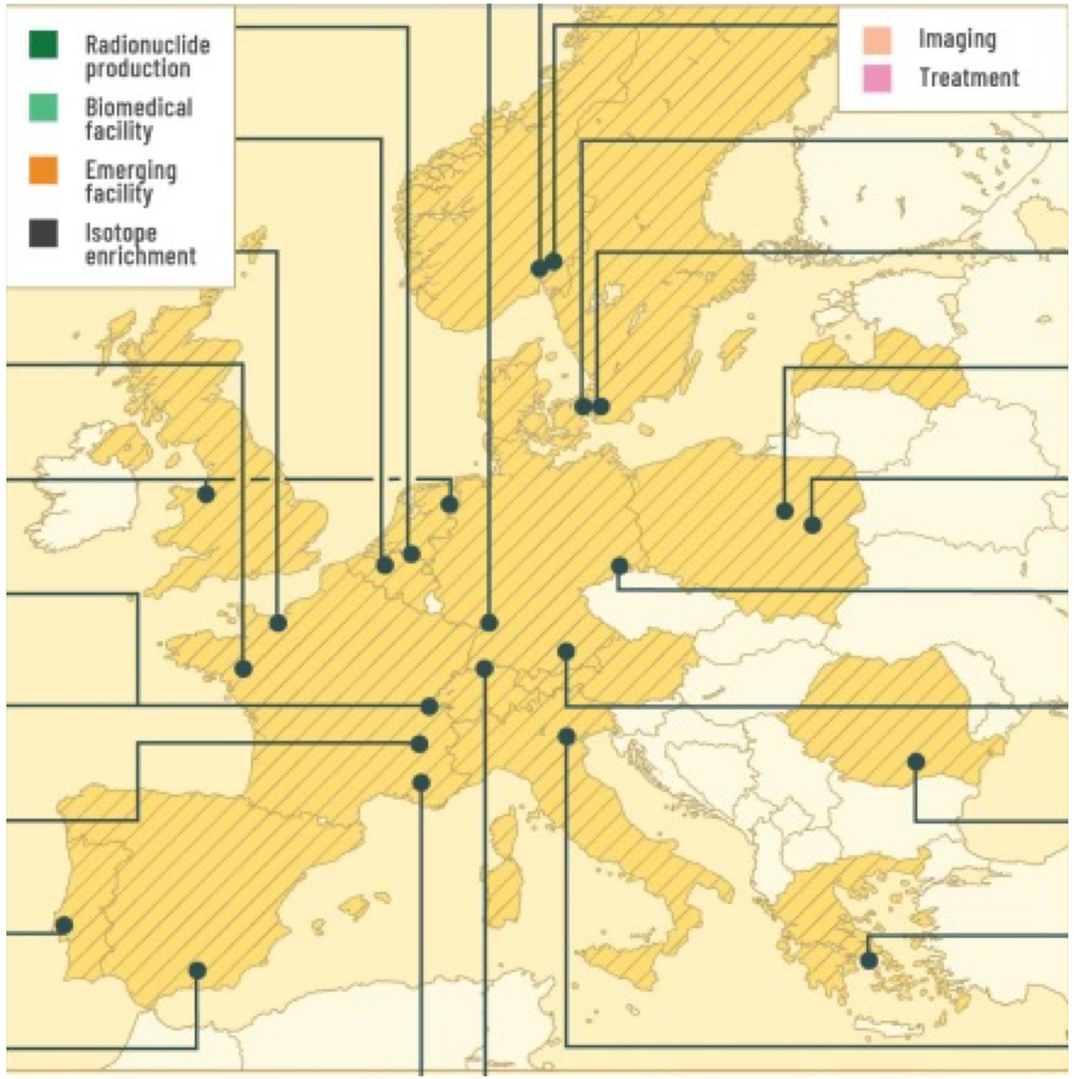
**HORIZON-INFRA-2025-01-SERV-04.**
**Research infrastructure services advancing frontier knowledge (bottom-up)**

- RADNEXT 2030 (Ruben Garcia, CERN)

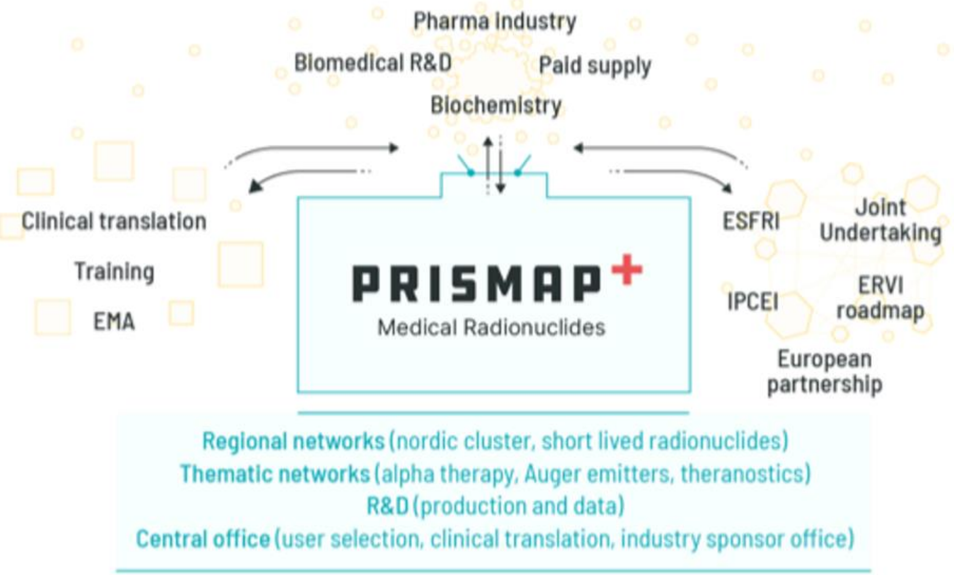
**Destination INFRASERV - Research infrastructures services to support health research, accelerate the green transition and the digital transformation, and advance frontier knowledge (2025)**

HORIZON-INFRA-2025-01-SERV-01: Research infrastructure services to enable R&I addressing main challenges and EU priorities related to the health domain
HORIZON-INFRA-2025-01-**SERV-02**: Research infrastructure services to enable R&I addressing main challenges and EU priorities
HORIZON-INFRA-2025-01-SERV-03: Research infrastructure services advancing frontier knowledge
HORIZON-INFRA-2025-01-**SERV-04**: Research infrastructure services advancing frontier knowledge (bottom-up)

# From PRISMAP to PRISMAP + : Furthering the European Medical Radionuclide Programme.
# A consortium of leading accelerators, neutron sources, isotope mass separators, and biomedical hubs



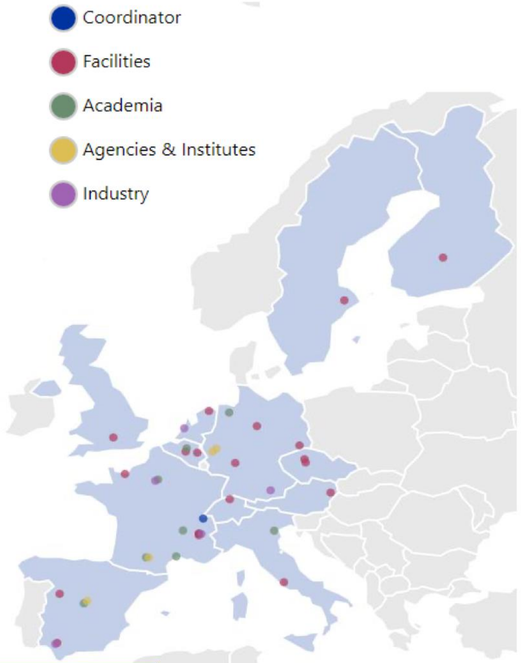

**Area 2: research infrastructure services for access to novel radionuclides and facilities:**
Research in radionuclides facilitated, contributing to the development of medical treatments and to the underlying required supply of stable or radio-isotopes for these treatments.



# RADNEXT

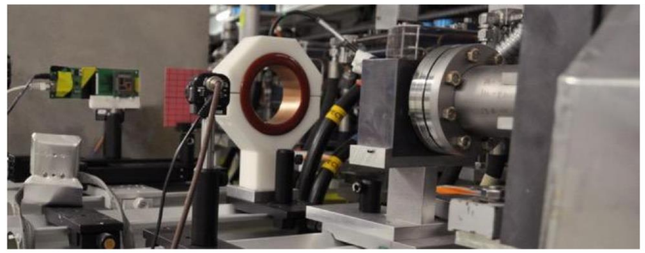
***Distributed network in the field of radiation effects testing***

***Focus on Single Event Effects (SEE)***




**Coordinator:**
***Ruben Garcia Alia***

- 21 **irradiation facilities**
- 8 **academic partners** and 9 academic supporters
- 4 **agencies and research institutes**
- 5 **industrial partners** and over 20 industry supporters



CERN GSI AIRBUS ThalesAlenia Space Università degli Studi di Padova COSYLAB

HEARTS
High-Energy Accelerators for Radiation Testing and Shielding

RADNEXT at TIARA collaboration council 20

This project has received funding from the Eu
2020 research and innovation programme un
**101008126**

## RADNEXT 2030

- Building on the success of RADNEXT
- Improved efficiency of user-facility access lifecycle
- Pathway towards sustainable research access for radiation effects testing for 2030+
- Inclusion of new facilities and test techniques

# 2. WP2025

## 2.1. Proposal submitted to WP2025 calls from the Accelerator community

**Destination INFRATECH**
**(Next generation of scientific instrumentation, for research infrastructures and foster innovation and co-creation with industry)**

**HORIZON-INFRA-2025-01-TECH-01.**
**New technologies and solutions for reducing the environmental and climate footprint of research infrastructures**

- iRIS (Johannes Gutleber, CERN)
- HTS4SRI (Stephane Sanfilippo, PSI)

**HORIZON-INFRA-2025-01-TECH-02.**
**Implementing research infrastructure technology roadmaps**

- EPITA (Toms Torims, Maurizio Vretenar, CERN)

**HORIZON-INFRA-2025-01-TECH-04.**
**AI-generated digital twins for science**

- TwinRISE (Trusted AI-Generated Digital Twins for Research Infrastructures)

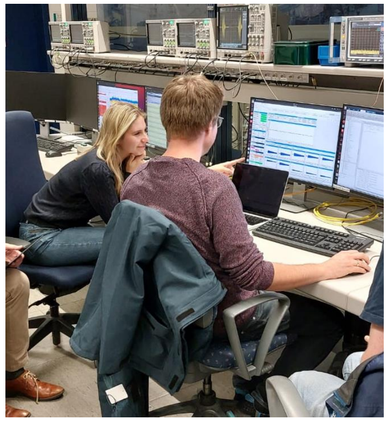
+IRIS + MODULARITY (HORIZON-CL4-2025-03-DIGITAL-EMERGING-07) + AI In Science (DIGITAL-62 CSA)

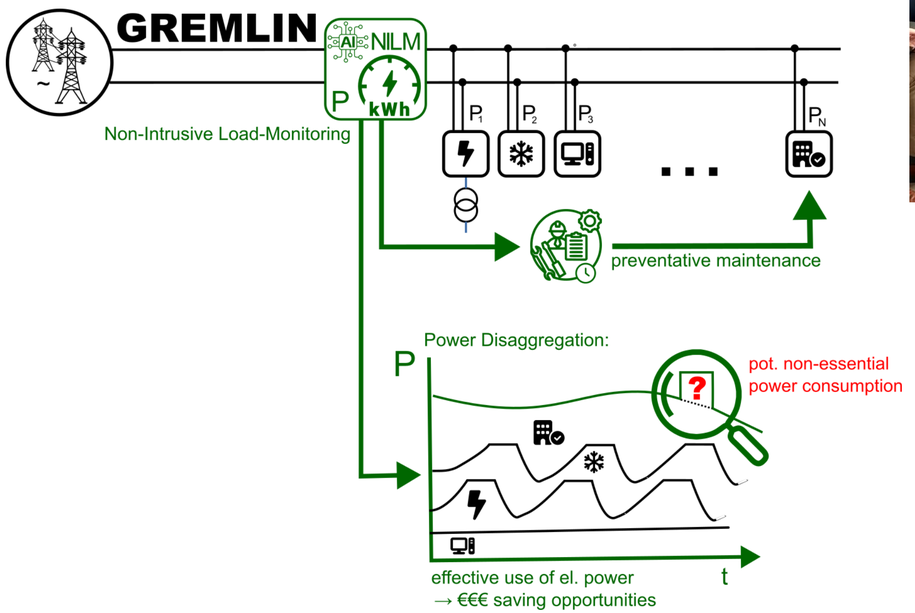
**Destination INFRATECH - Next generation of scientific instrumentation, tools, methods, and advanced digital solutions of research infrastructures and foster innovation and co-creation with industry (2025)**

HORIZON-INFRA-2025-01-**TECH-01**: New technologies and solutions for reducing the environmental and climate footprint of research infrastructures
HORIZON-INFRA-2025-01-**TECH-02**: Implementing research infrastructure technology roadmaps
HORIZON-INFRA-2025-01-TECH-03: AI-powered impact simulations in support of the Destination Earth initiative
HORIZON-INFRA-2025-01-**TECH-04**: AI-generated digital twins for science

# INTELLIGENT RESEARCH INFRASTRUCTURE SUSTAINABILITY (IRIS)

Johannes Gutleber (CERN)
2025-09-01






**What:**

- Showcase RIs as innovation engines for sustainability
- Position Europe at the forefront of sustainable RI development

**How:**

- Deliver technologies at TRL 6-7 validated with demonstration pilots
  - AI-powered **eco-design of particle accelerators**
  - AI-powered open **non-invasive load monitoring** as hidden energy and anomaly detector
  - AI-powered **materials characterisation** to enable **processing for re-use**
  - AI-driven **upscaling of soil reconsitution**
- **Sustainability assessment methodology** integrating advanced lifecycle analysis
- **Train staff and ECRs** with tangible pilots, perform impact assessments, prepare transfer to market

PSI Center for Accelerator Science and Engineering

# HTS4SRI

## Magnet technology Advances for sustainable research infrastructures through High Temperature Superconductors

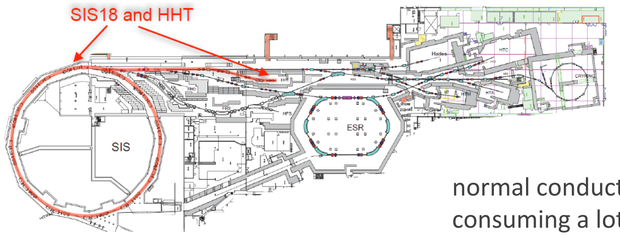
*HORIZON-INFRA-2025-01-TECH-01: New technologies and solutions for reducing the environmental and climate footprint of research infrastructures*

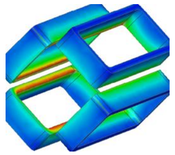
- Motivations & objectives
- Impact & Innovation
- Project description (partners, WPs, timeline, budget)

Stéphane Sanfilippo
Genève, 1st September 2025



**FFQ coils : HTS Final Focusing Magnet System at GSI heavy ion synchrotron SIS18**



normal conducting magnet focusing quad consuming a lot of energy (~ 60 kW)
→ HTS one

## Objective 1 – Advance HTS Magnet Technology for Energy Savings

- Raise TRL of HTS technologies applied to cryocooled dipole, quadrupole & combined-function magnets
- Develop radiation-tolerant conductors, coils & insulation
- Achieve ≥30% reduction in annual magnet energy consumption
- ...

## Objective 2 – Demonstrate Sustainable Coils & Magnets

Broad scale of applications related to various challenges and§ operating conditions

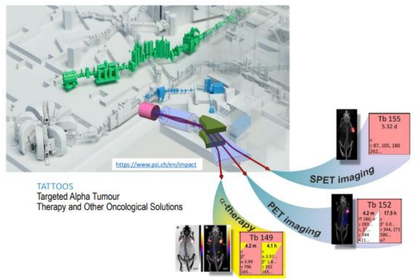
- HTS large quadrupole coils for SIS focusing magnets
- flagship demonstrator 1: **4 T HTS dipole (PSI–TATTOOS)**
- flagship demonstrator 2: **HTS combined-function magnet (FCC-ee)**

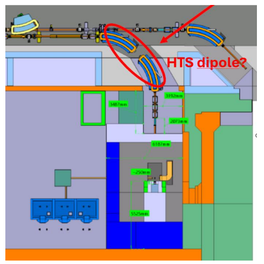
## Objective 3 – Systemic Sustainability & Knowledge Transfer

- Life-cycle assessment (LCA), & sustainable manufacturing
- Develop eco-design guidelines and sustainable manufacturing standards for HTS magnets.
- Integrate efficient cryogenics & low-loss powering solutions

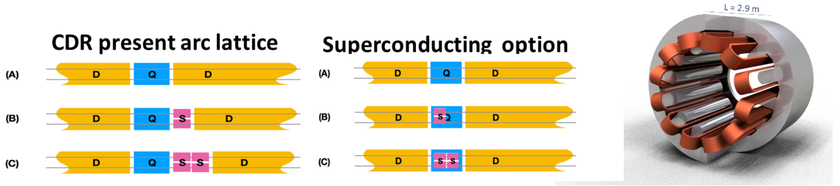
**ADHTS : 4 T HTS dipole demonstrator for the TATTOOS beam line**

***Targeted Alpha Tumour Therapy***




**SQCM: HTS sextupole & quadrupole for FCC-ee storage ring)**
**(~7,600 NC magnets → ~2,900 combined QSCMs)**



# EPITA project proposal

## Enabling Partnerships for Innovation & accelerator Technology Advancement

## Specific requirements

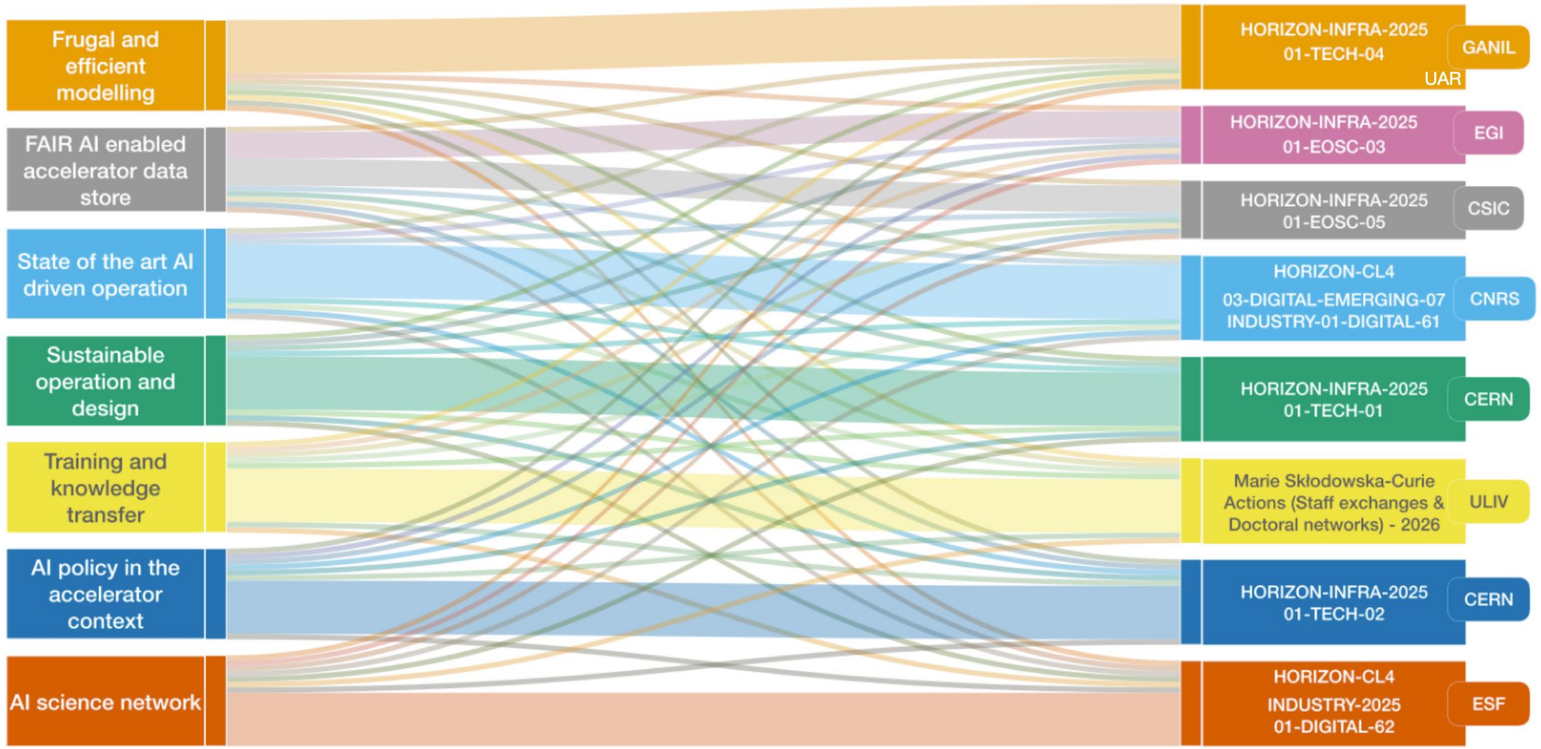
1. Implement significant parts of a research infrastructure technology **roadmap** (ESPP, LEAPS, others) or develop new advanced applications.
2. Address **prototyping** of high-performance systems needed to upgrade the involved research infrastructures or construct their next generation.
3. Include **co-creation** with **industrial partners** from the earliest possible stage (as beneficiaries, subcontractors, PCP partners, or with letters of engagement) .
4. Respond to the needs of several research infrastructures, possibly of different types.
5. Build on results from previous projects and avoid overlaps with ongoing projects.
6. Consider resource efficiency and environmental impacts.

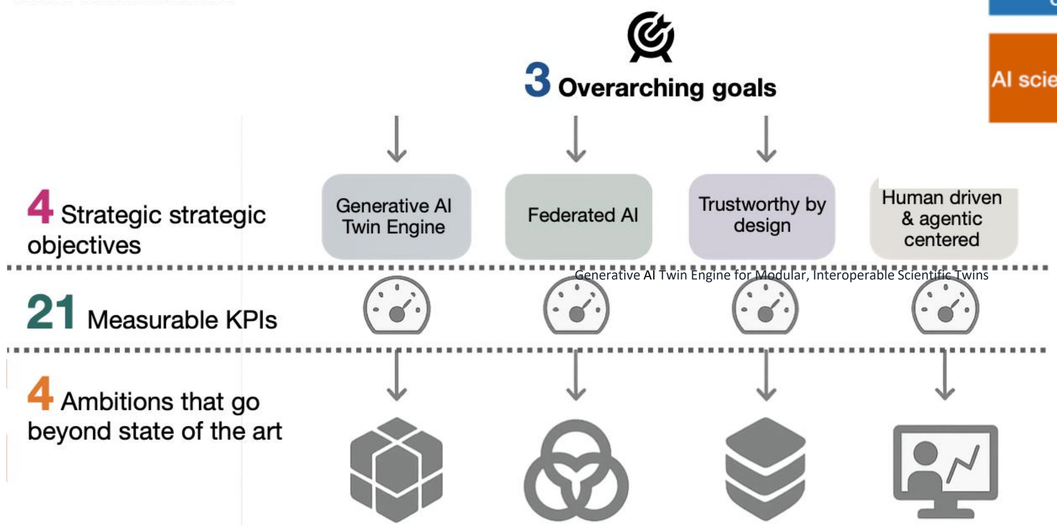
# Distributed effort

## TwinRISE

Trusted AI-Generated Digital Twins for Research

Adnan Ghribi
for The TwinRISE Consortium




- Generative AI Twin Engine for Modular, Interoperable Scientific Twins
- Federated AI Infrastructure for Secure, Sovereign Twin Training
- Trustworthy-by-Design Methods for Safety, Explainability, and Compliance
- Human-in-the-Loop Interaction via Agentic Pipelines and Human Machine Interfaces (HMIs)

ARTIFACT Network website: 👉 https://artifact-network.org

# 2. WP2025

## 2.1. Proposal submitted to WP2025 calls from the Accelerator community

**Destination INFRADEV**
**(Consolidation and evolution of the European Research Infrastructure landscape)**

### HORIZON-INFRA-2025-01-DEV-02.
**Early phase implementation of ESFRI Projects that entered the ESFRI Roadmap in 2021.**

- EuPRAXIA Early implementation phase (Antonio Falone, INFN-LNF)

### HORIZON-INFRA-2025-01-DEV-03.
**Consolidation of the Research Infrastructure landscape – Individual support for evolution, long term sustainability and emerging needs of pan-European research infrastructures**

- EssnuSB-FD (David Saiang, Lulea University of Technology, Tord Ekelof, UU)

### HORIZON-INFRA-2025-01-DEV-05.
**Preparatory actions exploring future frameworks for research infrastructures investment plans and funding streams, for integrated and sustained scheme for access and for joint technology development.**

- COORDINA-INNOV (DESY, H. Dosh)

**Destination INFRADEV - Consolidation and evolution of the European Research Infrastructure landscape (2025)**

HORIZON-INFRA-2025-01-DEV-01: Training and up-skilling of research infrastructures technical staff
HORIZON-INFRA-2025-01-**DEV-02**: Early phase implementation of ESFRI Projects that entered the ESFRI Roadmap in 2021
HORIZON-INFRA-2025-01-**DEV-03**: Consolidation of the Research Infrastructure landscape – Individual support for evolution, long term sustainability and emerging needs of pan-European research infrastructures
HORIZON-INFRA-2025-01-DEV-04: Support to the European Strategy Forum on Research Infrastructures
HORIZON-INFRA-2025-01-**DEV-05**: Preparatory actions exploring future frameworks for research infrastructures investment plans and funding streams, for integrated and sustained scheme for access and for joint technology development

# HORIZON-INFRA-2025-01-DEV-02

Funded by the European Union

This grant must be seen in continuity with the preparatory phase, implementing, upgrading and consolidating the preparatory phase results and addressing challenges and topics still to be matured.

Considering this the most important aspects (among others) to be addressed are:

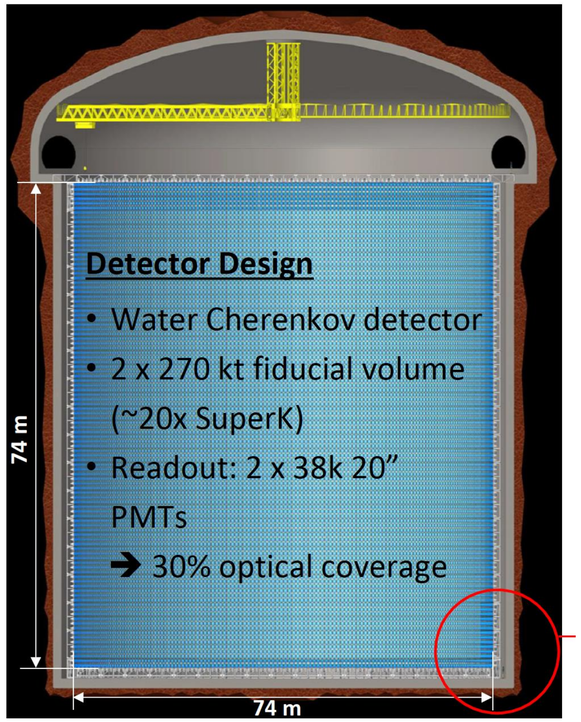
- Finalization of the legal framework and related documents (SLA, statute, by laws, IKC etc.)
- Finalization and consolidation of the concept of National Nodes
- Definition of the governance and its rules
- Definition of the financial and business plan for operational phase.

Legal advice is crucial → X-Officio involvement

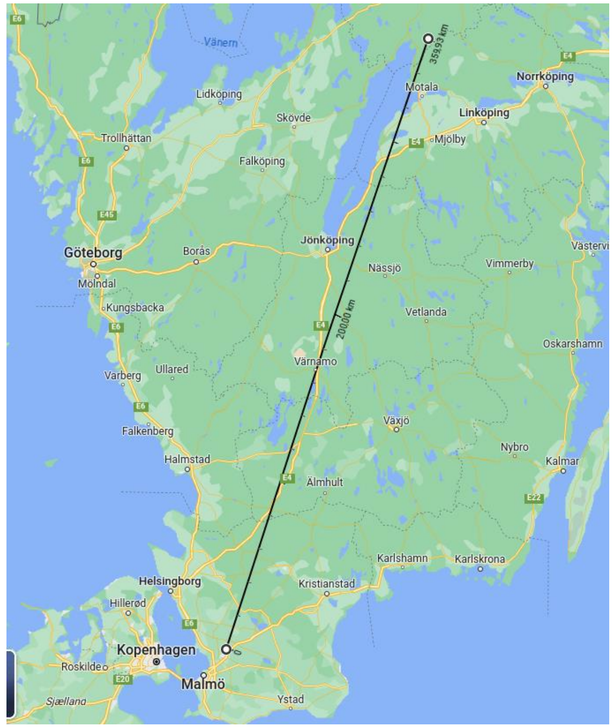
# ESSnuSB-FD

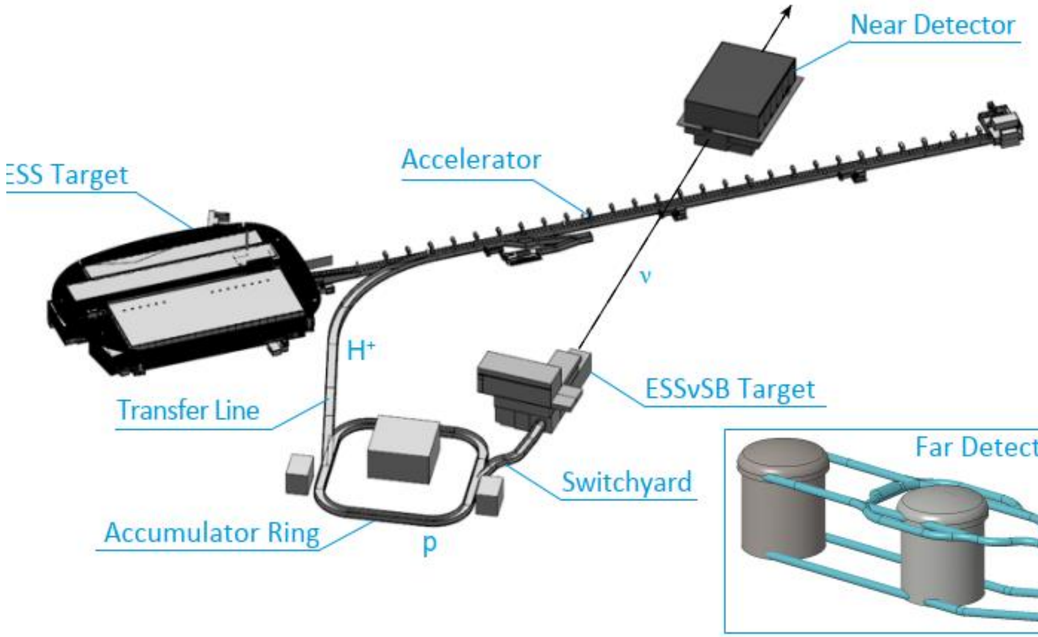
European Spallation Source neutrino Super Beam – **Far Detector**

Two Far detectors each of these dimensions -> 540 $m^3$ fiducial volume in total




Baseline Lund – Zinkgruvan 360 km




**The ESSnuSB-Far Detector project 5 Work Packages:**

| |
|---|
| Management |
| Site Characterization |
| Engineering design of ESSnuSB-FD Infrastructure |
| Sustainability, decommissioning and post-closure |
| The ESSnuSB-FD detector water tanks, photosensors, electronics, data acquisition and computing |
| Use of the ESSnuSB infrastructure for other applications |

David Saiang, Lulea University of Technology,
Tord Ekelof, UU

# 2. WP2025

## 2.2. WP2025 and EC Strategy indications

**HORIZON-INFRA-2025-01-DEV-05. Preparatory actions exploring future frameworks for research infrastructures investment plans and funding streams, for integrated and sustained scheme for access and for joint technology development.**

Goal: **Preparatory actions for new frameworks** in RI investment and funding, access, and joint tech development

**Area 1 - Investment & Funding**

- Map national/EU/alternative funding streams for RIs
- ...

Proposal: FundRI, coordinated by INESC, PI: Ricardo Migueis.

**Area 2 - Integrated Access Schemes**

- Design a sustainable, EU-wide access model ('one-stop-shop')
- ...

Proposal: Access2Access, coordinated byEuroBioimaging. PI: John Eriksson

**Area 3 - Joint Tech Development Framework**

- Coordinate tech roadmaps across ESFRI domains
- Identify shared tech needs, standardization, SME involvement
- ...

Call: Research Infrastructures 2025 | CSA | Budget: €4.5M | EC contribution: €1-1.5M/project

# 2. WP2025

## 2.1. Proposal submitted to WP2025 calls from the Accelerator community

**HORIZON-INFRA-2025-01-DEV-05. Preparatory actions exploring future frameworks for research infrastructures investment plans and funding streams, for integrated and sustained scheme for access and for joint technology development.**

### Area 3 - Joint Tech Development Framework

**COORDINA-INNOV** aims to **enhance the coordination** of European research infrastructures (RIs), Technology Infrastructures (TIs) and Industry through:

- a **structured approach to joint technology development**,
- involving **both intra- and inter-community collaboration,**
- and **strengthened engagement with industry**.

**The objective is not to fund isolated projects**, but to build a R&D, co-innovation durable framework

In this first implementation phase, **the initiative is anchored by the three tech communities INFRAINNOV-04-2020**, (synchrotrons, accelerators and detectors) **and the Life Sciences community** represented by EMBL.

With the **long-term ambition to expand to other RI fields** and emerging technologies.

## 2.2. WP2025 and EC Strategy indications

**HORIZON-INFRA-2025-01-DEV-05. Preparatory actions exploring future frameworks for research infrastructures investment plans and funding streams, for integrated and sustained scheme for access and for joint technology development.**

### WP2

- T2.1. To develop a **structured taxonomy of technology development in Big Science RIs in Europe**, starting from the frameworks established by the INFRAINNOV-04-2020 communities (synchrotrons, accelerator, detectors)
- ...

### WP3

- ...
- Task 3.2 will propose **mechanisms to enhance inter-community collaboration among the technology development clusters** of major European research and technology infrastructures, universities, research and technology organisations and industry.
- Task 3.3. will identify funding gaps and limitations in current schemes for LS-RI-linked technology development. (Proposal for a **Block Grant** approach)

# 2. WP2025

## 2.2. WP2025 and EC Strategy indications

**HORIZON-INFRA-2025-01-DEV-05. Preparatory actions exploring future frameworks for research infrastructures investment plans and funding streams, for integrated and sustained scheme for access and for joint technology development.**

**Important message to the Accelerator techology community:**

**We need to be prepared to define a clear strategic priority of the needed technologies**

**We will need to interact with all technology accelerator developers and users in order to define a list of prioritized topics, those technology blocks of main interest to the application fields.**

- **Particle physics**
- **Photon Science (Light sources, synchrotrons)**
- **Nuclear physics**
- **Atomic Physics**
- **Neutron science**
- **Energy (fission, fusion)**
- **Related Scientific fields (Gravitational waves, ET, ...)**
- **Medical and biomedical physics fields**
- **Industrial application fields (electronics radiation hardening, cargo, sterilization, lithography, ...)**

# 3. Trends and expectations in the short future

## 3.1. Expectations for the WP2026-2027

*(WP2026-2027 under consideration by EC RTD and in confidential consultations with NCP)*

### INFRASERV

- Towards a **single-entry point access portal:** integrated catalogues of services, converging access conditions and selection procedures.
- Proposals should ensure strong and continuous collaboration with the cross-domain preparatory action on access HORIZON-INFRA-2025-01-DEV-05 and the 2026/2027 INFRA-DEV.
- This collaboration should ensure a common front page to all above actions. Testing an ‘access programme like’ projects providing trans-national access

*(Few topics, big budget for a single one,*
*30 M€, 105+35 M€*
*A big budget to limited communities (35x3 M€, PS&E, H&F+SocSci-Hum, Energy+Env)*

# 3. Trends and expectations in the short future

## 3.1. Expectations for the WP2026-2027

*(WP2026-2027 under consideration by EC RTD and in confidential consultations with NCP)*

## INFRADEV

Wide number of topics, in the line defined in WP2025.

Aims: Close collaboration across projects to ensure, where applicable, policy coordination, technical interoperability and other synergies.

Proposals should ensure alignment with HORIZON-INFRA-2025-01-DEV-05 and the INFRASERV actions of WP2026-2027.

This collaboration should **ensure a single-entry point portal for access** to research infrastructures, common front page to all above actions, highlighting the common objectives of EU supported access.

*(wide number of topics,*
*75 M€, 85 M€ )*

# 3. Trends and expectations in the short future

## 3.1. Expectations for the WP2026-2027

*(WP2026-2027 under consideration by EC RTD and in confidential consultations with NCP)*

**INFRATECH**

Topic(s) to

- A continuation of the 'classical' INFRA-TECH calls, complementary with the ones in 2022 and 2024.
- The related developments should lead RIs **to support new areas of research and/or a wider community** of users, including industrial users.
- Expected to go beyond TRL 4. When beyond the specific use case of research infrastructures: 3-4.
- Rasonable number of projects could be funded.

And topics for:

- Co-creation of advanced technologies for research infrastructures, technological sovereignty.
- **Development of partnerships and collaborations between research infrastructures** and different types of research performing organisations **including industry**
- Proposals expected in line with the project funded under HORIZON-INFRA-2025-01-DEV-05, area 3.
- Expected to go beyond TRL 4. When beyond the specific use case of research infrastructures: 3-4.
- Very limited number projects funded, high budget

*(Few calls ,*
*90 (10x9) +15 dig twins; 30 (15x2))*

# 4. Summary of main messages

## 4.1. Near future expectations

### WP2026-2027

**A further iteration on the strategic messages in WP2025, in preparation for FP10**

- **Continuation of the EC strong motivation towards integrated approaches for translational access.**
- **Continuation of the EC motivation towards coordinated technology development within all ESFRI domains (in a final model that will be deeply discussed during WP2025).**
- **Good opportunities for the last INFRA-TECH projects in HE.**
- **Extremely competitive option to make a proposal as consolidated technology-developer community. High funding, but very limited number of expected approved projects.**

# 4. Summary of main messages

## 4.2. Acnowledments

### 1. Thanks to I.FAST

**I.FAST has facilitated to the Accelerator community a ground to interact with the other two consolidated communities (light sources, detectors) and technology developers.**
**The INFRAINNOV-04-2020 coordination body has resulted to be a most efficient meeting point.**

**A big thank to Maurizio Vretenar for his wide spirit of community.**

### 2. Thanks to the new proposals

**EPITA has proposed some funds to work on the review of priorities and strategic agendas of accelerator users and developers, what will facilitate our reply to the challenges presented before.**
**Besides, EPITA will also facilitate an internal discussion about our views on co-innovation models**

**Our deep thanks to Toms Torims and CERN for his aim to support our community.**

## 4.2. Acnowledments

# THANK YOU VERY MUCH!

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