I.FAST 3rd Annual Meeting – 16-19 April 2024

Sylvie Leray

The concept of the accelerator and magnet Technology Infrastructure

"Large-scale science projects address fundamental questions at the forefront of science and technology. These projects require large and sustained infrastructures and a good collaboration on long time scales. In turn, such projects provide unique equipment, challenging request for high technology and innovation, stimulating ideas that attract good people, and offer the occasion to bring people closer together."

Rolf Heuer, The Role of Big Laboratories, Phys. Scr. T158 (2013)

- The ensemble of Technological Facilities (TFs), encompassing large-scale Technical Platforms (TPs) for development, fabrication, assembly, integration and performance verification of accelerator and magnets components, together with large concentrations of dedicated, highly-skilled personnel, can be viewed as the **European accelerator and magnet Technology Infrastructure** (TI).

H2020 AMICI (Accelerator and Magnet Infrastructure for Cooperation and Innovation) project (2017-2019)

Goals:

- Bring together the European laboratories owning large scale Technology Platforms (TPs) in the domain and establish the AMICI Collaboration

- Investigate how to increase the visibility of the TI and ensure its long term sustainability
- Study how the TI could be reinforced, harmonized and made more efficient, and industry could benefit more from the possibilities offered by TPs, favoring a more effective knowledge transfer and fostering industrial innovation potential (http://eu-amici.eu/).

➥ Proposed actions, some of which implemented in **IFAST WP13, also WP2 and WP3** and support to transnational access to some of AMICI TPs in **EUROLABS Task 3.2.**

IFAST WP13 - Technology Infrastructure for Accelerators and Magnets

Partners:CEA,CIEMAT,CNRS,DESY,IFJ-PAN,INFN,KIT,PSI,UKRI,UU

WP13 General objectives:

- Propose a strategic approach ensuring the long-term sustainability of the TI and the development of its capabilities in view of the construction of future accelerator-based RIs.
- Extend and strengthen the cooperation with industry to exploit opportunities of fostering innovation in related technologies.
- Develop and promote services, within a common approach, for the benefit of RIs, future scientific projects and high-tech industry.

All Deliverables delivered on time

- **D13.1**: Strategy for the development of the AMICI TI (CEA)

Report on the key TPs that need to be sustained over the long term and possibly developed/upgraded in the future: **M30**

- **D13.2:** Report on the development and promotion of services to industry (DESY)

Report on the organization and operation of the contact point, on the organized workshops and proposition for standardized access rules: **M30**

- **D13.3:** GaN RF amplifier module at kW level (UU)

Realisation of an RF amplifier module based on GaN semiconductor technology and demonstration of combined power at kW level: ***M32***

Task 13.1: Strategy for the development of the AMICI TI

- Analysis of the landscape of the different scientific fields that could need the AMICI Technical Platforms (TPs) (based as much as possible on roadmaps or reports prepared by the concerned communities)
- Extensive inventory of the available accelerator and magnet TPs within the different laboratories with their characteristics and functionalities (available on the AMICI website)
- Recommendations to guide the future exploitation of technological platforms in key technological areas, with the aim of enhancing collaboration, efficiency, and innovation

Task 13.2: Developing and promoting services to industry in AMICI TFs

- Investigating the possibility of standardized access rules: feedback from the IAB suggests that the lack of non-unified access rules is actually not an issue for industrial users.
- Central information and contact point : AMICI Web site
- Workshops dedicated to a particular type of TP gathering personnel from the TPs and possible users.
  - *Superconducting RF cavity testing, DESY, Hamburg, 14-15 September 2022.*
  - *Test facilities for superconducting magnets, LASA Milano, 17-18 November 2022.*
  - *Platforms for characterization, treatments and test of materials, IJCLab, Orsay, 22-23 June 2023*
  - *Facilities for beam test of accelerator components, IFJ PAN, Krakow, 12 October 2023 (combined with EUROLABS Annual Meeting).*

Technology Infrastructures: a concept of growing interest for EC

- Nov 2021: CONCORDi 2021 - Industrial innovation for competitive sustainability – conference organized by JRC and EARTO; Report from JRC/EARTO (2022): Towards the Implementation of an EU Strategy for Technology Infrastructures
- ERA Policy Agenda 2022-2024 - Action 12: Accelerate the green/digital transition of Europe's key industrial ecosystems - ERA 12.2. Technology Infrastructures
  - Development of a coordination mechanism to provide industry with the technology infrastructures needed to test, validate and upscale innovations.
- Call HORIZON-INFRA-2022-DEV-01-02: Cooperation, synergies and networking between research infrastructures and technology infrastructures (CSA) → RITIFI project
- End 2023: establishment of the Informal Commission Expert Group 'Technology Infrastructures' by DG RTD - Members: CEA, ESRF, INSEC-TEC, VTT, ESFRI, ERIC Forum, and others → Goal: propose an EU strategy for TIs in FP10
- 2024: DG RTD, Directorate E – Prosperity commissioned Technopolis to provide an overview of existing policy initiatives, funding programmes and instruments, which aim at supporting the creation, upgrade, long-term use and accessibility of technology infrastructures → Study "Stocktaking of Policy Initiatives and Funding Programmes to Support TIs on National, Regional and EU Level"

Definition of Technology Infrastructures

- EC's Staff Working Document on TIs (SWD 2019/158) published in 2019
  - Technology infrastructures are understood as facilities, equipment, capabilities and support services required to develop, test and upscale technology to advance from validation in a laboratory up to higher TRLs prior to competitive market entry. They can have public, semi-public or private status.
  - Their users are mainly industrial players, including SMEs, which seek support to develop and integrate innovative technologies towards commercialisation of new products, processes and services, whilst ensuring feasibility and regulatory compliance
- Under the revised State aid Framework for RDI, adopted on 19 October 2023, and the revised General Block Exempted Regulation (Regulation (EU) No 651/2014), as amended by subsequent acts and last amended by the Commission Regulation (EU) 2023/1315 of 23 June 2023, Technology Infrastructures are referred to as Testing and Experimentation infrastructures.

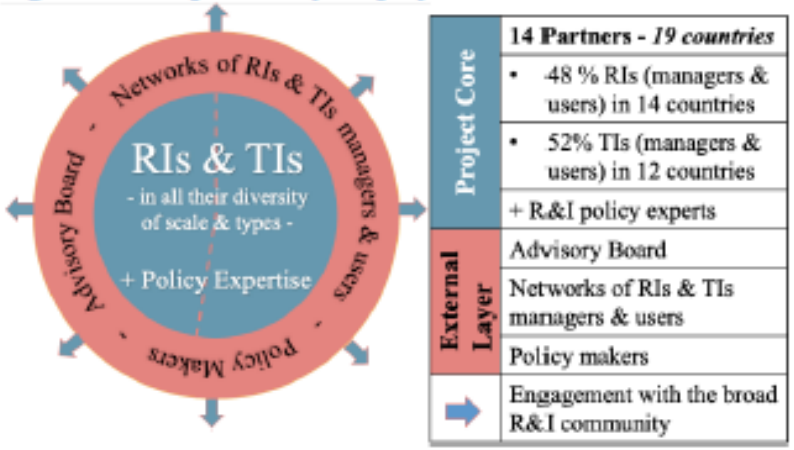
Definition of Technology Infrastructures

- Workshop Stocktaking of Policy Initiatives and Funding Programmes to Support TIs on National, Regional and EU Level - 14/02/2024
  - TIs encompass the facilities, equipment, capabilities (physical or virtual) and associated support services required to develop, test and upscale technologies. They can cover any type of (open innovation) testbeds, pilot lines, equipment, technology platforms, technology (co-creation) labs, cleanrooms, open innovation facilities, prototyping labs, testing and experimentation facilities, living labs, demonstrators, etc.
  - They aim to address the needs of industry to shift from validation in a laboratory up to higher TRLs prior to competitive market entry.
  - They are open to a wide range of users, mainly industrial players, including SMEs which seek support to develop and integrate innovative technologies towards the commercialisation of new products, processes and services, whilst ensuring feasibility and regulatory compliance.
  - They deliver a wide range of technology and non-technology related services (e.g. TT support, access to finance, legal support, business/market access).
  - Finally, large-scale TIs are usually too costly to be funded by private actors, and therefore require public support to remedy the 'market failure' and ensure access to TIs to a wide range of users, including SMEs. Such public support is especially needed to cover the capital costs for their creation and upgrade, but also to support accessibility, notably for SMEs and ensure their long-term sustainability.

RITIFI Project : Consortium

- 14 Partners : CEA (FR), DTI (DK), VTT (FI), ESRF (FR), TGB (BE), RISE (SW), FZJ (DE), INESC-TEC (PT), TNO (NL), EATRIS ERIC (NL), ESS ERIC (SW), IJS (SI), FHG (DE), Lukasiewicz-Port (PL).
- Large research performing organisation, **managing large and diverse set of state of the art RIs and Tis**, covering variety of research and technology fields, across 19 countries.
  Consortium **directly connected to many networks of RI and TI users**
- RIs and TIs play a crucial role to boost European's R&I capacity, **from exploratory research to the development**, testing, validation and integration **of knowledge-based innovative solutions** into new products, processes, and services.

Figure 1 - Composition of the project's consortium



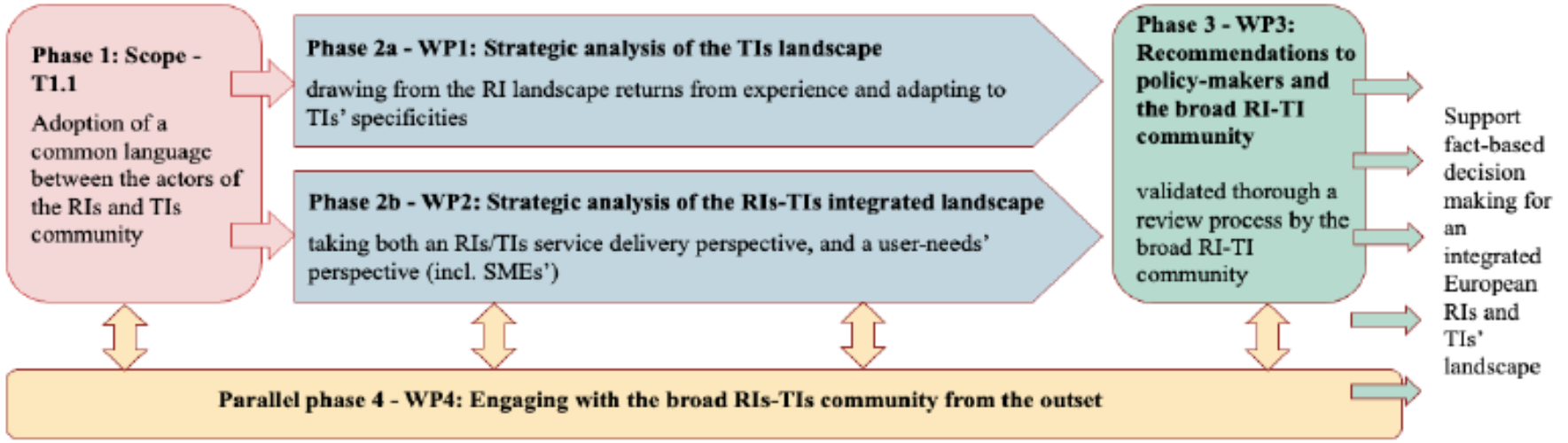
Project Core	**14 Partners - *19 countries***
	• 48 % RIs (managers & users) in 14 countries
	• 52% TIs (managers & users) in 12 countries
	+ R&I policy experts
External Layer	Advisory Board
	Networks of RIs & TIs managers & users
	Policy makers
➡	Engagement with the broad R&I community

RITIFI is funded by the European Framework for Research and Innovation Horizon Europe under grant agreement 101095267

RITIFI Project : Objectives & Workplan

Overall objective: structuring and strengthening the integration of the European landscape of RIs and TIs.

1. Stimulate the **collaboration between RIs and TIs** and develop a functional **framework to integrate RI-TI** services adapted to end-users' needs (incl. SMEs).
2. Provide **evidence-based guidelines** to improve the **visibility and access conditions** of RIs and TIs towards end-users (esp. SMEs) and the sustainability of **RI-TI pan-European networks**
3. Develop options for an **agile and fit-for-purpose governance model for TIs at EU level,** drawing upon **best practices from ESFRI** processes and adapted to TI specificities.
4. Provide a comprehensive and **multi-level analysis of the RI and TI policy landscape** and propose an action plan to ensure **alignment and synergies across policies**, incl. R&I, ERA, Industrial policy, digital and green, etc.
5. Develop policy intelligence for **priority-setting and synergies of investment plans** (public and private), to ensure that state-of-the-art RIs and TIs are available and sustainable in the long run.
6. Create awareness, and stimulate **the inclusive engagement of RIs and TIs managers, users and policy makers** in the development of an integrated RI-TI landscape, contributing to reinforce ERA competitiveness



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RITIFI Project : Outputs

- Capacity buildings recommendations for a better integration & improved value proposition of RI-TIs services adapted to users' needs
- Recommendation to strengthen the long-term sustainability of RIs and TIs' service delivery models
- Guidelines for a comprehensive mapping of TIs and RIs (and services)
- Recommendations for TIs and RIs pan-European accessibility to users
- Recommendations for the creation of thematic RI-TI networks
- Option for a governance model for TI at EU level
- Guidelines for observatory of policy initiatives and instruments
- Action plan for integration of RIs and TIs in EU policies and strategies
- Pathways to cover RIS and TIs funding needs and overcome funding gaps
- Blueprint for prioritization ad coordination of investments
- Validation of results by an engaged RI-TI community (including users)
- Compilation of project findings to foster uptake (white paper)

5 case studies

- Biomedical
- Clean hydrogen
- Circular material economy
- Accelerators and superconducting magnets
- Microelectronics

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An opportunity for the ASc&T community?

- **The ASc&T community owns many facilities that can be considered as TIs, some of them part of the AMICI collaboration.**
- **Compared to other fields, the market is considered a niche market, with the industry more often producing components for our projects than developing new activities of its own.**
- **The EC's growing commitment to TIs can be an opportunity for the ASc&T community**
  - ↪ To increase its visibility, to emphasize its importance in maintaining Europe sovereignty in Big Science and other fields of applications and support industry
  - ↪ To get some funding for the TIs
- **to have a chance of influencing future decisions, the community must first appropriate the concept of TIs and participate to the different bodies that are or will be in place**
- **TIs are appearing as complementary to RIs and should be part of Pilar 2**

  From JRC127798: RIs and TIs are complementary. RIs create new knowledge which will be key for TIs to address the future needs of European Industry. The same facility can play both roles, depending for example on the technology readiness level (TRL) of the projects carried out. An RI could also evolve into a TI as the knowledge and technology in a specific sector matures.

For companies who are interested

A survey is organized by RITIFI (open until 30 April)

https://link.webropolsurveys.com/S/4ED8B0C9EBEDA154

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Thank you for your attention

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