



ITINERIS - Italian Integrated Environmental Research Infrastructures System

Gelsomina Pappalardo

Consiglio Nazionale delle Ricerche



ConfGARR23
SAPERI INTERCONNESSI



- ❖ **European Research Infrastructures**
- ❖ **ESFRI/ ESFRI RIs Landscape in the ENV domain**
- ❖ **ENV RIs in Italy**
- ❖ **ITINERIS**
 - the project/objective/expected impact**
 - national and European context**
- ❖ **Summary**



European Research Infrastructures

European Research infrastructures are facilities that provide resources and services for the research communities to conduct top-level research and foster innovation in their fields.

A BROAD CONCEPT

- Great scientific equipment or set of instruments.
- Scientific collections, archives and structured information.
- Electronic infrastructures (e-infrastructures).
- Any other entity of a unique nature necessary for research.

ACCESS

Physical, Remote, Virtual

CENTRALIZED, DISTRIBUTED OR VIRTUAL

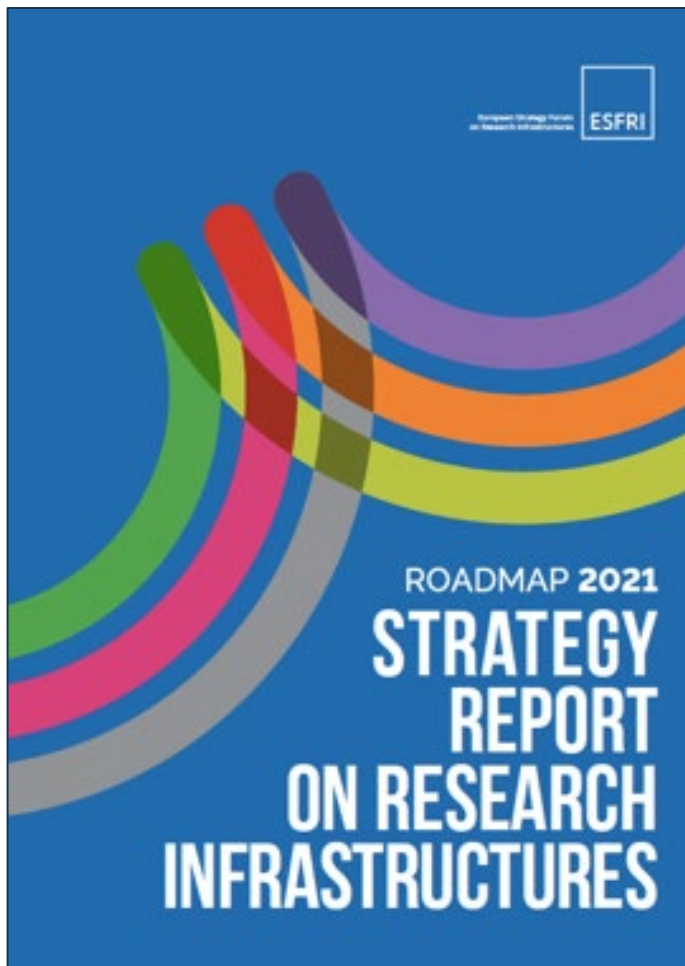


ESFRI ROADMAP 2021



ESFRI

European Strategy Forum
on Research Infrastructures



22 ESFRI PROJECTS 41 ESFRI LANDMARKS

With the Roadmap 2021 ESFRI updated the strategy on European RIs aimed at strengthening the competitiveness and value (excellence and impact) of European research

<https://roadmap2021.esfri.eu/>

The Roadmap 2021 includes the Landscape Analysis which provides an overview of the European RI ecosystem by identifying the main RIs operating transnational access in Europe, in all fields of research, and major new or ongoing projects, as well as an outlook to the global landscape of relevance.



22 ESFRI Projects (11 new)

ENE	ENV	HF	PSE	SCI	DIGIT
	DANUBIUS-RI	EMPHASIS	EST KM3NeT 2.0	E-RIHS	
IFMIF-DONES	DISSCo eLTER	EU-IBISBA METROFOOD-RI		EHRI	
MARINERG-i		EIRENE RI	ET EuPRAXIA	GGP GUIDE OPERAS RESILIENCE	EBRAINS SLICES SoBigData++
					2016
					2018
					2021

<https://roadmap2021.esfri.eu/>



European Strategy Forum
on Research Infrastructures

41 ESFRI Landmarks (4 new)

ENE	ENV	HF	PSE	SCI	DIGIT
JHR	EMSO ERIC EUROARGO ERIC IAGOS ICOS ERIC LIFEWATCH ERIC	BBMRI ERIC EATRIS ERIC ECRIN ERIC ELIXIR INFRA FRONTIER INSTRUCT ERIC	E-ELT ELI Eur. Spallation Source ERIC EU-XFEL FAIR ILL SKA SPIRAL2	CESSDA ERIC CLARIN ERIC DARIAH ERIC ESS ERIC SHARE ERIC	PRACE
					2006
ECCSEL ERIC	EISCAT-3D EPOS ERIC	EMBRC ERIC EU-OPEN Screen ERIC ERINHA EuroBio Imaging ERIC	EMFL CTA		
					2008
EU SOLARIS	AnaEE MIRRI				
					2010
ACTRIS			ESRF-EBS*		
			HL-LHC		
					2016



ConfGARR23

SAPERI INTERCONNESSI



Landscape Analysis - ENV

GEOSPHERE: FROM THE SURFACE TO THE INTERIOR OF THE EARTH, FROM GEOHAZARDS TO GEORESOURCES

(CURRENT STATUS, GAP, CHALLENGES AND FUTURE NEEDS)

ATMOSPHERE: FROM NEAR GROUND TO THE NEAR SPACE ATMOSPHERE

(CURRENT STATUS, GAP, CHALLENGES AND FUTURE NEEDS)

HYDROSHERE

FRESHWATER: ICE, GROUNDWATER, LAKES, RIVERS, ESTUARIES

(CURRENT STATUS, GAP, CHALLENGES AND FUTURE NEEDS)

MARINE: FROM COAST TO DEEP OCEANS AND ICE CAPS

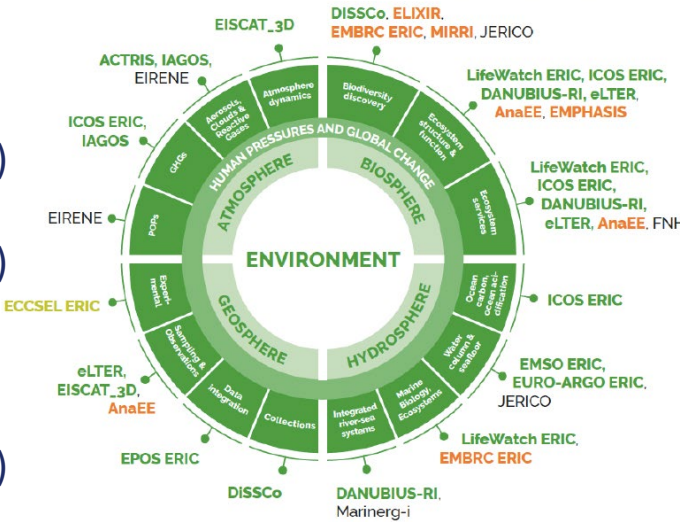
(CURRENT STATUS, GAP, CHALLENGES AND FUTURE NEEDS)

BIOSPHERE: BIODIVERSITY AND ECOSYSTEMS

(CURRENT STATUS, GAP, CHALLENGES AND FUTURE NEEDS)

VISION and PERSPECTIVES

8 Landmarks (ACTRIS, EISCAT_3D, EMSO, EPOS, EURO-ARGO, IAGOS, ICOS, LifeWatch) and 3 Projects (DANUBIUS-RI, DiSSCo, eLTER RI)



ESFRI

European Strategy Forum
on Research Infrastructures



➤ Link with other domains:

- link with life sciences (H&F) [[ANAE](#), [EMPHASIS](#), [EU-IBISBA](#), [EMBRC](#),];
 - the environment's role in energy systems (ENE);
 - process studies and technological developments (PSE);
 - the environment in interaction with human society (SCI);
 - large volume of data (DIGIT)
- The analysis of the relevance of ESFRI Research Infrastructures for Sustainable Development Goals (SDGs)

All ENV RIs contribute to SDGs; ENV RIs play an active role in COPERNICUS

- The analysis of capacity of RIs to respond to emergencies (as for example in the case of the COVID-19 crisis)

Unique laboratory test of environmental reaction / Support for filtering mask

- The contribution of ESFRI RIs to the digital transformation (including EOSC)

ENV RIs are typically distributed RIs – distributed volume of different kind of data – strong digital component

Link to EOSC: i.e. ENVRIFAIR H2020 project





ESFRI ENV RIs in Italy



- Italy contributes to almost all ENV ESFRI RIs: ACTRIS, DANUBIUS, DiSSCo, eLTER RI, EMSO, EPOS, EURO-ARGO, ICOS, LIFEWATCH.

- Relevant role in ESFRI Landmarks:
 - Hosting the EMSO and EPOS ERICs
 - Hosting the Service Center of LifeWatch ERIC
 - Hosting the ACTRIS ERIC SAMU, CARS, CAIS and Aerosol Remote Sensing Data Center
 - Hosting the ICOS Ecosystem Thematic Centre
 - Coordinating the Mediterranean and Black Sea Argo Regional Centre in Euro-Argo

- Participation in other non ESFRI ENV RIs (EUFAR, EuroFleet, Jerico, SIOS, ECORD)





ENV RIs in Italy/ PNIR

The active participation in ESFRI and other European ENV RIs testifies to the importance that Italy places in environmental research

There is a strong scientific community that has been working in this sector for many years /a very multidisciplinary community

Italy is a fragile country from an environmental point of view

This is also witnessed by the other ENV RIs at national level as reported in the PNIR (ATLaS, CeTrA, R/V Laura Bassi, SMINO)





Environmental research is aimed at understanding the functioning of the Earth system at various spatial and temporal scales.

Environmental research requires comprehensive observations integrated with relevant experimental and modeling approaches that are essential for understanding and predicting the mechanisms and evolution of the Earth's environmental system.

Environmental Research Infrastructures are key to providing systematic and coherent datasets needed for research that addresses major issues but also societal challenges such as climate, natural resources, health, food security, biodiversity and sustainable use of the sea, fresh water and soil.

The full exploitation of the synergies among the environmental research infrastructures is strategic for the country. It means **building the integrated platform for the observation and study of phenomena in the various sectors of interest ranging from marine sciences, to solid earth, to the atmosphere, to biodiversity and ecosystems, to support the country in dealing with large environmental challenges, also in line with the European priorities.**

ITINERIS - Italian Integrated Environmental Research Infrastructures System

➤ 7 Partners



➤ **22 RIs:**

The participating RIs are the Italian nodes of the **ESFRI Landmarks** ACTRIS, EMSO, Euro-Argo, ICOS and LIFEWATCH, from the ENV domain and ANAEE from the H&F domain and closely linked to the ENV domain; the Italian nodes of the **ESFRI projects** DANUBIUS, DISSCO, e-LTER, from the ENV domain, and EMPHASIS and EU-IBISBA from the H&F domain and also relevant for ENV; the **EU RIs** ECORD, EUFAR, Eurofleets, JERICO and SIOS, all from the ENV domain; and the national RIs ATLaS, CeTrA, N/V Laura Bassi, and SMINO, from the ENV domain, and Geosciences and LNS, both from the PSE domain, that in ITINERIS support services in the marine domain.

➤ **Total budget: 155,2 ML Euro**

➤ **Start date 1 November 2022 (for 30 + 6 months) + at least 10 years operation**





Main Objective

ITINERIS will build the Italian Hub of Research Infrastructures in the environmental scientific domain for the observation and study of environmental processes in the atmosphere, marine domain, terrestrial biosphere, and geosphere, providing access to data and services and supporting the Country to address current and expected environmental challenges.

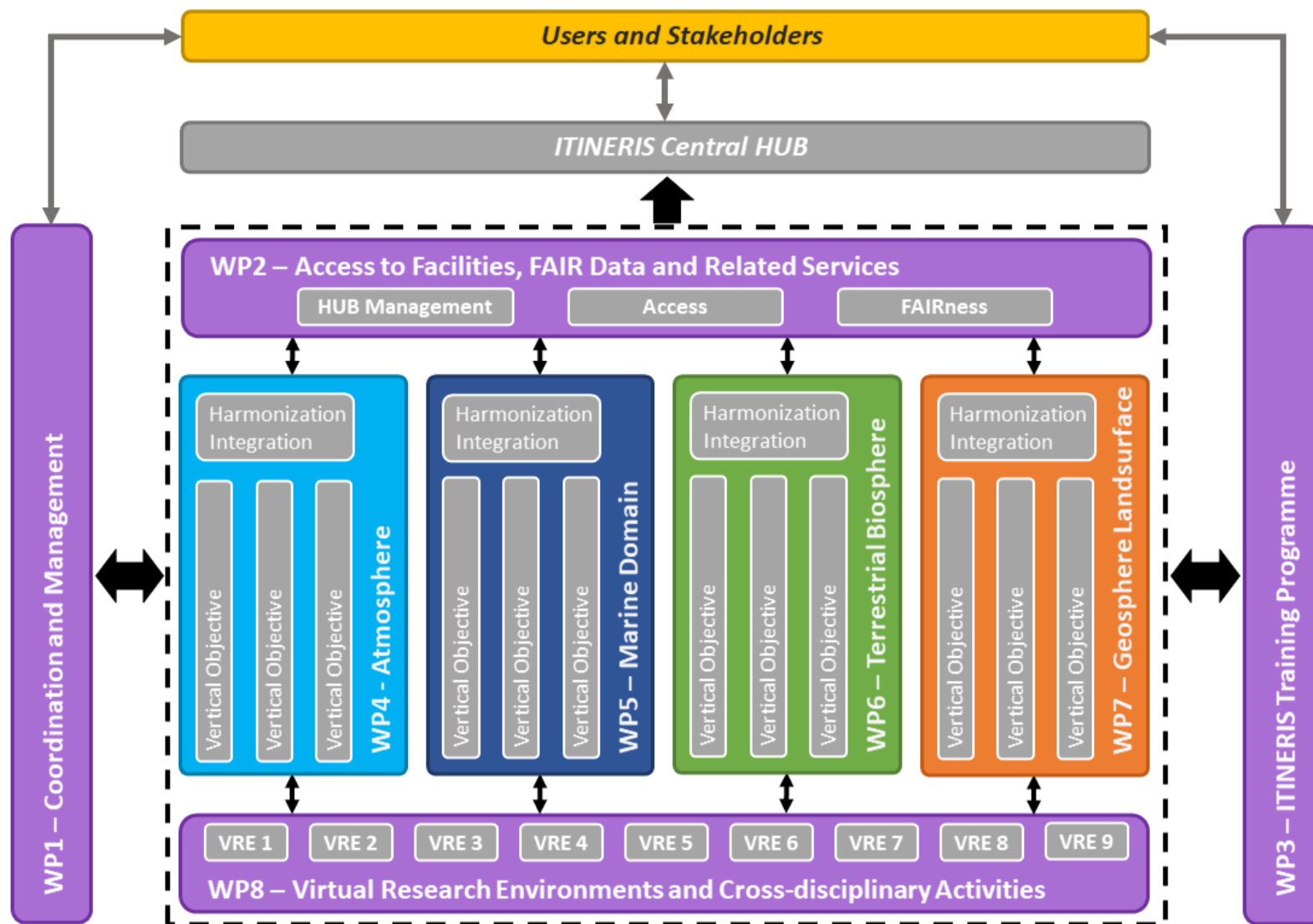
The main goal is to develop cross-disciplinary research in environmental sciences through the use and re-use of existing (or pre-operational) data and services and new observations, to address scientifically and societally relevant issues such as sustainable use of natural resources, implementation of Nature-Based Solutions, Green and Blue Economy, pollution reduction, critical zone and ecosystem management and restoration, carbon cycle, mitigation of the downstream effects of climate and environmental change.

This broad-scale vision of environmental research, sustained by the main Italian environmental scientists involved in European RIs, **is truly innovative and it will support our Country in taking a leading role in European environmental research, designing the framework for the next decades.**





ITINERIS Project Structure



ITINERIS in numbers

- 7 Partners, 39 OUs, 22 RIs
- 8 WPs, 89 Tasks, 75 IOs, 208 Deliverables
- 50 Permanent Staff directly involved in the proposal preparation
- More than 300 permanent staff committed for the activities
- Budget 155.208.808,81 € (Personnel 21.867.510,00 €; Investments 105.496.558,76 €; Access 3.884.146,82 €; civil infrastr. and services 5.779.856,00 €; training 8.026.890,00 €; indirect costs 10.153.847,23 €)
- 194 fixed-term personnel to be hired (21% Researchers, 62% Technologists, 17% Technicians)
- 63 PhD



ITINERIS main expected impacts

ITINERIS will establish the Italian national system of Research Infrastructures (RI) in the environmental domain, creating a coherent and harmonized flow of data, information and knowledge across all the participating RIs.

The ITINERIS project will produce new knowledge on environmental processes across subdomains, adopting a whole-system view and considering in particular the interactions and links among the different components, something that is often overlooked in individual RIs.

Link with other domains to promote cross disciplinarity

Expected wider scientific, economic, and societal effects of the project: (a) promotion of scientific excellence and creation of knowledge and innovation; (b) attraction of new researchers from other territories; (c) attraction of capital and investments in the territory; (d) impact on the competitiveness of enterprises, and more generally in terms of spin-off effect on the territory.

ITINERIS long term strategy in the national and European context

- National nodes of EU RIs with long-term commitment
- ENV RIs scientific community has been working together in Europe for many years now
- Capacity to serve a larger community with new services will have a positive impact at both national and EU level
- Improved access management and governance will also have a positive impact
- Partners commitment



Summary

- ❑ ESFRI and focus on ENV Research Infrastructures
- ❑ ENV RIs in Italy
- ❑ ITINERIS
- ITINERIS will establish the Italian Hub of Research Infrastructures (RI) in the environmental domain
- Strengthen of the Italian component in the EU ENV-RIs
- Development of new services with impact at regional, national and European level
- Strong synergies with other PNRR actions (RIs, CN Biodiversity, CN Agritech, CN HPC)
- Unique experiment in Europe to support our Country in taking a leading role in European environmental research

Acknowledgments

- ❑ ENV RIs scientific community
- ❑ The Italian Minister of University and Research
- ❑ RPOs hosting these RIs
- ❑ The CNR in particular, which supported the initiative and accepted the challenge of coordinating such a demanding and ambitious project

