



THE EU RESEARCH & INNOVATION PROGRAMME

2021 - 2027

RESEARCH INFRASTRUCTURES

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Research and Innovation

Research Infrastructures

Facilities providing resources and services for research communities to conduct research and foster innovation (single site, distributed, virtual). They provide access to external users.

Knowledge-related facilities



Major scientific equipments



ICT infrastructures



e.g.: archives, collections, data infrastructures, telescopes, research vessels, FEL, computing systems, communication networks

Inter alia, RIs contribute to:

- ✓ Extend the frontiers of knowledge
- Exchange and transmit knowledge

- ✓ Train the next generation of top researchers
- ✓ Support industrial innovation

Research Infrastructures in Horizon Europe



Widening Participation and Strengthening the European Research Area

Widening participation and spreading excellence

Reforming and Enhancing the European R&I system

Research Infrastructures in Horizon Europe

Overall objective

Empower Europe through an integrated ecosystem of world-class and accessible national and pan-European RIs, which help covering the continuum of needs from fundamental knowledge creation to technology deployment and support the implementation of Open Science policies as well as European technology leadership.

Strategic orientations for 2023-2024 WP

Same programming cycle: 2021-2024

- => main structure (Destinations and their expected impacts)
 - however, flexibility on the expected outcomes to fully achieve those expected impacts i.e. may be different from WP 2021-2022
 - what was considered:
 - ✓ Gap analysis: elements of the strategic plan or specific programme not covered by WP2021-2022
 - ✓ Lessons learnt: from the first WP cycle
 - ✓ Commitments made in HE implementation strategy (e.g. reduced complexity, simplified forms of costs, more bottom up topics, …)

Key priorities (1)

- Consolidate existing capacities and develop new RIs to support scientific breakthroughs and respond to new challenges, notably in the field of health and for the twin transition;
- Provide the European Research Area (ERA) with an effective and sustainable RIs landscape, which will make it increasingly attractive for researchers and talents from all over the world.
- Upsurge resilience of RIs, particularly in the context of recovery from COVID-19 pandemic and the energy crisis;
- Contribute to Open science & data policies through a trusted virtual environment (European Open Science Cloud - EOSC)
- Offer high-speed connectivity to researchers (Gigabit European Academic Network -GEANT).

Key priorities (2)

- Address global environmental, social and economic challenges, in line with the renewed ERA;
- Contribute to local and regional development by supporting, inter alia, the implementation of Smart Specialisation Strategies;
- Develop cutting-edge technologies for RIs and foster innovation;
- Reinforce the international dimension of European RIs.

Key targets in 2023-2024

- Develop new concepts for the next generation of European RI targeting gaps linked to key political priorities or addressing emerging needs for new scientific discoveries and major knowledge advancements
- Accelerate the implementation of RI projects included in the European Strategy Forum on Research Infrastructures' (ESFRI) Roadmap in 2018, in order to provide the ERA with additional capacities
- ✓ **Consolidate and optimise** the European RI landscape through:
 - Strengthening and evolution of individual pan-EU RI, to improve their long term sustainability and increase capacity to address EU policy priorities and support EU industry;
 - support to the development of complementarities, synergies and/or SLAs* between RIs, or merging to reduce fragmentation and duplication of efforts.
- Monitor implementation of European Research Infrastructure Consortium (ERIC) Regulation and contribution to ERA
- Enhance the international dimension of ESFRI/ERIC RIs and the International cooperation with Africa and/or Latin America in specific priority fields
- ✓ Support Presidency events and international conferences to increase visibility of RIs

*Service Level Agreement (typically in distributed RIs between central office and national or local nodes)

Key targets in 2023-2024: access

- Topics to be supported under the challenge driven and the curiosity driven approaches identified through MAPS (Multi Annual Priority Setting) plan, taking stock of the results of previous calls and the analysis in the context of ESFRI and ERICs on how to better complete and optimise the service offering of the RI landscape
- integration, under same projects, of different types of research infrastructures, breaking barriers between networks of similar or complementary RIs challenge: defining the appropriate consortia of beneficiaries and the involvement of third parties;
- > co-fund of access provision as identified gap from the Specific Programme
- Limited development of new relevant services is possible, including joint/cross-RI services, provided that the resulting services are opened and offered already under the actions (short term R&D) and that the long term sustainability of such services can be ensured by the participant RIs.

Key targets in 2023-2024: technology

- Deliver innovative scientific instrumentation, tools and methods to advance the state-of-art of European RIs, address specific needs of the RI landscape (in particular ESFRI and ERIC) and serve more advanced R&D, new areas of research, and/or a wider community of users.
- Simulate ultra-complex phenomena and advance scientific discovery through the development, in synergy with other relevant activities, of further Interdisciplinary Digital Twins - digital replicas of living or nonliving physical entities, delivering technical and software solutions and services to interdisciplinary research communities.

Main novelties

- Preparation of common strategies for future development of RIs technologies and services within broad RIs communities;
- Co-Fund action for access;
- **Greening** the research infrastructures technologies;
- Advancing the challenge-driven approach complementary to the bottom-up, excellence-driven approach.

In a nutshell

- > 5 Destinations: packages of actions contributing to specific objectives with expected impacts
- > 7 calls: 4 calls in 2023 (deadline: 09/03/2023), and 3 calls in 2024 (deadline: 12/03/2024)
- > 30 topics
- > Other actions:
 - **5 grants for identified beneficiaries:** ERIC monitoring, EOSC monitoring, 2 presidency events, enhanced depositing services;
 - **1 SGA** to the FPA for Research and Education Networks;
 - External expertise: reviewers; individual experts; ERICs evaluators.

~654 M€ total budget: ~320 M€ on topics/actions 2023, ~334 M€ on topics/actions 2024

Destinations

- INFRADEV: Developing, consolidating and optimising European RIs landscape, maintaining global leadership
- INFRASERV: RI services to support health research, accelerate the green and digital transformation, and advance frontier knowledge
- INFRATECH : Next generation of scientific instrumentation, tools and methods and advanced digital solutions
- > **INFRAEOSC :** Enabling an operational, open and FAIR* EOSC ecosystem
- INFRANET : Network connectivity enabler for collaboration without boundaries

*Findable, Accessible, Interoperable, Reusable

Destination INFRADEV: Developing, consolidating and optimising the European RI landscape, maintaining global leadership

Objective: develop a European **strategy** for RI and create a coherent, responsive, sustainable and attractive **RI landscape**, by strengthening existing facilities, reducing the fragmentation at national and regional level, ensuring coordination among MS/AC, and strengthening national and regional R&I ecosystems. Enhance the role of RIs for **international cooperation**.

Expected impact:

- Disruptive research and breakthrough science and innovation through cutting-edge, interconnected and sustainable Research Infrastructures;
- Strengthened scientific excellence and performance and efficiency of the European Research Area, increasing its attractiveness to researchers from all over the world;
- Coordinated research infrastructure capacity among countries and regions, also by exploiting possibilities given by the smart specialisation processes;
- Reinforced R&I capacities enabling systemic changes needed for a truly transformative societal and economic recovery and a strengthened resilience of critical sectors, as outlined in the Recovery Plan;
- Improved European response, in cooperation with international players, to emerging socio-economic and related scientific and technological challenges at global level.

HE WP 2023-2024 – Topics overview

Destination INFRADEV	Type of action	Budget per GA	Topic budget
Concept development for a research infrastructure to manage, integrate and sustain large medical cohort studies	RIA	1 - 3	3
Early phase implementation of ESFRI Projects entering the ESFRI Roadmap in 2018	CSA	1 - 1.5	7.5
Consolidation of the RI landscape – Individual support for evolution and long term sustainability of pan-European research infrastructures	RIA	3 - 4	40
Consolidation of the RI landscape – development of complementarities, synergies and/or integration between a set of pan- European research infrastructures	RIA	2 - 5	20
Preparation of common strategies for future development of RI technologies and services within broad RI communities	CSA	1.5 - 2.5	12.5
Strengthen bilateral cooperation on RIs with Latin America	CSA	0.75 - 1.5	3.75
Strengthening the international dimension of ESFRI and/or ERIC RIs	CSA	1 - 1.5	7.8
Preparatory phase of new ESFRI research infrastructure projects	CSA	~3	3
RI concept development (2024)	RIA	1 - 3	14
Strengthen the bilateral cooperation on RIs with Africa (2024)	CSA	1 - 1.5	1.5
Consolidation of the RI landscape – Individual support for evolution, long term sustainability and emerging needs of pan-European RI (2024)	RIA	2 - 4	8

Destination INFRASERV: RI services to support health research, accelerate the green & digital transformation, and advance frontier knowledge

Objective: Provide efficient and customised **research and innovation services** (e.g. access to unique scientific tools, samples provision, processing and analysis, data services) to support an effective and responsive health and care system and accelerate the transition towards a green and digital future. At the same time, RI services will also continue enabling the advancement of frontier knowledge.

Expected impact:

- Reinforced research infrastructures capacity to provide at scale and across the EU services to support excellent research to address societal challenges, and Horizon Europe missions and partnerships' objectives;
- Enhanced and increased society's long-term and consistent problem-solving capacity and evidence-based policy making in areas linked to health, and the green and digital transition, including a better understanding of socio-economic implications, through the provision of innovative, customised and efficient RI services;
- New discoveries and knowledge breakthroughs enabled by access provision to the best and in some cases unique state-of-the-art RIs;
- A new generation of **researchers trained** to optimally exploit all the essential and advanced tools for their research;

Destination INFRASERV: main features of all topics

- Focus on trans-national access in-person or remote and virtual access
- Bring together several complementary and interdisciplinary RIs
- Access includes *ad-hoc* training and scientific and technical support to users
- Harmonisation, customisation and virtualisation of RI services, and activities to facilitate and integrate the access procedures, also supported
- Access is provided to existing services, but limited development of new services, relevant to the challenges, can be supported, including joint/cross-RI services, provided that they are offered already under the actions and that their LTS* is ensured by the participant RIs
- Access provision in line with the European Charter for Access to Research Infrastructures
- Address data management, interoperability and connection of digital services to the **EOSC**
- Access can be provided, under certain conditions, to researchers in third countries. Third countries' RIs may be involved and funded when there is an EU benefit, e.g. they offer complementary or more advanced services than those available in MS/AC**.

*Long Term Sustainability **Member States / Associated Countries

HE WP 2023-2024 – Topics overview

Destination INFRASERV	Type of action	Budget per GA	Topic budget
RI services to enable R&I addressing main challenges and EU priorities	RIA	8 - 14.5	116
- RI services to enable research linking environmental factors to human health			
- RI services for improving clinical research in the paediatric area			
- RI services for climate-change risks			
- RI services for sustainable Arctic/polar regions			
- RI services for healthy ocean and waters			
- RI services for sustainable aquaculture, fisheries and blue economy			
- RI services for renewable energy technologies and systems			
- RI services for innovative applications of nanoscience and nanotechnology			
- RI services to enhance the EU capacity for the development of semiconductors			
- RI services for shaping the future generation society			
RI services advancing frontier knowledge	RIA	8 - 14.5	29
- RI services in Biosphere: terrestrial biodiversity and ecosystems, including forest			
- RI services in Astronomy and Astroparticle physics			
- RI services in Arts and Humanities			
RI services advancing frontier knowledge: co-fund pilots with pan-European RIs and/or national RIs	COFUND	2 - 5	12

Destination INFRATECH: Next generation of scientific instrumentation, tools and methods and advanced digital solutions

Objective: Develop ground-breaking **RI technologies**, i.e. scientific instrumentation, tools, methods, and advanced digital solutions which underpin the provision of improved and advanced RI services to **enable new discoveries** and keep Europe's RIs at the highest level of excellence in science, while paving the way to innovative solutions to societal challenges and new industrial applications, products and services.

Expected impact:

- Enhanced global competitiveness and technological excellence of Europe in an extremely fastmoving environment through investments into the development, of forward-looking technical instruments and tools for European RIs.
- Enhanced competitiveness of European industry through co-development with industrial actors of advanced RI technologies and technology transfer;
- Opening up of new areas of research and development of new industrial applications/products;
- Development of skills of RI staff aligned with the advancements of the RI technologies;
- Trans-disciplinarity, cross-fertilisation and a wider sharing of knowledge and technologies between academia and industry;
- Wider use of AI in research and enhanced data based research across Europe.

HE WP 2023-2024 – Topics overview

Destination INFRATECH	Type of action	Budget per GA	Topic budget
New technologies and solutions for reducing the environmental and climate footprint of RIs	RIA	~ 5	25
R&D for the next generation of scientific instrumentation, tools, methods, solutions for RI upgrade (2024)	RIA	5-10	62
Development of tools, solutions, modules to enable R&I on the social aspects of the green transition (2024)	RIA	~ 5	5
New digital twins for Destination Earth (2024)	RIA	~ 15	45
AR/VR-empowered digital twins for modelling complex phenomena in new RI application areas (2024)	RIA	~ 12	24

Destination INFRAEOSC: Enabling an operational, open and fair EOSC ecosystem

Objective: continue to develop the EOSC in a more cohesive and structured manner so that it becomes a fully operational enabling ecosystem for the whole research data lifecycle. This ecosystem includes FAIR research data commons (e.g. data, services, tools), based on key horizontal core functions, with corresponding e-infrastructures and service layers accessible to researchers across disciplines throughout Europe, leading to a "Web of FAIR Data and Services" for Science.

Expected *impact*:

- Transforming the way researchers as well as the public and private sectors create, share and exploit research outputs within and across research disciplines, leading to better quality, validation, more innovation and higher productivity of research;
- Facilitating scientific multi-disciplinary cooperation, leading to discoveries in basic research and solutions in key application areas;
- Seamless access to and management of increasing volumes of research data following FAIR principles and other research outputs stimulating the development and uptake of a wide range of new innovative and value-added services from public and commercial providers;
- Improving trust in science through increased FAIRness, openness and quality of scientific research in Europe, supported by more meaningful monitoring and better facilitators for reproducibility, validation and re-use of research results, and by improving pathways for the communication of science to the public.

HE WP 2023-2024 – Topics overview

Destination INFRAEOSC	Type of action	Budget per GA	Topic budget
Build on the science cluster approach to ensure the uptake of EOSC by RIs and research communities	RIA	~ 25	25
Development of community-based approaches for ensuring and improving the quality of scientific software and code	RIA	~ 8	8
Planning, tracking, and assessing scientific knowledge production	RIA	~8	8
Next generation services for operational and sustainable EOSC Core Infrastructure	RIA	~ 10	10
EOSC Architecture and Interoperability Framework	CSA	~ 3	3
Trusted environments for sensitive data management in EOSC	RIA	~5	15
FAIR and open data sharing in support of the mission adaptation to climate change (2024)	RIA	6 - 8	16
Supporting the EOSC Partnership in further consolidating the coordination and sustainability of the EOSC ecosystem (2024)	CSA	~ 4	4
Enabling a network of EOSC federated and trustworthy repositories and enhancing the framework of generic and discipline specific services for data and other research digital objects (2024)	CSA	~ 5	5
Long-term access and preservation infrastructure development for EOSC, including data quality aspects (2024)	RIA	~ 8	8
Innovative and customizable services for EOSC Exchange (2024)	RIA	~ 7	28

RIs in other Horizon Europe pillars: examples

- ✓ HORIZON-CL6-2023-BIODIV-01-6: Restoration of deep-sea habitats (IA): Proposals should develop and test innovative and technically challenging active restoration of deep-sea habitats. "Collaboration with the relevant existing European Research Infrastructures is considered necessary"
- HORIZON-CL6-2023-BIODIV-01-12: Reinforcing science policy support with IPBES and IPCC for better interconnected biodiversity and climate policies (CSA) "This includes links to ESFRI research infrastructures, to test whether they could host predictive models, visualization and analysis of their platform's early warning systems, to respond to IPBES and IPCC assessments and to CBD requests, by participating in joint activities such as workshops, scientific deliverables, or joint communication and dissemination measures."
- HORIZON-CL6-2023-FARM2FORK-01-1: European partnership on accelerating farming systems transition agroecology living labs and research infrastructures (Programme Co-fund Action) "Research infrastructures provide a wide range of services for research communities working in a long- term perspective."..."It should mobilise key partners and stakeholders, including ministries, funding agencies, research performing organisations, regions, local authorities, research infrastructures, living laboratories, farmers, advisors, industry, consumers, etc."..."Improve access to and use of services provided by research infrastructures and other relevant initiatives, for long-term measurement, observation and experimentation in support of agroecology. "
- ✓ HORIZON-HLTH-2023-ENVHLTH-02-04: Global coordination of exposome research (CSA): Proposal for options for a global governance structure for a Global Human Exposome Network taking advantage of and connecting to the existing research infrastructures and services in the area of the Exposome at the European level" ... "Proposals should interact with existing research infrastructures, services and research projects in the area of the exposome"
- HORIZON-HLTH-2023-TOOL-05-03: Integrated, multi-scale computational models of patient patho-physiology ('virtual twins') for personalised disease management (Research and Innovation Actions) "The proposals should adhere to the FAIR data principles and adopt data quality standards, GDPR-compliant data sharing, access and data integration procedures based on good practices developed by the European research infrastructures."

Additional features of co-fund pilots (cf. HORIZON-INFRA-2023-SERV-01-03)

- Funding rate: 70% of the eligible costs. Proposals must explain how the EU funding will be complemented by other national or international funding sources ;
- Access programme to RIs may be implemented <u>either directly</u> by the consortium, with the provision
 of trans-national / virtual access by beneficiaries, third parties or external providers of purchased
 services, <u>or</u> through the mechanism of "<u>financial support to third parties</u>" (*cascade granting*);
- national or international access programme managers, including the legal entities of distributed European RI, are expected to be <u>core partners</u> in the consortia;
- Proposals should include the list of services/installations made available by the action for transnational or virtual access and the estimated amounts of units of access made available for users.
- In case of financial support to third parties:
 - Description of the different types of research infrastructure services, (and ~ quantity of access), that are made available for trans-national or virtual access by the co-funded calls, including a <u>list</u> of examples of existing installations (e.g. those from beneficiaries/affiliated entities);
 - ✓ applicants to access calls: users together with the research infrastructures they need, including nodes of distributed ESFRI or ERIC infrastructures;
 - if beneficiaries/affiliated entities are recipients of the financial support, proposals must explain how they will ensure that these entities are <u>not</u> involved in the selection procedure of the calls, in order to avoid conflicts of interest and maintain confidentiality.

Financial Support to third parties I ("Cascading grants")

 Please refer to the relevant parts of General Annexes of the Horizon Europe Work Programme 2023/4 and the annotated Model Grant Agreement!!!

> https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/aga_en.pdf

- For the costs to be eligible under the action, they must be compliant with Article 6.2.D.1 of the HE MGA, which requires in particular that the beneficiaries set and respect the criteria and procedures for giving financial support;
- Considering that these criteria and procedures should respond to the objectives set out in the call conditions, it is for the consortium to elaborate on them and to implement them. This includes ensuring that the recipients fulfil the conditions, and paying the recipients;
- All calls for third parties and all calls that are implemented by third parties must be published on the Funding & Tenders Portal, and on the beneficiaries' websites'.



Financial Support to third parties II

- Proposal must detail the conditions which will apply for providing financial support to third parties;
- Call conditions must ensure objective and transparent selection procedures and include at least the following (for grants or similar):
 - i. the maximum amount of financial support for each third party ('recipient'); this amount may not exceed the amount set out in the Data Sheet (see Point 3)30 or otherwise agreed with the granting authority
 - ii. the criteria for calculating the exact amount of the financial support
 - iii. the different types of activity that qualify for financial support, on the basis of a closed list
 - iv. the persons or categories of persons that will be supported and
 - v. the criteria and procedures for giving financial support



Financial Support to third parties III

- The consortium has to describe in their proposal who amongst themselves will be responsible for organising the calls for financial support to third parties;
- It is up to the consortium to define the template for the agreements between the HE beneficiaries and third parties receiving financial support;
- Beneficiaries/affiliated entities of the consortia awarded may exceptionally also be recipients of financial support to third parties:
- Proposals must explain how they will ensure that such beneficiaries/affiliated entities are not involved in the selection procedure of the calls, in order to avoid conflicts of interest and maintain confidentiality:
- The HE beneficiaries have to provide a commitment on the availability of funds when submitting the results of the calls to the Commission;
- The costs reported have to fulfil the general conditions for actual costs to be eligible (i.e. incurred during the action duration, necessary, linked to the action, etc.
 The underlying projects / financial support to third parties has to be finalised and paid within the duration of the HEU GA.

Commission

Why do we use lump sum funding?

Reducing the financial error rate

- Following the ECA annual reports 2019 and 2020, there is wide agreement that the error rate in the R&I Framework Programmes must be reduced
- Lump sums are a key measure to achieve this in Horizon Europe

Significant simplification potential

- Lump sums remove the obligation to report actual costs and resources
- Easier to use for beneficiaries with limited experience
- Funding based on reimbursement of real costs remains complex and error-prone. Little scope for further simplification

Focus on content

• Focus less on financial management and more on content



Why do we use lump sum funding?

Easier access to the programme

- Very small share of beneficiaries have more than 100 grants:
 - Large entities
 - Dedicated staff and procedures to deal with actual costs
- Vast majority of beneficiaries have only 1 or 2 grants per programme
 - Most of them SMEs or newcomers
 - Little or no previous experience
 - Need a simple funding model



■ all beneficiaries ■ of which SMEs or newcomers



Basic principles

• Lump sum grants follow the standard approach as much as possible

same: templates, evaluation criteria, payment scheme, technical reporting

- One lump sum share per work package and beneficiary
- Very simple financial reporting
- Lump sum shares paid upon completion of work packages



Writing a lump sum proposal

- To write a lump sum proposal, applicants:
 - Use the standard Horizon Europe application form
 - Present the objectives and methodology of their project and address the expected outcomes and impacts as in any Horizon Europe proposal
 - Describe in detail the activities covered by each work package.
- To define and justify the lump sum, applicants must provide a **detailed budget table** with cost estimations.
- The detailed budget table is an **Excel file**. Applicants download it from the online submission system, fill it and submit it as an annex to the Part B application form.



Writing a lump sum proposal – detailed budget

- In the detailed budget table, applicants provide cost estimations for each cost category per beneficiary (and affiliated entity if any) and per work package.
- The cost estimations must be an **approximation of their actual costs.** They:
 - are subject to the same eligibility rules as in actual costs grants
 - must be in line with applicants' normal practices
 - must be reasonable / non-excessive
 - must be in line with and necessary for the proposed activities.
- The cost estimations are used to generate in the detailed budget table a breakdown of lump sum shares per work package and per participant.
- Details and instructions on how to fill in the lump sum detailed budget table are provided in the <u>Funding & Tenders portal</u>.



Evaluation of a lump sum proposal

- Your proposal will be evaluated by independent experts against the **standard evaluation criteria**: excellence, impact, and implementation.
- The cost estimations will be assessed against the proposed activities under the **implementation** criterion.
- Experts will:
 - ensure that the cost estimations are **reasonable and non-excessive**
 - evaluate whether the proposed resources and the split of the lump sum **allow completing the activities described in the proposal**.
- If the experts find overestimated costs, they make **concrete recommendations** on the budget that are recorded in the Evaluation Summary Report. This will be reflected in a modified lump sum amount in the grant agreement.
- Cost estimations that are clearly overestimated or underestimated lead to a **decreased score** under the implementation criterion.



Resources available

One dedicated **lump sum page** on the Funding & Tenders Portal with:

Guidance documents	 <u>What do I need to know?</u> & <u>Quick guide</u> <u>Frequently asked questions</u> <u>Detailed guidance for applicants and beneficiaries</u> <u>Lump sum briefing slides for experts</u> 	
Reference documents	 Model Grant Agreement Lump Sum Decision authorising the use of lump sum contributions under the Horizon Europe Programme 	
Studies	 European Commission assessment (October 2021) European Parliament (STOA) study on lump sums in Horizon 2020 (May 2022) 	
Events	Future eventsPast events and recordings	
Funding opportunities	 List of Horizon Europe topics using lump sum funding 	



Lump Sum Grants

in Horizon Europe

Why do we need them and how do they work in practice?





QUESTIONS AND ANSWERS