



European Strategy Forum
on Research Infrastructures

ESFRI ACTIVITY REPORT

2021-2023

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1 Foreword from Jan Hrušák, ESFRI Chair 2020–2021

The second part of my ESFRI chairmanship (2020–2021) was framed by the outbreak and impact of the COVID19 pandemic. Despite the resulting restrictions ESFRI continued to fulfil its mission to provide relevant policy advice and further consolidate the research infrastructure (RI) ecosystem. With the vision to maximize the impact of Pan-European investments in RIs, ESFRI has been developing strategic ideas for an integrated and interconnected RI ecosystem supporting the achievement of Europe's wider policy goals. This led to the release of an ESFRI strategy paper titled 'Making Science Happen' in spring 2020, which summarized two years of continuous discussions, engaging EU Member States and Associated Countries, the European Commission and the scientific community, and which was also ESFRI's contribution to the renewed European Research Area (ERA). In the document ESFRI articulated its vision of a future-oriented, interconnected, and interoperable research infrastructure ecosystem, which is decisive for Europe's capacity to deliver scientific breakthroughs and to rapidly address the societal challenges Europe and the world are facing. While interconnecting research with other policies across sectors, and by contributing to broader EU agendas, RIs are kernels of sustainable economic development, territorial cohesion in Europe, and an important element of international cooperation. In addition, RIs must be recognized as strategic investments into economic growth, sources of social wellbeing and sustainable development.

Over the years ESFRI became a global partner in the research and innovation ecosystem and an active player in discussions concerning RIs, e.g. the European Research Area, the European Open Science Cloud (EOSC) and the Open Science agenda. To effectively coordinate ESFRI activities related to the European Open Science Cloud a dedicated ESFRI Task Force on EOSC was set up. This has helped ESFRI to develop positions on EOSC related matters. Due to its importance the mandate of the task force was extended until the end of 2021.

In 2021 ESFRI finalized, despite the COVID19 pandemic, the Strategy Report on Research Infrastructures – The Roadmap 2021. The entire evaluation and monitoring process was adjusted so that the Roadmap release in December 2021 could be maintained. This was made possible due to the immense effort of the Strategy Working Groups and Implementation Group members and external evaluators, but also due to the commitment of the ESFRI Executive Board and all the ESFRI delegations. The Roadmap, which was presented to the public during an event in Ljubljana in December 2021, contains the list of 11 newly identified Pan-European RI projects that were added to the existing list together with 4 new Landmarks. The Roadmap also includes a comprehensive analysis of the current infrastructure landscape that brought together a science-based perspective on the European RI ecosystem. It also reviews the progress made by ESFRI on strategic policy guidance, arguing for a strong position of research infrastructures, as they form the backbone of the European excellence in research, and reflects issues of general interest to the national governments, RIs themselves and the EU as a whole.

Jan Hrušák, Chair, European Strategy Forum on Research Infrastructures (ESFRI), 2020–2021

2 Foreword from Jana Kolar, ESFRI Chair 2022–2023

It is with great pleasure that I present the ESFRI Activity Report for the 2022–2023 period. This report encapsulates the remarkable progress and dynamic developments that occurred within the sphere of European research infrastructures (RIs) over the past two years. As ESFRI Chair from 2022 to 2023, I had the privilege of witnessing first-hand the resilience, innovation, and collaborative spirit that define our community.

I assumed the chairmanship at a pivotal time. Unlike previous terms, this period did not include the development of a new Research Infrastructure Roadmap. Instead, we focused on further advancement of the field of RIs. The ambitious list of goals resulted in an impressive set of activities, which comprised those described in a three-year European Research Area Action dedicated to RIs, as well as additional tasks arising from policy needs or crises that required ESFRI's response, underscoring ESFRI's dedication to enhancing the sustainability, accessibility and resilience of research infrastructures in Europe.

The period covered in this report was marked by significant milestones. We initiated the process of evaluating the ESFRI research infrastructures and proposed a framework for their impact assessment. We examined the landscape of research infrastructures, their cooperation with industry, their financing, and access to RIs. We responded to the emerging crisis caused by the Russian aggression against Ukraine by emphasising the RIs' activities in support of the affected research community. Furthermore, the effects of the crisis on the energy and supply challenges in RIs were analysed to enhance their resilience in the face of current and future crises.

RIs are pillars of the research and innovation ecosystem, and we proceeded to highlight and support their contributions to the implementation of various policies. We showcased the contribution of RIs to the development of circular technologies and business models in the textile, construction, and energy-intensive industries, demonstrating the broad relevance of RIs. Furthermore, we made significant steps in promoting open science practices and advancing the FAIR data principles through our close collaboration with the European Open Science Cloud, contributing to the broader goals of the European Research Area.

The challenges we faced, from the energy crisis to geopolitical disruptions, tested our resilience and adaptability. Yet, they also underscored the importance of having robust, well-coordinated research infrastructures that can respond effectively to both expected and unforeseen challenges. Our community's response to these challenges has demonstrated the strength and cohesion of the European research landscape.

I extend my deepest gratitude to all contributing research infrastructures, ESFRI members, working groups, the European Commission and the StR-ESFRI support, and the broader stakeholder community for their unwavering dedication and hard work. These contributions have been instrumental in driving forward our shared vision of a cohesive and competitive European Research Area. As we look to the future, I am confident that ESFRI will continue to play a crucial role in advancing scientific excellence and innovation across Europe.

Thank you for your dedication, hard work, support, and commitment.

Sincerely,

Jana Kolar, Chair, European Strategy Forum on Research Infrastructures (ESFRI), 2022–2023

3 Executive Summary

The key achievements of ESFRI from 2021 to 2023 were:

- Publication of the 2021 ESFRI Roadmap in December 2021
- New methodology and data collection for the Landscape Analysis planned as a standalone document in 2022 and 2023
- Establishment of the Monitoring Committee and [ESFRI Landmark Monitoring 2022–2024 First Batch Report](#) in 2023
- Establishment of the ESFRI-EOSC Task Force in 2023
- Introduction of ESFRI Stakeholder Engagement Forum in 2022
- Publication of several thematic reports:
 - [ESFRI Working Group Report on Monitoring of ESFRI Landmarks: Proposal for the Implementation of the ESFRI Monitoring Approach \(2021\)](#)
 - [ESFRI Policy Brief on Assessment of Impact of Research Infrastructures \(2023\)](#)
 - [Stakeholder Engagement Report \(2023\)](#)
 - [ESFRI Report on Energy and Supply Challenges of Research Infrastructures \(2023\)](#)
 - [ESFRI Report on the Support of Research Infrastructures to the Ukrainian Research Community \(2023\)](#)
 - [2023 Report on Cooperation of ESFRI Research Infrastructures \(Landmarks\) with Industry \(2023\)](#)
 - [ESFRI Report on Access to Research Infrastructures and Charter on Access to RIs \(2023\)](#)
 - Preliminary ESFRI Report on RI Financing (2023)

In 2021, ESFRI launched the 2021 ESFRI Roadmap, where existing RIs in Europe are presented along with their scientific needs, gaps, collaboration opportunities and directions for future strategic investments. The ESFRI Working Group Report on Monitoring of ESFRI Landmarks was also published, establishing a new performance monitoring system for the European RIs. The Monitoring Committee was formed in March 2023 as a permanent working group to implement and guide the monitoring of ESFRI Landmarks. In 2022, the Landscape Analysis (LA) was de-coupled from the Roadmap and a new LA methodology was developed. Data collection followed in 2023. The document will be finalized in 2024. ESFRI also established a drafting group for Cooperation between Industry and ESFRI RIs, which conducted two surveys to identify the main characteristics of and barriers to cooperation between industry and RIs, and provide recommendations.

In 2023, an ESFRI-EOSC Task Force was set up to act as interface between the ESFRI Forum and the EOSC Steering Board. It aims to align collective interests and facilitate an integrated ecosystem of RIs that would feed into a dynamic EOSC federation as a key contribution to a 'web of FAIR data and services for science'. Several reports were finalized, among them the ESFRI Report on Energy and Supply Challenges of RIs, the ESFRI Report on the Support of RIs to the Ukrainian Research Community, the Report on Cooperation of ESFRI RIs (Landmarks) with Industry, the Report on Access to RIs and Charter on Access to RIs, a preliminary report on financing of European RIs, the ESFRI Landmark Monitoring 2022–2024 First Batch Report, the ESFRI Policy Brief on Assessment of Impact of RIs, and the Stakeholder Engagement Report. Recognizing the importance of resilience, ESFRI initiated preparatory activities for tackling the crisis linked to climate change.

ESFRI also put great emphasis on communication and outreach, introducing several new tools to further enhance the latter, including the ESFRI Stakeholders Forum (an interactive event providing a platform

for regular discussion on current issues among the different European RI stakeholders, which is aimed at increasing stakeholder engagement – also that of industry representatives) and a profile on Zenodo (an open access platform where ESFRI's analytical and policy documents can be published). Numerous events were organized by ESFRI between 2021 and 2023: twelve ESFRI Forum Meetings, two Stakeholder Forum Meetups, three ESFRI Open Sessions, three Exchange of Experience Workshops, nine Information Workshops, the event for the Launch of the 2021 ESFRI Roadmap on RIs in Europe, and the ESFRI 20th Anniversary Conference.

Several Strategy Working Groups (SWG) were active during 2021–2023: SWG Energy, Environment SWG, SWG Health & Food, Physical Sciences and Engineering SWG, Social & Cultural Innovation / Social Sciences and Humanities, The Data, Computing & Digital RIs SWG. The Implementation Group was also an important ESFRI body during this period. Until the end of 2021, ESFRI has interacted and periodically reported to ERAC. With the establishment of the new ERA governance, ESFRI, as the body for the coordination and implementation of R&I policy in the area of RIs, continued supporting a coherent and strategy-led approach to policy-making on European RIs by closely coordinating with and regularly informing the ERA Forum and other ERA governance bodies and received advice on strategic policy orientations and future trends that require the refinement of Union and national, including regional, R&I policies from ERAC on an ad hoc basis.

4 ESFRI Activities

The establishment of the European Research Area in 2000 marked a significant advance in integrating research efforts within the European Union. This initiative emerged as a strategic response to the existing fragmentation of Europe's research and innovation landscape. Its impact was especially pronounced in the field of research infrastructures, particularly the very large ones in physics and astronomy that had previously struggled with the absence of a pan-European coordination framework. Within a mere few months following the European Commission's proposal of the ERA concept, a conference to deliberate on developing a cohesive EU-centric approach to RIs was convened in France. These efforts led to the founding of the European Strategy Forum on Research Infrastructures (ESFRI) in 2002 and the unveiling of ESFRI's first European Roadmap for Research Infrastructures in 2006. The results of this integration were far-reaching, with the vast majority of EU Member States embracing the road-mapping strategy on a domestic scale and self-organisation of the research communities across Europe to establish RIs in their domains. Yet the work of ESFRI goes well beyond road mapping, for which it is best known. Its policy coordination of the domain of research infrastructures, addressing topics such as financing, energy and supply challenges, and cooperation with industry, has far-reaching effects on the development and functioning of Europe's research infrastructure landscape.

In 2021, a new cycle of implementation of ERA was put in motion, shaped by:^{1,2}

- the Pact for Research & Innovation in Europe (Pact for R&I) setting out the fundamental R&I values and principles for the new ERA, the priority areas for ERA actions and the policy coordination mechanisms, and
- the ERA Policy Agenda, designed to contribute to the priority areas from the Pact for R&I, setting out the voluntary ERA actions which are defined and coordinated at Union level in order to attain agreed outcomes.

The new ERA governance introduced in 2021 resulted in an ERA Policy Agenda Action dedicated to the field of RIs (ERA Action 8). In addition, the Council's Conclusion from 2022 invited ESFRI to address a number of additional activities.³

Due to the changing policy framework, this activity report first presents the activities of the ESFRI Roadmap launched in 2021, and then focuses on the implementation of the ERA Action 8 and the additional activities, based on the indications by the Competitiveness Council.

4.1 ESFRI Roadmap and Landscape Analysis of 2021

Since its establishment, ESFRI has produced **the ESFRI Roadmap** in 2006, 2008, 2010, 2016, 2018 and 2021. The Roadmap contains some of the best Pan-European science facilities based on a thorough evaluation and selection procedure. The Roadmap combines ESFRI Projects, which are new research infrastructures in progress towards their implementation, and ESFRI Landmarks, successfully

¹ Council Recommendation on a Pact for Research and Innovation in Europe.

² Future governance of the European Research Area (ERA) – Council Conclusions (adopted on 26/11/2021), 14308/21

³ Research Infrastructures – Council Conclusions (approved on 2 December 2022), 15429/22

implemented research infrastructures. The ESFRI Roadmap has proven to be very influential; impacting the European and national RI strategies and policies, as well as providing strategic guidance for Member States and Associated countries' investments, which goes beyond the research infrastructure domain.

The 2021 ESFRI Roadmap, launched in December 2021 includes 41 European Research Infrastructures that have already been implemented (Landmarks) and 22 RI Projects that are in their preparatory phase. 11 new RI Projects entered the Roadmap in 2021 with total investment costs of over EUR 4 billion. This is by far the highest value of new RIs' investment plans since the first roadmap in 2006. In addition, 4 RIs received the Landmark status, signifying their successful implementation. A revamped Landscape Analysis in this Roadmap presents the existing RIs in Europe and identifies scientific needs and gaps as well as collaboration opportunities and directions for strategic investments in the future. The key messages of the 2021 ESFRI Roadmap edition clearly underline the importance of world-class RIs in enabling cutting-edge research to address the pressing requests and challenges of our society and demonstrate the persisting willingness of national governments to invest substantially in improving RI capacities in Europe, as an important element of long-term scientific sovereignty and crisis preparedness, of which the COVID-19 pandemic has been a prominent example. The capacity of ESFRI RIs to create outstanding conditions for European Research & Innovation to be globally competitive, enabling Europe's leadership in a broad range of research fields was clearly demonstrated. RIs included in the ESFRI Roadmap contribute to key EU policy priorities, such as the Green Deal, Twin Green and Digital Transition, and Health Union. They facilitate the development of science-based solutions to key societal challenges, as illustrated by the **RIs against COVID-19 pandemic portal** that collected over 100 service offers provided by RIs to fight the pandemic. In addition, the services they offer could play an important role in implementing Horizon Europe Missions and achieving UN Sustainable Development Goals.

4.2 ERA Action 8 and Additional Activities of 2022–2023

4.2.1 ERA Action 8: Strategic analysis of the European research infrastructure landscape

In 2022, ESFRI decided to de-couple the Landscape Analysis from the Roadmap in order to underline its strategic relevance. According to the ERA Action 8, ESFRI will publish a more strategic LA report in 2024, as a standalone document, which must provide the framework for the next ESFRI Roadmap, contribute to the EOSC Strategic Research and Innovation Agenda, and promote the development of new research infrastructure services, including, when needed, infrastructure clustering for pan-European thematic or interdisciplinary services.

To reach this level of ambition, a new concept of LA has been developed in 2022. This aimed to provide a more consolidated gap analysis based on user needs that covers the different domains and multiple dimensions across the domains as well as includes the evolution of needs to identify priorities for future developments. The new methodology is built on the previous ESFRI experience, stakeholders' feedback on their needs and priorities, and experts' contributions for a more detailed analysis. In 2023, ESFRI invited RIs and other stakeholders to respond to surveys. Feedback from the main stakeholders has been published on the ESFRI website.⁴ For preparing the LA 2024, ESFRI also coordinates contributions from

⁴ <https://www.esfri.eu/stakeholder-contributions-landscape-analysis>, 1 Dec 2023

thematic ESFRI Strategy Working Groups and external experts. A first consolidated draft of the Landscape Analysis report is expected in December 2023, and its publication is scheduled for June 2024. The call for new RI project proposals for the next ESFRI Roadmap will follow the publication of the ESFRI Landscape Analysis.

Landscape Analysis Group Members

Name	Country/Institution
Chair	
Gelsomina Pappalardo	Italy
Members	
Karina Angelieva	Bulgaria
Elena Hoffert	France
Apostolia Karamali (until 15-03-2023)	European Commission
Agnès Robin	European Commission
Christoph Peschke	Germany
Ana Proykova	Bulgaria
Roland Roberts	Sweden
Jean-Marie Flaud	France
Lucia Banci	Italy
Kristiaan Temst	Belgium
Hanna Snellman	Finland
Maddalena Donzelli (until August 2023) / Anna Bertelli (since October 2023)	StR-ESFRI
Barbara Brečko	StR-ESFRI
Anastasios Patrikakos	StR-ESFRI

4.2.2 ERA Action 8: Broader and more sustainable access for all countries to European research infrastructures and their services and revision of the European Charter of Access to Research Infrastructures

ESFRI has invited RIs and other stakeholders to respond to [surveys](#) to identify evolving needs and related challenges to broader and more effective access to RIs and their services. Preliminary findings and recommendations were discussed with the community at the [ESFRI Stakeholders Forum Meetup](#) to gain further insights.

There are clear trends towards increasing and improving remote/hybrid¹ access and widening of virtual access as well as willingness to open up to new research communities and industry users. This has a strong impact on the operation of RIs, the required local resources and the skills of RI staff, as well as the need for offering training to new users. Recommendations include developing legal guidance, e.g. on IPRs and data protection issues, better recognition of distributed RIs, and helping diversify and sustain funding streams for access. Technical aspects are also crucial, with recommendations on priorities for technology developments, interoperability, FAIR principles, and assessment/mitigation of the

environmental footprint of access. The report with the findings and recommendations was finalised in December 2023 and published in January 2024 on Zenodo.⁵

The report also includes recommendations for revising the Charter of Access, which should elaborate more on digital, data and FAIR principles. It should also consider priority-driven access, crisis access mode, access for education and training, and references to reciprocity and sovereignty. Its revision is scheduled for the end of 2024.

Access to Research Infrastructures Group Members

Name	Country/Institution
Chair	
Agnès Robin	European Commission
Members	
Jana Kolar	Slovenia
Apostolia Karamali (until 15-03-2023)	European Commission
Peter Wenzel-Constabel	Germany
Gelsomina Pappalardo	Italy
Elena Hoffert	France
Inmaculada Figueroa	Spain
Anastasios Patrikakos	StR-ESFRI

4.2.3 ERA Action 8: Update of the ESFRI Roadmap and implementation of the research infrastructures performance monitoring framework

As a growing number of European research infrastructures become operational, including European Research Infrastructure Consortia (ERICs), the importance and value of their ongoing monitoring is increasing both at the European and national levels.

Following the Conclusions of the Council of the European Union of 29 May 2018 on Accelerating knowledge circulation in the EU, the Competitiveness Council "INVITES Member States and the Commission within the framework of ESFRI to develop a common approach for monitoring of their performance and INVITES the Pan-European Research Infrastructures, on a voluntary basis, to include it in their governance and explore options to support this through the use of Key Performance Indicators"⁶.

Building on the ESFRI report on 'Monitoring of Research Infrastructure Performance'⁷ and on the subsequent ESFRI report 'Proposal for the Implementation of the ESFRI Monitoring Approach'⁸, a

⁵ ESFRI (2024). ESFRI Report on Access to Research Infrastructures and Charter on Access to RIs. Available at: <https://zenodo.org/records/10555986>.

⁶ Conclusions of the Council of the European Union of 29 May 2018 on Accelerating knowledge circulation in the EU. Doc 9507/18. <http://data.consilium.europa.eu/doc/document/ST-9507-2018-INIT/en/pdf>.

⁷ ESFRI (2019). ESFRI Working Group Report: Monitoring of Research Infrastructures Performance. https://www.esfri.eu/sites/default/files/ESFRI_WG_Monitoring_Report.pdf.

⁸ ESFRI (2021). ESFRI Working Group Report: Monitoring of ESFRI Landmarks: Proposal for the Implementation of the ESFRI Monitoring Approach. https://www.esfri.eu/sites/default/files/ESFRI_WG_Landmark_Monitoring_Approach.pdf.

performance monitoring system for the European research infrastructures has been established, in close collaboration with relevant stakeholders. ESFRI established at its 83rd Forum meeting in March 2023 the Monitoring Committee as permanent working group to implement and guide the monitoring of ESFRI Landmarks.

The Landmark Monitoring shall enable regular exchange between ESFRI and the Landmarks on their long-term development, assess the quality of each individual Landmark, identify possible problems and support the Landmarks to take appropriate actions and gather information on the performance, outputs and impacts of the Landmarks. Moreover, the outcomes of the Landmark Monitoring will provide insights into the functioning of the European RI ecosystem as a whole and will contribute to the identification of gaps in the European landscape and future opportunities for the research infrastructures in Europe.

Thirty operational ESFRI Landmarks will have been monitored until the end of 2024, following the agreed methodology, with the use of qualitative information and key performance indicators. After conclusion of this first round of monitoring, ESFRI will explore further refinement of the system and decide on the application for further Landmarks, including revisiting monitored Landmarks in regular cycles. Synergies will also be explored with the envisaged ERIC Observatory and the general ERA monitoring framework.

The ESFRI Monitoring Committee Members

Name	Country/Institution
Chair	
Peter Wenzel-Constabel	Germany, ESFRI EB
Vice Chair	
Bente Maegaard	Denmark, SWG SCI/SSH, Chair (2021)
Members	
Lucia Banci	Italy, H&F SWG Chair
Martyn Chamberlain	European Commission
Odd Ivar Eriksen	Norway, ESFRI EB
Jean-Marie Flaud	France, SWG ENV Chair
Elena Hoffert	France, ESFRI EB
Jana Kolar	Slovenia, ESFRI Chair
Fabio Mazzolini	Italy, IG Chair (from October 2023)
Gelsomina Pappalardo	Italy, ESFRI EB
Ana Proykova	Bulgaria, DIGIT SWG Chair
Jeanette Ridder-Numan	Netherlands, IG Chair (until October 2023)
Roland Roberts	Sweden, SWG ENE Chair (since 2023)
Michael Ryan	Ireland, ESFRI EB
Hanna Snellman	Finland, SWG SCI / SSH Chair (since 2023)
Kristiaan Temst	Belgium, PSE SWG Chair (since 2022)

By the end of 2023, ESFRI had completed the performance monitoring of the first batch of ESFRI Landmarks and published a [report](#) summarising the main findings: generally, ESFRI Landmarks show

good performance in view of supporting scientific excellence, pan-European (even global) relevance and care for increasing needs to manage data according to the FAIR principles. Most ESFRI Landmarks have shown remarkable resilience to the COVID-19 crisis. However, sustainable funding and stable membership are still perceived as a challenge. It is also difficult for RIs to meet the increased expectations of the policymakers (e.g. greening, twin green and digital transition, missions), especially as they are often not backed by funds. Lessons learnt of the exercise were published and used as a basis for the second batch monitoring, which is ongoing. The third one is scheduled for completion by the end of 2024.

4.2.4 ERA Action 8: Report on the ERIC Framework

On 14 August 2023, the Commission adopted its [third report](#) on the application of the European Research Infrastructure Consortium (ERIC) Regulation. With 26 ERICs set up since 2011, ERIC has become a legal instrument of choice for a large part of common European research infrastructure initiatives and is helping to structure and integrate research activities and resources within the ERA.

However, the financial and operational sustainability of the ERICs remains a challenge. The report recommends that further effort is needed to strengthen the access programmes of the ERICs and the availability of their services, to increase synergies among the different funding sources, to facilitate engagement with international partners, and to address several operational challenges. The development of the new ERA Policy Agenda, supported by the work of ESFRI, the ERIC Committee, the ERIC Forum and relevant stakeholders, provides a framework for follow-up actions. An immediate one will be the revision of the [ERIC Practical Guidelines](#).

4.2.5 ERA Action 8: Increased cooperation between research infrastructures, e-infrastructures and stakeholders, including through EOSC

The Stakeholder Engagement Report was adopted in 2023, outlining the key strategic orientations and objectives of the ESFRI, detailing strategic orientations and reporting on implementing the stakeholder activities post-2021. The overarching goals of the stakeholder engagement include enhancing the quality of ESFRI and RIs outputs, establishing trust among actors, ensuring integration within the R&I ecosystem, and legitimising ESFRI processes. To this end, the key action areas identified by this ESFRI Report include:

- Involving stakeholders in ESFRI's work (in meetings; ad hoc guests, including open sessions).
- Establishing the ESFRI Stakeholders Forum and Meetup for interaction and mutual learning.
- Hosting other ESFRI events such as Exchange of Experience and Information Workshops for engagement and knowledge sharing.
- Collaborating with specific communities like EOSC, e-IRG and Technology Infrastructures.
- Promoting increased transparency by publishing meeting agendas, minutes and ESFRI reports.

Two activities in particular deserve special mention:

- The [ESFRI Stakeholder Forum](#) is a platform for regular discussion among the different European research infrastructure stakeholders. The first meetup in 2022 focused on the good practices and bottlenecks hindering the enhanced use of RI services or delivery. The second meetup in September 2023 discussed issues around access, funding, and cooperation with industry.

- An **ESFRI-EOSC Task Force** was set up in June 2023 as a structured interface between the ESFRI Forum and the EOSC Steering Board beyond the current ad hoc cooperation. It aims to align collective interests and facilitate an integrated ecosystem of research infrastructures that would feed into a dynamic EOSC federation as a key contribution to a 'web of FAIR data and services for science'. In the following, the activities of the group are presented in more detail.

4.2.6 Elaboration on scenarios to manage possible upcoming crises, including energy supply difficulties

ESFRI assessed the energy and supply challenges that research infrastructures face as a consequence of the COVID-19 pandemic aftermath & Russian aggression on Ukraine, leading to high inflation, increased energy costs, and shortages of critical resources in the EU. The [ESFRI report](#), prepared jointly by ESFRI and the stakeholders, reveals that almost two-thirds of RIs responding to a questionnaire are significantly impacted by the energy crisis. Energy-intensive RIs like synchrotrons, computing centres, particle sources, neutron facilities and lasers face the most severe challenges, with half of the responding synchrotrons reporting an interruption of operations. Recommendations for National Policymakers, ESFRI, the European Commission, and RIs propose actions to enhance resilience such as additional fund allocation, energy price capping, and implementations of response plans to green the operations of RIs.

Two follow-up activities were initiated:

- To prepare for the crisis linked to climate change, ESFRI decided to establish a group to work on the greening of RIs.
- An overview of the activities of RIs in support of the Ukrainian (UA) research community.

Contributors to the ESFRI Report on Energy and Supply Challenges of Research Infrastructures

Name	Institution
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Pierluigi Campana	Italy
Martyn Chamberlain	European Commission
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Andrew Harrison	ERF-AISBL, ELI-ERIC; external expert
Antje Keppler	ERIC Forum, Euro-BiImaging; external expert
Péter Lévai	Wigner Research Centre for Physics; external expert
René Martins	European Commission
Jure Plaskan	StR-ESFRI
Allen Weeks	ERIC Forum, ELI-ERIC; external expert
Joachim Wosnitza	ARIE Network, EMFL; external expert

4.2.7 Review of RIs' support to the Ukrainian research community

In October 2023, ESFRI also ran a questionnaire to the RIs on the topic of support to the UA research community. [The report](#) revealed that about half of the 32 responding RIs launched support measures

from the invasion's onset. These measures included hosting Ukrainian researchers, establishing joint projects, funding event participation, providing access and training, and donating scientific equipment. Most RIs utilised internal funds for these initiatives, supplemented by government, EU, and regional funds. The survey highlights the significant role played by RIs in supporting the Ukrainian research community during crises, similar to their response during COVID-19, and underscores the importance of a robust research infrastructure system for resilience in research and innovation.

Members of the Group Working on the ESFRI Report on the Support of Research Infrastructures to the Ukrainian Research Community

Name	Institution
Jure Plaskan	StR-ESFRI
Barbara Brečko	StR-ESFRI
Jana Kolar	ESFRI Chair

4.2.8 Analysis of financing of European RIs

ESFRI is looking into funding practices at national and EU levels, including multi-level funding synergies, for capital investments and operational costs, as well as bottlenecks and opportunities. Following consultations with governments and RIs, the preliminary recommendations focus on:

- The need for a complete and clear picture of RI funding sources and RI costs, including access costs, at all levels, with particular attention to national nodes of distributed RIs.
- The use of appropriate funding instruments and strategic decision-making mechanisms linked to national roadmaps, enabling the harmonised long-term engagement and planning of funding, including upgrades and further technological developments.

Tackling common challenges, including facing a crisis, employment of skilled staff, or support of new initiatives, will also be touched upon in ESFRI analysis.

The topic was discussed with stakeholders at the recent the [ESFRI Stakeholders Forum Meetup](#), also in view of the next Horizon Europe Work Programme and FP10.

Members of the Research Infrastructure Funding Drafting Group

Name	Institution
Chair	
Elena Hoffert	ESFRI EB
Members	
Jana Kolar	ESFRI Chair
Gelsomina Pappalardo	ESFRI EB
Alice Dijkstra	ESFRI expert
Apostolia Karamali	European Commission
Dominik Sobczak	European Commission
Patricia Postigo-McLaughlin	European Commission
Ricardo Migueis	INESC TEC, external expert
Markus Pasterk	BBMRI-ERIC, external expert

Barbara Brečko	StR-ESFRI
Maja Bučar	StR-ESFRI
Maddalena Donzelli	StR-ESFRI
Anastasios Patrikakos	StR-ESFRI

4.2.9 Approaches to assess the scientific, societal and economic impacts of investments in RIs

Based on the surveys of RIs and ESFRI countries, the [ESFRI report](#) highlights the importance of understanding the differences between performance monitoring, which ESFRI started implementing last year, and impact assessment (IA), ex-ante or ex-post, for RIs. It provides recommendations to stakeholders, policymakers, funders, governments, RIs, ESFRI, and the EC. They emphasise the importance of acknowledging the distinctiveness of research infrastructures by refraining from direct comparisons in IAs, understanding that these evaluations demand a tailored methodology rather than a one-size-fits-all approach. IAs should recognise scientific influence but also weigh diverse socioeconomic impacts. The stakeholders should consider the time needed to observe impacts and ensure sufficient resources and expertise development within organisations. Furthermore, embedding impact analysis frameworks into RI governance systems is essential for a holistic approach.

Members of the Impact Drafting Group

Name	Institution
Chairs	
Georg Lutz	Switzerland
Jana Kolar	ESFRI Chair
Members	
Karina Angelieva	ESFRI EB
Elena Hoffert	ESFRI EB
Michal Ryan	ESFRI EB
Peter Wenzel-Constabel	ESFRI EB
Dominik Sobczak	European Commission
Martyn Chamberlain	European Commission
Barbara Brečko	StR-ESFRI
Jure Plaskan	StR-ESFRI
Fotis Karayannis	StR-ESFRI
Maddalena Donzelli	StR-ESFRI
Tasos Patrikakos	StR-ESFRI
Jelena Angelis	EFIS Centre, external expert
Eric Guittet	CNRS, external expert

4.2.10 Further development of capacities and services of RIs addressing private sector needs in order to strengthen European competitiveness

During 2022 ESFRI established the drafting group for cooperation between industry and ESFRI research infrastructures. The purpose of the activity was to get a better understanding of the collaborative

relationships between research infrastructures and industry and to identify any key areas where research infrastructures need further support to enhance collaboration with industry.

The activity was also carried out with a view to the December 2022 Council of the European Union conclusions on Research Infrastructures, which are a principal element in the development of the European Research Area.

The drafting group based its work on the findings of the 2022 survey among ESFRI Landmarks on cooperation with industry (the report is available on [Zenodo](#)). A second survey, implemented in the beginning of 2023, focused on industrial partners of RIs to gather their views on cooperation with research infrastructures. Through both surveys, the main characteristics of cooperation between industry and RIs were identified, as well as key barriers to cooperation along with recommendations.

The original plans for the drafting group were also to gain insights into the roles of both research infrastructures and technology infrastructures with an eye on how both potentially complement one another. However, given the fact that the structures and definitions relating to technology infrastructures are still a work in progress by the European Commission it was decided that the drafting group would focus solely on the relationships between research infrastructures and industry/business.

The group concluded its work through the publication of its [report](#) that provided a deeper understanding of the scope and size of the collaborative relationships between industry and research infrastructures and included recommended support structures for research infrastructures to better engage with industry.

In addition to these activities, ESFRI highlighted the contributions of RIs to in the domain of circular economy, by submitting a contribution for the ERA industrial technology roadmap for circular technologies and business models in the textile, construction and energy-intensive industries,⁹ thereby increasing the visibility of the capabilities and achievements of the RIs in this domain.

Members of the RIs' Cooperation with Industry Drafting Group

Name	Institution
Chair	
Michael Ryan	ESFRI
Members	
Elena Hoffert	ESFRI
Eckhart Lilienthal	ESFRI
Jan Hrusak	ESFRI
Murat Ozgoren	ESFRI
Kristiaan Temst	SWG
Mirka Gottberg	European Commission
René Martins	European Commission
Apostolia Karamali	European Commission
Maja Bučar	StR-ESFRI, expert support
Jelena Angelis	EFIS Centre, external expert

⁹ European Commission, Directorate-General for Research and Innovation, ERA industrial technology roadmap for circular technologies and business models in the textile, construction and energy-intensive industries, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2777/188014>

4.2.11 Communication and Outreach

Communication and Outreach Plan was the basis for communication and outreach activities performed during the reporting period. This plan was aligned with the ESFRI Workplan and allowed for sufficient flexibility to facilitate ESFRI's strategic communication in a context of uncertainties and changes (e.g. the renewed ERA, recovery from the COVID-19 pandemic and global challenges related to Russia's invasion and war of aggression against Ukraine). Tailored communication activities were designed for various stakeholder groups: **ESFRI and non-ESFRI RIs** (ERICs, large scale national RIs), integrated RI networks, public authorities, funders and policy makers, academia and industry representatives.

While existing tools, such as the ESFRI website and social media, remained in use, additional communication outlets, such as **Zenodo** (an open access platform where ESFRI's analytical and policy documents can be published) and **the ESFRI Stakeholders Forum** (an interactive event aimed at increasing stakeholder engagement – also that of industry representatives) were also launched (see the report from the Stakeholder Engagement drafting group in the next section for more information).

ESFRI Website remains the central hub for all ESFRI communication and outreach activities. During 2021-2023, a steady increase in visitors was recorded, with expected spikes during major events and milestones, such as the launch of ESFRI Roadmap 2021, ESFRI 20 years anniversary in 2022 and ESFRI Stakeholders Forum Meetups. There was a 20% average increase in impressions on ESFRI related searches (Google search). More than 54K users were recorded in 2023: with 80K page visits and increased session duration (~2 min). Stakeholders Forum Meetups took the lead from ESFRI Roadmap during 2022-2023 as the most visited page, and Landmark Monitoring comes third.

ESFRI's social media platforms were also used to communicate ESFRI's work and activities, engage the RI community to multiply ESFRI's messages, and drive traffic to the website. On X (formerly Twitter) 32.8K impressions and 105 followers were gained in 2023 alone, with a total of 3581 followers. ESFRI LinkedIn page have shown organic and fast paced growth, with 1611 followers (508 gained in 2023 organically), and has over 27K impressions, while the main groups engaged include research, business development, and media. On the ESFRI YouTube channel, 66 videos have been published during 2021-2023, 162 subscribers were gained (total 267) and 11.1K views were generated. An additional online outlet, [the ESFRI Zenodo community](#), was established in June 2023 with an aim to strengthen ESFRI's academic impact. 7 publications were uploaded to Zenodo, generating over 2000 views and 1470 downloads. The publications include policy briefs, SWG and DG reports, event outcomes, etc.

All in all, by using conventional digital tools and pursuing the organization of targeted and dialogue intensive events ESFRI has managed to advance the way it engages stakeholders in and informs them of its activities. ESFRI communication outlets are now well-established points of reference with large numbers of active users/followers. Work needs to be done in the next period to achieve better media presence and adopt more modern/engaging/dynamic tools as well.

Members of the Communication and Outreach Group

Name	Institution
Chair	
Jana Kolar	ESFRI Chair
Members	
Georgia Kalozoumi	StR-ESFRI
Fotis Karayannis	StR-ESFRI
Tasos Patrikakos	StR-ESFRI
Eleni Sotiropoulou	StR-ESFRI
Iris Koleša	StR-ESFRI/Assistant to ESFRI Chair

4.2.12 Stakeholder Engagement

The ESFRI Stakeholders Forum was introduced to engage key players of the European R&I community in discussions on strategic issues related to RIs. In 2021, the stakeholders were invited to register as ESFRI Stakeholders on the ESFRI website. More than 360 registrations across all target groups were received. This pool was further expanded through ESFRI actively attracting representatives from organisations that were identified as key actors in the RI ecosystem and as such crucial to be included in the Forum but had not yet registered. The ESFRI Stakeholders Forum was officially launched in March 2022 with a high-level hybrid event. Two annual Meetups with physical participation have been organised since (in September 2022 and September 2023). The first Meetup focused on the good practices and bottlenecks hindering the enhanced use of RI services or delivery, while the second Meetup focused on RI Access, Funding, and Cooperation with Industry. The main outcomes of the Meetups were published and circulated via [the ESFRI website](#) (report from the 1st meetup)/[Zenodo](#) (report from the 2nd meetup) and Social Media platforms. The recordings of both events are also available on the [ESFRI YouTube Channel](#). Members of the ESFRI Stakeholders Forum have welcomed the opportunity to actively contribute to shaping the future of RIs in Europe. Their involvement so far included co-designing the content of the Meetups, and participating in surveys and questionnaires conducted by ESFRI Working and Drafting Groups that feed in ESFRI's work, as reflected in published reports and policy briefs.

Members of the Stakeholder Engagement Drafting Group

Name	Institution
Chair	
Jana Kolar	ESFRI Chair
Members	
Apostolia Karamali (until 15-03-2023)	European Commission
Dominik Sobczak (until 15-05-2023)	European Commission
Claudio Fattoretto	ESFRI Secretariat
René Martins	ESFRI Secretariat

4.3 ESFRI Strategy Working Groups and IG Reports

The 2021–2023 period expands over mandates of two ESFRI Chairs with different Executive Board compositions. At the beginning of 2022, the chairmanship of ESFRI was passed from Jan Hrušák to Jana Kolar, with a mandate till the end of 2023. At the same time, the ESFRI Executive Board Members changed, while the strategy working groups, the implementation group and the monitoring committee continued their work with the same composition until 30 June 2024.

Executive Board Members in 2021

Name	Country/Institution
Chair	
Jan Hrušák	ESFRI
Vice Chairs	
Inmaculada Figueroa	Spain
Yannis Ioannidis	Greece
Members	
Björn Hallerod	Sweden
Elena Hoffert	France
Jana Kolar	Slovenia
Gelsomina Pappalardo	Italy
Peter Wenzel-Constabel	Germany
Agnieszka Zalewska	Poland
Dominik Sobczak	ESFRI Secretariat
Claudio Fattoretto	ESFRI Secretariat
Anna Panagopoulou	European Commission
Johannes Klumpers	European Commission, alternate

Executive Board Members between 2022 and 2023

Name	Country/Institution
Chair	
Jana Kolar	ESFRI
Vice Chairs	
Peter Wenzel-Constabel	Germany
Inmaculada Figueroa	Spain
Members	
Karina Angelieva	Bulgaria
Odd Ivar Eriksen	Norway
Elena Hoffert	France
Yannis Ioannidis	Greece
Gelsomina Pappalardo	Italy
Michael Ryan	Ireland
René Martins	ESFRI Secretariat
Martyn CHAMBERLAIN	ESFRI Secretariat
Anna PANAGOPOULOU	European Commission

Apostolia Karamali (until 15-03-2023)	European Commission, alternate
Michael ARENTOFT (from 16-05-2023)	European Commission, alternate
Dominik SOBCZAK (until 31-03-2022)	ESFRI Secretariat

4.3.1 Energy

The Roadmap 2021 was completed in 2021: The project EU Solaris became an ERIC and a new project Marinerg-i became part of the ESFRI Roadmap. SWG ENE has contributed to their scientific evaluation as well as the one of Myrrha, which was not retained in the Roadmap 2021 as a Landmark.

Members of the SWG ENE participated in various related meetings, such as the ESFRI Forum and stakeholder meetings.

The SWG ENE organised a session during the Open Session on 22 September 2021 under the Leading Theme European Green Deal, with presentations by the Vice Chair T. Kurki -Sonio, followed by ones on the Landmarks JHR, ECCSEL and the Project IFMIF-Dones.

With the finalization of the Roadmap (published in 2022), the SWGs were invited to join the next phase of the process, namely the lessons learnt, in view of preparing, with the stakeholders, the following Roadmap. This action took the form of workshop organised in 2022 to better define the RIs' needs (see below).

In September 2021, a workshop on RIs' Impact ("Stay tuned to the future: impact of research infrastructures") was organised with the participation of the SWG ENE and the ECCSEL Landmark representative.

Preparation of the Monitoring process for the Landmarks was another important activity in 2021. This activity continued in 2022 and, in the case of SWG ENE, led to the Monitoring of the ECCSEL ERIC in 2023 (see below).

In 2022 the main actions included work both with the stakeholders and within the SWGs in preparation of the next Landscape Analysis, and the preparation of the Monitoring of the Landmark.

On the first point, a workshop entitled "ESFRI Landscape Analysis Workshop: Lessons learnt and outlook into the future" was organised on 28 April 2022. SWG ENE was an active participant in organising a breakout session with the stakeholders to better define the needs. The preparatory work for the next LA was performed by a Drafting Group, which included all the SWGs Chairs. Through this process, the SWG was able to anticipate the tasks awaiting its members in 2023 for the actual writing of the next LA.

On the second point, after an intense internal work with the ESFRI EB, the ESFRI Monitoring Group and the SWG Chairs, an information day was organised in September in Brussels, where the Chair of the Monitoring Panel for ECCSEL as well as the representative of the Landmark to be monitored, ECCSEL, were able to interact to effectively prepare the monitoring itself.

With the discontinuation of Switzerland's participation in ESFRI, one of the missions of the outgoing Chair was to propose a new SWG Chair to the Forum. This was successfully performed, allowing the Forum to elect Roland Roberts from Sweden as the Chair of the SWG ENE for the period starting from 1 January 2023. The outgoing Chair, M. Q. Tran, expressed his gratitude to the whole SWG ENE, to the EB and the Forum for their support during his tenure. Prof Tran has continued to be willing to offer very helpful advice to the SWG even after his replacement.

During 2023 SWG activities were primarily related to attempting to contribute effectively to the new landscape analysis and roadmap process. Issues were discussed by the SWG during several meetings (all on-line). Given the major challenges facing the energy sector in Europe and the World, and the apparent pressing needs to develop new, effective and economic, energy technologies, the relative low number of ESFRI infrastructures focussed on Energy is assessed to be clearly suboptimal. The SWG has discussed reasons for this imbalance, and possible actions to stimulate new proposals, but the SWG remains uneasy about this situation.

Members of the SWG ENE

Name	Country/Institution
Chairs	
Minh Quang Tran	Switzerland (until end of 2022)
Roland Roberts	Sweden (since 2023)
Vice Chair	
Taina Kurki-Suonio	Finland
Members	
Isolde Arzberger	Germany
Petr Březina	Czech Republic (since 2022)
Emer Dennehy	Ireland (since 2022)
Pierre Dewallef	Belgium
Claudio Fattoretto	European Commission (2021)
Harm Jeeninga	Netherlands
Peter Liška	Slovak Republic
Declan Meally	Ireland (2021)
Xavier Montagne	France
Kjeld Pedersen	Denmark
Marco Ripani	Italy
Joaquin Sanchez	Spain (since 2022)
Božidar Šarler	Slovenia
Ivan Štekl	Czech Republic (2021)
Athanasios Stubos	Greece
Michela Vellico	European Commission (since 2022)
Zpyros Voutetakis	Greece (since 2022)
Grażyna Zakrzewska-Kottuniewicz	Poland

4.3.2 Environment

At the start of 2021 the leadership of the Strategy Working Group on Environment (ENV SWG) did not change as Jean-Marie Flaud from France was reappointed as Chair by the ESFRI Forum.

Throughout the whole reporting period, the ENV SWG continued to work in a very collegial manner with a view to ensure that all members' expertise was well employed in its duties.

There was a partial renewal of the composition of the SWG, but several representatives continued to serve in the ENV SWG, which ensured continuity and enabled the sharing of experience with new members. Agnès Robin's role as the representative of the European Commission and Gert Verreet's role as the Vice Chair of the group were renewed.

The group met six times in 2021, four times in 2022 and five times in 2023. Each time, the Chair and Vice Chair prepared timely draft agendas and minutes. That, and an update of the rolling work plan, served all members with up-to-date information on all aspects of the work of the group. The Chair also ensured that the newcomers were quickly brought up to speed.

Partly due to the COVID-19 pandemic most activities were conducted online. The SWG was very pleased and grateful that its only in-person meeting during this period, in September 2023 at the invitation of Greece at the National Observatory in Athens, strengthened the group dynamics and led to a renewed commitment of its members.

In 2022–2023, the SWG performed the monitoring of the landmarks Euro-Argo and ICOS. In the second half of 2023 the focus shifted to the monitoring of the ESFRI landmarks EMSO, EPOS, and IAGOS.

The preparation of the new ESFRI landscape analysis was a constant focus, given the increasing interest for the impact that coordinated environmental research can have. The group considered that promoting excellent environmental science remains a necessity to enable and support broader societal impact for resolving pressing environmental and societal issues.

Members of the SWG ENV

Name	Country/Institution
Chair	
Jean-Marie Flaud	France
Vice Chair	
Gert Verreet	Belgium
Members	
Vassilis Amiridis	Greece
Begoña Artiñano	Spain (since 2022)
Azize Ayol	Türkiye
Urs Baltensperger	Switzerland (until September 2022)
Karolina Begusch-Pfefferkorn	Austria
Linda Bergqvist Ampel	Sweden (since 2022)
Magnus Friberg	Sweden (2021)
Rui Figueira	Portugal
Jeremy Gault	Ireland (2021)
Jana Klánová	Czech Republic
Steffi Lehmann	Germany
Simone Lolli	Italy
Teis N. Mikkelsen	Denmark
Krasimir Mitev	Bulgaria
Andrzej Mizgajski	Poland
Tanja Pipan	Slovenia

Morjolein Robijn	The Netherlands
Agnès Robin	European Commission
Lýdia Sobotová	Slovak Republic
Sanna Sorvari Sundet	Finland (since 2022)
Irina Stanciu	Romania
Sanna Survari Sundet	Finland (2021)
John Wenger	Ireland (since 2022)

4.3.3 Health & Food

There was a general renewal of the composition of the Strategy Working Group on Health & Food (H&F SWG) at the beginning of 2022. The Chair of the SWG changed from Radislav Sedlacek from Czech Republic to Lucia Banci from Italy. Over the three-year period several ESFRI member states and the EC appointed new representatives.

The activities and meetings in 2021 were still affected by the limitations on mobility due to the COVID-19 pandemic, but the H&F SWG nonetheless performed numerous activities and engaged in several exchanges. The group met three times (by videoconference) in 2021, four times (once in person and twice by videoconference) in 2022, and four times in 2023 (twice in person and twice through a videoconference).

In 2021, H&F SWG activities were devoted to elaboration of the various aspects of the 2021 ESFRI Roadmap, mainly for the preparation and drafting of the SWG chapter on the Landscape Analysis. Furthermore, in 2021 the SWG was engaged in the evaluation of eight new ESFRI proposals (DIPOH, EBRAINS, EIRENE, EPTRI, EuPRAXIA, FNH-RI, SEEIST, VAC4EU) to possibly be included in the 2021 Roadmap and in the monitoring of the progresses of two 2010 projects (MIRRI and AnaEE). One of the new projects (EIRENE) was approved and included in the 2021 Roadmap.

In 2022 and 2023 the SWG was extremely busy with the new activities as defined in the ESFRI 2022–2023 Workplan. In particular, the SWG was extensively involved in the Monitoring process of the Landmarks which have already started their operational phase and actively provide services. 10 Landmarks (out of the 12 in the domain) were selected to be monitored; the panels were established and the procedure implemented and adapted to each case. Four Landmarks were monitored in 2022, four in 2023 and two are scheduled for monitoring in 2024.

One of the major activities in 2023 also included the analysis, drafting and finalization of the H&F domain Landscape analysis – now developed as an independent document with respect to the Roadmap. This activity required extensive work and exchanges within the SWG and turned out to be a very demanding task since a number of issues emerged on the LA drafting, starting from the fact that the two areas, Health and Food, are quite diverse and cover multiple fields. It was, therefore, necessary to identify and classify services within the various areas. In addition to this, the SWG had to produce a single document based on inputs by two external experts who worked independently producing two separate reports that were elaborated with a quite different approach and style. Finally, additional work was performed to synchronise the content of the report with those of the other domains.

Members of the H&F SWG

Name	Country/Institution
Chairs	
Radislav Sedláček	Czech Republic (2021)
Lucia Banci	Italy (since 2022, member in 2021)
Members	
Maria Anvret	Sweden
Aytunga Arik Kibar	Türkiye
Martijntje Bakker	The Netherlands (2021)
Jan Gunnar Bjaalie	Norway (since 2022)
Hanne Christine Bertram	Denmark (2021)
Martyn Chamberlain	European Commission (since 2022)
Rob Diemel	The Netherlands (since 2022)
Józef Dulak	Poland (2021)
Eric Guittet	France (2021)
Andreas Holtel	European Commission (2021)
Diego Intrigliolo	Spain (since 2022)
Agnieszka Kita	Poland (since 2022)
Adriana Kolesárová	Slovak Republic (since 2022)
Georgios Kollias	Greece (2021)
Dimitrios Kontoyiannis	Greece (since 2022)
Kirsten Kyvik	Denmark (since 2022)
Astrid Lægreid	Norway (2021)
Karin Lohmann	Germany (2021)
Anna Mkrtchyan	Armenia (since 2022)
Maria Emilia Monteiro	Portugal (since 2022)
Helen Murphy	Ireland
Stéphanie Nemeghaire	Belgium (2021)
Michal Novák	Slovak Republic (2021)
Damjana Rozman	Slovenia
Radislav Sedláček	Czech Republic
Luís Soares	Portugal (2021)
Sabine Steiner-Lange	Germany (since 2022)
Ioannis Xenarios	Switzerland (until Sept. 2022)
Ad hoc members	
Aldo Ceriotti	Italy (2021)

4.3.4 Physical Sciences & Engineering

The Physical Sciences and Engineering strategy work group (PSE SWG) has actively contributed to several ESFRI activities.

It was engaged in the preparation of the **Roadmap 2021**. Four new project applications were evaluated by subpanels containing members of the PSE SWG. The scientific merits of the four applications were discussed within the PSE SWG and its members assisted in formulating the final recommendations on inclusion of the four submitted projects on the roadmap. Special attention was paid to harmonization of the approach taken by the four subpanels, so that each candidate project was evaluated in a similar way.

The SWG was also involved in the preparation work of the **Landscape Analysis 2021**. Continuing the work from 2020, the SWG polished and harmonized the texts in the first half of 2021. Footnotes and references were added. Also, a lot of attention was devoted to the infographics, and in particular on the discussion which RIs should be included in the infographics. This led to the realization that this is an important point of attention for the next edition of the Landscape Analysis. In 2022 and 2023 the PSE SWG was closely involved in the discussions about the new concept of the Landscape Analysis for 2024. The major difference of approach compared to the previous edition is that the community of RIs would be more involved via their input through a questionnaire and the fact that the LA would be prepared by external experts who would prepare a draft version of the LA. It was observed that many (but not all) RIs provided input this way. Unfortunately, a few of the major RIs in the PSE domain did not respond to the questionnaire, but other RIs really provided very valuable feedback. This input from the field and the 'workfloor' is something that we missed in previous versions of the LA and it is very valuable. Unfortunately, this valuable input did not really find its way to the LA drafts provided by the external experts and for future editions the procedures need to be adapted so that this valuable new approach will come to its full fruition. The PSE SWG also provided at various occasions its input to the draft versions of the LA, and in the future this input flow still needs to be optimized. The PSE will be eager to engage in a discussion on the improvement of the implementation of the new concept for future LAs.

The PSE SWG has been very closely involved in defining the concepts and the procedures for the **Landmark Monitoring** (LM), as well as its practical implementation (timeline, definition of the questionnaire, procedure for the selection of KPIs, elaboration of an agreed framework leading to the Monitoring Guide etc.). The chair of the PSE SWG has participated actively in the conceptualization and preparation for multiple online information workshops related to the LM. The monitoring has been divided into three batches, and for each of the batches there have been or will be online information workshops for the Landmarks, for the monitoring panels, and for the external experts. These workshops have been carefully prepared and have turned out to be very useful for the entire LM Monitoring exercise. The preparations for the Monitoring process and the information workshops were executed through 2022 and 2023 and will continue through 2024. From the side of the PSE SWG it should be noted that the LM Monitoring process is considered to be one of the most decisive, impactful and important ESFRI actions.

The PSE SWG moreover provided valuable input to the first **Circular Technology Roadmap**, which was published in 2023¹⁰. From the side of the PSE SWG, several examples were provided of the way in which

¹⁰ https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/era-industrial-technology-roadmaps_en with link to the [report](#).

RIs (in particular in the domain of analytical facilities) can contribute significantly to this area of fundamental and applied research. It is foreseen that the PSE SWG will provide a more detailed input to future editions of this roadmap.

Finally, the PSE SWG also contributed to the activities of the workgroup charged with the mission to make a survey of the **interactions between RIs and industry**. This exercise is particularly relevant and interesting for the PSE domain, since most interactions with industry actually occur in this realm. This action started by the elaboration of a questionnaire that was sent to several relevant industrial partners. The data were collected and analysed and led to several interesting conclusions about the current relationship between RIs and industry. This culminated in an overall and all-encompassing report on this ESFRI action.

Members of the PSE SWG

Name	Country/Institution
Chairs	
Jose Luis Martínez Peña	Spain (2021)
Kristiaan Temst	Belgium (since 2022, Vice Chair in 2021)
Vice Chair	
Kristiaan Temst	Belgium (2021)
Jean-Luc BIARROTTE	France (since 2022)
Members	
Theo Alexopoulos	Greece (2021)
Marek Biesiada	Poland
Miran Čeh	Slovenia
Georgios Fagas	Ireland
Antonín Fejfar	Czech Republic (since 2022)
Jens Jørgen Gaardhøje	Denmark
Simo Huotari	Finland
René Martins	European Commission
Marie-Hélène Mathon	France (2021)
Mattias Marklund	Sweden (since 2022)
Tatsuya Nakada	Switzerland
Christoph Peschke	Germany
Caterina Petrillo	Italy
Branislav Sitár	Slovak Republic
Constantinos Stergiou	Greece (since 2022)
Petr Trávníček	Czech Republic (2021)
Michiel VAN DEN HOUT	Netherlands (2021)
Patricia Vogel	Netherlands (since 2022)

Name	Country/Institution
Cahit YESILYAPRAK	Türkiye
Ad hoc members	
Sandro De Silvestri	Italy
Françoise Genova	France (2021)
Karsten Riisager	Denmark
Observers	
Jonathan Butterworth	CERN
Rob Ivison	ESO (since 2022)
Marek Lewitowicz	NuPECC
Uwe Meyer	Ruslandconsult (2021)
Boris Sharkov	JINR Dubna (2021)
Andrew Williams	ESO

4.3.5 Social & Cultural Innovation / Social Sciences and Humanities

The Chairs of the Strategy Working Group on Social & Cultural Innovation (SWG SCI) changed twice during the three-year term. In late 2021, the ESFRI Forum appointed Georg Lutz from Switzerland as Chair to follow the work of Bente Maegaard from Denmark. Hanna Snellman from Finland was elected as Vice Chair. When Switzerland became unable to participate in the work of the SWG because of its non-association to Horizon Europe, Georg Lutz's successor Hanna Snellman was appointed Chair as of 1 January 2023. Vice Chair Denisa Fedáková from Slovakia was elected in 2023. Between 2021 and 2023, one-third of the SWG members changed.

During the three-year term, the actions of the SWG centred on the large ESFRI processes: Landmark Monitoring and Landscape Analysis. The group both fed into these actions and commented and implemented them. During the term, the SWG met 14 times (twice in person). In addition, subgroups worked between meetings by email and online.

In 2021, four new RI proposals were evaluated: GGP, Guide, Operas and Resilience. In 2022, Landmark Monitoring of Batch 1 was organised for CLARIN and ESS. Landmark Monitoring Batch 1 was completed, Batch 2 with DARIAH and SHARE was established, and Batch 3 with CESSDA was initiated in 2023. Landscape Analysis Section 1 was finalised during a face-to-face SWG workshop in Vienna.

Besides ESFRI-initiated actions, the SWG had external presentations, for example from other RI stakeholders. A webinar on Ukraine in European Research Infrastructures in the Social Sciences and Humanities was organised together with EASSH in 2023.

The SWG expressed a strong will to use the original name of the working group (i.e. Social Sciences and Humanities – SSH). Unlike the current name (SCI), SSH is the general and broad definition that researchers in the field recognise and identify with. At the 86th ESFRI Forum meeting in Ljubljana in December 2023, the motion to change the name of the SWG into Social Sciences and Humanities was approved by the Forum.

Members of the SWG SCI / SSH

Name	Country/Institution
Chairs	
Bente Maegaard	Denmark (2021)
Georg Lutz	Switzerland (2022, member in 2021)
Hanna Snellman	Finland (2023)
Vice Chair	
Denisa Fedáková	Slovak Republic (since 2022, member in 2021)
Members	
Daniel Alves	Portugal (since 2022)
Meriç Bakiler	Türkiye (since 2022)
Basudeb Chadhuri	France (2021)
Sally Chambers	Belgium (since 2022)
Alice Dijkstra	Netherlands
Christofer Edling	Sweden
Inga Hennicke-Aden	Germany (since 2022)
Bjørn Henrichsen	Norway
Jindřich Krejčí	Czech Republic
Brina Malnar	Slovenia
Órla Murphy	Ireland
Costanza Navarretta	Denmark (since 2022)
Karel Neels	Belgium (2021)
Patricia Postigo McLaughlin	European Commission (since 2022)
Julia Prikoszovits	Austria (since 2022)
Matthias Reiter-Pázmándy	Austria (2021)
German Rigau	Spain (since 2022)
Klaus Schindel	Germany (2021)
Hanna Snellman	Finland (2021)
Sonia Stefanizzi	Italy
Maria Theofilatou	European Commission (2021)
Tomasz Szlendak	Poland
Despoina Tsiafaki	Greece
Przemysław Urbańczyk	Poland (2021)
Eleonora Zuolo	France (since 2022)

4.3.6 Data, Computing & Digital Research Infrastructures

The Data, Computing & Digital Research Infrastructures Strategy Working Group (DIGIT SWG) members were involved in the hearings and harmonisation (2021) of the evaluations of proposals for the ESFRI 2021 Roadmap, monitoring of the Landmarks (2022–2023) and the Landscape Analysis (2022–2023). All members signed no-conflict-of-interest declarations.

The hearing of SLICES proposal was held by a panel composed only by the DIGIT members. The hearings of EBRAINS & DIPOH were held by a panel composed of the H&F SWG, and SoBigData++ RI with the SCI SWG. All hearings were organised online in April 2021.

Because the evaluation of new proposals is based on the e-needs as well, all DIGIT members attended the hearings and harmonisation of the evaluation of all (18) proposals, namely GUIDE (van Rijn), OPERAS (Coppens), RESILIENCE (Meyer), EuPRAXIA (Palkovic), EuroNanoLab & SEEIST (Renner), GGP & ET (Plexousakis), JERICO-RI & MARINERG-I (Svensson), FNH-RI (Gunnar), DIPOH (Koppel), EIRENE RI (Choirat) and VAC4EU (Sterle). The harmonisation meeting was held on 4 May 2021.

The Chair of the SWG DIGIT was responsible for the distribution of proposals among SWG DIGIT members in correspondence with their specialisation. The workload of all SWG DIGIT members is very significant and their involvement and professional work should be underlined.

As the ESFRI Forum agreed that the Landscape Analysis part in the 2021 Roadmap needs to evolve into a more strategic document, the SWG DIGIT members worked on interconnections with other sectors. Chapter 2 of the LA is devoted to the interconnections necessary for understanding the complex structure of the research infrastructure landscape.

The SWG DIGIT members attended the ESFRI Monitoring of Landmarks Workshop on 5 April 2022 and participated in the monitoring process (2022–2023).

The 3rd ESFRI Open Session, with the leading theme *Research Infrastructures and Big Data* took place on 30 June 2022. The discussion on presentations of projects from the DIGIT sector (SoBigData (Fosca Giannotti), EBRAINS (Paweł Świeboda) and SLICES RI (Andrea Passarella)) was moderated by Ana Proykova, ESFRI DIGIT SWG Chair.

The workshop with the Monitoring Panels on 30 November 2022 was also attended by SWG DIGIT members.

During the reporting period a renewal of ESFRI SWG memberships was held in 2022 and new members were appointed in September 2022 to fill the gaps in the expertise of the group. The Chair ran two online workshops for the SWG members to discuss the responsibilities of the members in the major activities. The composition of the drafting group of LA-DIGIT and the appointment of the group's Vice Chair - Ivar Koppel - were announced in the beginning of January 2023.

The ESFRI Monitoring Panel (DIGIT) was constituted and it attended the workshop on 25 January 2023.

In 2022–2023 the SWG DIGIT group representatives attended kick-off events organised by EBRAINS, SLICES RI – receiving positive feedback afterwards.

Members of the SWG DIGIT

Name	Country/Institution
Chair	
Ana Proykova	Bulgaria
Vice Chair	
Ivar Koppel	Estonia (since 2022, member in 2021)

Name	Country/Institution
Members	
Hrachya Aststryan	Armenia (since 2022)
Volker Beckmann	France (2021)
Gunnar Bøe	Norway
Isabel Campos	Spain (since 2022)
Martyn Chamberlain	European Commission (since 2022)
Christine Choirat	Switzerland
Frederik Coppens	Belgium
Lukáš Demovič	Slovak Republic
Mário Gaspar da Silva	Portugal (since 2022)
Peter Hegedűs	Hungary (since 2022)
Hans Karlsson	Sweden (since 2022)
Norbert Meyer	Poland
Martin Palkovič	Czech Republic (2021)
Dimitris Plexousakis	Greece
Christian Renner	Germany
Arjen Van Rijn	Netherlands
Federico Ruggeri	Italy
Lorenza Saracco	European Commission (2021)
Peter Sterle	Slovenia
Gunilla Svenson	Sweden (2021)
Helmut SVERENYÁK	Czech Republic (since 2022)
Onur Temizsoylu	Türkiye
Kristian Torp	Denmark (since 2022)

4.3.7 Implementation Group

The Implementation Group (IG) continued its work in 2021. The group met several times online to contribute to the update of the ESFRI Roadmap 2021 by monitoring the Projects that were on the ESFRI Roadmap since 2010 and by evaluating 18 new proposals. The 2010 Projects that were identified as Landmarks for the new Roadmap 2021 were: AnaEE, EU-SOLARIS, MIRRI, and the 2016 Project ACTRIS. Other 2016 Projects were evaluated to determine if they were on track to become an ESFRI Landmark in the next Roadmap (i.e. after the 2021 update).

In 2022, preparations for the Monitoring of Landmarks started and a Monitoring Committee was set up by ESFRI. The Chairs of the SWGs and IG became members of the Monitoring Committee. The IG also identified independent experts who were tasked to evaluate the Landmarks. Members of ESFRI IG were

present in all Monitoring panels and contributed to the Monitoring Reports together with the members of the SWGs. The first batch of Landmark monitoring concluded and was included in the ESFRI report in June 2023.

In 2022 and 2023 the IG continued to meet frequently – still online.

With the retirement of the SWG's Chair Jeannette Ridder-Numan following the ESFRI Forum Meeting in September 2023, the leadership of the IG was handed over to Fabio Mazzolini.

Members of the IG

Name	Country/Institution
Chairs	
Jeannette Ridder-Numan	Netherlands (until Oct. 2023)
Fabio Mazzolini	Italy (from Oct. 2023)
Vice Chair	
Ondřej Hradil	Czech Republic (since Jan. 2023, member earlier)
Members	
Pierluigi Campana	Italy (since Oct. 2023)
Martyn Chamberlain	European Commission (since 2022)
Evangelia Chrysina	Greece
Hans A. Eide	Norway (since 2022)
Anna Fill	Switzerland (until Sept. 2022)
Elena Hoffert	France (2021)
Sverker Holmgren	Sweden
Guðbjörg Andrea Jónsdóttir	Iceland (since 2022)
Györgyi Juhász	Hungary (since 2022)
Kostadin Kostadinov	Bulgaria (2021)
Fabio Mazzolini	Italy (2021)
Iulia Mihail	Romania
Murat Ozgoren	Türkiye
Ivan Pezlar	Slovak Republic
Claudia Ritter	Germany
Michael Ryan	Ireland (2021)
Michał Rybiński	Poland
Dominik Sobczak	European Commission (2021)
Caroline Volckaert	Belgium (since 2022)

4.3.8 ESFRI-EOSC Task Force

4.3.8.1 Activities from 2021 to mid-2022

During this period, the first ESFRI-EOSC Task Force (TF) was active. ESFRI created a **Task Force on EOSC** in the form of an informal ESFRI Working Group with the addition of nominated experts and EC officers involved in EOSC activities. The main objectives were to contribute to the effective coordination of ESFRI activities related to EOSC, following up EOSC developments, building relationships with the different EOSC structures and coordinating ESFRI inputs to activities related to EOSC. The TF was set up in 2019, with an initial mandate until the end of 2020, which was then extended until March 2022. The overarching result of the TF's work was the promotion of the RI community's needs and its role to the co-design (together with other stakeholders), uptake and sustainability of EOSC. During its last phase (2021–Q1 2022), the main achievements were the close cooperation with the ESFRI/EOSC cluster projects and the EOSC Association, and the organisation of events highlighting the importance of ESFRI and the RI community in EOSC.

The main focus on the liaison between ESFRI and EOSC was to ensure that EOSC has visibility of the needs of the RI community and to facilitate prioritisation of these needs within EOSC efforts, such as EOSC-Core and EOSC-Exchange. It involved building relationships with several key EOSC stakeholders that are part of the EOSC tripartite partnership, namely:

- The EOSC Steering Board,¹¹ especially via a joint ESFRI-EOSC Task Force that was recommended by ERAC and is currently in the process of being created.
- The EOSC Association¹² and its related Advisory Groups and Task Forces, including the TF on Researcher Engagement and Adoption.¹³ The EOSC Association is reinforced via the EOSC Focus project (HORIZON-INFRA-2021-EOSC-01-02), which is the main support project of the EOSC tripartite partnership. Furthermore, the EOSC Association in cooperation with the EC DG R&I, has developed a coordination structure among the EOSC-related projects, and StR-ESFRI³ was invited to collaborate. The collaboration is supported by the EOSC Forum platform.¹⁴
- The EOSC Future¹⁵ implementation and integration project, bringing together all major stakeholders, and developing the related federated services as part of the EOSC Core and Exchange. The follow-up of the EOSC Future project will be based on the EOSC tender lots.¹⁶
- Other relevant e-Infrastructure and thematic stakeholders, such as the EOSC Clusters, and the follow-up umbrella cluster project (HORIZON-INFRA-2023-EOSC-01-01: Build on the science cluster approach to ensure the uptake of EOSC by research infrastructures and research communities).

¹¹ [EOSC Steering Board - Register of Commission expert groups and other similar entities \(europa.eu\)](#)

¹² [Advancing Open Science in Europe | EOSC Association](#)

¹³ [Researcher Engagement & Adoption | EOSC Association](#)

¹⁴ [Overview | EOSC Forum](#)

¹⁵ [EOSC Future EOSC Future - EOSC Future](#)

¹⁶ [Services - 234660-2022 - TED Tenders Electronic Daily \(europa.eu\)](#)

A key result of the Task Force was the organisation of three RI-EOSC workshops, the third of which, entitled "**3rd ESFRI RIs -EOSC Workshop: What does EOSC bring to RI users?**,"¹⁷ took place on 25 and 26 January 2022. The overarching message from the workshop was that further progress towards a fully operational EOSC was still needed for thematic communities and researchers, in particular for RIs and their end users, to fully benefit from the EOSC value. A clear call was made to develop a user-friendly and comprehensive catalogue of available EOSC services, as well as corresponding use cases, success stories and demonstrations that clearly highlight the EOSC benefits and potential impact towards a culture of Open Science. The role of ESFRI and of thematic RIs working together with EOSC Core developers and operators is also crucial to speed up Open Science, FAIR data management and to promote cross-disciplinary research. Providing a clearer vision of the EOSC services facing the users for the future including the EOSC marketplace is key for the users to understand what they should expect and why they should actively connect and engage with EOSC. There are also different needs and levels of uptake of FAIR and open science practices by different thematic communities. This has to be understood and treated appropriately by the EOSC providers and operators.

In conclusion, acknowledging that the EOSC concept is still work in progress, being developed in a complex environment with European, national, and regional constituents, as well as generic (disciplinary agnostic) and thematic (disciplinary) components, with different levels of maturity and priorities, EOSC should intensify and prioritise its efforts towards providing clearer added value towards end users. Ongoing efforts to build a user driven EOSC must continue and need to be complemented by concrete use cases of its value proposition to the researchers. The crucial role of ESFRI and the thematic RIs in this process has been recalled based on the wide experience they have gained to interface with the researchers. It was proposed that the next related workshop focuses more on use cases, success stories and demos.

Members of the ESFRI Task Force on EOSC (until March 2022)

Name	Institution/Country
Chair	
Mirjam van Daalen	ESFRI delegate, Switzerland
Vice Chair	
Yannis Ioannidis	ESFRI Delegate, Greece and EB member (ESFRI Vice Chair)
Members	
Hans Eide	ESFRI expert, Norway
Inmaculada Figueroa	ESFRI Delegate, Spain and EB member (ESFRI Vice Chair)
Sverker Holmgren	ESFRI expert, Sweden
Jan Hrušák	ESFRI Delegate, Czech Republic
Gelsomina Pappalardo	ESFRI delegate, Italy
Ana Proykova	ESFRI delegate, Bulgaria and DIGIT SWG Chair
Lorenza Saracco	European Commission (DG RTD)
Michel Schouppe	European Commission (DG RTD)

¹⁷ <https://www.esfri.eu/esfri-events/3rd-esfri-ris-eosc-workshop>

Dominik Sobczak	European Commission (DG RTD)
Support	
Victoria Douglas	StR-ESFRI
Fotis Karayannis	StR-ESFRI
Eva Pastorkova	StR-ESFRI
Anastasios Patrikakos	StR-ESFRI

4.3.8.2 Activities from June 2023 till the end of 2024

After the end of the initial mandate of the first ESFRI Task Force on EOSC, ESFRI decided to get advice from ERAC on this topic, namely on the form of cooperation with EOSC. In September 2022, ERAC stressed that *“Coordination between ESFRI and EOSC is necessary. However, this should by no means lead to any new body and should focus rather on setting up a light and flexible process, such as a joint Task Force.”*¹⁸ The Competitiveness Council, in its conclusions of December 2022,¹⁹ recognised a key role of ESFRI and thematic RIs working together with EOSC core developers and operators to speed up the implementation of open science policy and the FAIR data management and to promote interdisciplinary R&I in Europe and considered that *“coordination between ESFRI and the EOSC Steering Board is needed”*.

These statements follow the Competitiveness Council conclusions of November 2021 on the future governance of the ERA, which suggested that ESFRI and the EOSC Steering Board (EOSC-SB) continue their work as independent Commission expert groups and closely coordinate with and regularly inform the ERA Forum. Actions of the current ERA Policy Agenda of most direct relevance to both ESFRI and the EOSC-SB are:

- Action 1 (“Enable the open sharing of knowledge and the re-use of research outputs, including through the development of the EOSC”), including deploying open science principles and practices by various communities and **increasing EOSC connections across the European research infrastructure landscape**, and
- Action 8 (“Strengthen sustainability, accessibility and resilience of research infrastructures in the ERA”), comprising **increasing cooperation between research infrastructures, e-infrastructures, and stakeholders, including through the EOSC**, and strengthening the impact of European research infrastructures and the EOSC on the long tail of science, opening up data and digital services to all European researchers.

Thus, ESFRI continued to coordinate much of its activities around EOSC via a new **ESFRI-EOSC Task Force**. The ESFRI-EOSC Task Force was endorsed by the ESFRI and the EOSC Steering Board in Q2 2023, with the task to prepare a work plan for the 2023–2024 period within proposed areas of joint interest. The Task Force was established for the duration of the current ERA Policy Agenda (until the end of 2024) with the possibility for renewal.

The first meeting of the Task Force took place on 12 June 2023. Subsequent meetings were held on 10 July, 4 September and 12 October 2023. The general objective of the ESFRI-EOSC Task Force is to ensure a structured interface between the ESFRI Forum and the EOSC Steering Board beyond the current ad hoc cooperation. Key drivers for the task force are to align collective interests and maximise the impact

¹⁸ [Post Meeting Flash.pdf \(era.gv.at\)](#)

¹⁹ [Research infrastructures: Council adopts conclusions - Consilium \(europa.eu\)](#)

of efforts towards enabling an integrated ecosystem of research infrastructures that would feed into a dynamic EOSC federation as a key contribution to a 'web of FAIR data and services for science'. Topics to be covered by the ESFRI-EOSC task force include: i) help reducing fragmentation of the research data landscape in Europe by stimulating the connection of ESFRI RIs and ERICs to the EOSC federation; ii) assistance in increasing of FAIR research data productivity in Europe; iii) preservation and curation of research data acquired and shared through ESFRI RIs and the EOSC federation; iv) fostering of continuous deployment of open science principles as well as identification, sharing and dissemination of best practices across the European landscape of RIs and the EOSC federation. The task force organised a workshop on 23 and 24 January 2024 in Milan on the Productivity of FAIR Data and Advanced Digitalization to identify bottlenecks in the productivity of quality-assessed FAIR data and impact of AI on research.

Members of the ESFRI-EOSC Task Force (after June 2023)

Name	Country/Institution
Chair	
Volker Beckmann	EOSC SB delegate, France
Members	
Giorgio Rossi	EOSC SB delegate, Italy
Elena Hoffert	ESFRI Delegate, France
Jan Hrušák	ESFRI Delegate, Czech Republic
Martyn Chamberlain	European Commission (DG R&I-Open Science & Research Infrastructures)
Javier Lopez Albacete	European Commission (DG R&I-Open Science & Research Infrastructures)
Support	
Fotis Karayannis	ATHENA; StR-ESFRI3 Project Manager
Observers	
Jens Habermann	ERIC Forum (BBMRI-ERIC, ERIC Forum 2.0 Project)
Mark Johnson (ILL)	EIRO Forum (ILL)
Bob Jones	EOSC Association (CERN and EOSC-A)
Stefan Hanslik	e-IRG (Austria BMBFW – e-IRG Chair)
Observers Rotating on a 6-month basis	
Tiziana Ferrari*	ERF (EGI Director)
Andrew Goetz**	ARIE (ESRF)

Note: *1st 6 months. ** 2nd 6 months

5 ESFRI Meetings

The meetings for the 1 January 2021–31 December 2023 period are reported. These include ESFRI Plenary Forums, ESFRI Stakeholders Forums and other ESFRI events such as open sessions and various workshops.

5.1 ESFRI Plenary Forums

The Forum is a self-regulated body, operating in an open method of coordination, between the different countries mainly on the basis of consensus. The Forum is composed of delegations from all EU Member States and Associated Countries, wishing to take part, and the European Commission. Forum meetings are held on a regular basis, typically four times a year.

[75th ESFRI Forum Meeting](#)

23–24 March 2021, Online

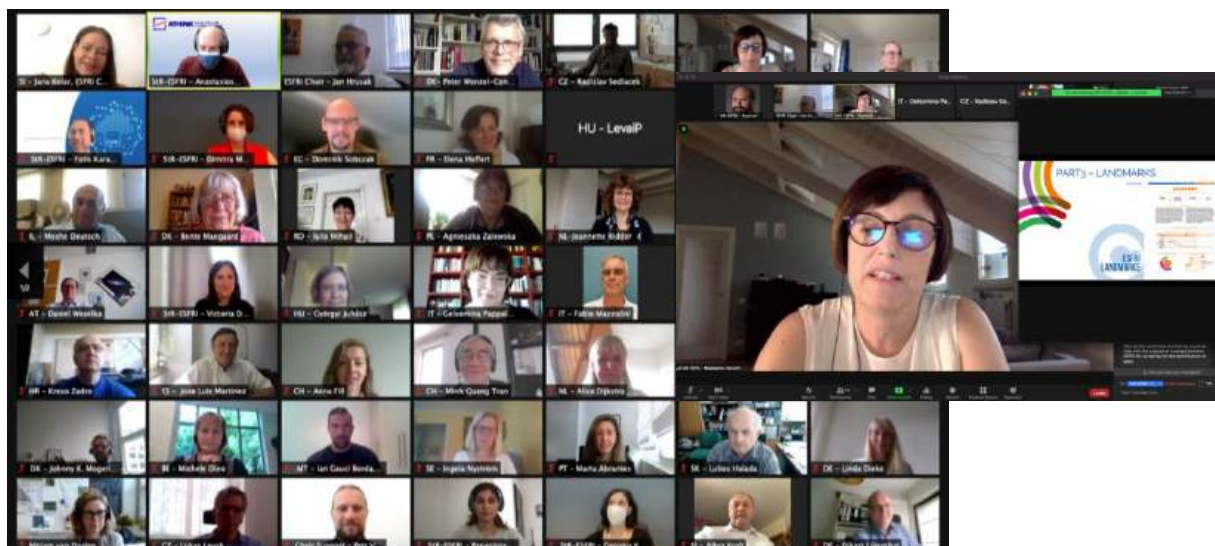


The **75th ESFRI Forum Meeting**, which was held online on 23 and 24 March 2021 hosted the **1st Open Session**, a new initiative aiming at strengthening the ESFRI communication strategy, as discussed in [the ESFRI White Paper Making Science Happen](#). The introduction of the ESFRI Open Sessions was the first step towards the development of effective communication mechanisms in order to foster effective exchange of information between ESFRI delegates and ESFRI research infrastructures. This first Open Session was organised on 24 March in a virtual mode and the leading theme was the response to the COVID-19 pandemic by RIs associated with the H&F and SCI SWGs.²⁰

²⁰ Video from the session is available here: <https://youtu.be/bJrYW9oHOoM?si=bOWmUG85HFyn7QKd>.

[76th ESFRI Forum Meeting](#)

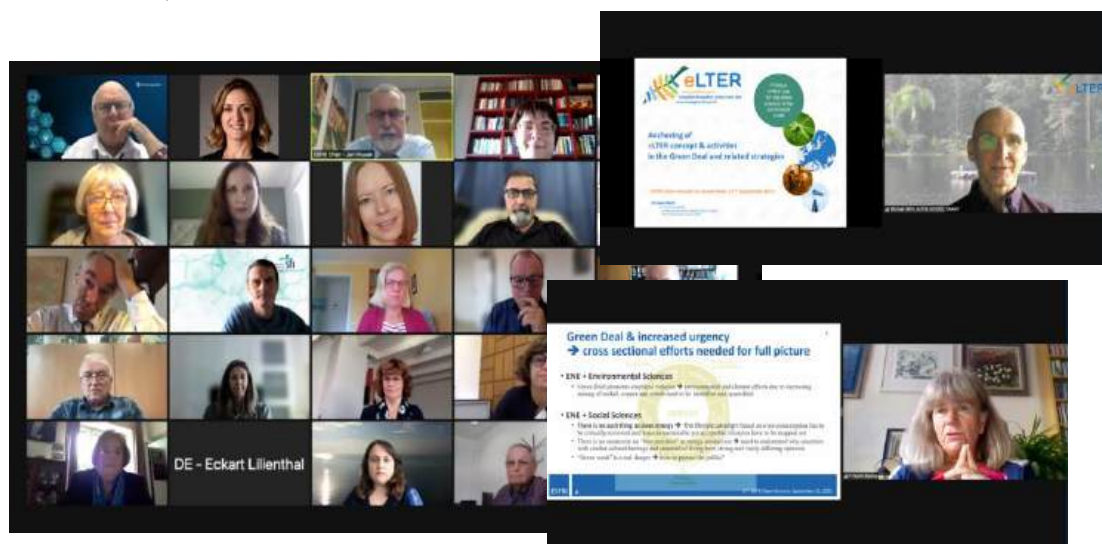
30 June–1 July 2021, Online



The **76th ESFRI Forum Meeting** was held online on 30 June and 1 July 2021 and developed the concept of **ESFRI Stakeholder Forum** as another strategic instrument for communication within the RI ecosystem.

[77th ESFRI Forum Meeting](#)

21–22 September 2021, Online

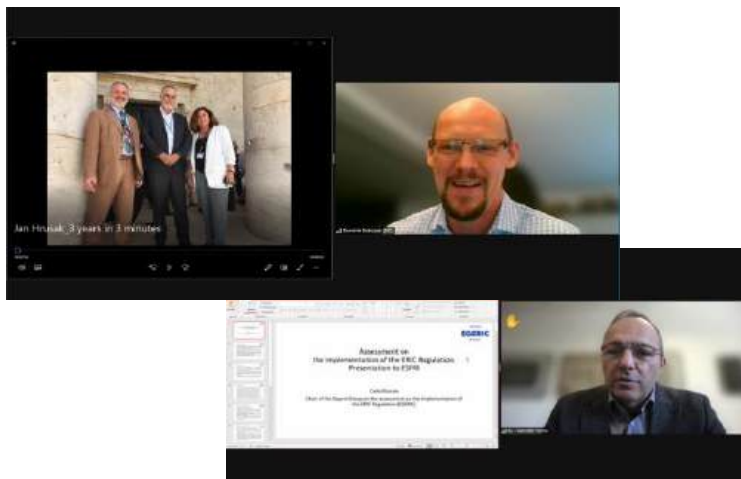


The **77th ESFRI Forum Meeting** was also held online on 21 and 22 September 2021 and hosted the **2nd Open Session²¹** aimed at strengthening the ESFRI communication strategy and discussing the contribution of RIs to the European Green Deal.

²¹ Video from the session is available here: https://youtu.be/Rk_WXSu3NOQ?si=W-F7G-vDtFSx8ZXC.

[78th ESFRI Forum Plenary Meeting](#)

6 December 2021, Online



The **78th ESFRI Forum Meeting** was held fully digitally on 6 December 2021. The event was hosted by the Slovenian Presidency of the Council of the EU as part of **the ESFRI Days**. As part of the latter, the **Launch of the 2021 ESFRI Roadmap** was also held as an online celebratory event. Despite its virtual format the meeting attracted high-level participation demonstrating ESFRI's impact and importance. During the high-level policy panel moderated by Jana Kolar (ESFRI delegate from Slovenia), the Slovenian Minister of Education, Science and Sport Simona Kustec together with Jean-Eric Paquet, Director-General for Research and Innovation at the European Commission, Pavel Doleček, Deputy Minister for Higher Education, Science and Research at the Czech Ministry of Education, Youth and Sports, and Marco Giungi, Diplomatic Advisor of the Italian Minister of Education, University and Research, discussed how research infrastructures can further contribute to an evolving research and innovation environment, to sustainable European economic growth and to address the key global challenges. All panellists agreed that implementing the ESFRI Roadmap via adequate funding, synergies, inclusiveness, and increased visibility and impact is now the major task for the European Commission, the Member States, and the scientific community.

[79th ESFRI Forum Plenary Meeting](#)

23 March 2022, Paris, France

The **79th ESFRI Forum Plenary Meeting** was held on 23 March 2022 in Paris, France. The discussion focused on the new ERA governance and ERA Policy Agenda as well as the ESFRI Work Plan for 2022–2023. Delegations were also informed about the StR-ESFRI3 project.



[80th ESFRI Forum Plenary Meeting](#)

30 June 2022, Online

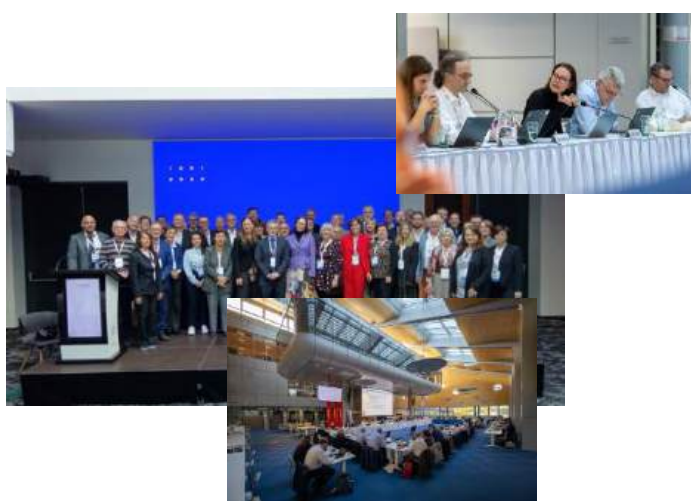


The **80th ESFRI Forum Plenary Meeting** was held on 30 June 2022. It was fully digital. Besides the permanent topics on the agenda, the delegates discussed key messages from the Stakeholder Forum Launch, ESFRI's research on the synergies of funding for research infrastructures and the outcomes of the ESFRI-EC Workshop on Research and Innovation Needs of RIs. The Secretariat sought approval of the nominations to the Strategic Working Groups (SWGs) and to the Implementation Group, as well as the document Terms of Reference 2022–2023 for the SWGs. An **open session** on RIs and big data was also organized as part of the meeting.

[81st ESFRI Forum Plenary Meeting](#)

18 October 2022, Brno - Czech Republic

The **81st ESFRI Forum Plenary Meeting** was held on 18 and 19 October 2022, in Brno, Czech Republic. The event was hosted by the Czech Presidency of the Council of the EU. At the meeting, the ESFRI Work Plan for 2022–2023 was approved. Digital transition of open RIs was highlighted. The conclusions from the ERAC Plenary on the digital transition of research infrastructures in September 2022 were presented along with plans for collaboration between ESFRI and EOSC on the creation of a pan-European data repository. Energy and supply challenges of RIs were also discussed.



[82nd ESFRI Forum Plenary Meeting](#)

12 December 2022, Online



The **82nd ESFRI Forum Plenary Meeting** was held from 12 to 13 December 2022 as a fully digital event. The Horizon Europe Research Infrastructures Work Programme along with the future RI challenges that could be relevant for the 2025-2027 period were discussed, and SWG activities presented.

[83rd ESFRI Forum Plenary Meeting](#)

23 March 2023, Online



The **83rd ESFRI Forum Plenary Meeting** was held from 23 to 24 March 2023 as an online event. R&I in the Recovery and Resilience plans, the GBER revision in relation to R&I on the Green Deal and Industrial & Digital Strategy, and ERA Action 12 were presented. Delegates were also updated on the work of SWGs and DGs, and informed about discussions about a joint ESFRI-EOCS task force in ERAC. Terms of Reference for the Monitoring Committee were approved.

[84th ESFRI Forum Meeting](#)

20–22 June 2023, Lund, Sweden



The **84th ESFRI Forum Meeting** took place between 20 and 22 June 2023, in Lund, Sweden, and was hosted by the Swedish Presidency of the Council of the EU. Delegates were updated on the work of SWGs, DGs, and the joint ESFRI-EOCS task force. Cooperation with third countries was discussed and policy developments at the EU level related to RIs were presented. The Chair of the Search Committee presented the report of the Search Committee and proposed election modalities. Candidates for the next ESFRI Chair were also presented.

[85th ESFRI Forum Meeting](#)

28–29 September 2023, Tenerife, Spain

The **85th ESFRI Forum Meeting** took place on 28 and 29 September 2023, in Tenerife, Spain. The event was hosted by the Spanish Presidency of the Council of the EU. Delegates were informed about the ESFRI community on Zenodo having been created, ESFRI's involvement in discussions related to ERA Action 8, an ongoing EC's review of Horizon Europe grants in support of 2018 ESFRI Roadmap Projects, EC's third report on the application of the ERIC Regulation, as well as the work of ESFRI SWGs, DGs and the Monitoring Committee. The proposed procedure of the preparation of next Executive Board mandate as well as the procedure for updating ESFRI Procedural Guidelines were discussed. ESFRI's involvement in preparation of the ERA Policy Agenda 2025–2027 was also debated.



86th ESFRI Forum Meeting

11–12 December 2023, Ljubljana, Slovenia



The **86th ESFRI Forum Meeting** took place on 11 and 12 December 2023, in Ljubljana, Slovenia. Delegations were informed about the adoption of recommendations on researchers careers and ERA monitoring, ERA Policy Agenda 2025–2027, the development of the Horizon Europe Strategic Plan 2025–2027 and FP10 preparations were also discussed. New EB members were approved and the timeline for the call for new WG Chairs agreed. Proposed revisions of ESFRI Procedural Guidelines were presented. Engagement of ESFRI delegations was discussed and the structure of triennial ESFRI report was outlined. The SWG SCI's name change to Social Sciences and Humanities (SSH) was approved. Handover to the new Chair also took place.

5.2 ESFRI Stakeholders Forum

The ESFRI Stakeholder Forum is a platform to attract stakeholders, raise awareness across the RI ecosystem, and facilitate cooperation and mutual learning for new and improved RI services and their enhanced use by various communities.



The Stakeholders Forum was launched on 24 March 2022. Since then, the web pages have been developed into an information resource for stakeholders, with ESFRI news and videos.

5.3 ESFRI Stakeholders Meetup

The main objectives of the ESFRI Stakeholder Forum Meetup are to create a structured constructive two-way communication channel with a broad community of stakeholders, to contribute to better integration of the RIs in related communities and to contribute to improved services of the RIs. The event is organised closely with the stakeholders, who are consulted for the topics and will be part of the organising committee. Typically, the stakeholders beyond the RI-related infrastructure and policy communities should be involved, such as technology infrastructures, stakeholders from the domain of higher education, from across the research and innovation ecosystem, etc.

The ESFRI Stakeholders Forum Meetup is currently an annual event (bi-annual after 2023) bringing together research infrastructures, decision- and policy-makers, regions, socio-economic actors, research organisations, and higher education institutions which may contribute to or run RIs, or are potential users of RIs. It aims to attract stakeholders of RIs, raise awareness across the whole research and innovation ecosystem and facilitate cooperation and mutual learning between RIs and their stakeholders.

[1st ESFRI Stakeholders Forum Meetup](#)

15 September 2022, Brussels, Belgium



The first ESFRI Stakeholders Forum Meetup took place on 15 September 2022 in Brussels and focused on the good practices and bottlenecks hindering the enhanced use of RI services or delivery. It was organized as a full-day event with the limited physical presence of around 130 people to set the Stakeholders Forum deliberation and co-design processes in full motion.

[2nd ESFRI Stakeholders Forum Meetup](#)

27 September 2023, Tenerife, Spain



The second Forum Meetup took place on 27 September 2023 in Tenerife. More than 120 members participated and the Meetup discussions were focused on access, funding, and cooperation with industry. Each session started with a panel discussion, followed by group discussions where participants addressed relevant questions also identified in consultation with stakeholders. A specific question was addressed in each of the sessions regarding the ESFRI Landscape Analysis which was currently on going. Furthermore, a common question was posed for all three topics about how the next European Commission Work Programme 2025–2027 and the new Framework Programme could include them.

ESFRI also engaged with stakeholders through a variety of other formats: ESFRI Open Sessions, Experience and Information Workshops and other events.

5.4 ESFRI Open Sessions

Among new initiatives aiming at strengthening the ESFRI communication strategy described in ESFRI White Paper, was the introduction of the ESFRI Open Sessions organized twice a year. They are intended to serve both the ESFRI Delegates and representatives of the ESFRI research infrastructures and facilitate two-way exchanges. The objective of these events is to inform/showcase the work of the RIs in the different domains to ESFRI and enable the exchange of information between ESFRI, EC & RIs. The sessions are a part of ESFRI meetings. ESFRI decides on the topic to be highlighted. For the first series of three Open Sessions, the topics were Covid-19, European Green Deal and Big Data.

1st ESFRI Open Session

24 March 2021, Online

Leading Theme: ESFRI RIs response to the COVID-19 pandemic

The 1st ESFRI Open Session focused on the ESFRI research infrastructures' response to the COVID-19 pandemic. The main focus was put on the activities of research infrastructures operated in the **Health and Food**, and **Social and Cultural Innovation domains**. Contributions came

from Lucia Banci (Member of ESFRI Strategy Working Group on Health and Food), Anton Ussi, (Operations & Finance Director, EATRIS ERIC), Niklas Blomberg (Director, ELIXIR), Bente Maegaard (Chair of the ESFRI Strategy Working Group on Social and Cultural Innovation), Axel Börsch-Supan (Managing Director, SHARE ERIC) and Franciska de Jong (Executive Director, CLARIN ERIC). The recording of the session is available on Youtube: <https://youtu.be/bJrYW9oHOoM>.

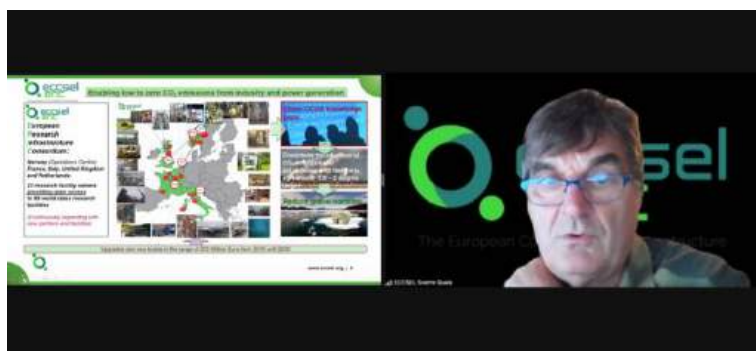


2nd ESFRI Open Session

22 September 2021, Online

Leading Theme: European Green Deal.

The 2nd ESFRI Open Session was organised online, as part of the 77th ESFRI Plenary Meeting, on 22 September 2021 to discuss the European Green Deal and participation was open to everyone. The ESFRI Chair recalled that the ESFRI White Paper "Making Science Happen", adopted in 2020, lays down the foundation of future strategic development of the European Strategy Forum on Research Infrastructures. RIs presented their activities in the fields of (1) **environment** (speakers: Gert Verreet, SWG Environment; Eija Juurola, ACTRIS and IAGOS; Michael Mirtl,



eLTER) and (2) **energy** (speakers: Taina Kurki-Suonio, SWG Energy; Gilles Bignan and Angel Ibarra, The Jules Horowitz Reactor and IFMIF Dones; Sverre Quale, ECCSEL ERIC). The recording of the session is available on YouTube:

https://www.youtube.com/watch?v=Rk_WXSu3NOQ.

3rd ESFRI Open Session

30 June 2022, Online

Leading Theme: Research Infrastructures and Big Data.

The 3rd ESFRI Open Session was organised online, as part of the 80th ESFRI Plenary Meeting on 30 June 2022. The ESFRI Chair welcomed the participants and presented the main objective of open session and the agenda. This was followed by the presentation of the draft ESFRI Work Plan 2022–2023 and ESFRI activities. After that presentations of RI activities in the field of **Physical Sciences and**

engineering (speakers: Gonzalo Merino, PIC Consortium; Jean Daillant, LEAPS Consortium and SOLEIL; Rosie Bolton, SKA), presentations of RI activities in the field of **Data, Computing and Digital Research Infrastructures** followed (speakers: Roberto Trasarti, SoBigData CNR; Paweł Świeboda, EBrains; Andrea Passarella, SLICES, CNR). The recording of the session is available on YouTube:

<https://www.youtube.com/watch?v=c27uOyHZjfg>.



5.5 Exchange of Experience Workshops

The objective of these events is to exchange views with the participants involving direct interaction with the participants. The stakeholders involved are almost exclusively RIs and policy makers. They are limited in size 60/100 people to support interactive approaches. The topics are selected in a top-down style. The past events included funding, KPIs, EOSC etc.

[Effective Use of Horizon Europe - Preparatory Phase and Individual Support Funding](#)

15 November 2021, Online



ESFRI organised an online Workshop on the effective use of Horizon Europe Preparatory Phase and Individual Support funding, on 15 November 2021. The objective of this EoE workshop was to provide insight on the overall ESFRI roadmapping and landscaping process, the RI lifecycle and the project monitoring process. The workshop presented Horizon Europe support to Preparatory Phase projects including requirements for management. The socio-economic impact, the importance of credible Key Performance Indicators, the provision of access to data and data management plans were also discussed along with the identification of the most appropriate legal structures for RIs (ERIC, private legal entity, etc.), in dedicated panel discussion sessions.

[3rd EOSC-ESFRI Workshop on RIs and EOSC - What does EOSC bring to RI users?](#)

25–26 January 2022, Online

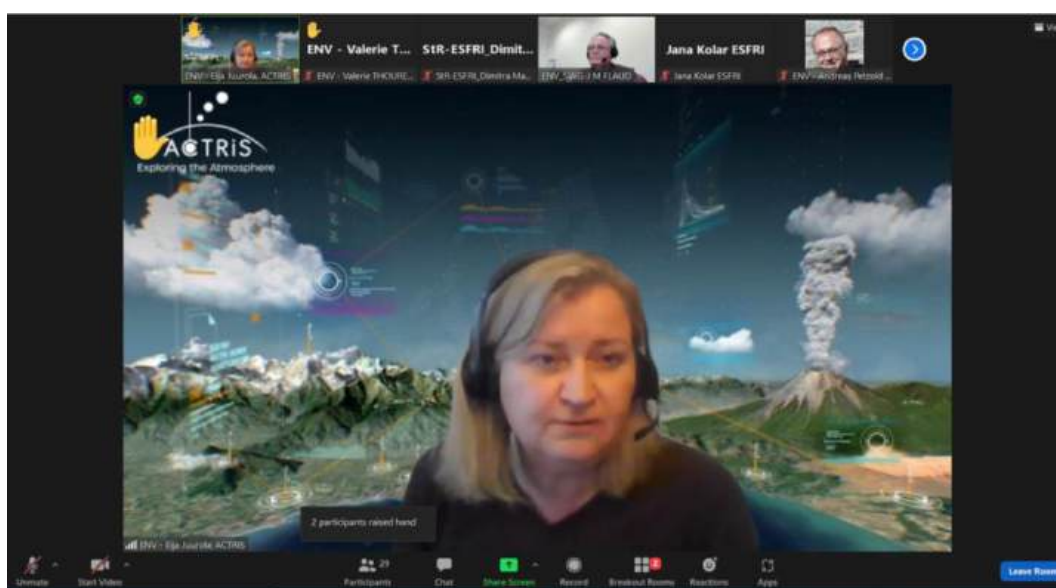


The 3rd Workshop on the connection of ESFRI research infrastructures to the European Open Science Cloud (EOSC) titled "3rd ESFRI RIs -EOSC Workshop: What does EOSC bring to RI users?" took place on 25 and 26 January 2022, as an Online Event. The main objective of the workshop was to bring together ESFRI, ESFRI RIs and EOSC stakeholders, in order to showcase and better comprehend the EOSC

concept, including the Open Science and "FAIR" policy agenda, and the vision for the future, along with the EOSC value proposition for its users, and ensure an optimal federation of clusters and RIs with EOSC. The event focused on the current state of EOSC and how the thematic RIs and ESFRI clusters fit into the developing landscape, including the partnership with the newly established EOSC Association. The workshop was organised by the ESFRI Task Force on EOSC and the StR-ESFRI2 Project, in close cooperation with ESFRI and the EC, and with participation from the EOSC Cluster projects, the EOSC Association Board of Directors, and the EOSC Future project. The recording of the workshop is available on Youtube: https://www.youtube.com/playlist?list=PLjHsxBU5yVVRCq_UQzo_J61vVcGUUDDlY.

[ESFRI EoE Workshop on Monitoring of Landmarks](#)

5 April 2022, Online



The online EoE Workshop on Monitoring of Landmarks took place on 5 April 2022. The main objective of the workshop was to present the rationale, the methodology and the organisation of the monitoring, and to serve as a kick-off of the monitoring process, while allowing participants to clarify open questions. The workshop attendees had the opportunity to participate in a thematic breakout session on the implementation of Landmark monitoring, according to their area of expertise/interest, to facilitate productive discussions. The six breakout sessions were themed in accordance with ESFRI SWGs, namely Energy and Data, Computing and Digital RIs, Environment, Health and Food, Physical Sciences and Engineering, Social and Cultural Innovation. For each of the six breakout sessions, a summary report was produced that reflects the collated outputs from the discussion topics, representing the views of the participants involved, which was then presented during the plenary session that followed.

5.6 Information workshops

The objective of these events is to transmit information to the ESFRI stakeholders, mainly RIs, and collect opinions on a particular topic, such as e.g. draft ESFRI reports, monitoring and rodamping process.

Implementation:

- **R&I Needs of Research Infrastructures**, Joint Commission - ESFRI Workshop. 30–31 March 2022 (Online)
- ESFRI Workshop on **Monitoring of Landmarks**. 5 April 2022 (Online)
- ESFRI Workshop on **Landscape Analysis**. 28 April 2022 (Online)
- ESFRI Kick-off Workshop on **Monitoring of Landmarks**, 16 September 2022, Brussels
- ESFRI Information Workshop on **Monitoring Panels**, 30 November 2022, (Online)
- ESFRI Workshop on **Monitoring of Landmarks/ Information for External Experts**, 25 January 2023, (Online)
- **RI Funding Questionnaires** Workshop. 16 February 2023 (Online)
- Workshop on **ESFRI's Approach to RI Impact Assessment**. 30 May 2023 (Online)
- Workshop Discussing the **Results of the Questionnaire on RI Funding**, 23 June 2023 (Online)

5.7 Other Events

[Launch of the 2021 ESFRI Roadmap on Research Infrastructures in Europe](#)

7 December 2021, Online



A new ESFRI Roadmap was published in 2021. On 7 December 2021, ESFRI presented the 2021 ESFRI Roadmap on Large Scale Research Infrastructures during an online celebratory event. The event was centred around the Roadmap 2021 motto "Equipping Europe with infrastructures for ground-breaking research" and the presentation of the 11 new RI Projects in 2021 Roadmap update. Renowned speakers from the European research and the research infrastructures areas, the European Commission and the Slovenian Government participated in thematic panel discussions on RIs in the ERA Policy Agenda and RIs as drivers of international cooperation, and hosted a lively Policy Roundtable discussion.

The event was hosted by the Slovenian Presidency of the Council of the EU, as part of the ESFRI Days event, with the support of StR-ESFRI2 Project, and was broadcasted live from Ljubljana, Slovenia, via the ESFRI YouTube channel. Participation was open to everyone, and the event generated huge interest from the community, with over 600 participants following the conference throughout the day. Questions from the online audience were welcome throughout the event, and the interaction was facilitated via the online tool Mentimeter, while a separate online Press Conference was organized exclusively for media representatives. The Official Roadmap 2021 Teaser video and original videos submitted by ESFRI RIs were screened during the event breaks.

The ESFRI 20th Anniversary Conference

25 March 2022, Paris, France



In 2022, ESFRI celebrated its 20 years of existence with the ESFRI 20th Anniversary Conference: European Research Infrastructures at the Heart of Scientific Discoveries that took place on 25 March 2022, in Paris, France, hosted by the French Presidency of the Council of the European Union and under the auspices of the French Académie des sciences. The conference celebrated the achievements of ESFRI, highlighting the role it plays in enhancing European excellence in research and innovation. Participation was open to everyone and brought together key stakeholders, including policy experts, facility managers and leading researchers, exploring the drivers behind the development of the rich European research infrastructures landscape, and discussing emerging trends and the challenges for the future.

The conference provided an important opportunity to explore the range of cutting-edge work being undertaken across the research domains that are reliant on the services provided by European research infrastructures. Several outstanding scientists shared with the audience their major discoveries and illustrated how they have benefited from the unique European RIs, and Reinhard Genzel, 2020 Nobel Prize Laureate in Physics, honored the event with his presence and gave an exciting keynote speech. The Conference closed with the ERIC plates ceremony, with Jean-Eric Paquet, Director General for Research and Innovation, European Commission, awarding commemorative plates to Euro-BioImaging ERIC, ELI ERIC and AnaEE-ERIC for their achievement of becoming ERICs.

[The ICRI 2021 Conference](#)

1-3 June 2021, Online

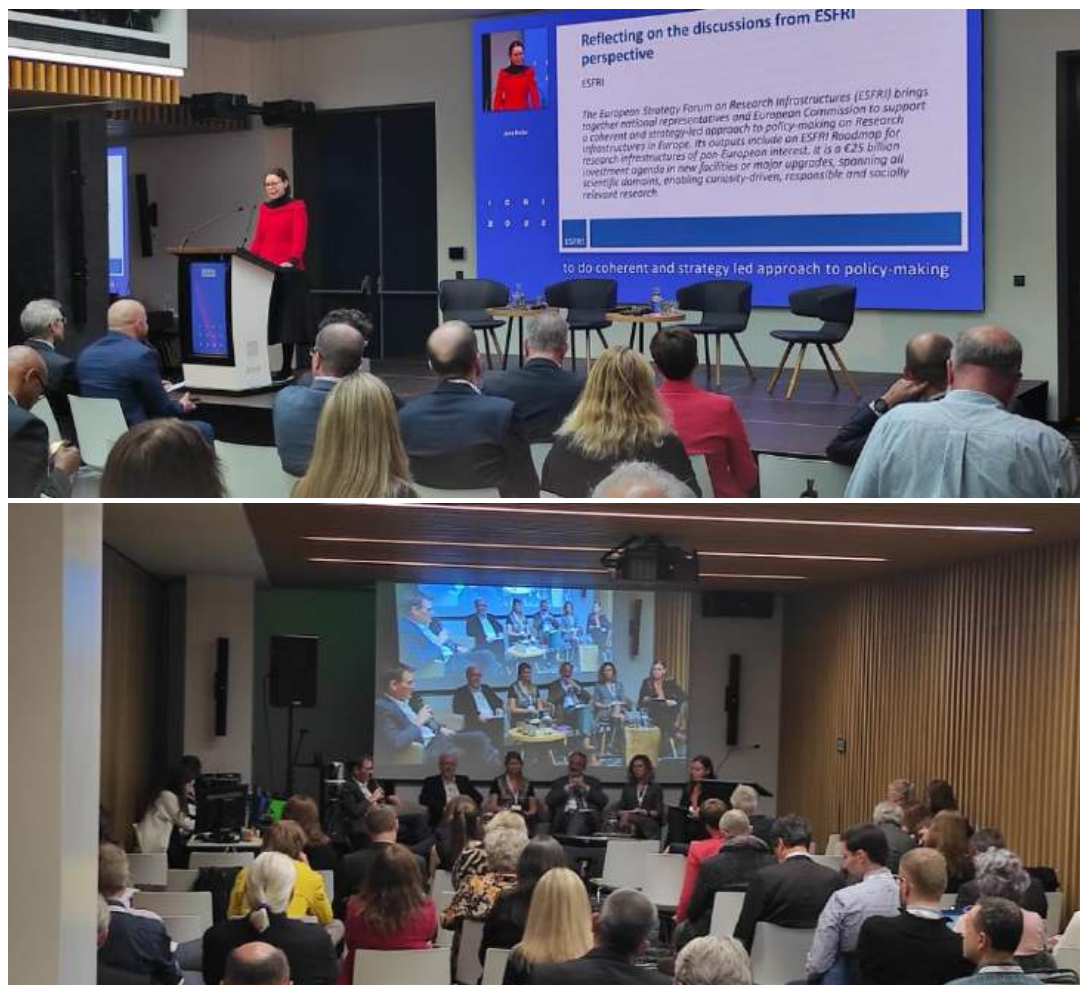


Through its Chair, ESFRI was also involved in the organisation of the global conference on research infrastructures **ICRI 2021** (International Conference on Research Infrastructures 2021) that took place between 1 and 3 June 2021. The main organiser of ICRI 2021 was the Canada Foundation for Innovation in close cooperation with the Directorate-General for Research and Innovation of the European Commission.

Originally, the conference was supposed to be an in person meeting in Ottawa, Canada, but due to the ongoing COVID-19 pandemic and related epidemiological measures, it was moved to a virtual environment. The topic of research infrastructures and grand societal challenges was presented by ESFRI Chair Jan Hrušák who showcased the ESFRI White Paper and its strategic vision on a vital, sustainable, integrated and interoperable ecosystem of research infrastructures, striving for top science with impacts. The application of new knowledge into practice is a prerequisite for long-term sustainable economic growth and social well-being.

The ICRI 2022 Conference

19–21 October 2022, Brno, Czech Republic



The 4th International Conference on Research Infrastructures **ICRI 2022** took place in Brno from 19 to 21 October 2022 under the Czech Presidency of the European Council. ICRI 2022 was devoted to the role of RIs in addressing grand challenges and emergencies, focusing at the same time on medium and long-term mitigation solutions that need to be developed and established. ESFRI has already set a plan to assist in promoting international cooperation in these endeavours and widening the participation of the R&I community in designing RIs and services that will be targeted towards these challenges. In ICRI 2022, several ESFRI members and ESFRI Roadmap RI representatives were part of the program, presenting the European perspective in a host of subjects and adding their knowhow to panels. ESFRI Chair Jana Kolar moderated the COVID-19 and Pandemics of Infectious Diseases session and addressed the conference participants at the closing plenary. She highlighted ESFRI Roadmap and Landscape Analysis as ESFRI's biggest outputs and outlined the future challenges for RIs that will necessitate global cooperation (also in terms of funding).

6 ESFRI in Broader ERA Governance

Since the ERA governance has changed in 2021, this part of the report covers the 2021 and 2022-2023 periods separately.

6.1.1 2021 ERA governance related ESFRI activities

Until the end of 2021, ESFRI has interacted and periodically reported to ERAC. In the scope of the implementation of ERA Priority 2b, ESFRI addressed the mandate related to the implementation of the ERA Roadmap and closely collaborated with ERAC, in particular:

- The Chair of ESFRI served on the ERAC Steering Board;
- ESFRI presented to the ERAC Steering Board its plan of activities related to the implementation of ERA Priority 2b and informed ERAC on its other activities related to Council mandates going beyond the ERA Roadmap;
- ESFRI prepared a concise annual report to ERAC, providing a timely strategic and operational overview of the activities that are relevant to the development of the ERA Priority 2b and of the impact of these activities on the achievement of that Priority;
- ESFRI actively took part in the strategic discussions on the European Research Area.

Over the years RIs started to form an **integrated (horizontally and vertically interconnected) ecosystem**, of which causalities, interdependencies and implications to the stakeholders including national authorities are not yet understood. From the policy perspective this is even more important than any access issue as the RIs are not networking only among themselves and cross-disciplinary, but connecting different user communities (also across sectors) and are penetrating the different networks including universities.

In the Council and the European Research Area and Innovation Committee (ERAC) discussion, where the ESFRI Chair was an *ex-officio* member of the Steering board, it was recognized that Europe has with ESFRI an effective mechanism to identify the potential of new investment priorities in RIs. In addition, ESFRI was seen as a functioning governance and strategic model allowing the development and implementation of instruments to further optimize the RI ecosystem, its organisation and performance. Operational RIs **largely determine the quality** of European research and the entire ERA, and the **ESFRI monitoring system** provides impetus for further **improvement of RI services** and strengthens the coherence between European, national and regional priorities and policies for RIs. The ESFRI monitoring **has the potential to qualitatively change the RI ecosystem** and can impact the national processes similarly to how the RI roadmapping concept had a decade ago.

Recognizing the pivotal role of ESFRI RIs, in 2021 ESFRI was an important role model in the discussions about the **new ERA concept and particularly its governance** that were held in ERAC and the ERA Forum for transition that prepared the new policy concept. The strengths of ESFRI highlighted in these discussions were: its self-limitation to strategy issues, the application of the principle of variable geometry, encouraging participation in accordance with national priorities, the establishment of a sound working method and evaluation system with strict adherence to excellence in science, a solid governance structure with the inclusion of representatives of all MS and AC, thus encouraging the setting up of national roadmap processes. Moreover, ESFRI has clear key deliverables (roadmap and landscape analysis) and has contributed to the visibility of investments into RIs and their significance for research as well as for society at large.

Within these discussions it was valued that ESFRI has learned over time that a lot more attention needs to be addressed to the maturity of projects before embarking on a formal process and started working on a sustainable evaluation methodology including the monitoring scheme as a self-standing concept. The ESFRI process has been seen to provide good 'transferable' elements, most significantly self-limitation to strategy issues, sound working method and evaluation system, solid governance model, clear deliverable, landscape analysis (e.g. Societal Challenges needs, what parts are the partnerships addressing, what is missing, where are gaps not addressed at the EU or national level or by foundations etc.) for the **new ERA policy framework and in the discussions on common EU values and principles**.

In these discussions it was also noted that European RIs are increasingly becoming digital; for their own operation, equipment and instrumentation, for the access and services they provide as well as for the data and results they generate. Already at this stage it was recognized that a strengthened interface between ESFRI and the EOSC governance ensuring both the appropriate policy drivers as well as effective operational interaction is needed. This has led to the creation of the **ESFRI Task Force on EOSC** (on the basis of the Council conclusions on European Open Science Cloud adopted on 29/05/2018) with the main objective to contribute to the effective coordination of ESFRI activities related to EOSC. The Task Force has been steadily following EOSC developments and has organised several **EOSC-related events** during its mandate (2019–2021); in particular to build relationships with the EOSC Cluster projects and with other EOSC structures.

6.1.2 2021–2023 ERA governance related ESFRI activities

With the Council Conclusions on the Future Governance of the European Research Area in 2021,²² the ERA Forum was established. Organised as an EC expert group, with membership encompassing the Member States and the EC, the new body is responsible for enhancing coordination towards the effective implementation of the ERA Policy Agenda, supporting the Commission and the Member States in the delivery of the ERA Actions. The same Council Conclusions also suggest that for the coordination and implementation of R&I policy in the area of research infrastructures, the ESFRI continues their work as an independent Commission Expert Group and closely coordinates with and regularly informs the ERA Forum.

This was strengthened by the Council Conclusions on Research Infrastructures,²³ which call on the Commission to ensure that ESFRI is closely involved in the work of the ERA Forum when relevant, which is essential for an effective exchange and contribution of RIs to the implementation of the ERA.

The recent changes in the political framework of ERA implementation have, therefore, had a profound influence on the interaction and reporting of ESFRI.

Within the new governance, ESFRI, as the body for the coordination and implementation of R&I policy in the area of RIs, **continues supporting a coherent and strategy-led approach to policy-making on European research infrastructures**. Its tasks include recurrent activities, which are the periodic update of the ESFRI Roadmap, the Research Infrastructure Landscape Analysis and the monitoring of ESFRI landmarks. Besides these activities, ESFRI follows recommendations of the Competitiveness Council, co-creates and contributes to the implementation of relevant ERA Policy Agenda actions,

²² Council Conclusions on the Future Governance of the European Research Area, 14308/21, 26 November 2021.

²³ Council Conclusions on Research Infrastructures, 13921/22, 15 November 2022.

<https://data.consilium.europa.eu/doc/document/ST-13921-2022-INIT/en/pdf>

and may respond to other needs as they arise. The ESFRI activities in the period of 2021-2023 were, therefore, based on the ERA Action 8, and the further indications outlined in the Council Conclusions on RIs.²⁴ Furthermore, two Council Presidency conferences were organised on the topics of relevance to ESFRI, each issuing a Declaration:

- Swedish Presidency of the Council of the European Union hosted a conference on research data in Lund on 19 and 20 June 2023, with the resulting the Lund Declaration.²⁵
- Spanish Presidency of the Council of the European Union hosted a conference titled Global Dimension and Sustainability of Research Infrastructures in Tenerife on 25 and 26 September 2023, resulting in the Tenerife Declaration.²⁶

Both events provide important indications for the future work of ESFRI, and we are grateful to the Council Presidencies for their continuous focus on the topic of RIs.

Regarding **governance**, ESFRI closely coordinates with and regularly informs the ERA Forum and other ERA governance bodies and receives advice on strategic policy orientations and future trends that require the refinement of Union and national, including regional, R&I policies from ERAC on an ad hoc basis.

Within this framework, ERA Action 8 and the additional activities of 2021-2023 have been reported to the ERA Forum on 26 October 2023. The strategic advice of ERAC is planned to be sought in the first half of 2024.

The first presentation and discussion of the ERA Action in the field of RIs for the period 2025-2027 took place at the ERA Forum on 16 November, with a follow up on 13 December 2023.

²⁴ Council Conclusions on Research Infrastructures, 13921/22, 15 November 2022.

<https://data.consilium.europa.eu/doc/document/ST-13921-2022-INIT/en/pdf>

²⁵ https://swedish-presidency.consilium.europa.eu/media/5wehfvzx/2023-06-20_eu2023_maximising-the-benefits-of-research-data_declaration.pdf

²⁶ https://infrasevent.presidencyeu.es/wp-content/uploads/2023/09/230926_Declaration_Tenerife.pdf

7 Future Outlook and Activities

The main purpose of ESFRI was and continues to be giving advice and providing help in the process of decision taking of the Member States (MSs), Associated Countries (ACs) and European Commission (EC) in the area of large research infrastructures of Pan-European character.

In order to achieve this goal, ESFRI is oriented to fulfil different activities as a continuous process that will feed the decision-makers with the proper information. In this respect, ESFRI needs to perform a continuous exercise of monitoring the performance of RIs, as well as an exercise about the financial sustainability and global financial envelope of activities related to RIs, from any financial source in the EC, MSs and ACs. Also, the strategic approach of the Landscape Analysis in relation to RIs is necessary in order to assure the world-class level of RIs related to the ESFRI Roadmap, as well as the comparison with relevant initiatives in the different regional areas worldwide (e.g. Pacific Rim, North America, East Asia, ASEAN). The updated information on these three pillars (monitoring, financial sustainability and landscape analysis) are the necessary ingredients to contribute efficiently to the main task of ESFRI to give advice and favour the implementation of the different RIs included in the ESFRI Roadmap.

Beside the hard-core activities mentioned above, ESFRI plans to further upgrade relations with different stakeholder groups and boost their engagement in the RI activities in the future. The first step towards this will include a more intense collaboration with the ESFRI RI Landmarks, improved collaboration of the RIs in the main activities of ESFRI, as well as the continuation of activities related to the exchanges in specific collaboration fora, between ESFRI and the stakeholders, in a large approach. Also, it is important to mention future activities in relation to the Internationalization of the RIs and the positioning of the RIs in a global scene, as well as the contribution of the RI landscape to the global diplomacy of the EU, by means of the MSs and ACs. Moreover, different activities on aligning the RIs with the needs to address the main challenges of the EU in relation to Health, and the Twin Green and Digital transition will be a high priority for the coming period in the agenda of ESFRI and the RIs.

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