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FOREWORD FROM THE CHAIR



This Biannual Report reflects the main results of the very intense two last years of ESFRI's activity. The scope of periodic reports is transparent information and record on ESFRI actions for all interested stakeholders and particularly for the Council of the European Union and the European Parliament. The Report is not a strategy document as it is only a record of activities and meetings – Plenary Forum Meetings, Executive Board and Working Group Chairs Meetings, *ad hoc* Working Group Meetings, conferences and workshops – carried out in 2017 and 2018. It also contains the reports provided by ESFRI to ERAC, concerning the implementation of ERA Priority 2b about Research Infrastructures.

The period 2017-2018 was very intense for ESFRI, involving the full process of elaboration of the Roadmap 2018 which included the *Selection and Evaluation of New Proposals of Research Infrastructures*, the *Monitoring of ESFRI*

Projects, the *Pilot Periodic Review of ESFRI Landmarks* that led to the development of the concept of *Periodic Update of ESFRI Landmarks*, the update of the *Landscape Analysis*. ESFRI also published the *ESFRI Scripta Vol. 2 and Vol. 3*, elaborated responses to previous and novel mandates of the Council of the European Union, and developed an *ESFRI Position on the European Open Science Cloud*.

ESFRI also established one new *ad hoc* Working Group on Monitoring of RIs for addressing the issue of Periodic Update of Landmarks' status that expanded to a broader scope following the 2018 mandate of Council to develop a methodology suitable to address the monitoring of all Research Infrastructures operating in Europe with a pan-European or international scope.

The main achievement of this period was the realisation of the *ESFRI Roadmap 2018* which was officially presented on 11th September 2018 in Vienna during an event hosted by the Federal Ministry of Education, Science and Research, in close cooperation with ESFRI and the European Commission under the Austrian Presidency of the Council of the European Union. The event, also broadcasted on the web, provided an overview of the Roadmap 2018 including the new Projects and Landmarks, the extensive Landscape Analysis, the analysis of the Interconnections among RIs and strategy ele-

ments for the future. In three months the 1.000 printed copies were out and a second batch printing was necessary.

As a follow up on its activities, ESFRI organised a Workshops on *Monitoring of RIs, Periodic Update of Landmarks, use of KPIs* on 19th-20th November 2018 in Milan and planned two workshops on the EOSC/ESFRI interaction – *ESFRI Workshop on RIs and EOSC* – and on the future of ESFRI – *Future Directions of ESFRI* – to be held in January 2019 in London.

With my chairmanship concluding in December 2018, I thank the Executive Board, the ESFRI Forum Delegates, all the members of the ESFRI permanent and *ad hoc* Working Groups for the goals ESFRI pursued with great success. I am grateful to the ESFRI Secretariat at Directorate-General for Research & Innovation and to the StR-ESFRI Project staff for direct support, for playing a key role in the editorial activities and in the Roadmap process, for establishing the network liaisons and dissemination actions, for implementing the *esfri.eu* website and organizing several workshops and events.

A handwritten signature in blue ink, appearing to read 'Giorgio Rossi'.

Giorgio Rossi
ESFRI Chair

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EXECUTIVE SUMMARY

The main achievements for ESFRI in 2017 and 2018 were the realisation of the ESFRI Roadmap 2018 with the Selection and Evaluation of New Proposals of Research Infrastructures, the Monitoring of ESFRI Projects and the discussion on the concept of the Periodic Update of Landmarks in the complex context of the Landscape Analysis, an intense activity of workshops and editing of the ESFRI Scripta volumes on Long-Term Sustainability of RIs and on Innovation-oriented cooperation of RIs, the definition of the ESFRI Position on EOSC, the launch of the new *ad hoc* Working Group on Monitoring of RIs and the election of the new Chair for a two-plus-one year mandate with the goal of delivering the next Roadmap update in 2021.

The *Selection and Evaluation of New Proposals of Research Infrastructures* to be included in the Roadmap 2018 engaged the Strategy Working Groups (SWGs), the Implementation Group (IG) and the Executive Board (EB) for several months, as the evolving landscape and the opening of novel opportunities challenged the methodology.

A substantial work went into the elaboration of the *Landscape Analysis* that evolved from the descriptive survey of 2016 in an analytical effort to capture the potential of *multi-messenger* approach to all disciplines to identify the interconnections of the RIs from different research domains, and the transversal activities that involve all RIs.

The *ESFRI Roadmap 2018* was officially presented on 11th September 2018 in Vienna during an event hosted by the Austrian presidency, back to back with the ICRI 2018 conference. The Roadmap printed volume included the new *Projects* and *Landmarks*, the extensive *Landscape Analysis*, the analysis of the Interconnections among RIs and strategy elements for the future. In three months the 1.000 printed copies were out and a second batch printing was necessary.

The new mandates of the Competitiveness Council prompted ESFRI to elaborate an *ESFRI Position on EOSC* and to engage in an intense discus-

sion with the European Commission on this issue, as well as to discuss in the Forum and in dedicated workshops the items of the *Periodic Update of Landmarks* and the *Monitoring of Research Infrastructures*.

After publishing the Roadmap 2018, a reflection on the evolution of the ESFRI MoS (ESFRI Monitoring System) informatics support to the Forum did combine with the decision of strengthening the cost analysis of the RIs throughout their lifecycle, also acquiring services from consultants on how to effectively collect information and formulate relevant financial figures for better transparency on RI's costs.

ESFRI started a strategic reflection on its future role. The decision to fix the next Roadmap update in 2021 was consequent to the evidence of the amount of work needed for the procedure, which may limit ESFRI on other activities prompted by the Council mandates and by its own strategic view, as well as on the consideration that two-years cycles, as followed lately to fulfil the 10-years rule of residency of projects, turned out to be tight also for the mature formulation of new proposals.

The concept of two dedicated workshops on the interaction of ESFRI and the EOSC and on the strategy for the *Future of ESFRI* was established, and the decision was taken to hold those

early in 2019, under the new chairmanship.

ESFRI | ACTIVITIES

STRATEGY REPORT AND ROADMAP 2018

In the meeting of **27th May 2016** on *FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges*, the Competitiveness Council “ACKNOWLEDGES the efforts made by ESFRI to further prioritise Research Infrastructure projects on the ESFRI Roadmap, WELCOMES the identification of ESFRI Landmarks, RECOGNISES their continued strategic role in driving scientific excellence and innovation in Europe and CALLS on ESFRI to closely monitor the implementation of ESFRI Projects, to periodically assess the scientific status of ESFRI Landmarks, and to prepare the next ESFRI Roadmap update in 2018”¹.

To accomplish this mandate, ESFRI has undertaken a process that officially started in October 2016 with the presentation of the updated framework during the International Conference on Research Infrastructures 2016 (ICRI 2016) in Cape Town (South Africa), reinforced in January 2017 with the InfoDay in Málaga (Spain) and completed in September 2018 with the presentation of the Roadmap 2018 in Vienna.

Following the publication of the Roadmap 2016, ESFRI reaffirmed its commitment in implementing the full evaluation methodology, as for the Roadmap 2016, in order to identify the most relevant and promising new RIs – or major upgrades of existing ones – covering all scientific areas.

1. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16
<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

On **4th and 5th October 2016**, ESFRI launched the process that led to the Roadmap 2018 update during ICRI 2016 that took place in Cape Town. The event, also broadcasted online, provided the international community with the rationale for the update and an overview of the methodology that ESFRI adopted for the *Selection and Evaluation of New Proposals of Research Infrastructures* and the *procedure of Monitoring of ESFRI Projects* that qualified ESFRI Projects reaching the 10-year term as ESFRI Landmarks. ESFRI performed also the *Pilot Periodic Review of ESFRI Landmarks* that led to the development of the concept of the *Periodic Update of Landmarks* towards the identification of opportunities for integration and internationalisation of the Research Infrastructures portfolio.

On that occasion, ESFRI informed the audience that a dedicated Information Day, followed by an Exchange of Experience Workshop, was going to be organised in January 2017 in Málaga by the Spanish Delegation in close cooperation with the European Commis-

sion and the StR-ESFRI Project. On **17th January 2017**, during the Information Day, ESFRI presented the Methodology described in the Public Roadmap 2018 Guide².

Continuing its incubator role, ESFRI organizes the **Selection and Evaluation of New Proposals**, leading to the identification of additional RIs of strategic importance for Europe. The deadline for online *Submission of New Proposals* expired on **31st August 2017**. In September, the EB checked each proposal for eligibility and proposed attribution to the leading Strategy Working Group. Proposals carrying a prominent impact across multiple domains were attributed also to a second SWG. In addition, as projects with dominant, or substantial, digital Research Infrastructure character were submitted, ESFRI decided to establish a new Strategy Working Group on Data, Computing

2. **ESFRI Public Roadmap 2018 Guide**
https://ec.europa.eu/research/infrastructures/pdf/esfri/esfri_roadmap/esfri_rd2018_guide_for_applicants.pdf

and Digital Research Infrastructures – the DIGIT SWG.

The twelve submitted proposals were all eligible and underwent the two parallel and independent evaluation processes run by SWGs and the Implementation Group, also involving around 80 external experts. Based on their analysis, the Forum concluded that one proposal did not meet the minimal requirements to be considered as potential candidate for the Roadmap 2018. In **January 2018**, the remaining eleven proposals were invited to dedicated hearing sessions during which the proposals' Coordinators addressed and discussed the issues identified in the first stage of the evaluation. After the hearings, the SWGs and IG finalised their analysis and drafted a joint evaluation report for each proposal.

According to the ESFRI Roadmap 2018 Guide, a threshold score High on both scientific excellence and maturity is needed for considering the inclusion of a proposal in the Roadmap. In case of nine proposals the SWGs and the IG agreed on a common conclusion: four passed the criteria for inclusion and five did not meet the minimal requirements. In case of two proposals a common position could not be reached. Based on these inputs, the EB assessed the strategic value of the four proposals evaluated for inclusion, considering their role in filling gaps and overall reinforcing the Roadmap. The EB also discussed the two non-harmonised proposals, as both met the scientific excellence criterion and addressed important strategic needs of the European scientific community. This led to the recommendation of six new entries in the ESFRI Projects list that was adopted on **28th-29th June**

2018 during the **65th ESFRI Forum Meeting in Corfu**.

Ample discussion in the Forum also led to identifying two high strategic potential areas for development of Research Infrastructures in the field of Social & Cultural Innovation: the area of *religious studies* and that of *digital services for open science* as described in a dedicated page in the Landscape Analysis.

At the same time ESFRI developed a comprehensive methodology for the **Monitoring of ESFRI Projects** already on the Roadmap. The monitoring process involved an evaluation of the evolution and actualization of the scientific case as well as assessment of the progress of the projects towards implementation, including the commitment of an established international consortium of owners, agreement on the budget for the construction phase and a solid concept for the governance model and financing the whole lifecycle of the infrastructure. Those projects that failed to achieve implementation within the ten-year period were removed from the Roadmap, fostering further prioritisation of RI investments in Europe. Projects that successfully reached the Implementation Phase were further considered for the Landmark status.

The **Monitoring of six ESFRI Projects 2010** – EU-SOLARIS, MYRRHA, Wind-Scanner (ENE); AnaEE, ISBE, MIRRI (H&F) – was carried out in **Spring 2017** with questionnaires addressing generic and specific aspects of the scientific case and progress towards implementation. Based on their analysis, the SWGs and IG developed final reports with outcomes presented on **19th September 2017** during the **62nd ESFRI Forum Meeting in Brussels** where the

Delegates took note of conclusions and recommendations thus approving them by written procedure by **29th September 2017**.

The **Monitoring of nine ESFRI Projects 2008** – ECCSEL ERIC (ENE); EISCAT_3D, EPOS, SIOS (ENV); EMBRC ERIC, ERINHA, EU-OPENSREEN ERIC, Euro-Biolmaging (H&F); CTA (PSE) – was carried out in **Spring 2017** with questionnaires addressing generic and specific aspects of the scientific case and progress towards implementation. Based on their analysis, the SWGs and IG identified several critical questions about each Projects 2008, and then liaised to achieve a common list of issues. In **January 2018**, all nine ESFRI Projects 2008 were invited to dedicated hearing sessions during which the RIs' Coordinators addressed and discussed the issues. After the hearings, the SWGs and IG reached their conclusions and drafted a joint evaluation report for each project. The SWG and IG Chairs harmonised the results of the monitoring, and the Executive Board formulated the recommendation to the Forum to award the status of ESFRI Landmark to eight of the ESFRI Projects 2008. One project – SIOS – did not reach the pan-European dimension that is required to be an ESFRI Landmark. SIOS is described in the Landscape Analysis but it is not listed anymore as ESFRI RI. The outcomes were presented on **21st March 2018** during the **64th ESFRI Forum Meeting in Sofia** where the Delegates approved conclusions and recommendations on ESFRI Projects 2008 to become Landmarks.

In addition to this, responding to the invitation of the Competitiveness Council, ESFRI also launched a pilot exercise with four ESFRI Landmarks to explore the ways of effective

monitoring of RIs which are already implemented or under construction. The **Pilot Periodic Review of ESFRI Landmarks** addressed the evolution and actualization of the scientific case and the RI implementation, at the same time identifying their main long-term sustainability challenges. This exercise helped in developing a concept for the update of the Landmarks status to feed into a comprehensive and robust methodology for the periodic review applicable to all Landmarks in the future together with clear and well accepted criteria.

The position of all ESFRI Research Infrastructures in the European research landscape has been sketched and understood in the framework of the updated **Landscape Analysis** – with global perspective – across the science domains. The ESFRI Roadmap process now incorporates the necessary steps to further strengthen the RI ecosystem in the years to come. ESFRI will continue to update its roadmap periodically, offering opportunities to new projects in all fields of science.

The **fifth Strategy Report and ESFRI Roadmap 2018** was adopted in its current form containing three parts comprising the Strategy Report, the Landscape Analysis, and the Projects and Landmarks on **28th-29th June 2018** during the **65th ESFRI Forum Meeting in Corfu**.

The ESFRI Roadmap 2018 was officially presented on **11th September 2018** at Aula der Wissenschaften in Vienna under the Austrian Presidency in close cooperation with ESFRI and the European Commission. The event, also broadcasted on the web, provided an overview of the Roadmap 2018, that was distributed in hard copies and

made available for consultation or download on the dedicated websites.

The complete document can be consulted by downloading a pdf, by browsing a mini-site via an entry page hosted at the esfri.eu website. The ESFRI Roadmap 2018 is also available for downloading from the [European Commission](http://ec.europa.eu) website³.

The Roadmap 2018 displays the ESFRI Landmark portfolio of 37 long-term engagements in all fields of science and 18 ESFRI Projects, with 6 new entries in the Energy, Environment, Health & Food and Social & Cultural Innovation domains.

3. **ESFRI Roadmap 2018**, August 2018
<http://roadmap2018.esfri.eu>
https://ec.europa.eu/info/files/esfri-roadmap-2018_en

In response to the invitation by the EU Council to ESFRI to “[...] closely monitor the implementation of ESFRI Projects, to periodically assess the scientific status of ESFRI Landmarks, and to prepare the next ESFRI Roadmap update in 2018”, the Roadmap 2018 is made of three parts, devoted to different aspects:

- **PART 1** presents the features of the ESFRI Roadmap 2018 with emphasis on development of the RIs landscape reinforcing critical areas of competitiveness of European research. The list of *18 ESFRI Projects and 37 ESFRI Landmarks* is presented: each RI is identified by acronym, full name, type of RI, legal status, year of entry in the Roadmap, year of expected start of operation and estimated costs. This part also includes an analysis of the evolving role of the RIs, which reflects the specific mandates from the Eu-



LAUNCH OF THE ESFRI ROADMAP 2018 – 11th September 2018, Vienna (Austria)

From the left: Barbara Weitgruber (Director General for Scientific Research and International Relations, Austrian Federal Ministry of Education, Science and Research), Giorgio Rossi (ESFRI Chair), Jan Hrušák (ESFRI Vice-Chair), Jean-David Malo (Director for Open Innovation and Open Science, Directorate-General for Research & Innovation, European Commission).

European Council to address the FAIR – Findable, Accessible, Interoperable, Reusable – data principles and e-Infrastructure, the Long-Term Sustainability and the benefits for innovation. ESFRI summarises the applied Methodology and introduces the challenges for its future refinement based on the lessons learnt during this Roadmap exercise. The background of ESFRI and its history over the last 16 years complete PART 1.

- **PART 2** is the *Landscape Analysis* that provides the current context of the most relevant Research Infrastructures that are available to European scientists and to technology developers typically through peer review of competitive proposals. The unique contribution played by the ESFRI RIs in all scientific domains is analysed along with the interconnections and cross-cutting aspects of the whole European RIs ecosystem.

The *Landscape Analysis* is an indicative reference document central to ESFRI Methodology and does not represent, in any way, the view and prioritisation of ESFRI, nor any national financial and political commitment.

The *Landscape Analysis* is organised in three sections:

- **SECTION 1** consists of six chapters – one per scientific domain – and describes the state of play of all Research Infrastructures in the corresponding thematic area, their contributions to support frontier research and to provide key data necessary to address the *Grand Challenges*.
- **SECTION 2** is an all-new analysis effort to render explicit the relevant connections that already exist

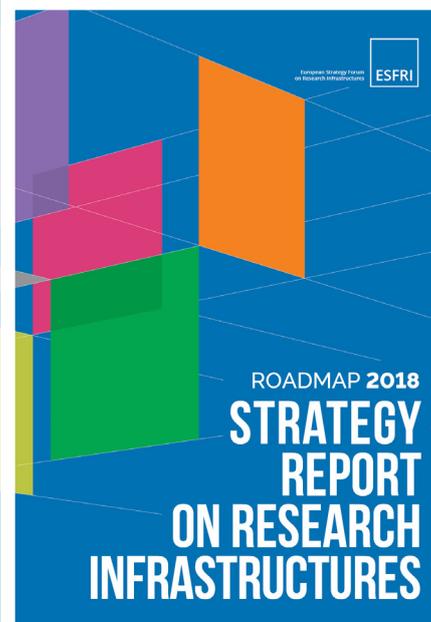
among different thematic areas by means of the ESFRI RIs, and to identify the critical needs and opportunities for new links and new research practices.

- **SECTION 3** describes the state of play of Research Infrastructures in addressing transversal issues like education and training, needs for digital infrastructure, contribution to innovation along with the horizontal analyses like socio-economic impact, territorial impact, pan-European and global dimensions that are carried out by all RIs.

The LA indicates also *High Strategic Potential Areas of Research in the field of Social & Cultural Innovation* that resulted from the Roadmap preparation work.

- **PART 3** describes – through dedicated cards – each ESFRI Project and each ESFRI Landmark. A short description of the RI is given as well as updated information on the legal status, the timeline for construction/operation, and the estimated costs. The information on the political support to ESFRI RIs, expressed by Governments of Member States and Associated Countries – e. g. Lead country, Member country or Prospective Member country – is validated by the corresponding ESFRI Delegations.

As a follow-up, on **30th November 2018** the Competitiveness Council on *Governance of the European Research Area* "[...] WELCOMES the Strategy Report and the ESFRI Roadmap update of 2018, and INVITES ESFRI to prepare the next ESFRI Roadmap update in 2021, strengthening its strategic role in the evolving Research Infrastructure landscape"⁴.



COVER PICTURE OF THE ROADMAP 2018

4. **Conclusions of the Council of the European Union of 30 November 2018** on Governance of the European Research Area. Doc. 14989/18
<https://data.consilium.europa.eu/doc/document/ST-14989-2018-INIT/en/pdf>

COORDINATION OF MEMBER STATES' INVESTMENT STRATEGIES IN e-INFRASTRUCTURES

In the meeting of **29th May 2015** on *Open, data-intensive and networked research as a driver for faster and wider innovation*, the Competitiveness Council "INVITES ESFRI to explore mechanisms for better coordination of Member States' investment strategies in e-Infrastructures, covering also HPC, distributed computing, scientific data and networks"⁵.

To respond to the invitation by the Council, ESFRI established an *ad hoc* Working Group to prepare input for ESFRI on how to address the Council conclusions. Based on the report from the Working Group, ESFRI adopted the recommendation on **9th December 2016** during its **59th ESFRI Forum in Brussels** and then transmitted to the EU Council.

On **20th February 2017**, the EU Council approved the *ESFRI recommendation on coordination of Member States' investment strategies* in e-Infrastructures recognizing ESFRI as a Strategy hub of funders.

ESFRI RIs, along with the many other RIs that are internationally open, are unique in assuring a robust quality control on the scientific data to be managed accordingly to the FAIR principles and on the related data services.

ESFRI Landmarks and Projects are Research Infrastructures producing scien-

tific data that are used by highly competitive and broad research communities covering most areas of research. ESFRI RIs are evaluated, selected, monitored and reviewed with much emphasis on their e-Infrastructure component that is considered a basis for excellent science and excellent data services to the broadest community.

ESFRI RIs, in general, already implement FAIR and Reproducibility criteria of the data and operate open access portals and Data Management Plans (DMPs) in tune with their user communities. ESFRI RIs of all domains can engage in providing data quality check and in monitoring the persistence of data integrity in a way that will give to the EOSC the necessary robustness in terms of high-quality data products and services.

Furthermore, ESFRI RIs can help to cover hitherto unstructured areas and contribute towards the development of European Open Science (Data) Commons. By favouring the exploitation of the most advanced and well documented data sets – metadata and data analysis support services developed by ESFRI RIs – a robust environment favouring interdisciplinarity shall be developed. RIs can contribute

to make DMPs more homogeneous in each domain and to address near-neighbour domains.

On this background and through extensive discussion, ESFRI formulated a position on EOSC that has been communicated to the EC in **January 2018** (see **ESFRI POSITION ON EOSC**).

5. **Conclusions of the Council of the European Union of 29 May 2015** on *Open, data-intensive and networked research as a driver for faster and wider innovation*. Doc. 9360/15
<http://data.consilium.europa.eu/doc/document/ST-9360-2015-INIT/en/pdf>

ESFRI POSITION ON EOSC

ESFRI welcomes the EOSC initiative that identifies an ambitious and very important goal with structuring impact on European science and beyond.

1. ESFRI IS A STRATEGY HUB OF FUNDERS

The ESFRI Forum has been created by the European Council to develop and support a coherent and strategy-led approach to policy-making on Research Infrastructures in Europe. It represents 28 MS and 12 AC. It acts upon mandates by the Council as STRATEGY HUB OF FUNDERS of Research Infrastructures of pan-European interest and elaborates a Roadmap of the RIs to be funded as new initiatives (ESFRI Projects) or as consolidated strategic undertakings (ESFRI Landmarks). It has received in 2015 the mandate to "explore mechanisms of better coordination of Member States' investment strategies in e-Infrastructures, covering also HPC, distributed computing, scientific data and networks". Also with respect to this specific broad mandate ESFRI acts as STRATEGY HUB OF FUNDERS for the e-Infrastructures of pan-European strategic interest.

ESFRI considers that ensuring convergence of strategies and implementation actions with EOSC is a priority.

A close and effective collaboration between EOSC and ESFRI Forum is needed and must be structured at the proper level.

ESFRI has responsibility regarding FAIR, Reproducibility and Openness of Data of the Research Infrastructures (Landmarks and Projects, inspiring also other national/international RIs) that absorbs a sizeable fraction of the whole European effort in RIs. EOSC will mobilize important resources and will federate national data systems also enabling new actors to foster the data interoperability and multi/interdisciplinary research.

A continuous dialogue between ESFRI and EOSC at the strategy level as well further collaboration at all levels of implementation will ensure and enhance synergies and will effectively promote convergence to advanced Commons.

2. ESFRI – AND OTHER INTERNATIONALLY OPEN – RIs ARE UNIQUE IN ASSURING A ROBUST QUALITY CONTROL ON SCIENTIFIC DATA TO BE OPENED

ESFRI Landmarks and Projects are Research Infrastructures producing scientific data that are operated by highly competitive and broad research communities covering most areas of research. ESFRI RIs are evaluated, selected, monitored and reviewed with much emphasis on their e-Infrastructure as an element for excellent science and excellent data services to the broadest community. ESFRI RIs are amongst the key pillars of research that already perform quality check on the open access data and have data management plans agreed by the users.

ESFRI RIs of all domains can engage in providing data quality check and in monitoring the persistence of data quality and integrity to release to the EOSC the necessary robustness of data products and services.

3. EOSC SHOULD ADOPT A SUBSIDIARITY AND PARTICIPATORY PRINCIPLE

EOSC should recognize and take full advantage from the well performing data management plans (DMPs) and practices as developed by ESFRI RIs that already implement FAIR and Reproducibility criteria of the Data and operate open access portals. EOSC should favour the participation of the RIs to the elaboration of Commons to serve as key elements of the EOSC. The acronym should actually become, or be generally understood as, European Open Science (Data) Commons.

4. EOSC SHOULD FILL THE GAPS OF UNSTRUCTURED AREAS

EOSC should play a significant role in raising to the most advanced level the science domains that have unsatisfied e-needs. EOSC should transparently display which and where services already exist, and help to develop metadata standards for overall progressive alignment of different domains and their increasing integration.

5. EOSC SHOULD ENABLE HIGH LEVEL INTERDISCIPLINARITY

EOSC should contribute to develop a robust environment to promote INTERDISCIPLINARITY by favouring the exploitation of the most advanced and documented data sets by advanced metadata and data analysis support services.

6. EOSC SHOULD MAKE HIGH LEVEL INTEROPERABILITY POSSIBLE AND WORKABLE

The great goal of INTEROPERABILITY is the most EOSC specific of all. RIs can contribute to make Data Management Plans (DMPs) more homogeneous in each domain and to address near-neighbour domains, but the general picture of cross-domain interoperability needs the EOSC action at European/international level. In this respect, the role of EOSC in facilitating and improving interoperability of existing well-developed data systems – including those of RIs – and guiding development of interoperable data systems in unstructured areas is crucial and irreplaceable. The INTEROPERABILITY is a long term goal to which the existing sectorial best practises can contribute, but should not be perturbed as far as they are the operational best existing model and system.

As a follow up, in the EU Council Conclusions of **29th May 2018** on *European Open Science Cloud*, the Competitiveness Council "[...] CALLS on the Commission to make optimal use of ongoing projects, existing expertise and knowledge available via existing initiatives, such as ESFRI, eIRG, GO FAIR and others; [...] and RECOMMENDS (EOSC) that effective coordination is established with ESFRI"⁶.

Jan Hrušák – already ESFRI Vice-Chair and elected new ESFRI Chair starting from 1st January 2019 – was appointed independent expert of the EOSC Executive Board as announced on **23rd November 2018** during the **EOSC Launch Event in Vienna**, as part of the programme of the Austrian Presidency of the Council of the European Union.

On **30th November 2018** the EU Council on *Governance of the European Research Area* "[...] NOTES the steps taken, including the work of the ERAC Standing Working Group on Open Science and Innovation, towards launching the European Open Science Cloud (EOSC), which constitutes a major milestone to making all research data in the ERA FAIR; STRESSES the need to design a sound governance framework for EOSC in coordination with Member States that empowers the scientific communities and can evolve over time; CALLS upon all involved parties to implement EOSC fully in due time, and NOTES the important role of Research Infrastructures in this context; RECALLS the need for effective coordination between EOSC and ESFRI, including the governance level"⁷.

6. **Conclusions of the Council of the European Union of 29 May 2018** on European Open Science Cloud (EOSC). Doc. 9291/18
https://www.era.gv.at/object/document/4013/attach/CC_EOSC_final.PDF

7. **Conclusions of the Council of the European Union of 30 November 2018** on Governance of the European Research Area. Doc. 14989/18
<https://data.consilium.europa.eu/doc/document/ST-14989-2018-INIT/en/pdf>

LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES

In the meeting of **27th May 2016** on *FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges*, the Competitiveness Council "UNDERLINES the importance of ensuring long-term sustainability of Research Infrastructures and invites the Commission to prepare together with ESFRI and relevant stakeholders a targeted action plan"⁸.

ESFRI has addressed RIs sustainability since its creation, but a systemic approach was taken up in response to the Competitiveness Council request. ESFRI decided to establish an *ad hoc* Working Group with the mandate to provide a set of recommendations that would help to strengthen the Long-Term Sustainability of RIs, and to offer a consolidated input to the dedicated Action Plan to be prepared by the European Commission, focussing on the pre-conditions identified by the consultation launched by the Commission in December 2015. These pre-conditions include maintaining excellence, funding and governance aspects, socio-economic impact as well as the management and exploitation of data and the innovation potential of RIs⁹.

ESFRI had previously developed its concept of lifecycle of the Research Infrastructures in the framework of the Road-

8. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16
<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

9. **EC Stakeholder Consultation Report**.
https://ec.europa.eu/research/infrastructures/pdf/lts_report_062016_final.pdf

map evaluation exercise, and at all stages of the lifecycle different aspects of sustainability were identified. The LTS WG has analysed the Long-Term Sustainability of Research Infrastructures from a broad perspective taking the ESFRI viewpoint well beyond the mere economic analysis. Scientific excellence is the condition *sine qua non* for sustainability throughout the entire RI lifecycle, and its persistence is crucial in the long-term Operational Phase. Excellence in science and outstanding quality services to the users are imperative for the successful performance of each Research Infrastructure, and they are addressed in the monitoring and reviewing processes by ESFRI.

The report on Long-Term Sustainability was first presented to the Forum on **7th March 2017** during the **60th ESFRI Forum Meeting in Lisbon** and then approved in its final version on **21st June 2017** during the **61st ESFRI Forum Meeting in Krakow**, transmitted to the EU Council and then shared with the European Commission to jointly address, with a multifaceted but overall consistent analysis, the mandate of the Competitiveness Council on Long-Term Sustainability of RIs.

The report – released as ESFRI Scripta Vol. 2 in **October 2017** – proposes 7

main recommendations covering the key aspects of Long-Term Sustainability of Research Infrastructures (see **ESFRI RECOMMENDATION ON LONG-TERM SUSTAINABILITY OF RIs**)¹⁰.

These recommendations are expanded into 35 specific points ranging over securing highly qualified and motivated human resources, realizing a robust transfer of information to society from the Research Infrastructure via a quality-controlled e-Infrastructure, building an effective interface between RIs and innovation activities, understanding the actual value of the diverse benefits to society, addressing the optimal governance and management structure and promoting coordination among RIs.

It represents an advanced expert analysis of substantial value on the sustainability issues connected with the large investments associated with Research Infrastructures, but does not represent in any way commitments of the ESFRI Member States and Associated Countries at political or economical level.

10. **Long-Term Sustainability of Research Infrastructures, ESFRI Scripta Vol.2**, October 2017
https://www.esfri.eu/sites/default/files/u4/ESFRI_SCRIPTA_TWO_PAGES_19102017_1.pdf

ESFRI RECOMMENDATION ON LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES

1. Establish and maintain excellence through the entire lifecycle of RIs by all appropriate means, by securing adequate framework conditions, and by opening the RIs up to the world.

2. Ensure that RIs have the right people in the right place at the right time by strengthening and harmonising national research and educational systems to make sure that all essential skills are available.

3. Harmonise and integrate a vision for convergent operation of RIs and e-Infrastructures in Europe to ensure cost-effective service provision to the user communities.

4. Fully exploit the potential of RIs as innovation hubs by incorporating strategies for their development into national and European innovation policies.

5. Set up effective means of determining the economic and wider social value of RIs, and incorporate these benefits into science-policy-society dialogues.

6. Establish adequate framework conditions for effective governance and sustainable long-term funding for RIs at every stage in their lifecycle, together with effective management.

7. Foster broader coordination at National and European levels when designing processes for planning and supporting national and pan European RIs and so enhance their strategic value.

MONITORING OF RESEARCH INFRASTRUCTURES

In the meeting of **29th 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”¹¹.

Given the EU Council mandate, on **28th-29th June 2018** during the **65th ESFRI Meeting in Corfu**, ESFRI decided to establish an *ad hoc* Working Group on *Monitoring of Research Infrastructures*, whose starting point was a dedicated Workshop on *Monitoring of RIs, Periodic Update of Landmarks, use of KPIs*, organised on **19th-20th November 2018 in Milan**.

The workshop explored the rationale and perspectives for developing a common monitoring methodology. In particular, a number of topics posing specific challenges were discussed, such as merits and limits of Key Performance Indicators, implementation of FAIR+R data principles, EOSC-readiness and their implications on RIs' performance and sustainability as well as harmonisation of RI costs and financial flows reporting throughout the lifecycle.

The event was concluded with a formulation of a workable way forward for developing a common monitoring methodology, which should first collect evidence from existing processes, in particular those already developed by the Research Infrastructures themselves. A future methodology for the ESFRI Landmarks should include both Key Performance Indicators (KPIs) and Key Impact Indicators (KIs) in order to help RIs optimise their activities, investments and budget. Any method developed should be offered in particular to those RIs that have not yet developed their own, and should be helpful to the ones already established. It was also suggested that the Landmark application could serve as an example, while the final ESFRI paper would include the generalized approach and the specific Landmark update methodology.

11. **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>

ESFRI
**WORKING
GROUPS**



PERMANENT WORKING GROUPS

Since 2006, ESFRI has presented a series of Roadmap updates supporting a coherent and strategy-led approach to the development of pan-European Research Infrastructures, which would ensure that scientists in Europe have access to world-class facilities enabling them to do cutting-edge research.

To this end ESFRI has established the **Strategy Working Groups** in six research domains and the **Implementation Group**, transversal to all research areas. These permanent Working Groups are composed of experts, as indicated and agreed by the Forum.

The Strategy Working Groups are responsible for the analysis of the scientific aspects of the Research Infrastructures – *Evaluation of New Proposals, Monitoring of ESFRI Projects and Periodic Update of ESFRI Landmarks* – in a given field of research as well as for the update of the *Landscape Analysis*.

The Implementation Group is responsible for the analysis of the maturity features of Research Infrastructures – *Evaluation of New Proposals, Monitoring of ESFRI Projects and Periodic Update of ESFRI Landmarks* – in all fields of research.

STRATEGY WORKING GROUPS

Each SWG consists of a number of members nominated by ESFRI Delegations, ensuring complementary expertise and realising an adequate and fair balance of the different scientific communities of Europe in the field. The SWGs – which also include EC representatives and e-IRG experts – are in general chaired by ESFRI Delegates. The SWG Chairs, participate and report regularly to the ESFRI Forum and ESFRI Executive Board meetings.

Six SWGs were active as of December 2018:

DIGIT	Data, Computing and Digital Research Infrastructures
ENE	Energy
ENV	Environment
H&F	Health & Food
PSE	Physical Sciences & Engineering
SCI	Social & Cultural Innovation

In view of the update of the Roadmap 2018, ESFRI mandated its Strategy Working Groups to:

- scout and monitor the general development of the European and Global Research Infrastructures ecosystem in each field by performing a *Landscape Analysis*. Update the LA by identifying the existing relevant RIs open to use by European or full international users and analyse the overall capacity in the given field and the potential for upgrade/increase of quality and capacity connected with these RIs. Identify existing new or on-going projects at national/regional/international level that impact the field and evaluate the overall increase in quality/capacity expected in the

relevant time scale. Identify trends of the evolving use and need of Research Infrastructure in the different domains to address the dynamical aspects of the landscape;

- contribute to the definition of the ESFRI Methodology described in the ESFRI Roadmap 2018 Guide for the *Evaluation of New Proposals*, the *Monitoring of ESFRI Projects* and the *Pilot Periodic Review of Landmarks*;
- evaluate the new proposals in view of their scientific quality and impact on the overall landscape – filling of gaps, upgrading quality or capacity, replacing obsolete RIs, pushing leadership, increasing competitiveness – verify the fulfilment of minimal requirements for the Preparation Phase. Each project evaluated for the science aspects and pan-European relevance by the SWG was also evaluated, in a parallel and independent way, by the IG. The results of both evaluations were harmonized by joint work sessions of SWG and IG to produce an Evaluation Report Summary that provided the relevant information for the ESFRI EB recommendations to the Forum;
- monitor the *ESFRI Projects* that entered the ESFRI Roadmap in 2008 and 2010, fostering their implementation also in view of the ending of their residency on the Roadmap with a successful record of implementation and/or delivery of science results, thus eventually promoting them to the status of Landmark;
- perform, along with the Implementation Group, the Pilot Review of four selected ESFRI Landmarks thus contributing to develop a methodology for the *Periodic Update of Landmarks* and define a few generic key performance indicators;
- contribute to the drafting of the *ESFRI Roadmap 2018*.

DIGIT

DATA, COMPUTING AND DIGITAL RESEARCH INFRASTRUCTURES

ESFRI established the Strategy Working Group on Data, Computing and Digital Research Infrastructures (DIGIT SWG) in **Autumn 2017** as projects with dominant, or substantial, digital Research Infrastructure character were submitted for inclusion in the ESFRI Roadmap 2018.

The DIGIT SWG evaluated the SILECS proposal alone, OPERAS together with the SCI SWG, and DiSSCo with the ENV SWG. The group members – 24 prominent experts in the field of data, computations and digital infrastructures – were distributed in three sub-groups, which evaluated independently the three proposals. No conflict of interest was ensured via e-mail declarations.

The first meeting was a videoconference held on **19th January 2018** to discuss about criteria for evaluating the electronic needs of e-Infrastructures, to select rapporteurs for the forthcoming hearings of the new proposals, to address collaboration with the other SWGs.

The second meeting was organized on **12th September 2018** in Vienna after the launch of the Roadmap 2018. The group discussed: i) the important transition of the e-Infrastructure usage in the ERA, from a *horizontal* (supportive) role to a combined role (*vertical & horizontal*); ii) possible new criteria for inclusion in the application/evaluation forms for the future updates of the

ESFRI roadmaps; iii) the challenges that can occur because of the emergence of *vertical* e-Infrastructures – stand-alone undertakings.

The updated list of members of the DIGIT SWG as of December 2018 is reported in the following table.

DIGIT SWG MEMBERSHIP*

Name

Country

| Chair

PROYKOVA Ana Bulgaria

| Members

ARGYRAKIS Panos e-IRG, Greece

BOE Gunnar Norway

BURGUEÑO Augusto EC Representative

CIUBANCAN Mihai Romania

COPPENS Frederik Belgium

DEMOVIČ Lukáš Slovakia

FOURNIER Johannes Germany

GARDA Patrick France

GENOVA Françoise e-IRG, France

GIRONA Sergi e-IRG, Spain

GOBLE Carole United Kingdom

HERRERA-VIEDMA Enrique Spain

KOPPEL Ivar Estonia

MEYER Norbert e-IRG, Poland

MYLLYMÄKI Petri Finland

PALKOVIC Martin Czech Republic

POWER Kerry Ireland

RUGGIERI Federico Italy

SARACCO Lorenza EC Representative

SVENSSON Gunilla Sweden

TEMIZSOYLU Onur Turkey

VAN RIJN Arjen e-IRG, Netherlands

VAN STEEN Maarten The Netherlands

VERSCHEURE Olivier Switzerland

*Please note that changes in the membership may have occurred during 2017-2018.

ENE

ENERGY

The Strategy Working Group on Energy (ENE SWG) met four times in 2017 and one in 2018 on **29th March 2017, 9th June 2017, 7th September 2017, 22nd November 2017** and **23rd February 2018** in Brussels. Further exchange was organized via e-mail. The following tasks have been performed within that period:

- *Monitoring of ESFRI Projects 2008* – ECCSEL ERIC, resulting in its approval as an ESFRI Landmark. The task comprised the delivery of a monitoring report (in cooperation with IG), preparation of and participation in the project hearing and the formulation of recommendations to the project;
- *Monitoring of ESFRI Projects 2010* – EU SOLARIS, WindScanner and MYRRHA. The task comprised the delivery of a monitoring report (in cooperation with IG) and the formulation of recommendations to the projects;
- *Evaluation of New Proposals* – IFMIF-DONES (in cooperation with IG and including input from PSE SWG) and EU-IBISBA (co-evaluation as input to H&F SWG). The task comprised the delivery of a monitoring report, preparation of and participation in the project hearings and a recommendation to the ESFRI Forum concerning the approval as ESFRI Projects. Both projects have been included in the Roadmap;

- elaboration of the *Landscape Analysis* in the energy field as part of the Roadmap 2018;

- discussion of and contributions to cross-sectional activities, e.g. the elaboration of Sections 2 and 3 of the

Landscape Analysis and the further development of the ESFRI Methodology.

The updated list of members of the ENE SWG as of December 2018 is reported in the following table.

ENE SWG MEMBERSHIP*

Name

Country

| Chair

BOLT Harald

Germany

| Members

ARZBERGER Isolde

Germany

BLAABJERG Frede

Denmark

CÁRABE Julio

Spain

DARIE George

Romania

DEWALLEF Pierre

Belgium

GONÇALVES Helder

Portugal

HAUKSDÓTTIR Steinunn

Iceland

HUSTAD Johan

Norway

JARRAUD Nicolas

Cyprus

JEENINGA Harm

The Netherlands

KURKI-SUONIO Taina

Finland

LISKA Peter

Slovakia

MEALLY Declan

Ireland

MEYER Norbert

e-IRG, Poland

MONTAGNE Xavier

France

OLSSON Lisbeth

Sweden

QUENTAL Nuno

EC Representative

ROBBA Michela

Italy

ROBERTS Roland

Sweden

ROBIN Agnes

EC Representative

ŠARLER Božidar

Slovenia

SMOLINSKI Adam

Polonia

SORIA LASCORZ Enrique

Spain

ŠTEKL Ivan

Czech Republic

TATARAKIS Michael

Greece

TRAN Minh Quang

Switzerland

*Please note that changes in the membership may have occurred during 2017-2018.

ENV

ENVIRONMENT

The Strategy Working Group on Environment (ENV SWG) met five times in 2017 and twice in 2018. Other activities were conducted offline, mainly via e-mail.

The first 2017 meeting was held on **19th January 2017** in Málaga (Spain) and it was concurrent with the InfoDay and 2nd Exchange of Experience Workshop on Monitoring of ESFRI Projects and Landmarks. This meeting was mainly devoted to prepare the work for the Roadmap 2018 process which includes the update of the *Landscape Analysis*, the *Monitoring of Projects 2008*, the *Pilot Periodic Review of Landmarks* and the *Evaluation of New Proposals*. The discussion and the preparation of the work benefitted from the feedback got from the InfoDay event and the EoE workshop.

The second 2017 meeting was held in Brussels on **10th May 2017**. In this meeting the methodology for the Pilot Periodic Review of ICOS ERIC was discussed and the panel of the ENV SWG members for this review was established, identifying a rapporteur. The panels for the monitoring of three Projects 2008 – EISCAT_3D, EPOS and SIOS – were also established, identifying for each group a rapporteur. Further discussion was devoted to the work to be done for the update of the *Landscape Analysis* following the template as provided by the ESFRI EB.

The third 2017 meeting was held on **25th-26th July 2017** in Rome and it was mainly devoted to the preparation of the ENV SWG recommendations for the Projects 2008 to be then discussed with the IG in September. The second part of the meeting was devoted to the Landscape Analysis report and a drafting group with specific responsibilities for each member was identified.

The fourth 2017 meeting was held on **29th September 2017** in Brussels. New proposals for the ESFRI Roadmap 2018 were assigned to the ENV SWG: eLTER and DISSCo. Moreover, the ENV SWG was asked to provide recommendations also for three other new proposals related to the H&F domain: EIRENE, EU-IBISBA and METROFOOD-RI. For each proposal a panel of ENV SWG members and a specific rapporteur was established.

The fifth 2017 meeting was held on **6th-8th November 2017** in Málaga. The regular ENV SWG meeting was held on the 6th and 8th November while the 7th was devoted to a workshop with the ENV RIs. The scope of this workshop was to strengthen the dialogue between ESFRI ENV SWG and ENV RIs, to clarify the ESFRI process for the preparation of the ESFRI Roadmap 2018 and to contribute to the updated *Landscape Analysis*. Common issues and specific aspects were discussed in particular those regarding cross-cutting aspects: innovation, socio-economic impact, IPR and legal issues, *Big Data* and e-needs (including position on EOSC), regional impact, pan-European dimension and global dimension. The first day of the ENV SWG meeting was mainly devoted to discuss the status for the *Evaluation of New Proposals* and of the *Monitoring of Projects 2008*; the last day was devoted to the *Landscape Analysis*

benefitting from the outcome of the workshop with the ENV RIs.

In 2018 the ENV SWG members from each specific evaluation panel participated in the hearings held in January-February in Brussels.

The first 2018 meeting was held on **1st-2nd March 2018** in The Hague. In this meeting the final recommendations for the new proposals and the Projects 2008 were prepared in order to be ready for the harmonization meeting with the IG in March. The progress of the work on the Landscape Analysis report was also discussed.

The second 2018 meeting was held on **8th-9th October 2018** in Naples, after the launch of the Roadmap 2018. This meeting was mainly devoted to the discussion on the new ENV SWG mandate, composition and timeline, and on the future work to be done for improving the methodology for assessing the socio-economic impact for the ENV RIs and how to better follow/monitor the ESFRI Landmarks and Projects. For this reason, three members of the ENV SWG attended the ESFRI Workshop *Monitoring of RIs, Periodic Update of Landmarks, use of KPIs* which was held on **19th-20th November 2018** in Milan.

The updated list of members of the ENV SWG as of December 2018 is reported in the following table.

ENV SWG MEMBERSHIP*

Name	Country
Chair	
PAPPALARDO Gelsomina	Italy
Vice-Chair	
VOLZ Andreas	Germany
Members	
BEGUSCH-PFEFFERKORN Karolina	Austria
DE JONGE Marc	The Netherlands
FIGUEIRA Rui	Portugal
FLAUD Jean-Marie	France
FRIBERG Magnus	Sweden
GAULT Jeremy	Ireland
GIARDINI Domenico	Switzerland
HERNÁNDEZ-BRITO Joaquín	Spain
HODGSON Sophie	United Kingdom
IITAL Arvo	Estonia
IMS Rolf Anker	Norway
JOHANSSON Anna-Maria	EC Representative
KAUPPI Lea	Finland
LYKOUSIS Vasilios	Greece
MAREK Michael	Czech Republic
PILEGAAR Kim	Denmark
PIPAN Tanja	Slovenia
VAN RIJN Arjen	e-IRG, Netherlands
VERREET Gert	Belgium
VULTURESCU Viorel	Romania

*Please note that changes in the membership may have occurred during 2017-2018.

H&F

HEALTH & FOOD

The Strategy Working Group on Health & Food (H&F SWG) met seven times – five in person and two times by teleconference – in 2017 and four times in 2018.

In **2017**, the group concentrated its efforts on the *Monitoring of Projects 2010* – AnaEE, ISBE and MIRRI –, the *Monitoring of Projects 2008* – EMBRC ERIC, ERINHA, EU-OPENSREEN ERIC, EuroBioImaging –, the *Pilot Periodic Review of Landmarks* – ELIXIR –, and the *Evaluation of New Proposals* – ELRENE, EU-IBISBA, METROFOOD-RI –, and updating the Health & Food *Landscape Analysis*.

H&F SWG provided feedback to the ESFRI Forum on the pilot review of Landmarks, having invited ELIXIR at its meeting to discuss this feedback and hear ELIXIR's suggestions:

- the questionnaire should aim to be both qualitative and quantitative to better document – e.g. indicators of usage of the RI. Expansion of the users' section to provide more detail on users, usage and services. A general comment applicable to all Projects and Landmarks: future EC funding in all stages of lifecycle should include the task of conducting surveys as part of the work package on users;
- the process could involve general, non-confidential information on evaluations taking place at national level,

or by the Research Infrastructure scientific advisory board. The Landmark review could benefit from knowing if the RI has undergone recent evaluations at national level or by their own independent advisory boards, which could highlight their excellence and impact. For example, in this case, ELIXIR will make public EXCELERATE mid-term review. This could be very helpful to support H&F SWG review;

- the process could include interviews with the RI, which consist of the central hub and also some national nodes, as well as two main users. H&F SWG members found it very helpful to invite ELIXIR and discuss in detail;
- the process should include 2 external (international) reviewers but for this to work, the questionnaire needs to be more concise, avoid repetition/overlap, and each heading should include an explanatory text. At present, the questionnaire may only be clear to those who are involved in ESFRI (Projects, SWG members, IG members, etc.);
- the review process could be done following the specific strategic and financial cycle of each RI, and not necessarily be done for all RIs at the same time. Review process could take place every 4-5 years.

The *Landscape Analysis* update was built on previous exercises by analysing all latest national roadmaps, and relevant official national strategies in 2017, and by mapping current facilities at pan-EU level and identifying gaps. H&F SWG developed a core text based on this exercise, but also developed its contribution to Section 2 in the Roadmap – Interconnections between domains – and Section 3 – Cross-cutting aspects. The work on Interconnections

between domains was built on previous work exploring Boundary areas between H&F and other ESFRI SWGs, carried out since 2015 and published in ESFRI Roadmap 2016. H&F SWG explored a range of methods to evaluate the socio-economic impact of H&F RIs, using the Benefits Framework as the basis.

In **2018**, H&F SWG performed the evaluation of four Projects 2008 and of three new proposals, by planning, attending and discussing the outcomes of hearings, preparing a summary of final reports, formulating scoring and feedback from hearings for each Project and proposal, and lessons learnt. The peer-review of new proposals involved external reviewers. H&F SWG contacted and followed up over 60 external reviewers over a period of five months, in order to achieve the necessary number of external reports for each Proposal. Other topics were discussed at H&F SWG meetings in 2018, e.g. progress on the *European Open Science Cloud* and EOSC pilot, and its important link to connecting data infrastructures in life sciences.

H&F SWG continued working on its text for the update of the Landscape Analysis, including Section 1 – Core text; Section 2 – Interconnections; and Section 3 – Cross-cutting aspects. Members discussed in more detail areas for effective connections between H&F RIs, and between H&F RIs and RIs in other domains. Within this topic, H&F SWG run an exercise to identify priority areas in terms of readiness, and potential scientific, societal and economic impact, with input from Ilaria Nardello, current BMS Board Chair representing all 16 H&F RIs, and Niklas Blomberg, coordinator of EC-funded cluster project CORBEL and Director of ELIXIR, who presented

CORBEL work on developing common approaches and standards for data integration across scientific domains, and new EOSC cluster project EOSC-Life.

At its last meeting, H&F SWG discussed its programme of work for **2019**, the impact of ESFRI Health & Food Research Infrastructures, future opportunities, and potential new proposals to ESFRI Roadmap 2021. Members also started discussing ESFRI Roadmap 2021, their perspectives and forward look from H&F SWG. The discussion included lessons learned, contribution from H&F SWG to ESFRI Roadmap 2018, strategic objectives of ESFRI beyond 2021, and ESFRI role in the international context.

The updated list of members of the H&F SWG as of December 2018 is reported in the following table.

H&F SWG MEMBERSHIP*

Name

Country

Chair

PASTORI Gabriela

United Kingdom

Vice-Chair

ANVRET Maria

Sweden

Members

BAKKER Martijntje

The Netherlands

BANCI Lucia

Italy

BJÖRKROTH Johanna

Finland

DE ANDRES MEDINA Rafael

Spain

DE FROIDMONT-GOERTZ Isabelle

EC Representative

FICHNA Jakub

Poland

GIRONA Sergi

e-IRG, Spain

GUITTET Eric

France

JESPERSEN Jørgen

Denmark

KOLLIAS George

Greece

LÆGREID Astrid

Norway

LEPROULT Rachel

Belgium

LOHMANN Karin

Germany

MLINARIČ-RAŠČAN Irena

Slovenia

MURPHY Helen

Ireland

NOVÁK Michal

Slovakia

OZGOREN Murat

Turkey

POPA Mona Elena

Romania

RIBEIRO Margarida

EC Representative

SEDLÁČEK Radislav

Czech Republic

XENARIOS Ioannis

Switzerland

*Please note that changes in the membership may have occurred during 2017-2018.

PSE

PHYSICAL SCIENCES & ENGINEERING

The Working Group on Physical Sciences & Engineering (PSE SWG) met physically five times over the period 2017 to 2018. In addition, some important part of the activity of the PSE WG was conducted electronically, either by email or teleconference. The activity of the year 2017 started with the briefings in Málaga (Spain), during the launch event of ESFRI Roadmap 2018 process, in particular with the monitoring of ESFRI project CTA.

The first meeting was held on **24th March 2017** in Madrid, the two main points were the definition of the subgroups in charge of the *Landscape Analysis*, the *Monitoring of Projects 2008* and the *Pilot Periodic Review of Landmarks*, CTA and SPIRAL2 respectively. The membership of each subgroup together with their tasks was decided, a visit to SPIRAL2 site was also proposed. The visit took place in May 2017 and was a very satisfactory experience from both parts (visit group and facility). The subgroups held several teleconference meetings with the aim of writing a first draft of LA.

In the second meeting on **7th September 2017** in Madrid, the reports by each subgroup were presented and discussed, whether the reports on CTA and SPIRAL2 were presented and approved. The PSE WG Chair informed that three new proposals applied to enter the Roadmap 2018, two in the domains of PSE – EuroNanoLab,

EuroStrain – and one actually falling in the domain of ENE – IFMIF-DONES. Nevertheless, from the technical point of view, all the three proposals were evaluated by the PSE SWG, including the ENE one. In this later case, PSE SWG submitted the technical evaluation of the Physics and Engineering aspects and the rest of elements were done by the ENE SWG. Three groups were formed to conduct the evaluation process. Many teleconferences followed, to decide on the external referees participating in the review of the proposals, to draft the reports and the questions to be addressed at the hearings that finally took place in **January 2018** in Brussels. In parallel, CTA managers decided to undergo the monitoring process to eventually become a Landmark. The subgroup from PSE responsible of the report on CTA also prepared the questions to be addressed to CTA in the hearings that also took place in January 2018 in Brussels.

The third meeting was held on the **22nd February 2018** in Brussels, the members of the PSE were informed on the hearing process that involved the new proposals EuroNanoLab and EuroStrain, and the possible promotion of CTA to Landmark.

The fourth meeting was held on **31st May 2018** in Brussels. The PSE SWG Chair informed on the status of the new proposals and the promotion of CTA to Landmark, the meeting was mainly devoted to the last discussion of the LA draft before submitting it to the Executive Board. Also, the evaluation reports for the two PSE SWG proposals – EuroNanoLab, EuroStrain – were discussed in the final form and approved by the group.

Finally, the fifth meeting was held on **12th November 2018** in Brussels. The discussions were concentrated on the implementation of Key Performance Indicators for the Research Infrastructures in a long-term approach (along the lifecycle of the RI), as well as the reorganization of the PSE SWG in order to describe properly the area of Science of Engineering, inside the expertise of PSE SWG. In this spirit of discussion, at least five members of the PSE SWG participated at the ESFRI Workshop *Monitoring of RIs, Periodic Update of Landmarks*, use of KPIs on **19th-20th November 2018** in Milan.

The updated list of members of the PSE SWG as of December 2018 is reported in the following table.

PSE SWG MEMBERSHIP*

Name

Country

| Chair

MARTÍNEZ PENA José Luis

Spain

| Members

ABELA Rafael

Switzerland

ANTIČIĆ Tome

Croatia

BIESIADA Marek

Poland

CEH Milan

Slovenia

FAGAS Georgios

Ireland

GENOVA Françoise

France

GHITA Dan Gabriel

Romania

GONÇALVES Bruno

Portugal

HARRISON Andrew

United Kingdom

HOOIJER Christa

The Netherlands

HUOTARI Simo

Finland

KENZELMANN Michel

Switzerland
(from November 2018)

KLOO Lars

Sweden

KOLEVA Mina

EC Representative

LÉVAI Peter

Hungary

LYNOV Jens-Peter

Denmark

MATHON Marie-Hélène

France

NAKADA Tatsuya

Switzerland

PETRILLO Caterina

Italy

RAMÍREZ Rafael

Spain

TEMST Kristiaan

Belgium

TRÁVNÍČEK Petr

Czech Republic

VAN SAARLOOS Wim

The Netherlands

WOLF Frank

Germany

ZOCCOLI Antonio

Italy

Name

Country

| Observers

BUTTERWORTH Jonathan

CERN

ELSEN Erckhard

CERN

GIANOTTI Fabiola

CERN

IVISON Rob J.

ESO
(from November 2018)

LEWITOWICZ Marek

NuPECC

MASIERO Antonio

APPEC

MEYER Uwe

JINR

PESCHKE Christoph

DLR

RUSAKOVITCH Nikolai

JINR

*Please note that changes in the membership may have occurred during 2017-2018.

SCI

SOCIAL & CULTURAL INNOVATION

The Strategy Working Group on Social & Cultural Innovation (SCI SWG) met twice in 2017 and three times in 2018. Other activities were conducted offline, mainly via e-mail.

The first 2017 meeting was held on **18th May 2017** in Brussels. This meeting focussed on exchanges about national roadmaps, on discussions about the best ways of involving more European countries in the SWG and on the idea of organizing a European conference about the impact of Research Infrastructures. Nevertheless, the main part dealt with the preparation of the update of *Landscape Analysis*, the *Pilot Periodic Review of Landmarks* and the *Selection and Evaluation of New Proposals*.

The second 2017 meeting was held on **14th September 2017** in Brussels. This meeting, which welcomed new MS/AC representatives (DE, FI, PL), was devoted to the organization of the Impact Conference in Bologna in January, to the presentation, discussion and approbation of the SCI SWG contribution to the new ESFRI *Landscape Analysis* and to the *Selection and Evaluation of New Proposals*.

The first 2018 meeting was held on **24th January 2018** in Bologna and mainly devoted to the finalization of the SCI SWG *Landscape Analysis* and to its *Evaluation of New Proposals*.

This meeting was immediately followed by the [International Conference on the Impact of Research Infrastructures in Social and Sciences Humanities](#) on **24th-25th January 2018**, organized by the SCI SWG in collaboration with the *Fondazione par le scienze religiose Giovanni XXIII in Bologna*. The main motivation for this conference was the growing consensus that it is important to be able to assess the value of Research Infrastructures, not only for scientific research, but also for the society at large. Currently, there is no unified framework for the impact assessment of investment in Research Infrastructures. Various conceptual frameworks exist in parallel comprising a range of observable direct and indirect effects and longer-term impacts, in particular economic impacts. However, most of these studies and frameworks do not concentrate on Social Sciences and Humanities. SSH Research Infrastructures are the most proper tool to take into account the future of society. Their experiences and variety stress the impact of SSH RIs beyond research: it affects the vision of decision makers and social actors. Furthermore, core aspects of RI benefits, such as their impact on human and social capital formation and innovation, are not sufficiently explored. This conference aimed to address this deficiency and to discuss the broad scale of types of impact and methodologies for their assessment.

The conference, to which the Chairs of the other ESFRI SWGs were invited, had three main subtopics:

- analysis of the varieties of impact, beyond scientific impact strictly speaking;
- recent developments in the metrics of impact in its varieties;

- ways of increasing impact of Research Infrastructures.

The proceedings of this conference was published at the beginning of 2019 under the title *STAY TUNED TO THE FUTURE - Impact of Research Infrastructures for Social Sciences and Humanities* (Bente Maegaard & Riccardo Pozzo eds., *LESSICO INTELLETTUALE EUROPEO*, Bologna).

The second 2018 meeting of the SCI SWG was held on **31st May 2018** in Brussels. After a presentation of the state of affairs concerning the SSH projects submitted to ESFRI Roadmap, the meeting was mainly devoted to the follow-up of the Bologna Impact Conference – editorial process of the proceedings, consequences to be drawn from the ongoing reflection – and to the examination of the final version of the *Landscape Analysis*.

The third and last 2018 meeting, held on **4th October 2018** in Brussels, was focused on the outputs of the recent ESFRI Roadmap exercise, on a collective reflection to find new ways of collective work in the Group, and to the call for candidates launched by ESFRI for new Chairs of the SWG.

The updated list of members of the SCI SWG as of December 2018 is reported in the following table.

SCI SWG MEMBERSHIP*

Name	Country
Chair	
DUBUCS Jacques	France
Members	
ARGYRAKIS Panos	e-IRG, Greece
CONSTANTOPOULOS Panos	Greece
DEBOOSERE Patrick	Belgium
DIJKSTRA Alice	The Netherlands
DOOLEY Brendan	Ireland
EDLING Christofer	Sweden
HENRICHSEN Bjørn	Norway
HOFFERT Elena	France (from November 2018)
KENESEI István	Hungary
KREJČÍ Jindřich	Czech Republic
LAAKSO Liisa	Finland
LUTZ Georg	Switzerland
MAEGAARD Bente	Denmark
MALNAR Brina	Slovenia
OROSOVA Olga	Slovakia
PUHL Johanna	Germany (deputy)
REITER-PÁZMÁNDY Matthias	Austria
SARKAR Ranjana	France
SCHINDEL Klaus	Germany
STEFANIZZI Sonia	Italy
THEOPHILATOU Maria	EC Representative
URBAŃCZYK Przemysław	Poland
WOOLLARD Matthew	United Kingdom

*Please note that changes in the membership may have occurred during 2017-2018.

IMPLEMENTATION GROUP

The IG consists of the Chair, five to nine ESFRI Delegates, an expert of e-IRG and a representative of the European Commission. The IG activities are supported by external experts appointed for specific tasks.

In view of the forthcoming update of the Roadmap 2018, ESFRI mandated its Implementation Group to:

- contribute to the definition of the ESFRI Methodology described in the ESFRI Roadmap 2018 Guide for the *Evaluation of New Proposals*, the *Monitoring of ESFRI Projects* and the *Pilot Periodic Review of Landmarks*;
- assess the maturity of new proposals in view of their inclusion in the Roadmap 2018. Each project evaluated for the science aspects and pan-European relevance by the SWG will also be evaluated, in a parallel independent way by the SWGs. The results of both evaluations were harmonized by joint work sessions of SWG and IG to produce an Evaluation Report Summary that provided the relevant information for the ESFRI EB recommendations to the Forum;
- monitor the *ESFRI Projects* that entered the ESFRI Roadmap in 2008 and 2010, for promoting their implementation also in view of the ending of their residency on the Roadmap with a successful record of implementation and/or delivery of science results, thus eventually promoting them to the status of Landmark;
- perform, along with the Strategy Working Groups, the Pilot Review of four selected ESFRI Landmarks thus contributing to develop a methodology for the *Periodic Update of Landmarks* and define a few generic key performance indicators;
- contribute to the drafting of the *ESFRI Roadmap 2018*.

IG

IMPLEMENTATION WORKING GROUP

The Implementation Group (IG) met six times in 2017 and twice in 2018 with the scope to assess 12 new proposals, 6 ESFRI Projects 2010, 9 ESFRI Projects 2008, and 4 pilot Landmarks.

The first 2017 meeting was held on **6th March 2017** in Lisbon when the IG discussed about the identification of Independent Experts for the assessment of the Projects 2008, on the questionnaires for the Projects 2010 (Part A, B and C), and on responsibilities for monitoring Landmarks.

The second 2017 meeting took place on **15th-16th May 2017** in Brussels and concentrated mainly on the first discussion on the filled questionnaires by the six Projects 2010, and on the draft assessments of four pilot Landmarks.

The third 2017 meeting was held on **19th June 2017** in Krakow for the final discussion and agreement on the assessment of the Project 2010 and on the Pilot Periodic Review of Landmarks that led to finalise preliminary conclusions and recommendations to the EB.

The fourth 2017 meeting took place on **6th-7th September 2017** in Brussels with the aim to discuss and agree on approval and signing of the assessment reports for the Projects 2010.

The fifth 2017 meeting was held on **21st-22nd November 2017** in Brussels

to review the preliminary reports on Projects 2008 and the critical questions in preparation of the hearings scheduled for end of **January 2018**.

The sixth 2017 meeting took place on **4th-5th December 2017** in Brussels to review the new proposals based on the submitted questionnaires and relevant project attachments, and to draft critical questions in preparation of the hearings scheduled for end of January 2018.

The first 2018 meeting on **18th April 2018** in Brussels was focused on the

discussion about the final SWG and IG reports for each new proposal in preparation for the general harmonisation meeting scheduled for 24th April.

The second 2018 meeting was held on **30th May 2018** in Brussels to draw the final conclusions and recommendation on new proposals for inclusion in the Roadmap 2018.

The updated list of members of the IG as of December 2018 is reported in the following table.

IG MEMBERSHIP*

Name

Country

| Chair

ERIKSEN Odd Ivar

Norway

| Vice-Chair

RYAN Michael

Ireland

| Members

CHARDONNET Christian

France

FIGUEROA Inmaculada

Spain

HOLMGREN Sverker

e-IRG, Sweden

HRUŠÁK Jan

Czech Republic

LEANDRO Cristiana

Portugal

LENOIR Laurence

Belgium

MIHAIL Iulia

Romania

RIDDER-NUMAN Jeannette

The Netherlands

TUINDER Harry

EC Representative

*Please note that changes in the membership may have occurred during 2017-2018.

AD HOC WORKING GROUPS

Since 2013, ESFRI has performed a number of specific studies and analyses to strengthen its coherent and strategy-led approach to the development of Research Infrastructures as well as to address specific mandates of the Council of the European Union.

To this end ESFRI has established the *ad hoc* Working Groups that explore strategic issues about Research Infrastructures, including the innovation-oriented cooperation with RIs, the mechanism for better investments of Member States in e-Infrastructures, the long-term sustainability of RIs.

Ad hoc Working Groups can be also mandated internally by the ESFRI Forum, such as the one committed to the analysis of the evolving European Landscape of Research Infrastructures for Neutron Scattering.

LONG-TERM SUSTAINABILITY WORKING GROUP

The Working Group on Long-Term Sustainability (LTS WG) was set-up in 2016 in order to comprehensively respond to the Conclusions of the Council of the European Union of **27th May 2016** on *FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges* that “**UNDERLINES** the importance of ensuring long-term sustainability of Research Infrastructures and **INVITES** the Commission to prepare together with ESFRI and relevant stakeholders a targeted action plan”¹².

The objective of the LTS WG was to provide a consolidated input to the European Commission for the preparation of the Action plan mentioned in the Council conclusions, addressing the *Long-Term Sustainability of Research Infrastructures*. The Sustainability debate was focusing on the pre-conditions identified by the consultation launched by the Commission in December 2015. These pre-conditions include funding and governance aspects of RIs, socio-economic impact as well as the management and exploitation of data and the innovation potential of RIs.

The LTS WG – chaired by Mr. Jan Hrušák – consisted of high-level representatives of funding decision bodies, Research Infrastructures managers/experts and European Commission representatives from DG RTD and DG CNECT.

Since its establishment in 2016, the Group met several times and organised a Workshop – in collaboration with the European Commission – on **25th November 2016 in Brussels**, where representatives of the various categories of stakeholders were invited to participate and to present their experiences, needs and expectations.

Based on its analysis, the LTS WG provided a first draft report by **March 2017** and finalised it in **June 2017** when the final report on Long-Term Sustainability was transmitted to the EU Council and shared with the European Commission.

With the launch of the ESFRI Scripta Vol. 2 on **13th December 2017** during the **63rd ESFRI Forum Meeting in Lund** the LTS Working Group ceased its activity.

12. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16

<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

LTS WG MEMBERSHIP

Name

Country

| Chair

HRUŠAK Jan

Czech Republic

| Vice-Chair

LENOIR Laurence

Belgium

| Members

BURGUEÑO ARJONA Augusto

EC Representative

CAMINADE Jean-Pierre

France

CLAUSEN Kurt

Switzerland

COCCO Massimo

EPOS

FROISSARD Philippe

EC Representative

HARRISON Andrew

United Kingdom

HENRICHSEN Bjørn

Norway

MIRON Catalin

ELI

PETRILLO Caterina

ESS

RITTER Claudia

Germany

SARKJOIA Merja

Finland

MONITORING WORKING GROUP

The Working Group on Monitoring (MONITORING WG) was set-up on 28th-29th June 2018 during the 65th ESFRI Meeting in Corfu in order to comprehensively respond to the Conclusions of the Council of the European Union of **29th May 2018** on *Accelerating knowledge circulation in the EU*, the Competitiveness Council that “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”¹³.

The objective of this Working Group is to consolidate the existing knowledge on *Monitoring of Research Infrastructures performance*, propose a common approach at European level and explore options to support this with the use of *Key Performance Indicators* (KPIs). Such KPIs must be easy to use, shall be adjustable to different systems and types of RIs – new as well as existing – and yet robust to ensure high a level of confidence. They could serve as one element of the monitoring carried out by RIs and their governance bodies to monitor their performance.

The Group should develop flexible schemes, methods and procedures that could be used to increase the transparency, comparability and complementarity of monitoring practices across the (European) landscape of RIs, including therefore international, national or regional RIs. The Group should also propose a methodology for the *Periodic Update of ESFRI Landmarks*, taking into account the results of the pilot review exercise of 2017.

The work of the Group commenced on **20th November 2018**, following up on a dedicated ESFRI Workshop on *Monitoring of RIs, Periodic Update of Landmarks, use of KPIs*, organised on **19th-20th November 2018** in Milan. The outcome of its work is expected in the second half of 2019.

13. **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>

MONITORING WG MEMBERSHIP

Name

Country

| Chair

WENZEL-CONSTABEL Peter Germany

| Vice-Chair

HARRISON Andrew United Kingdom

| Members

BANCI Lucia Italy

BJÖRLING Sofie Sweden

DIAZ Isabelle France

GIARDINI Domenico Switzerland

HENRICHSEN Bjørn Norway

KOLAR Jana Slovenia

MANGEMATIN Vincent EC, External Expert

PANACCIONE Giancarlo IT, External Expert

RAMOS Ana Portugal

REID Alasdair EC, External Expert

RIBEIRO Margarida EC Representative

STANKIEWICZ Marek Poland

VANDROMME Dany FR, External Expert

ESFRI MEETINGS

EXECUTIVE BOARD & WORKING GROUP CHAIRS

16th February 2017

Brussels, European Commission

This was an interim Executive Board Meeting.

The EB discussed and agreed on general guidelines for the Strategy Working Groups on drafting the **Landscape Analysis**, taking advantage of lessons learnt from the Roadmap 2016 exercise and improving coherence and readability through different domains. The EB confirmed that the *Landscape Analysis* has to be updated as it describes the ecosystem in which each project needs to fit in. It should cover operational RIs offering open access services, available at national, European and international level. The EB and SWG Chairs agreed on developing a common LA template to be discussed during the 60th ESFRI Forum Meeting in Lisbon. The e-IRG was asked by ESFRI to update the e-Infrastructure LA.

Since ESFRI was asked – as one of the ERA-related Groups – to contribute to the **ERAC Opinion on the interim evaluation of Horizon 2020** as well as on the **future Framework Programme**, the EB reflected on ESFRI position on ERAC Opinion – the role, the scope and the distribution of activities within the part related to Research Infrastructures. The EB formulated an outline of ESFRI contribution to the ERAC Opinion in order to prepare a draft to be discussed during the 60th ESFRI Forum Meeting in Lisbon and then present it to the ERAC Plenary Meeting on 16th-17th March in Malta. ESFRI was also asked to prepare an **ESFRI contribution to the ERAC Annual Report**. The EB prepared a draft text which reflects the 2016 activities of ESFRI, and agreed to propose it for adoption to the 60th ESFRI Forum Meeting in Lisbon.

The ESFRI Chair – Mr. Giorgio Rossi – recalled the **Roadmap 2018** timetable to the EB which discussed on the state of play regarding the Questionnaires to the *Projects 2008*, the *Projects 2010* and the *Pilot Landmarks*.

The Acting Director at DG CONNECT – Mr. Thomas Skordas – presented the planned development of the **EuroHPC initiative** in the coming years, including options for EU-level governance mechanism for investments in HPC. He underlined that electronic data infrastructures, for which ESFRI is responsible, need to be closely linked with development of HPC, this is why EuroHPC – which would constitute the main governance body representing Member States – would

benefit from interactions with ESFRI. The EB underlined that ESFRI is open to further collaboration in this area and concluded with Mr. Skordas that the initiatives covering data infrastructures are under the responsibility of ESFRI while the initiatives related to HPC would be covered by EuroHPC. The EB also stressed the need for the two groups to coordinate their work.

The ESFRI Chair shortly reported – on behalf of the Chair of the **Working Group on Long-Term Sustainability of RIs** – on the progress of the work of the LTS WG, and briefly presented the preliminary draft of the main recommendations to prepare a more advanced version for discussion during the EB meeting in Lisbon.

6th March 2017

Lisbon, Portugal

This was a joint Executive Board & Working Group Chairs Meeting in preparation of the 60th ESFRI Forum Meeting on 7th March 2017.

The ESFRI Chair informed the EB about the status of the **Roadmap 2018** update. **Monitoring of Projects and Pilot Periodic Review of Landmarks** was ongoing through a three-steps process including: i) Projects and Landmarks filling the dedicated Questionnaires through the ESFRI MoS; ii) ESFRI Delegates validating or declining their country political support; iii) the involved SWGs and the IG reviewing documents for evaluation and assessment. The **Projects 2010** were asked to submit through the ESFRI MoS their Questionnaire by 10th February, with extension to 26th February for MIRRI and ISBE. The involved SWGs – Health & Food and Energy – and the IG received whole packages of documents for the Projects 2010 on 3rd March and monitoring was ongoing. The deadline for the Pilot Landmarks to submit all documents was on 28th February to be delivered to SWGs and IG by 21st March. The **Projects 2008** received credentials to access the ESFRI MoS and fill the specific Questionnaire on 21st February with the deadline to submit all documents by 28th April.

The EB exchanged views with the SWG Chairs on general guidelines and template for drafting the **Landscape Analysis** and agreed on their revision in view of the *Landscape Analysis*

update for the Roadmap 2018. The aim of the LA is to have an overview of the RI ecosystem in Europe to serve as reference for ESFRI, in particular for the *Evaluation of New Proposals*. Regarding the timeline, the EB stressed that the LA should be ready in time to serve as reference for the *Evaluation of New Proposals* and for the Forum to have background information to take an informed decision on the Roadmap 2018.

The Chair of the **Working Group on Long-Term Sustainability of RIs** – Mr. Jan Hrušák – recalled the mandate and the background of the Group as well as reported on activities and meetings leading to the recommendations and the draft report. Considering the need to address different audiences, the WG decided to adopt a multilevel approach to the report. The Group proposed to focus on 7 main recommendations – underpinned by 35 more specific recommendations – from which the LTS WG formulated the political messages to different stakeholders. A first draft of a full report from the LTS WG was expected to be sent to the EB around the 20th March for discussion in order to be adopted by the Forum in early May. Intermediate versions constituted the initial ESFRI input for the European Commission's Staff Working Document (SWD) on Long-term Sustainability in view of the EC inter-service consultations on the SWD, the publication of its SWD document, and the Council conclusions on LTS recommendations foreseen by the end of the year.

20th June 2017

Krakow, Poland

This was a joint Executive Board & Working Group Chairs Meeting in preparation of the 61st ESFRI Forum Meeting on 21st June 2017.

The ESFRI Chair informed the EB about the status of the **Roadmap 2018** update. The Chair of the SWG on Health & Food, the Chair of the Energy SWG – this last represented by the ESFRI Secretariat – and the Chair of the IG reported on the progress of the **Monitoring of Projects 2010**. Based on this information, the EB discussed the current situation of each Project and the challenges that they face in view of their expected implementation by 2020. A report from the evaluation/assessment of each Project, with clear recom-

mendations, was planned to be prepared and presented to the Forum for adoption in September.

The EB and the WG Chairs discussed about the observations from the **Pilot Periodic Review of Landmarks**. It was concluded that a more targeted approach would be more suitable for monitoring the development and operation of each RI. The EB agreed to work on a concept which would include a dialogue and agreement with each Landmark on the objectives, planning and KPIs, which would then be regularly followed up by ESFRI. This would also give an opportunity to use more extensively all the strategic and reporting documents that these RIs prepare as part of their regular activities and specially to make optimal use of external evaluations conducted on behalf of their governing boards. Establishing such a review system would stipulate a cyclical evaluation of a very limited number of Landmarks every year, aligned to the Landmarks' specific cycles and decoupling the Landmarks' list from the ESFRI Roadmap. This concept would be consulted with the Landmarks selected for the pilot in a dedicated meeting in 2018.

The European Commission also informed the EB that an **EC High-Level Expert Group on Monitoring of RIs** was planned to be set up in the second half of 2018 to analyse the ESFRI RIs, including both Projects and Landmarks. The group was expected to assess the effectiveness and impact of support provided by the Framework Programme across the lifecycle of RIs and identify key challenges related to their long-term sustainability. The outcome of the work of this Group would feed into the preparation of the next Framework Programme and contribute to the ESFRI Landmark review.

The EB and the WG Chairs discussed the **Monitoring of Projects 2008**. The concerned WGs had already received all documents submitted by the Projects in relation to this process, and were currently analysing them. It was agreed to invite all Projects 2008 to dedicated hearings foreseen on January 2018, upon submission of new documents by the projects themselves that could be important for the progress of the monitoring process.

The EB and the SWG Chairs agreed on the final guidelines for the **Landscape Analysis** and the template, including Section 1 – domain-specific, Section 2 – Interconnections, and Section 3 – cross-cutting aspects. The SWG Chairs proposed to coordinate their effort to ensure a harmonised and balanced text across all domains. A first draft of the revised *Landscape Analysis* was expected to be ready for discussion in September.

The final text of the ESFRI report of the **Working Group on Long-Term Sustainability of RIs** was presented to the EB. It was underlined that the document was of very high quality, comprehensive and with many interesting ideas. The EB agreed to propose to the Forum its adoption and to prepare it for publication as a volume of the ESFRI Scripta series by the end of the year. The European Commission thanked Mr. Jan Hrušák for the LTS WG work and its valuable input to the EC Staff Working Document.

The EB considered of high importance to demonstrate the impact that RIs have on science, economy and society as a whole. The EB recognised the high value of the report prepared by the **Working Group on Innovation** in 2016, and proposed to realise a publication as a new volume of the ESFRI Scripta series. The EB agreed to ask Mr. Jean Moulin, who chaired the Group, to eventually update the report. The publication was foreseen to be ready by the end of 2017 to be disseminated during the different events on the impact of RIs which are planned in the first half of 2018.

The EB Member – Mr. Yannis Ioannidis – reported to the EB on the **European Open Science Cloud** Summit organised on the 12th June, in which many ESFRI RIs and Member States, invited through ERAC, were represented. An EOSC Declaration was expected to be published during the summer, which would be followed by a discussion on the EOSC governance structure. The EB agreed that ESFRI should accelerate the implementation of its mandate to serve as a hub of funders for e-Infrastructures and it should proactively engage in the discussions on the development of the EOSC.

The final draft of the **ESFRI Annual Report 2016** was welcomed by the EB to be proposed to the Forum for adoption and subsequent publication.

The Commission informed the EB about a meeting of **H2020 support actions for RIs**, which include MERIL-2, RItrain, InROAD, RISCAPe and StR-ESFRI. The meeting took place on 8th June in Brussels. Each project presented their activities, hitherto outcomes and opportunities for synergies and collaboration. As the activities and outcomes of these projects are of potential interest to ESFRI and Member States activities, the EB agreed to invite them to the Forum Meeting when they reach important milestones that are worth presenting publicly.

11th September 2017

Brussels, European Commission

This was an interim Executive Board Meeting.

The EB made an overview about the submission procedure for the **Selection and Evaluation of New Proposals** for inclusion in the **Roadmap 2018**. The EB recalled the eligibility criteria, as specified in the ESFRI Roadmap Guide 2018, and then verified if the submitted proposals were meeting all of them. The EB concluded that all proposals were fulfilling the eligibility criteria, except the proofs of inter-institutional multilateral agreements that were not yet downloaded from the submission system. The EB observed that many proposed RIs move towards higher Technology Readiness Level (TRL) with digital components to play an increasingly important role. The EB agreed to propose to the Forum to establish a new Strategy Working Group dedicated to the evaluation of proposals with dominant or strong e-Infrastructure components. The composition of the new SWG was discussed and the EB agreed to propose to include five e-IRG experts from the other SWGs plus a number of experts nominated by the Forum. The EB agreed to discuss a draft decision and the Terms of Reference during the following EB meeting on 18th September.

The Commission presented the main features of the Staff Working Document on **Long-term Sustainability of Research Infrastructures**, thanking ESFRI for their inputs to this work. The document, that identified 42 elements for action on long-term sustainability, was intended to be officially published in Autumn and presented to the Member States during the Estonian Presidency, to start a further discussion on prioritising concrete actions that are most urgent and could make a significant impact. The EB observed that further discussion within ESFRI could be facilitated by the LTS WG, whose final report was also expected to be published as ESFRI Scripta Vol. 2 in Autumn.

The Commission presented to the EB the general information on the development of the **European Open Science Cloud** and the outcomes of the EOSC Summit on 12th June in Brussels. A draft EOSC Declaration, consisting of 33 high-level statements, was circulated for endorsement – and possible specific commitments – to the non-governmental participants of the Summit. A first common feedback from

the scientific community suggested that such an infrastructure is needed. The EC also noted that technical and financial aspects go hand in hand in the preparation of the EOSC, which is seen as commons for European science, calling for a combination of incentives and rewards. It was also recognised that FAIR principles are needed to be operational, recognising the specificities of different disciplines to develop an inclusive and shared vision and to build trust. The EC anticipated that the most urgent building blocks of the EOSC were going to be supported through the Work Programme 2018-2020: specific topics were expected to be dedicated to build a coordinated EOSC architecture to support the decision making of the EOSC governance structure. The EC proposed to release the final version of the EOSC Declaration in September/October 2017 to serve as a common baseline for a broader endorsement of stakeholders, while the EOSC Roadmap for implementation was expected at end of the year or beginning of 2018.

The EB recalled the EU Council mandate on **Coordination of Member States' Investment Strategies in RIs**. It was noted that data quality and reproducibility need particular attention, as well as data management, use and traceability are very sensitive issues. It was underlined that ESFRI RIs should maintain the responsibility for the produced data, because a very good technology of data access and data storage may not be enough to guarantee the maintenance of FAIR principles. Particular attention was drawn to metadata as a critical issue. The EB concluded that, given the intense work to develop RIs in Europe also in reinforcing their e-Infrastructure dimension, ESFRI shares many common objectives with the EOSC and it is expected to play an important role in this initiative. As a follow up the Commission provided information about a dedicated meeting for Horizon 2020 EOSC-related calls to inform the ESFRI RIs and ESFRI itself about the scope of these calls. This meeting – whose programme would be developed by the EC in consultation with ESFRI – was planned to take place on 27th November, on the eve of the EOSC Stakeholder Forum. On that occasion, a more strategic discussion on EOSC could also be organised between the EC and ESFRI.

The ESFRI Chair made a preview of the **GSO Report 2017** to be presented to the G7 Science Ministers' Meeting on 28th September in Turin. One of the important aspects tackled was a global excellence-based access, as well as the concepts of global open innovation and open access to data. Two prototypes for GRIs were proposed – Global Under-

ground Laboratories and International Mouse Phenotyping Consortium – to be endorsed by the G7 Ministers.

18th September 2017

Brussels, European Commission

This was a joint Executive Board & Working Group Chairs Meeting in preparation of the 62nd ESFRI Forum Meeting on 19th September 2017.

The EB recalled the discussion on the eligibility criteria for the **Selection and Evaluation of New Proposals** for inclusion in the **Roadmap 2018**. Based on eligibility criteria, among the twelve submitted proposals, ten fulfilled the eligibility criteria – DISSCo, EHRI, EIRENE, eLTER, EU-IBISBA, EuroNano-Lab, EuroStrain, METROFOOD-RI, OPERAS and RESILIENCE – whether two – IFMIF-DONES and SILECS – did not meet the condition of providing a proof of a signed inter-institutional, multilateral agreement. The EB agreed to propose to the Forum to ask the coordinating Delegations to provide the missing documents by 15th October. The EB discussed with the WG Chairs the attribution of proposals to SWGs. It was agreed to propose to the Forum to establish the new Group as Strategy Working Group on Data, Computing and Digital Research Infrastructures (SWG DIGIT). The timeline of evaluations was discussed and the key milestones were agreed. Preliminary report, critical questions – prepared by the SWGs and IG and harmonised by the EB – were planned to be ready for discussion in December in Lund, followed by invitation of new proposals to dedicated hearing sessions in January.

The EB thanked the WG Chairs for preparing the final reports on the **Monitoring of Projects 2010**. The EB agreed that the main message to be passed to the Projects 2010 – and to the Delegations involved in their implementation – was that they were still far from meeting the key minimal requirements that would enable them to be considered as Landmark. The EB agreed to ask the Forum to submit their comments in order to approve the reports by written procedure.

Each SWG and the IG presented their initial considerations on the **Monitoring of Projects 2008**. It was agreed to prepare a set of clarification questions for each project, that could be answered within the month of October. The updated prelimi-

nary reports, critical questions – prepared by the SWGs and IG and harmonised by the EB – were planned to be ready for discussion in December in Lund, followed by invitation of Projects 2008 to dedicated hearing sessions in January.

The EB considered an approach to the **Periodic Review of Landmarks** based on: i) formal lessons learnt from the Pilot Periodic Review and consultation of the Pilot Landmarks before a formal discussion at the Forum; ii) continuous light monitoring of Landmarks and periodic updates of the state of play (e.g. every 5 years) to have a comprehensive picture of the state of the Landmarks, their strengths, challenges and perspective evolution; iii) gradual review of all Landmarks to make the process independent from the schedule of the Roadmap updates and allow for decoupling of the Landmarks list from the Roadmap itself. It was recalled that the EC had intention to set up an Expert Group in 2018 to assess the state of play of each ESFRI RI, future challenges and ways to optimise EU intervention.

SWG Chairs updated the EB on the progress of work on the **Landscape Analysis**. A draft Section 1 was expected to be ready for a first presentation to the Forum during the 63rd ESFRI Forum Meeting in Lund.

The Secretariat recalled that the mandate of the ESFRI Chair, along with EB Members and WG Chairs, was expiring at the end of June 2018. According to ESFRI Procedural Guidelines, up to 12 months before the mandate expires, a **Search Committee** should be constituted. The Secretariat proposed to inform the Forum accordingly and organise a call for nominations to the Search Committee to be constituted in November and to hold its first meeting during the 63rd ESFRI Forum Meeting on 13th December 2017 in Lund.

11th December 2017

Lund, Sweden

This was the Executive Board Meeting in preparation of the 63rd ESFRI Forum Meeting on 13th December 2017.

The ESFRI Chair informed the EB about the status of the **Roadmap 2018** update. The SWG and IG Chairs meeting was held in parallel to finalise preliminary reports for the **Evalua-**

tion of New Proposals and the **Monitoring of Projects 2008** and prepare critical questions to be presented and discussed together on the following day. The plan was to send letters of invitation, along with critical questions, to *New Proposals* and *Projects 2008* to participate in dedicated hearing sessions planned in late January. The EB discussed briefly on the format of the hearing sessions and panel composition. The EB agreed on having the post-hearing reports by end of February in preparation of the Harmonisation meeting planned on 6th-7th March in Milan. The ESFRI Secretariat prepared a draft schedule for the hearing sessions with names of the panel committee members and the agenda for each panel and presented it for discussion within the EB.

The EB further discussed the ESFRI approach to **Periodic Review of Landmarks** to respond to the European Council that asked ESFRI to regularly monitor the scientific progress of Landmarks, and to ensure that the Landmarks status is a quality label for RIs at European level. The EB collected input and agreed on preparing a note for discussion the 64th ESFRI Forum Meeting on 21st March in Sofia.

The EB discussed the draft note on the **Evaluation of ESFRI Roadmap 2018 Methodology**. The EB welcomed some comments from Delegations about a more strategic reflection on ESFRI role and activities, also in view of enhancing the strategic views of ESFRI on e-Infrastructures, as mandated by the Council. The EB agreed to consider having "emerging research areas" in the *Landscape Analysis*. A revised version of the note was agreed to be prepared and presented for discussion on 21st March 2018 during the 64th ESFRI Forum Meeting in Sofia.

The ESFRI Chair recalled the informal meeting on H2020 EOSC-related calls on 27th November, which followed the publication of the EOSC Declaration. The EB discussed the presentation of the draft EOSC Roadmap to the Member States and then agreed on preparing a paper with the **ESFRI Position on EOSC**, based on the main elements of the discussion paper on e-Infrastructures and inputs from Delegations, to be analysed first within the EB and then circulated to the Forum by early January. The adoption by written procedure was scheduled by 21st January to provide inputs to the EC Staff Working Document planned shortly after.

On a related topic the EB reflected on the future collaboration between ESFRI and e-IRG, especially in the context of the EOSC and the EU Council mandate on **Coordination of Members States' Investment Strategies in RIs**. The EB

agreed on having an open, exploratory discussion with a representation of the e-IRG on the fringes of the meetings in Sofia in March 2018.

The ESFRI Chair recalled the debate on the **Long-Term Sustainability of RIs** and the two related publications, the Sustainable European Research Infrastructures - A call for action from the European Commission, and the ESFRI Scripta Vol. 2 in October 2018. The EB agreed that the LTS is a strategic issue for the future of ESFRI.

The ESFRI Chair informed the EB about the updated version of the report of the **Working Group on Innovation** as ESFRI Scripta Vol. 3.

12th December 2017

Lund, Sweden

This was a joint Executive Board & Working Group Chairs Meeting in preparation of the 63rd ESFRI Forum Meeting on 13th December 2017.

The SWG Chairs and a representative of e-IRG responsible for drafting the LA on e-Infrastructures – Ms. Rosette Vandebroucke – provided an overview of the progress made by the SWGs in preparing the **Landscape Analysis**. The EB discussed the timeline of the release of the *Landscape Analysis* to be discussed within the EB and then presented to the Forum for approval during the 65th ESFRI Forum Meeting on 28th-29th June in Corfu.

The SWG and IG Chairs made a short summary on the status of the **Monitoring of Projects 2008** in relation to their scientific excellence and maturity, also taking into account new information provided by the projects and the impact on their initial assessments, and formulated critical questions. It was agreed to recommend to the Forum to invite all Projects 2008 to the hearing sessions in January as well as all *New Proposals*, except one which scored low. The EB discussed with the WG Chairs the critical questions and agreed on their harmonization and consolidation in the following weeks in order to have them sent to projects before Christmas.

7th March 2018

Milan, Italy

This was a joint Executive Board & Working Group Chairs Meeting for the harmonisation of the evaluation/assessment results that followed the SWG & IG Chairs Meeting on 6th March 2018.

The ESFRI Chair recalled that the aim of the **Evaluation of New Proposals** is identify which of them are scientifically strong and of strategic importance for the European Research Area, and mature enough to effectively enter the Preparatory Phase.

The SWGs and IG Chairs, that met on 6th March to harmonise the outcomes of their evaluation/assessment and reach a joint conclusion on each proposal, introduced the proposals under their responsibility: IFMIF-DONES (ENE); DiSSCo, eLTER (ENV); EIRENE, EU-IBISBA, METROFOOD-RI (H&F); EuroNanoLab (PSE); EHRI, OPERAS, RESILIENCE (SCI); and SILECS (DIGIT). The EB discussed these results and informed the WG Chairs about the outcomes of the discussion: three proposals – DiSSCo, eLTER, METROFOOD-RI – were recommended for inclusion in the ESFRI Roadmap; three proposals – EIRENE, EuroNanoLab, SILECS – did not demonstrate sufficient strength in the scientific case and therefore were not recommended to be included in the Roadmap; IFMIF-DONES met the minimal requirements but strategic analysis needed to be developed further; four proposals – EHRI, EU-IBISBA, OPERAS and RESILIENCE – were not harmonized, with a positive indication for the scientific merit and an overall lack of satisfaction of the minimal key indicative requirements for implementation. The EB asked the SWG & IG Chairs to finalise their joint evaluation reports for each proposal, including overall findings for those where a consensus had not been reached. The EB asked the IG to provide the scores of external experts for these proposals as well as asked the respective SWGs and the IG to reconvene in order to finalise the harmonisation stage.

The ESFRI Chair recalled the purpose of the **Monitoring of Projects 2008**: assess if a project fulfilled the key indicative requirements for the Implementation Phase and can be then considered as Landmarks. The SWGs and IG Chairs, presented the results for projects under their responsibility: ECCSEL ERIC (ENE); EISCAT_3D, EPOS, SIOS (ENV); EMBRC ERIC,

ERINHA, EU-OPENSOURCE ERIC, Euro-Biolmaging (H&F); and CTA (PSE). The EB and WG Chairs discussed and drafted recommendations to the Forum on Projects 2008. Eight of the nine Projects 2008 were considered implemented and, given their strategic importance and uniqueness, were recommended to become Landmarks.

19th March 2018

Sofia, Bulgaria

This was the Executive Board Meeting in preparation of the 64th ESFRI Forum Meeting on 21st March 2018.

The EB discussed about the suggested format of the presentation of the outcomes of the **Monitoring of Projects 2018** with recommendation to eight of them to become Landmarks. The EB discussed the urgent need to ensure consistent financial information that represents the economic value of ESFRI RIs, and agreed to explore possible ways to achieve this.

The EB agreed to inform the Forum that the whole process for the **Evaluation of New Proposals** was not completed, as some of the final harmonised SWG/IG reports were not available yet. The EB also agreed to organise in April a dedicated one-day meeting in Brussels, which would include a WG Chairs harmonisation meeting and an EB meeting to prepare *Recommendation for New Proposals*.

The ESFRI Chair recalled that the European Commission Staff Working Document on the **European Open Science Cloud** was published on 14th March and presented to the Research Working Party. The EB acknowledged that in general the SWD on EOSC is a good document with certain ideas consistent with the **ESFRI Position on EOSC**. However, it was noted that there is no explicit mention of ESFRI Forum but only of ESFRI Research Infrastructures. There was also a discussion on the EOSC in ERAC Plenary Meeting on 15th and 16th March in Sofia, where ESFRI and the Working Group on Open Science and Innovation (WG OSI) – as ERA-related Groups – both presented their positions. The most important message from the discussion was that ESFRI and WG OSI were requested to work much closer together. The EB agreed on

asking the ESFRI Forum to welcome the proposal to interact with the WG OSI on the EOSC topic.

The ESFRI Chair informed the EB that e-IRG Chair proposed a paragraph on European Open Science Commons to be included in the Bulgarian conference conclusions. The EB discussed the content of this proposal and agreed to discuss this topic in the informal meeting with e-IRG on 20th March.

The EB recalled that initial conclusions on a general approach for the **Periodic Review of Landmarks** has already been agreed following-up on the discussion held at the EB and the Forum in June 2017 in Krakow. The EB agreed to propose concrete way forward, which should engage ESFRI Landmarks in the discussion. A more intensive work on this issue was expected to start after the summer 2018, in order to reach a final agreement on the methodology by June 2019.

The EB made initial considerations on how to organise a reflection on the **Future of ESFRI**. The first input to the discussion was suggested to be based on the lessons learnt from the Roadmap 2018 and the general challenges related to the maturing RI landscape where ESFRI would need to go beyond its incubating role.

The ESFRI Chair informed the EB about the publication of the ESFRI Scripta Vol. 3 on the updated outcomes of the WG on Innovation.

20th March 2018

Sofia, Bulgaria

This was a joint Executive Board & Working Group Chairs Meeting in preparation of the 64th ESFRI Forum Meeting on 21st March 2018.

The EB informed the WG Chairs about the suggested format of the presentation of the outcomes of the **Monitoring of Projects 2018** with recommendation to eight of them to become Landmarks. The EB also informed the WG Chairs on the discussion upon the need to ensure consistent financial information that represents the economic value of ESFRI RIs. The EB and SWG Chairs, together with the Secretariat, agreed to send together a formal request to the Forum.

The Chair debriefed the WG Chairs on the EB discussion the previous day about the way forward for the **Evaluation of New Proposals**. The EB asked the WG Chairs to elaborate a joint WG/IG report for each new proposal as a reflection of a discussion between the respective WGs, describing also how the advice of external experts was taken into account and including a more comprehensive overall conclusion. An additional WG Chairs harmonisation meeting followed by an EB meeting was planned to be organised in April in Brussels to prepare a *Recommendation for New Proposals*.

The Chair of the ENV SWG – Ms. Gelsomina Pappalardo – informed the EB about the outcomes of the SWG Chairs meeting on the previous day. Ms. Gelsomina Pappalardo, proposed a timeline for drafting the **Landscape Analysis** including sections on interconnections and cross-cutting aspects. The approach to draft interconnections part, which has been formulated in a table format, was discussed in detail as for the objectives and the main messages. The EB agreed to inform the Forum about the work on a more strategic part on interconnections and acknowledged that there is a clear added value to this chapter. The message of such analysis could be that ESFRI landscape, considered across the domains in an open research environment, enables research and new data to address the *global challenges* by a multidisciplinary approach. In this context, the ESFRI Roadmap can serve as an interdisciplinary research tool to address cross-cutting issues that are not of disciplinary origin.

24th April 2018

Brussels, European Commission

This was a joint Executive Board & Working Group Chairs Meeting for the harmonisation of results that followed the SWG & IG Chairs Meeting on 6th March 2018 and the EB & WG Chairs Meeting on 7th March 2018.

The ESFRI Vice-Chair – Mr. Jan Hrušák – summarised the outcomes of the harmonisation meeting for the **Evaluation of New Proposals**, recognising the very substantial amount of work that was put into the evaluation by all Working Groups. According to the ESFRI Roadmap Guide 2018, a threshold score *High* on both scientific case and implementation was needed for considering a proposal inclusion in the Roadmap

2018. Among the twelve submitted proposals, nine were harmonized: four passed the criteria for inclusion – DiSSCo, eLTER, EU-IBISBA, METROFOOD-RI – and four did not meet the minimal requirements in both scientific case and implementation – EIRENE, EuroNanoLab, EuroStrain, SILECS. Two proposals – RESILIENCE and OPERAS – scored for the scientific case *High* but, considering their *Medium* score on maturity for implementation, the EB agreed that they were not ready to enter the Roadmap. Two projects – EHRI and IFMIF-DONES – could not be harmonised as the SWGs and the IG could not reach a conclusive common position on the fate of the proposals. The EB agreed to postpone the final decision on the recommendation on *New Proposals* to the following meeting in May.

The EB discussed the general outline of the **Roadmap 2018 document**, which would be divided into three parts: Strategy Report, *Landscape Analysis* and ESFRI RI cards. The EB also distributed the work on the different parts and agreed on the timeline that would lead to a formal draft of the Roadmap to be distributed to the Forum by beginning of June.

16th May 2018

Videoconference

This was the Executive Board Meeting for the final harmonisation of the results of the **Evaluation of New Proposals** and recommendation for inclusion in the Roadmap 2018 following the EB & WG Chairs Meetings on 7th March 2018 and on 24th April 2018.

The ESFRI Chair recalled the discussions on the *New Proposals* in the two previous meetings of the EB. The EB acknowledged that four proposals – DiSSCo, eLTER, EU-IBISBA, METROFOOD-RI – meet the minimal requirements criteria both for the scientific case and implementation and were recommended to be included in the Roadmap 2018. The EB also acknowledged that four proposals – EIRENE, EuroNanoLab, EuroStrain, SILECS – did not demonstrate sufficient maturity regarding the scientific case, as comprehensively justified in the evaluation reports, and didn't recommend them for inclusion in the Roadmap 2018. Two more proposals – OPERAS and RESILIENCE – in the SCI domain, in spite of scoring *High* in the scientific case, did not fulfil all minimal requirements

criteria for implementation but the EB agreed that they may represent strategic areas in the SCI domain. The two non-harmonised proposals – EHRI and IFMIF-DONES – that both scored *High/Very High* on the scientific case and *Medium* on implementation deserved an in-depth discussion on their strategic potential. After discussion, the EB concluded to recommend to the Forum six proposals for inclusion as ESFRI Projects in the Roadmap 2018 – DiSSCo, EHRI, eLTER, EU-IBISBA, IFMIF-DONES and METROFOOD-RI.

The EB decided to prepare a joint activity report for 2017 and 2018, the **Biannual Report 2017-2018**.

The EB started to discuss about the implications of the **Competitiveness Council conclusions on Accelerating knowledge circulation in the EU** and on **European Open Science Cloud** that were expected on 29th May; the *Periodic Update of ESFRI Landmarks*; the preparation of the Roadmap update – timeline, submission form, methodology and criteria; the need for a robust, comprehensive and consistent cost reporting by RIs.

12th June 2018

Videoconference

This was an interim Executive Board Meeting.

The ESFRI Chair informed the EB about the state of play of the **Roadmap 2018** preparation. The *EB Recommendation for New Proposals* was sent to the Forum on 31st May and the draft of the Roadmap 2018 (without Projects and Landmarks cards) was sent to the Forum on 4th June, with the deadline for comments by Delegations on 15th June. It was agreed that the Roadmap text would then be revised taking the comments into account. The Chair also noted the need to contact the *Projects 2008* which are expected to become Landmarks and ask them to update their information in a virtual version of the fiches for the Roadmap 2018. The EB suggested to find, at the same time, a suitable communication to SIOS, which was not expected to become a Landmark.

The EB welcomed that ESFRI has been recognized as an important contributor to fostering long-term sustainability of Research Infrastructures, as specified in the **Competitive-**

ness Council conclusions on Accelerating knowledge circulation in the EU of 29th May. The EB in particular observed that ESFRI should have a role to play in reference to three paragraphs of the Council conclusions, namely 17, 18 and 19. The EB discussed possible activities that could be implemented in response to the Conclusions.

In paragraph 17, the Council "*ACKNOWLEDGES the positive role of ESFRI in fostering the development of the state-of-the-art Research Infrastructures in Europe and STRESSES the need for further strengthening and consolidation of the landscape of pan-European Research Infrastructures in view of their long term sustainability*". The EB noted that no immediate action is needed from ESFRI, although ESFRI was expected to play an important role in further strengthening and consolidation of the landscape of pan-European Research Infrastructures in the longer term. The European Commission recalled to the EB about the upcoming High-Level Expert Group to analyse the long-term sustainability challenges of European RIs and lessons learnt from EU interventions with a view to the next Framework Programme.

In paragraph 18, the Council "*UNDERLINES the importance of further efforts within the framework of ESFRI for a better aligned decision making for setting-up and participating in ESFRI Research Infrastructures in particular by exchanging experience about national roadmaps procedures and their national budget lines practices*". As a first step, the EB agreed that ESFRI would take stock of existing knowledge taking into account the outcomes of the InRoad project on national RI roadmap practices, links with funding and effects on RI implementation and operation, as well as any other relevant information. As a second step, ESFRI could gather inputs from Delegations to complement information collected by InRoad, for example on national funding practices, which vary across Member States.

In paragraph 19, the Council "*STRESSES the importance of human resources and training skills as key factors in the success for Research Infrastructures and ACKNOWLEDGES the need for Research Infrastructures to strengthen a service-driven approach; 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*". Taking into account the urgency of the topic and previous discussions in ESFRI, the EB agreed to propose to the Forum to set up an

ad hoc Working Group in 2018 to integrate all the inputs and propose a common approach for monitoring of RIs.

The EB recalled the **Competitiveness Council conclusions on European Open Science Cloud** of 29th May with particular reference to the points where ESFRI has been mentioned, namely 3, 8 and 11. In particular, in paragraph 11, the Council *"UNDERLINES that the key factors for the success of EOSC are a sound governance and sustainable business model as well as training an adequate number of data professionals. SUPPORTS the two-stage approach for the EOSC governance that enables all Member States and the Commission to steer and oversee the initial development of the EOSC in the first phase. In the second phase the EOSC governance should become mainly stakeholder-driven, while maintaining a higher-level steering role for all Member States and the Commission. RECOMMENDS that effective coordination is established with ESFRI"*. The Chair remarked that there is an excellent potential of collaboration and coordination between ESFRI and EOSC, and of fulfilment of the recommendation of the Council. The EB agreed to further elaborate on this important topic at the next meeting in Corfu, in order to prepare an informed non-session foreseen in the Forum agenda.

27th June 2018

Corfu, Greece

This was a joint Executive Board & Working Group Chairs Meeting in preparation of the 65th ESFRI Forum Meeting on 28th-29th June 2018. The WG Chairs joined the meeting when indicated.

The ESFRI Chair informed the EB about some concerns by several Delegations about **EB recommendation on New Proposals**, namely RESILIENCE and OPERAS. The EB decided to present the recommendation to the Forum as it was sent on 29th May and invite Delegates for comments. In addition, the EB invited the Chair to propose an alternative solution if the recommendation was significantly challenged.

The EB reviewed the written input on the **Competitiveness Council conclusions on Accelerating knowledge circulation**

in the EU of 29th May for discussion in the non-session of the Forum Meeting.

The EB discussed the input on **Competitiveness Council conclusions on European Open Science Cloud** of 29th May in preparation of the non-session in the Forum Meeting. The Chair recalled the concept of establishing a permanent coordination structure at three levels – operational, executive and strategic – as discussed in the EB meeting on 12th June 2018 and the European Commission expressed reservation about the creation of such a permanent structure.

The ESFRI Chair explained that in the context of **ERA Governance review 2018**, ESFRI was asked by ERAC to fill in a questionnaire related to the effectiveness of the ERA governance structure by 29th June. The Chair discussed with the EB the answers to the questionnaire.

The WG Chairs joined the meeting.

The WG Chairs were informed about the way the EB decided to proceed with the presentation of the **EB recommendation for New Proposals** to be included in the Roadmap 2018.

The ESFRI Chair discussed with the EB and WG Chairs the content of the Parts 1, 2 and 3 of the **Roadmap 2018 document**, as well as the graphical design. The EB noted the overall very high quality of the text. In particular, the EB recognised a high added value of the novel parts of the *Landscape Analysis* which illustrate the interconnections of RIs across domains, demonstrating the wealth and potential of the ESFRI RI ecosystem. Potential challenges to have the full *Landscape Analysis* adopted as integral part of the Roadmap were recognised and the EB explored the ways that could facilitate this decision in the Forum.

The Secretariat presented the outlines of the agendas for the **Roadmap 2018 Launch event** and the **Exchange of Experience Workshop on Preparatory Phases**, which was planned on 11th-12th September in Vienna. The outlines were welcomed by the EB.

The Chair recalled that the extended mandate of the ESFRI EB and WG Chairs was expiring at the end of December 2018 and that the election of **New EB Members and WG Chairs** needed to be organised. In order to ensure effective transi-

tion to the new governance, the EB agreed to open the call for candidates by 20th July with the deadline on 1st November.

5th September 2018

Videoconference

This was a joint Executive Board & WG Chairs Meeting in preparation of the 66th ESFRI Forum Meeting on 10th September 2018.

The ESFRI Chair recalled the urgency to establish an *ad hoc* **Working Group on Monitoring of RIs** as decided at the 65th ESFRI Forum Meeting on 28-29th June 2018 and presented the main features of the draft Terms of Reference for adoption in Vienna or immediately after. The EB discussed the text and agreed on the timeline with the call for nomination by end of September, a kick-off meeting during the Workshop with Landmarks in November in Milan, a draft report by March 2019, a workshop with stakeholders in May 2019, the adoption of the final report in the second half of 2019 and publication. The EB also discussed about the procedure for identifying members with the following proposal: an operational Chair with experience in ESFRI Methodology as well as national decision-making and RI management, and a combination of members nominated by Delegations (up to nine) and five external experts proposed by the EB to be identified after the meeting in Vienna. The Commission informed the EB that the **EC High-Level Expert Group on Monitoring of RIs** on RIs was set up.

The Commission informed the EB on the latest developments in relation to the **European Open Science Cloud** governance structure: the EC decisions on the EOSC Executive Board – that it was considered as an opportunity for ESFRI to propose a representative – and on EOSC Governance Board.

The EB agreed to launch an informal discussion in the Forum about the Reflection on the **Future of ESFRI** beyond the Roadmap update. The reflection process was agreed to start in Vienna and followed up in later meetings in 2018 and 2019.

The EB discussed the timeline for the **Roadmap update** and agreed that optimal planning would be the following: i) January-May 2019 – agreement on the refined Roadmap Meth-

odology; ii) June 2019 – official launch of the update process and a dedicated InfoDay; iii) June 2021 – planned adoption of the Roadmap; iv) October/November 2021 – Launch event of the new Roadmap update.

11th September 2018

Vienna, Austria

This was a joint Executive Board & WG Chairs Meeting following the 66th ESFRI Forum Meeting on 10th September 2018 and in preparation of the Roadmap Launch event in the afternoon.

The EB discussed the call for candidates for **New EB Members and WG Chairs** and agreed to prepare dedicated Terms of Reference to be added to the call for candidates, stressing the high expected workload taking into account the ESFRI tasks in the next three years. The EB discussed the modus operandi in relation to the preparation of the Forum. It was recognised that effort should be made to improve the connection between the EB and the Forum.

The EB went through the agenda of the **Roadmap 2018 Launch event**, discussed the flow of the different sessions and confirmed the roles of the moderators.

The EB went through the agenda of the **Exchange of Experience Workshop on Preparatory Phase** and clarified the purpose of the bilateral meetings with new Projects.

The Commission recalled the state of play of the **European Open Science Cloud** initiative, explaining the way forward to set-up the EOSC interim Governance Board until 2020. It was noted that a recently published EC decision on setting up the EOSC Executive Board creates an opportunity for ESFRI to propose a representative. It was agreed that the EB would have been informed by the Secretariat as soon as the call for candidates was published.

The EB took stock of the discussions in the Forum on 10th September on the Terms of Reference of the *ad hoc* **Working Group on Monitoring**. The EB agreed to prepare a revised draft and send it to the Delegations.

The Chair informed the EB about the intention of ESFRI to engage, with the support of StR-ESFRI, a consultant to develop a robust and broadly applicable cost reporting model – **Guidelines on Cost Estimation of Research Infrastructures** – for the next Roadmap update. The work is expected to be delivered by March 2019.

27th September 2018

Videoconference

This was an interim Executive Board Meeting .

The EB recalled the discussion about the **Guidelines on Cost Estimation of Research Infrastructures** and made a proposal of four *case studies* to be included in the analysis – DANUBIUS-RI, ELIXIR, ESRF EBS and SHARE ERIC – to cover different RI lifecycle stages, different RI types and different scientific domains, and agreed to ask about their willingness to participate in this study.

The ESFRI Chair reported about the informal meeting with the Director-General for Research and Innovation – Mr. Jean-Eric Paquet – in presence of Mr. Jan Hrušák and Mr. Jean-David Malo, on 13th September where the ESFRI Chair and Vice-Chair presented the ESFRI Roadmap 2018 and introduced its main features. The European Open Science Cloud was also discussed by recalling the Council mandate and the hitherto involvement of ESFRI in the development of EOSC and the need to identify the proper level of effective collaboration. The Work Programme on RIs was also discussed, in particular regarding the role ESFRI could play for the revitalisation of the European Research Area.

The ESFRI Chair reported on the ERAC meeting in Salzburg, where the Chair presented the ESFRI Roadmap 2018 and noted an opportunity to discuss the topic of monitoring indicators within the ERAC framework.

The ESFRI Chair summarised the scope of the call for candidates to **European Open Science Cloud** Executive Board, which was earlier sent to the EB by the Secretariat. The Chair recalled the agreement to propose an ESFRI candidate by 10th October. The EB agreed that Mr. Jan Hrušák was the most

adequate candidate representing ESFRI, in his role of ESFRI Vice-Chair and a clear mandate from the Forum in the next EB.

The EB shortly discussed the agenda for the **ESFRI Workshop on Monitoring of RIs, Periodic Update of Landmarks and use of KPIs** in Milan foreseen in November 2018. It was agreed that the workshop could also serve as kick-off of the new **Working Group on Monitoring**.

The EB agreed on the final text of the draft ToR for the selection of **New EB Members and WG Chairs**. The deadline for the call for candidates was fixed on 31st October and discussion on applications foreseen at the next EB in November.

The EB shortly discussed the organisation of the reflection on the **Future of ESFRI**. This process was planned to involve three steps: i) an informal meeting or working dinner in Milan for EB Members and WG Chairs to discuss the process; ii) a brainstorming non-session in the Forum Meeting in December, followed by a more structured, dedicated workshop for the Forum in late January 2019; iii) a more formal discussion in the Forum throughout 2019 based on the results of the workshop.

19th November 2018

Milan, Italy

This was a joint Executive Board & Working Group Chairs Meeting for the preparation of the **ESFRI Workshop on Monitoring of RIs, Periodic Update of Landmarks and use of KPIs**. The WG Chairs joined the meeting when indicated.

The Chair informed the EB about the complications encountered in proposing an ESFRI representative to the **European Open Science Cloud** Executive Board. Mr. Rossi explained that ESFRI was not eligible to propose a formal representative of the Forum, because ESFRI is not a formal organisation. Due to this, Mr. Jan Hrušák made himself available to take part in the EOSC EB as an independent expert.

The ESFRI Chair explained to the EB the suggested way forward to make a proposal for the selection of **New EB Members and WG Chairs**. He presented the approach agreed with the incoming Chair, Mr. Jan Hrušák to ensure an operational

EB with a good combination of experience and new ideas, aiming at a good gender and geographical balance, in line with the Procedural Guidelines. It was agreed that the Chair himself would make a proposal to the Forum, in agreement with the incoming Chair and the Commission. The Chair gave an overview of the nominations for the WG Chairs, observing that no nomination has been made for SWG on Health & Food and that there are two candidates for SWG on Social & Cultural Innovation. For all other Groups there was one nomination for each.

The WG Chairs joined the meeting.

The Chair recalled the extensive discussions in the Forum on the way forward for follow-up of the Landmarks by ESFRI that led to the organisation of the **ESFRI Workshop on Monitoring of RIs, Periodic Update of Landmarks and use of KPIs** foreseen on 19th-20th May in Milan. The EB exchanged information on the preparation of the different sessions. The Chair explained that two written outputs from the workshop were expected. First, a short, summarized output (1-1.5 page in total) was planned for information during the 67th ESFRI Forum Meeting on 11th December 2018. Later, a more comprehensive paper with workshop conclusions was expected to be developed.

The ESFRI Chair introduced the discussion outlining the context and the possible main lines for the reflection on the **Future of ESFRI** and challenges therein. The EB concluded that an input paper would be prepared for the non-session of the 67th ESFRI Forum Meeting on 11th December 2018, with outline of challenges and potential topics for further discussion in the Workshop on the 31st of January.

10th December 2018

Brussels, European Commission

This was a joint Executive Board & Working Group Chairs meeting in preparation of the 67th ESFRI Forum Meeting on 11th December 2018.

The Chair recalled the purpose and the agenda of the **ESFRI Workshop on Monitoring of RIs, Periodic Update of Landmarks and use of KPIs** that took place on 19th-20th November

2018 in Milan. The quality of the Workshop and all its sessions was recognised by the EB, with special thanks given to the moderators – Giorgio Rossi, Inmaculada Figueroa, Agnieszka Zalewska, Gabriela Pastori and Philippe Froissard – for the very good preparation of the sessions, which enabled constructive and useful discussions. Moderators provided a short summary of the outcomes of their sessions (the session on FAIR data was summarised by Yannis Ioannidis). The conclusions made in the final session of the Workshop were discussed.

Mr. Peter Wenzel-Constabel, Chair of the **Working Group on Monitoring**, recalled the objective of the Group and informed the EB about the outcome of the first meeting on 20th November 2018 in Milan. He also shared with the EB the plan to hold two meetings of the Group before the next ESFRI Forum Meeting in March 2019.

The ESFRI Chair presented the current state of play as regards the understanding of the different types of costs reported to ESFRI and informed the EB about the progress of the **Guidelines on Cost Estimation of Research Infrastructures** which is ongoing with the help of four ESFRI RIs as case studies – DANUBIUS-RI, ELIXIR, ILL and SHARE ERIC. The work was foreseen to be finalised in February/March 2019.

The ESFRI Chair recalled the context of ESFRI engagement with the **European Open Science Cloud** and presented to the EB the concept and objectives of the ESFRI Workshop on RIs and EOSC planned to take place in January in London.

As regards the reflection on the **Future of ESFRI**, the ESFRI Chair introduced the input paper and suggested that the purpose of the non-session is to identify the four main topics for discussion at the workshop planned to take place in January in London. The concept note suggested that these topics could be based on the May and December Council conclusions – call for strengthening the strategic role of ESFRI, fostering long-term sustainability, consolidation of the landscape, coordination of national decision making processes, monitoring, etc. The EB exchanged views on the challenges lying ahead and on the scope of the workshop.

PLENARY FORUM

60th ESFRI FORUM

7th March 2017

Lisbon, Portugal

The 60th ESFRI Forum Meeting took place on 7th March in Lisbon and was hosted in the historical venue of Theatre Thalia by the Portuguese Ministry of Science, Technology and Higher Education, represented by the Minister – Mr. Manuel Heitor – who opened the meeting highlighting the current main challenges for Europe and advocating for a more comprehensive and inclusive science policy at European level.

REPORT FROM CHAIR

The ESFRI Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Brussels. Mr. reported on the InfoDay for the presentation of the ESFRI Roadmap 2018 update and the Exchange of Experience Workshop held on 17th-18th January in Málaga. Mr. Rossi reported on the *Monitoring of Projects* and the *Pilot Review of Landmarks* and took the opportunity to praise the SWGs and IG commitment and long standing work.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The EC Delegate – Mr. Octavi Quintana – informed the Forum about the main issues mentioned in the White Paper on the future of European Union, as presented by President Juncker and discussed at the European Parliament on 1st March.

Mr. Octavi Quintana also referred to the 2nd ERIC Report, in which the EC planned to discuss in particular the implementation of the ERIC regulation, VAT exemption, ERIC registry, economic versus non-economic activities of the ERICs, role of the Commission services, ERIC and international cooperation.

The report was expected to be adopted in June and then submitted to Council, European Parliament, Economic and Social Committee and Committee of the Regions.

Concerning the Horizon 2020 Work Programme 2017 on RIs, the EC Delegate announced that the deadline was fixed on 29th March. The draft Work Programme 2018-2020 was foreseen to be presented to the Programme Committee on 17th March and its adoption was expected in Autumn 2017.

ROADMAP 2018 – UPDATE

The Chair reported on the progress of the *Monitoring of Projects 2008 and Projects 2010* and the *Pilot Review of Landmarks*. The Chair referred that the Specific Questionnaires for the Projects 2008, Projects 2010 and Pilot Landmarks was uploaded into the ESFRI MoS, a platform developed by the StR-ESFRI Project to support these processes. ESFRI Delegates were asked to validate or decline, thorough the ESFRI MoS, their country political support, an action which was instrumental to carry out the evaluation and the assessment performed by the SWGs and IG.

PRESENTATION OF e-IRG ROADMAP

The e-IRG Chair – Ms. Gabriele von Voigt – presented the general objectives of e-IRG and noted its user-driven approach while underlining synergies with ESFRI. The e-IRG e-Infrastructures commons were showcased as one of the main reflection documents. Mrs. Gabriele von Voigt highlighted the challenges of the new e-IRG Roadmap 2016, such as the need for common governance and financing policies and to tackle legal and technological aspects, and then presented two other main publications: *Evaluation of e-Infrastructures and the development of related Key Performance Indicators* and the *Guide to e-Infrastructure requirements for European Research Infrastructures* both published in March 2017.

ESFRI PROCEDURAL GUIDELINES

The ESFRI Executive Secretary – Mr. Dominik Sobczak – recalled that the updated ESFRI Procedural Guidelines were

presented at the 59th ESFRI Forum Meeting on 9th December 2016 and explained the main changes concerning the alignment of the mandate of the Chair and Executive Board to ensure sustainability and continuity of the EB. As there were no comments following the presentation, the Chair asked the Forum to adopt the document. The Procedural Guidelines were adopted by the Forum.

ESFRI ANNUAL REPORT 2016

The ESFRI Chair presented the outline of the *ESFRI Annual Report 2016*, which was circulated in December. The Chair asked for a last round of written comments and reactions. It was decided that the ESFRI Secretariat would circulate the final document to be approved by written procedure.

ESFRI CONTRIBUTION TO ERAC ANNUAL REPORT

The ESFRI Chair recalled to the Forum the request to provide an *ESFRI contribution to the ERAC Annual report 2016*. The Chair presented the main parts of the document and asked for comments. The Forum agreed to take comments into account in the revised text and adopted the document.

ESFRI CONTRIBUTION TO ERAC OPINION ON H2020 INTERIM EVALUATION

The Chair recalled to the Forum the background on the request from ERAC to ESFRI to contribute to the *ERAC Opinion on interim evaluation of Horizon 2020* and the *future Framework Programme*. Based on contributions from ESFRI Delegations, the Executive Board prepared a draft ESFRI Position to be presented to the ERAC Plenary Meeting on 16th-17th March in Malta. After a discussion, the revised text was adopted by the Forum.

ESFRI RECOMMENDATION ON e-INFRASTRUCTURES – FOLLOW-UP

The ESFRI Chair recalled to the Forum the *ESFRI recommendation on coordination of Member States' investment strategies in e-Infrastructures*. The Commission informed the Delegates that the recommendation was presented to the Research Working Party on 30th January 2017 and that the Competitiveness Council took note of the recommendation on 20th February. The Chair also informed the Forum about a presentation of the Acting Director at DG CONNECT – Mr. Thomas Skordas – during the Executive Board meeting on 16th February, in which he outlined the plan to set up EuroHPC, a board dedicated to funding of HPC in Europe.

AD HOC WORKING GROUP ON LONG-TERM SUSTAINABILITY OF RIs – UPDATE

The Chair of the Working Group on Long-term Sustainability of RIs – Mr. Jan Hrušák – recalled the context of the work and the mandate of the Group, specifying that the Competitiveness Council of 27th May 2016 invited the Commission to prepare together with ESFRI and relevant stakeholders an action plan on long-term sustainability of RIs. The ESFRI LTS WG report was expected to be one of the valuable inputs to this process, along with the Commission Staff Working Document and the European Stakeholder Consultation on long-term sustainability. Presenting the draft report, Mr. Hrušák noted that the WG decided to adopt a multilevel approach to the report, considering the need to address different audiences. The Group proposed 7 main recommendations which formulate the political messages of the Group. These messages constitute the prime considerations that would foster the optimal use and impact of RIs and thus would support their long-term sustainability. These 7 main messages were underpinned by 35 more specific recommendations. At the third level, each recommendation was rationalised with background information and examples substantiating it. A first draft of a full report from the LTS WG was expected to be sent to the EB around the 20th March for discussion in order to be adopted by the Forum in early May. Intermediate versions constituted the initial ESFRI input for the European Commission's Staff Working Document on long-term sustainability (SWD) in view of the EC inter-service consultations on the SWD, the publication of its SWD document, and the Council conclusions on LTS recommendations foreseen by the end of the year.

ESFRI RIs PROPOSED TO GSO

The ESFRI Chair recalled the composition and the scope of the Group of Senior Officials as well as its mandate which is to explore the possibilities of establishing RIs at global level. The Chair introduced the concept of the GSO list of infrastructures of global interest and mentioned the ESFRI RIs which are on the GSO lists, as proposed by members of the GSO. The Chair informed the Forum about a request to ESFRI for ELI to be proposed to the GSO and reported on the discussion at the EB which recognised that currently ESFRI has no procedure for endorsement of such requests. The Chair informed the Forum about a reply provided to ELI that there is no possibility for explicit ESFRI endorsement. After discussion on the need of the Forum to consider establishing a formal procedure to deal with such requests, the Chair concluded that another discussion on this topic could be needed in the future in relation to the ESFRI Landmarks.

61st ESFRI FORUM

21st June 2017

Krakow, Poland

The 61st ESFRI Forum Meeting took place on 21st March in Krakow and was hosted by the Polish Ministry of Science and Higher Education at the Jagiellonian University and Polish Academy of Arts and Sciences. It was opened by the Director for Innovation and Development at the Polish Ministry of Science and Higher Education – Mr. Mateusz Gaczyński – who introduced the latest research policy developments in Poland and plans for the future.

REPORT FROM CHAIR

The ESFRI Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Lisbon. Mr. reported on the ERAC Plenary Meeting held on 16th-17th March 2017 in Malta and the associated workshop on the interim evaluation of H2020 and the preparations of the next Framework Programme, where the inputs of different ERA-related groups were discussed.

The Chair also gave an account of the 9th GSO Meeting in Napoli, where the *Global excellence-driven Access (GeA)* criteria were discussed. Open innovation and data management were mentioned as other activities of the GSO, which deserve the Forum's attention.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The EC Delegate – Mr. Octavi Quintana – informed the Forum about the *European Open Science Cloud* Summit which took place in Brussels on 12th June. The Summit consisted of five main sessions organized by pillars: 1. Data culture, stewardship and policy tools; 2. adoption and implementation of the FAIR data principles; 3. Research data infrastructures and services; 4. sustainable funding and governance; 5. HPC, big data and super-connectivity. Mr. Octavi Quintana reported on the concluding remarks of the Director-General for Research and Innovation – Mr. Robert-Jan Smits – who stressed the need to create a governance board of representatives of different communities to support and monitor the further development and implementation of the Open Science roadmap. An EOSC declaration was expected to be signed by the end of September.

In the discussion that followed, a number of Delegations expressed disappointment that the ESFRI Forum was not invited to the Summit, even though it was recognised that ESFRI Research Infrastructures are a very important component of the EOSC. The ESFRI Chair noted that following up on the ESFRI recommendation on e-Infrastructures the Forum should be proactive in engaging with the EOSC. It was decided that the elaboration of the ESFRI strategy on e-Infrastructure would proceed in the same time scale as the EOSC debate stimulated by the EC.

Concerning the Horizon 2020 Work Programme 2017 on RIs, the EC Delegate announced that the evaluation was ongoing. The EC Delegate also informed the Forum that the latest draft of the Horizon 2020 Work Programme for 2018-2020, in-

cluding the calls related to EOSC, was going to be discussed with the Programme Committee on 27th June and its publication was expected in October.

AD HOC WORKING GROUP ON LONG-TERM SUSTAINABILITY OF RIs – FINAL REPORT

The Chair of the Working Group on Long-term Sustainability of RIs – Mr. Jan Hrušák – thanked for the input of different Delegations to the draft report, underlining that the contributions provided a significant added value to the recommendations. Mr. Hrušák also stressed that long-term sustainability is not reduced simply to financial means, but it is a much more comprehensive concept spanning across all the activities of the RI.

The ESFRI Chair thanked the Working Group for the hard work and an excellent report, which demonstrates the potential of ESFRI to produce knowledge on Research Infrastructures. He proposed the Forum to have the report adopted and suggested to prepare it for publication as ESFRI Scripta Vol.2 by the end of 2017. The Forum approved the report and agreed to publish it.

The EC Delegate also thanked Mr. Hrušák and all members of the Working Group for their excellent work and for the important contribution that this report made to the Staff Working Document on long-term sustainability of Research Infrastructures, which will be published by the Commission after the summer.

AD HOC WORKING GROUP ON INNOVATION – UPDATED REPORT

The Chair – Mr Giorgio Rossi – also recalled a report from the Working Group on Innovation which was adopted by the Forum in 2016. Mr. Rossi underlined its quality and relevance and proposed to have it edited for publication – upon update by the Chair of the INNO WG – Mr. Jean Moulin – as ESFRI Scripta towards the end of 2017/beginning of 2018. The Forum agreed.

ROADMAP 2018 – UPDATE

The ESFRI Chair recalled to the Forum the general timeline of the ESFRI Roadmap 2018 update process. In particular, *Monitoring of Projects 2010* had been performed by SWGs and IG during spring to assess their progress on the scientific case and implementation. This monitoring exercise concerned three Projects in Health & Food and three Projects in Energy. Mr. Rossi asked the Chairs of the two SWGs and the Chair of the IG to share with the Forum their most important findings.

At the same time, a *Pilot Review of Landmarks* has been carried out. The ESFRI Chair reported on the state of play of this exercise and shared preliminary considerations that resulted from the discussion between WG Chairs and the EB to start a discussion within the Forum about the *Periodic Review of Landmarks*.

The *Monitoring of Projects 2008* was also undergoing: projects had submitted their monitoring documents, to be then analysed by SWGs and IG over the summer. The Chair also informed the Forum that the EB agreed to organise hearings with each Project 2008 in order to ensure that all relevant information was taken into account in their assessment for the Roadmap 2018.

On *Submission of New Proposals*, deadline was planned on 31st August.

ESFRI ANNUAL REPORT 2016

The Chair recalled to the Forum the context of the *ESFRI Annual Report 2016* and informed the Delegations that the text has been further elaborated by StR-ESFRI and the Secretariat and was being edited for publication. The Chair asked the Forum to adopt the report. The report was adopted.

62nd ESFRI FORUM

19th September 2017

Brussels, European Commission

The 62nd ESFRI Forum Meeting took place on 19th September in Brussels and was hosted by the European Commission at the Madou Building.

REPORT FROM CHAIR

The ESFRI Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Krakow. Mr. reported on a series of events in which he represented ESFRI, namely the Round table in Milan European Economy Forum and the interview for RISCAPE.

Mr. Rossi also informed the Forum about the GSO meetings planning and their work on the concept of Global Research Infrastructures.

Finally, the Chair informed the Forum about the publication of the ESFRI Annual Report 2016. Copies were available for the Delegations during the meeting.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The new EC Delegate – Mr. Jean David Malo – sent his apologies and the new Head of Unit for Research Infrastructures at DG Research and Innovation – Mr. Ales Fiala – introduced the topic of the *European Open Science Cloud*. The Deputy Head of Unit for Research Infrastructures at DG Research and Innovation – Mr. Philippe Froissard – then presented the current state of play and the next steps of the EOSC development process. Mr. Froissard informed the ESFRI Forum that the EC was organising a dedicated meeting on 27th Novem-

ber to present the relevant call on EOSC in the Horizon 2020 Work Programme 2018-2020 to the ESFRI Forum and the interested RIs. This meeting was intended to provide a better understanding of the funding opportunities and to offer an occasion for the ESFRI RIs and Delegations to have a clear vision of the process and their potential role.

The ESFRI Chair welcomed once again the willingness of the European Commission to discuss the forthcoming EOSC Declaration with ESFRI and re-affirmed that ESFRI was ready to play an active role in the discussions on the EOSC. The Chair proposed that the inputs of Delegations to the EOSC Declaration were sent to the Executive Board to consolidate an *ESFRI Position on EOSC*.

EC STAFF WORKING DOCUMENT ON LONG-TERM SUSTAINABILITY OF RIs

The EC Representative – Mr. Philippe Froissard – presented the Staff Working Document (SWD) on Long-term sustainability of RIs, which was prepared for publishing, to respond to the Competitiveness Council mandate, in which the Commission was tasked to develop an action plan, in collaboration with different key stakeholders, including ESFRI. The debate with ESFRI, EIROforum, ERA stakeholders and other key stakeholders was constructive and touched upon elements which go well beyond funding and governance issues. The European Commission thanked ESFRI for its contribution to the work and in particular for the report prepared by the Working Group on LTS, which was a very valuable input as it provided a set of concrete actions, which were considered in a number of the SWD 42 recommendations. As a follow-up, the discussions with the upcoming presidencies were considered as very good opportunities to prioritize actions. In particular, the presidency event in Bulgaria in March 2018, back to back with the ESFRI Forum, was underlined to be an excellent moment to deepen the general debate, and the ICRI 2018 in Vienna, under the Austrian presidency, to tackle the international dimension.

MERIL2 PROJECT – PRESENTATION

The MERIL2 Coordinator – Ms. Ana Helman – presented the MERIL initiative, which aims at carrying out a comprehensive mapping of European openly accessible Research Infra-

structures of more than national relevance. Ms. Ana Helman presented the new version of the portal, which comprises more than 940 RIs currently mapped, of which 500 were quality-checked.

ROADMAP 2018 – UPDATE

The ESFRI Chair thanked the WGs for their work and reported to the Forum on the state of progress.

The ESFRI Chair presented an overview of results of the *Monitoring of Projects 2010* and thanked the SWGs on Health & Food and Energy, as well as the IG for the high-quality reports. The Chair underlined in particular that all the Projects 2010 had still significant challenges to meet in the next two years as they were still not ready to be considered as implemented. The Chair asked the Forum for comments by 29th September in order to have the reports approved by written procedure for distribution to the projects. The Forum agreed to proceed as proposed.

On *Monitoring of Projects 2008*, Mr. Rossi explained that the EB proposed to give the Projects 2008 an additional opportunity to submit updated documents related to the questionnaire in order to capture their state of implementation before questions for hearings were prepared. The letters with such clarification questions prepared by the relevant Working Groups was planned to be sent to the Projects in early October, with a deadline to submit answers and updated documents at the beginning of November. The Forum agreed to proceed as proposed.

Concerning the *Submission of New Proposals*, the ESFRI Chair presented an overview of the twelve submitted proposals. Ten out of twelve submitted proposals fulfilled the eligibility criteria. These proposals included DiSSCo, EHRI, EIRENE, eLTER, EU-IBISBA, EuroNanoLab, EuroStrain, METROFOOD-RI, OPERAS and RESILIENCE. Two other proposals, SILECS and IFMIF-DONES, did not meet the condition of providing a proof of a signed inter-institutional, multilateral agreement. The EB recommended temporarily accepting these proposals for evaluation upon the condition that the leading Delegations – France and Spain, respectively – provided the required documentation by 15th October. The Chair proposed to the Forum an agreement to proceed with the evaluation of the 10 eligible proposals, and to temporarily suspend the evaluation of SILECS and IFMIF-DONES until the missing

documents were provided. The Forum agreed on this procedure.

For the *Evaluation of New Proposals*, the attribution by scientific field to the respective SWGs was done on the basis of a self-declaration of the proposals. The ESFRI Chair asked the Forum to agree on the attributions' list taking also in consideration the need for some proposals to be evaluated by other relevant SWGs. Given the submission of proposals with very substantial digital infrastructure components, the Forum recognised the need to set up a new SWG specifically dedicated to digital infrastructures and agreed to establish it as *Strategy Working Group on Data, Computing and Digital Research Infrastructure (DIGIT SWG)*. A call for nomination of members of the newly formed DIGIT SWG was open with deadline on 29th September 2017. For the time being, the DIGIT Group was proposed to be chaired by Ana Proykowa and composed of the e-Infrastructures experts of the other five SWGs. The Forum agreed on the proposed way forward for the Group and asked for the nominations to be sent to the ESFRI Secretariat.

PERIODIC UPDATE OF ESFRI LANDMARKS

Following the previous discussion in Krakow, the ESFRI Chair proposed the EB to prepare a document based on lessons learnt from the *Pilot Review of Landmarks* for discussion in Forum Meeting in December in Lund. This document was intended to represent the basis for discussion with the Forum and the Pilot Landmarks to develop a shared strategy for reviewing Landmarks in the future. The agreed methodology would start to be applied around 2020.

The Commission informed the Forum about the plan to establish a dedicated High Level Expert Group to assess the progress of ESFRI infrastructures towards their implementation and long-term sustainability. The experts were expected to provide a report for each of the targeted ESFRI RIs, which could serve as a knowledge baseline for future reviews of ESFRI Landmarks. The Group activity was foreseen from the second half of 2018 until early 2020.

NEW ESFRI CHAIR, EXECUTIVE BOARD MEMBERS AND WG CHAIRS – MANDATE

The ESFRI Secretary drew the attention of the Forum to the fact that the mandate of the current ESFRI Chair, along with other Executive Board Members and the WG Chairs, expired at the end of June 2018. The Secretary proposed to the Forum to establish the Search Committee before the ESFRI Forum Meeting in December and recalled that "The Search Committee shall be formed by four ESFRI Delegates coming from different countries who would not see their country nominating a candidate". The Secretariat proposed to the Forum to launch, shortly after the meeting, a call for nominations to the Search Committee. The Forum agreed to proceed as proposed.

63rd ESFRI FORUM 13th December 2017

Lund, Sweden

The 63rd ESFRI Forum Meeting took place on 13th December 2017 in Lund and was hosted by the Swedish Delegation at the Museum of Artistic Process and Public Art.

REPORT FROM CHAIR

The Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Brussels.

Concerning the ERAC Steering Board meeting on 7th November, the Chair debriefed the Forum on the creation of an *ad hoc* Working Group on Partnerships, and the request to contribute to the *ERAC Annual Report 2017* with a focus on real-world impact of the activities of ERAC and ERA-related groups by the end of February 2018.

For a short overview of the ERAC Plenary meeting on 5th December 2017, the Chair gave the floor to Mr. Jan Hrušák who reported on the first discussion on the review of ERA Governance and the establishment of the WG on Partnerships. Regarding the LEAPS meeting, the Chair outlined to the Forum

the purpose of the meeting and asked Mr. Andrew Harrison to inform the Delegates about the objectives of this initiative.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The EC Representative – Mr. Philippe Froissard – informed the Forum about the publication of the first part of the Work Programme 2018-2020 adopted at the end of October, and noted that the first deadline of some calls on Research Infrastructures was already fixed on 5th December 2018. The publication of the WP 2020 parts is expected around February 2019. Mr. Froissard gave an overview of the structure of the WP and highlighted the calls with a potential interest to ESFRI and ESFRI projects. Mr. Froissard made a reference to a specific info day organised by the EC on 27th November in Brussels to present to ESFRI RIs and ERICs the opportunities offered by the INFRADEV and INFRAEOSC calls. A general info day, organised by the NCP network RICH, was held on the 30th of November in Brussels to present all calls and topics.

Mr. Froissard also informed the Forum about the presentation of the Staff Working Document on long-term sustainability of RIs to the Council Research Working Party in October 2017 and to ERAC in December 2017.

NEW ESFRI CHAIR, EXECUTIVE BOARD MEMBERS AND WG CHAIRS – SEARCH COMMITTEE

The Chair of the Search Committee – Ms. Beatrix Vierkorn-Rudolph – informed the Forum about the outcomes of the first Committee Meeting. The Committee proposed to the Forum to extend the mandate of the current ESFRI Chair – Mr. Giorgio Rossi – together with all Executive Board Members and Working Group Chairs, by six months until 31st December 2018 to allow the entire team to complete the Roadmap 2018 update and favouring a smooth transition to the mandate of

the new Chair. The Forum unanimously agreed to the proposal. Mr. Rossi accepted the extension of the mandate until the end of 2018.

The Committee also proposed to start the search for a new ESFRI Chair immediately, envisaging the opening of the Call for Candidates in January 2018 with a deadline in mid-March. The following plan was proposed: next Search Committee meeting organised in March alongside the Forum meeting in Sofia to analyse the applications received; interviews with the applicants in May; elections during the ESFRI Forum Meeting in June. The Forum agreed on this proposal.

Ms. Vierkorn-Rudolph also informed the Forum that the Committee reflected on the particular duties of the new Chair, which include, among others, the next Roadmap update, organising appropriate ESFRI inputs to the EOSC, fostering long-term sustainability of RIs, international outreach as well as addressing more comprehensively the innovation aspects, because RIs need to demonstrate better their impact on the economy and society.

EUROPEAN OPEN SCIENCE CLOUD

The ESFRI Chair informed the Forum about the informal meeting with EC on the H2020 EOSC-related calls on 27th November, which followed the publication of the EOSC Declaration. He proposed to prepare a paper on *ESFRI Position on EOSC*, based on the main elements of the discussion paper on e-Infrastructures and inputs from Delegations, to be circulated to the Forum by early January. The adoption by written procedure was scheduled by 21st January to provide inputs to the EC Staff Working Document planned shortly after. The Forum agreed on this proposal.

Mr. Philippe Froissard gave an overview of the EOSC Stakeholder Forum on 30th November 2017 in Brussels, which brought together around 350 participants and raised a lot of interest and expectation from the stakeholders. Mr. Froissard also reported on a working paper on EOSC circulated to the ERAC Working Group on Open Science & Innovation by the General Secretariat of the Council on 29th November 2017. This working paper provided an analysis of the comments received from the Member States following the presentation by the EC at the WG meeting on 25th October.

Mr. Froissard informed the Forum about the next steps in the EOSC development, following a meeting on 11th December in the Council Research Working Party. The EC was expected to present the outline of its proposal to the ERAC OSI WG on 21st December in view of the preparation of a Staff Working Document to be launched in early 2018.

RITRAIN PROJECT – PRESENTATION

The Administrative Director of BBMRI ERIC and Coordinator of Rltrain – Mr. Markus Pasterk – presented the hitherto achievements of the Rltrain project, in particular the launch of a masters' course in management of RIs. Building on the RAMIRI project, this project tackles the need to provide a specialised training program in management of RIs. To this end, a dedicated master's course had been developed and implemented at University of Milano-Bicocca. The first edition met with very high interest from managers across many European RIs. The course is supported with webinars available online.

ROADMAP 2018 – NEW PROPOSALS

The ESFRI Chair recalled that twelve proposals were submitted and were under evaluation. The Chair asked all Working Groups involved in the *Evaluation of New Proposals* to provide an update on their progress.

The Chair of SCI SWG – Mr. Jacques Dubucs – confirmed that the evaluations are well on track for all three proposals – EHRI, OPERAS and RESILIENCE – with only OPERAS being a bit delayed due to temporary unavailability of the rapporteur.

The Chair of ENV SWG – Ms. Gelsomina Pappalardo – also reported good progress on both proposals – DiSSCo and eLTER – and observed that the initial impressions of the SWG and the IG are largely coherent.

The Chair of H&F SWG – Ms. Gabriela Pastori – noted that some external evaluation reports on the three proposals – EIRENE, EU-IBISBA and METROFOOD-RI – were still missing but didn't envisage significant delay of the evaluation process. She observed that the schedule was very tight, which should be reflected on in the next Roadmap exercise.

The Chair of PSE SWG – Mr. José Luis MARTÍNEZ – reported very good progress in evaluations of two proposals – EuroNanoLab and EuroStrain. He informed the Forum that following a profound analysis of the scientific case of the EuroStrain proposal, the Group concluded that it failed to demonstrate sufficient scientific quality to be considered as a potential candidate for the Roadmap. In particular, the weaknesses of this proposal are so substantial that the panel was convinced that the eventual hearing has no potential to alleviate the weaknesses identified in the proposal.

The Chair of DIGIT SWG – Ms. Ana Proykova – informed the Forum that the Group was effectively set up and managed to get the evaluation done on time for a unique proposal – SILECS – and other proposals with substantial digital infrastructure components – DiSSCo and OPERAS. She also took the opportunity to thank the Group members for effective work.

The Chair of ENE SWG – Mr. Harald Bolt – sent his apologies prior to the meeting and therefore no update from the Group was provided on IFMIF-DONES.

The Chair of the IG – Mr. Odd Ivar Eriksen – underlined that the Group had a very high workload with 21 projects – including the 2008 ones – to be assessed, with inputs from 3 external experts. Nevertheless, the work was completed on time and the Group was ready for the hearings.

The ESFRI Chair recalled the purpose of hearings and recommended that all proposals were invited with the exception of EuroStrain. The Chair also informed the Forum that hearings would take place from the 30th January to 1st February and outlined the structure of the hearings. The Forum agreed with this proposal.

ROADMAP 2018 – MONITORING OF PROJECTS 2008

The ESFRI Chair recalled to the Forum that, following the initial results of the monitoring, all nine Projects 2018 were asked to answer in writing a number of targeted questions by the beginning of November, before being invited to hearings. The Chair noted that the timeline for hearings for Projects 2008 is the same as for New Proposals and invited the Working Groups involved in the *Monitoring of ESFRI Projects 2008* to share with the Forum their initial conclusions.

The Chair of the IG – Mr. Odd Ivar Eriksen – recalled the Group objective to verify the fulfilment of key indicative requirements for implementation and noted that all Projects 2008 made a very substantial progress since their assessment in 2015.

The Chair of SWG ENV – Ms. Gelsomina Pappalardo – observed that the additional questions didn't bring the expected result and similar ones would be asked again in the hearings. This step could be reconsidered the next time similar exercise is done.

The Chair of H&F SWG – Ms. Gabriela Pastori – noted that the opportunity for providing updates and additional information was important. She also noted that some representatives of the nodes of distributed RIs would be involved in the hearings.

The Chair of PSE SWG – Ms. José Luis MARTÍNEZ – observed that in case of CTA concrete deadlines proved useful to catalyse decisions.

The ESFRI Chair concluded that the 10-year deadline has proved effective to accelerate the implementation of the RIs, especially in the period when they approach the end of the 10-year presence on the Roadmap. He recalled the purpose of hearings and recommended that all projects were invited. The Chair also informed the Forum that hearings would take place from the 30th January to 1st February and outlined the structure of the hearing. The Forum agreed with this proposal.

ROADMAP 2018 – LANDSCAPE ANALYSIS

The ESFRI Chair recalled the purpose of the *Landscape Analysis* and informed the Forum that the SWGs were making good progress, collaborating also with Ms. Rosette Vandembroucke who is responsible for the part on e-Infrastructures on behalf of the eIRG. Mr. Giorgio Rossi noted that further work was expected in the next three months in order to present the outcomes of that analysis in the ESFRI Forum Meeting in March to have it adopted by the Forum in June, together with the rest of the Roadmap.

AD HOC WORKING GROUP ON LONG-TERM SUSTAINABILITY OF RIs – ESFRI SCRIPTA VOL. 2

The ESFRI Chair recalled that the report of the LTS WG was approved by the Forum in Kraków and invited the Chair of the Group – Mr. Jan Hrušák – to present the publication of the ESFRI Scripta Vol. 2. Mr. Hrušák informed the Forum that the report has been published both in electronic and in paper format and thanked the members of the Group and the ESFRI support StR-ESFRI Project for editorial work. Mr. Hrušák observed that with the publication of the report the task of the Group has been fulfilled and asked the Forum to close the mandate of the Group. The Forum agreed to close the mandate of the Group and the ESFRI Chair congratulated Mr. Hrušák and the entire Group on the excellent work.

64th ESFRI FORUM 21st March 2018

Sofia, Bulgaria

The 64th ESFRI Forum Meeting took place on 21st March 2018 in Sofia and was hosted by the Bulgarian Delegation on behalf of the Bulgarian Presidency at the Boyana Residence.

REPORT FROM CHAIR

The ESFRI Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Lund.

The Vice-Chair – Mr. Jan Hrušák – reported on the 37th ERAC plenary on 15th-16th March in Plovdiv. In the context of this meeting, there were two contributions from ESFRI: i) the contribution to ERAC Annual Report 2017 and ii) an information note on ESFRI activities in the first quarter, including the progress of the ESFRI Roadmap, publication of the ESFRI Scripta Vol.3 on Innovation and ESFRI position on the EOSC. The governance issue and the role of the Member States in the EOSC context was one of the main issues discussed in the meeting.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The European Commission Delegate – Mr. Jean-David Malo – informed the Forum on the discussion on Long-term sustainability, the American Association for the Advancement of Science (AAAS) Annual Meeting 2018, and the state of play of the European Open Science Cloud.

Concerning the Action Plan on the long-term sustainability of Research Infrastructures, Mr. Malo thanked the Bulgarian Presidency to take the initiative to address such a relevant topic in their upcoming Flagship conference. The Commission considers the Bulgarian conference as an opportunity to prioritise the recommendations and to discuss with stakeholders a strong basis for the European Action plan.

During the American Association for the Advancement of Science (AAAS) Annual Meeting 2018 on the 19th February, the Commission organised a session on "Fostering the innovation potential of Research Infrastructures", which addressed the role of industry as a co-developer and supplier of high-technology components, and as a user of innovative services provided by RIs.

Concerning the *European Open Science Cloud*, Mr. Malo described the main objectives and content of the recently released Staff Working Document (SWD) on the EOSC, which takes into consideration the key requirements of the different actors, including the *ESFRI position paper*. The ESFRI Chair thanked the European Commission for the overview of the current activities and reiterated ESFRI engagement in this domain, especially in data management and service orientation, building on existing RIs, and providing a coherent approach towards implementation.

ROADMAP 2018 – RECOMMENDATION ON PROJECTS 2008

The ESFRI Chair reported on the outcomes of the *Monitoring of Projects 2008*, highlighting that eight Projects were con-

sidered as implemented – CTA, ECCSEL ERIC, EISCAT_3D, EPOS, EMBRC ERIC, ERINHA, EU-OPENSREEN ERIC, Euro-Biolmaging – while SIOS did not. After a short presentation by the relevant Working Group Chairs, highlighting their strengths and achievements, but also identifying specific challenges for the next years where a particular follow-up would be advised, the ESFRI Chair recommended to the Forum to grant the eight Projects the status of ESFRI Landmarks in the Roadmap 2018. The Forum approved the final reports from *Monitoring of Projects 2008* and accepted the EB Recommendation to include eight Projects as ESFRI Landmarks in the Roadmap 2018.

ROADMAP 2018 – NEW PROPOSALS

The ESFRI Chair updated the Forum on the state of play of the *Evaluation of New Proposals*. Since the harmonisation meeting on 6th-7th March 2018 in Milan was not conclusive, another meeting was scheduled in April to elaborate a recommendation for each project by the end of May and circulate all documentation for comments and adoption during the 65th ESFRI Forum Meeting taking place on the 28th-29th June in Corfu.

ROADMAP 2018 – LANDSCAPE ANALYSIS

The ESFRI Chair presented the structure of the *Landscape Analysis* and the timeline for its preparation: Section 1 to describe the RI landscape, gaps, challenges and future needs covering all sub-fields; Section 2 to identify areas where integration of and connection between RIs, as well as vision and perspectives across the thematic fields, should be strengthened; Section 3 to cover cross-cutting aspects such as education and training, innovation, impact, big data and e-Infrastructures needs, as well as institutional, regional, national, European and international dimensions and interplay between these dimensions. The Forum agreed to have a full package on the Landscape at the end of May to be adopted in June, together with the rest of the Roadmap.

The Chairs of the SWGs informed the Forum about the current status of work on the *Landscape Analysis* in their respective fields, demonstrating in particular the work done on identifying interlinks between different domains. The Chair observed that the *Landscape Analysis* is a proof that Europe

has created an effective toolkit to generate data across disciplines with high potential to develop data that could help address the global challenges of interdisciplinary character.

PERIODIC UPDATE OF ESFRI LANDMARKS

The Chair recalled earlier discussions on this topic, in particular in the two ESFRI Forum Meetings in Krakow and Brussels in 2017. Based on the discussion within the Forum, the Chair suggested that the strategic part (Part1) of the Roadmap 2018 would mention the ongoing discussion on *Periodic Review of Landmarks*, while ESFRI would postpone the process after the summer, when a meeting with the pilot Landmarks would be organised.

ESFRI ROADMAP 2018 METHODOLOGY – EVALUATION NOTE

The Executive Board Member – Mr. David Bohmert – introduced the concept of the note and welcomed comments until end of April. The Vice-Chair noted that while the note has a broad scope that also addresses strategic challenges for ESFRI in the mid-term, lessons learnt from the Roadmap 2018 procedure need to be prepared for the text of the Roadmap.

NEW ESFRI CHAIR, EXECUTIVE BOARD MEMBERS AND WG CHAIRS – CALL FOR CANDIDATES

The Chair of the Search Committee – Ms. Beatrix Vierkorn-Rudolph – informed the Forum about the three applications received from Mr. Christian Chardonnet, Ms. Inmaculada Figueroa and Mr. Jan Hrušák. Ms. Vierkorn-Rudolph noted that all three applications were submitted within the deadline and were complete, as they contain all required documents. Ms. Vierkorn-Rudolph informed the Forum that the Search Committee would interview candidates in May with the aim to present the outcomes to carry out the formal elections in June.

AD HOC WORKING GROUP ON INNOVATION – ESFRI SCRIPTA VOL. 3

The Chair announced the publication of the ESFRI Scripta Vol. 3 – *Innovation-oriented cooperation of Research Infrastructures*. The publication is based on the report from the Working Group on Innovation, adopted by ESFRI in March 2016. The report was revised in late 2017 under editorial supervision of Mr. Jean Moulin, who chaired the Innovation Group, and thanks to the StR-ESFRI Project.

65th ESFRI FORUM 28th-29th June 2018

Corfu, Greece

The 65th ESFRI Forum Meeting took place on 28th-29th June 2018 in Corfu and was hosted by the Greek Delegation on behalf of Corfu authorities, the Mayor of Corfu – Mr. Konstantinos Nikolouzos – and the Director of the Ephorate of Antiquities of Corfu – Mr. Diamado Rigakou – at the Church of St. George in the Old Fortress.

REPORT FROM CHAIR

The ESFRI Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Sofia.

The Chair briefly referred to the ERAC Plenary Meeting on 17th May in Brussels, as in this meeting there was an initial analysis of the inputs from ERA-related Groups to the 2018 ERA Governance review. The documents that ESFRI submitted to ERAC were provided to the Forum. The Chair informed the Forum that ERAC was conducting a survey that ESFRI needed to fill in and submit to ERAC by 29th June. The Executive Board was consulted on the nature of the answers.

The Chair also reported on the outcomes of the 11th GSO meeting in Tallahassee/Livingston (US) on 21st-25th May 2018.

Giorgio Rossi participated in numerous meetings on RIs and e-Infrastructures, such as the one hosted by the Iceland Delegation, and Pro-ESOF presentation of ESFRI methodology

and perspective developments on Research Infrastructures in Trieste.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The European Commission Delegate – Mr. Jean-David Malo – informed the Forum about the two sets of Competitiveness Council conclusions of 29th May 2018, the Commission proposal for Horizon Europe and ICRI 2018.

Mr. Malo underlined that ESFRI is prominently featured both in Council Conclusions on *Accelerating knowledge circulation in the EU*, and Council Conclusions on the *European Open Science Cloud*. Mr. Malo noted that the content of these conclusions as well as potential way forward would be discussed in the 2nd day of the Forum meeting.

Mr. Malo briefly introduced the proposal of the European Commission for Horizon Europe. He mentioned in particular the 3 pillar structure, the novelties such as EIC and the mission approach. In the context of the Open Science pillar there is a comprehensive Research Infrastructures programme, with a proposed budget similar to the one in H2020.

Mr. Malo mentioned also the rationalisation of the partnerships and a new approach regarding the new strategic programming process – with an interim draft by the end of the year. This document will be discussed in the 2019 with the newly elected Parliament and the Commission. The Commission also noted that discussions with the Council and the Parliament had already started in a fast track.

Concerning International Conference on Research Infrastructures, the Commission informed the Forum that the preparations for ICRI (12th-14th September 2018) were ongoing in collaboration with the Austrian Delegation which informed the Forum about the current state of the agenda, as the last programme committee was going to take place on the 29th June.

NEW ESFRI CHAIR – ELECTION

The Chair of the Search Committee – Ms. Beatrix Vierkorn Rudolph – asked the candidates to leave the room and presented a short overview of the election process. She then recalled to the Forum that the three candidates were interviewed in Brussels and that the two candidates who maintained their candidature – Ms. Inmaculada Figueroa and Mr. Jan Hrušák – met the profile needed for the chairmanship of ESFRI. The Search Committee report was sent to the Delegations in advance of the Forum meeting, providing the candidate applications and outcomes of the interviews.

The two candidates made a presentation of about 10 minutes, sharing their visions for the Chairmanship, priorities and strategy to tackle the challenges facing ESFRI in the upcoming 3 years. The Forum proceeded with the vote, either physically or remotely: Mr. Jan Hrušák received the majority of the votes and he was elected ESFRI Chair taking office on 1st January 2019.

NEW EXECUTIVE BOARD MEMBERS AND WG CHAIRS – PROCESS AND SCHEDULE

The ESFRI Chair recalled to the Forum that the mandate of the EB Members and the SWG and IG Chairs expires at the end of the current year. The Chair proposed to the Forum to launch a call for candidates for new EB Members and SWG and IG Chairs with the deadline of 1st November. The Forum welcomed this proposal envisaging that the Forum would take a decision on the composition of the EB and on the WG Chairs before the end of the year.

ROADMAP 2018 – RECOMMENDATION ON NEW PROPOSALS

The ESFRI Chair recalled the discussions on the *Selection of New Proposals* in the two previous meetings of the EB. The EB acknowledged that four proposals – DiSSCo, eLTER, EU-IBISBA, METROFOOD-RI – meet the minimal requirements criteria both for the scientific case and implementation and were recommended to be included in the Roadmap 2018. The EB also acknowledged that four proposals – EIRENE, EuroNanoLab, EuroStrain, SILECS – did not demonstrate sufficient maturity regarding the scientific case, as compre-

hensively justified in the evaluation reports, and didn't recommend them for inclusion in the Roadmap 2018. Two more proposals – OPERAS and RESILIENCE – in the SCI domain, in spite of scoring *High* in the scientific case, did not fulfil all minimal requirements criteria for implementation but the EB agreed that they may represent a strategic area in the SCI domain. The two non-harmonised proposals – EHRI and IFMIF-DONES – that both scored *High/Very High* on the scientific case and *Medium* on implementation deserved an in-depth discussion on their strategic potential. After discussion, the EB concluded to recommend to the Forum six proposals for inclusion as ESFRI Projects in the Roadmap 2018 – DiSSCo, EHRI, eLTER, EU-IBISBA, IFMIF-DONES and METROFOOD-RI.

The ESFRI Chair recalled the whole process that led to the EB Recommendation as result of the evaluation carried out by the Strategy Working Groups and the Implementation Group and the Executive Board discussions. The rationale of the harmonisation process was presented as well as the strategic discussion held in the last EB meetings. The Chair presented then the rationale to include six new projects in the Roadmap – DiSSCo, EHRI, eLTER, EU-IBISBA, IFMIF-DONES and METROFOOD-RI – and opened the floor for comments from the Delegations.

After a detailed discussion on the opportunity to include EHRI and IFMIF-DONES – as well as OPERAS and RESILIENCE – as ESFRI Projects, a new proposal was made: either include EHRI and IFMIF-DONES as new Roadmap entries and OPERAS and RESILIENCE as *High Strategic Potential Areas* in a 6+2 combination, or take EHRI and IFMIF-DONES out of the new entries with a combination of 4+4. Since the general consensus was for the first option with the list of 6 new Projects plus 2 *High Strategic Potential Areas* with a clear description in the LA, the Forum approved this solution.

ESFRI ROADMAP 2018 – ADOPTION

The ESFRI Chair presented Part 1 of the Roadmap and the Forum expressed satisfaction.

The Chair presented Part 2 of the Roadmap, underlining the scope of the update as well as the new features of this chapter, and stressed that this is an essential part forming the basis for strategic advice that ESFRI gives on prioritization of investments in RIs. After discussion, the Chair concluded that there is a general acceptance of the work on the Land-

scape Analysis and recognition of its quality, while reservation is only expressed with regards to specific formulations. The Chair concluded that the Forum agreed on approving the Part 2.

The Chair presented Part 3 with the layout of the RI cards for Projects and Landmarks included in the ESFRI Roadmap. Mr. Rossi in particular explained the proposal on how to present different status of participants and how to treat RIs which are led by the EIROforum members.

The Forum adopted the ESFRI Roadmap 2018 consisting of three parts and including 37 Landmarks and 18 Projects.

The Chair thanked Delegations for constructive discussions and closed Day 1 of the Forum meeting.

INTRODUCTION TO DAY 2

The Chair welcomed the Delegations at Day 2 of the Forum meeting and introduced the agenda.

NON-SESSION

Two non-sessions took place: the first on the ESFRI mandates on e-Infrastructures and coordination with EOSC, and the second on the Methodology for review of ESFRI Landmarks, the mandate to develop a common approach for monitoring of RI performance, and the mandate on better aligned decision making and exchanging of experience in national roadmaps and budget line practices.

ESFRI ROADMAP 2018 – LAUNCH EVENT AND EoE WORKSHOP

The Chair informed the Forum that the first outlines of the agendas for the two events were discussed in the EB. The Chair presented these outlines to the Forum and the Delegations agreed to proceed along these drafts in organization of the events.

66th ESFRI FORUM

10th September 2018

Vienna, Austria

The 66th ESFRI Forum Meeting took place on 10th September 2018 in Vienna and was hosted by the Austrian Presidency at the Palais Harrach.

REPORT FROM CHAIR

The ESFRI Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Corfu.

The ESFRI Chair informed the Forum that printed copies of the Roadmap 2018 were delivered to Vienna. He announced that an electronic version of the Roadmap was available online with corrections of few minor errors that have been spotted after publication with no impact on the integrity of the document.

The Chair noted his participation in the Programme Committee of the ICRI 2018 conference, which was immediately following the ESFRI Roadmap 2018 Launch event in Vienna. Mr. Rossi also mentioned that he was invited to present the Roadmap at the 39th ERAC Plenary meeting on 17th-18th September in Salzburg.

The Chair raised the issue of reporting costs of Research Infrastructures and recalled earlier discussions in the Forum on this topic. Mr. Rossi observed that ESFRI had not made much progress on cost analysis that would be consistent and transparent enough to have confidence in the different cost categories. ESFRI definitions of these categories were subject of different interpretations and resulted in certain level of incoherence in cost reporting and lack of homogeneity across RI typologies and science domains. Overall, ESFRI

has the understanding that the entire Roadmap is worth around 18 billion euro, but this is only an estimate. The Chair informed the Forum that there was a public tender under the StR-ESFRI Project and a contractor was identified to analyse a number of case studies of willing RIs to understand how the costs are calculated and how this could be improved. The goal would be a prototype of a methodology that could apply to all types of RIs.

The Chair also recalled that the mandate of EB Members and WG Chairs was about to expire at the end of the year. The Chair underlined importance to specify clearly the expectations and the duties for candidates to understand the needed resources and time commitment in order to fulfil the function. Consequently, the Chair informed the Forum that specific Terms of Reference for the selection of new EB Members and WG Chairs were going to be prepared by the Executive Board and communicated by the end of September.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The European Commission representative – Mr. Philippe Froissard – informed the Forum about the intention to set-up a new High-Level Expert Group on Research Infrastructures in Autumn. The Group's activities until the summer of 2019 were expected to focus on the assessment of effectiveness of instruments available under Horizon 2020 to support the development of RIs across their lifecycle to draw conclusions on how these instruments can be adapted under Horizon Europe to even better address the needs of RIs.

The Commission recalled the background and objectives of the INFRADEV-3 call, as well as the rationale for dividing the topic into two deadlines, in 2018 and 2019. A brief presentation of the first outcomes was given.

The Commission recalled the Council conclusions of 29th May 2018 on the *European Open Science Cloud* and the three levels of its governance: Governance Board, Executive Board

and Stakeholder Forum. Mr. Froissard informed the Forum that on 27th August the Commission published a decision to set up an expert group that would form the first Executive Board. The call for applications was opened with a deadline of four weeks to select a short list of candidates. Mr. Froissard also recalled the tasks of the Governance Board, which would be composed of national representatives. For the first phase until 2020, the Commission proposed to set it up as a permanent working group of the Strategic configuration of the Horizon 2020 Programme Committee.

ESFRI ROADMAP 2018 – LAUNCH EVENT AND EoE WORKSHOP

The Chair recalled to the Forum the agenda of the *Roadmap 2018 Launch event* and thanked the Austrian Presidency for the very effective cooperation in the organization of this event. The Chair reassured the Forum that everything is ready for the event and over 250 participants had registered.

The ESFRI Executive Secretary – Mr. Dominik Sobczak – informed the Forum about the final agenda of the Exchange of Experience Workshop on Preparatory Phases. The workshop raised a lot of interest with over 70 registered participants. Mr. Sobczak thanked the StR-ESFRI Project team for the effective organization of the workshop and for their support also to the logistics of the Roadmap Launch event.

NEXT ROADMAP UPDATE

The ESFRI Chair introduced the topic, by highlighting that the ESFRI Roadmap update requires work from different stakeholders and that ESFRI would need additional time to react to the new mandate from the Council. Mr. Rossi also underlined that the lessons learned from the 2018 update need to be fully considered concerning ESFRI methodology, cost analysis and exploring new concepts. The Chair proposed to the Forum a timeline for the next ESFRI Roadmap update, with the adoption of the Roadmap planned in 2021. The Call for applications would be launched in mid-2019, with a deadline in March/April 2020. A Roadmap launch event would then take place in the second semester of 2021, around October or November. As it was described, within this schedule the hearings and harmonization could take more time. This would also allow the *Projects 2010* to have full 10 years to im-

plement, as their monitoring would only be carried out in late 2019 and early 2020. The update of the *Landscape Analysis* would also be carried out in 2020. Concerning the general Monitoring of the ESFRI RIs, Mr. Rossi also noted that ESFRI would build on the work done by the Working Group on Monitoring performance of RIs and on the EC Expert Group for assessment of RIs. After thanking all the Delegations for their constructive inputs, the Chair concluded that the Forum agreed with the proposed timeline of the Roadmap update, with the adoption of the new ESFRI Roadmap in 2021.

AD HOC WORKING GROUP ON MONITORING OF RIs PERFORMANCE

The ESFRI Chair recalled the Council conclusions of 29th May 2018 and the rationale for the *ad hoc* Working Group on Monitoring of RI performance. The objective of this Working Group is to consolidate the existing knowledge on monitoring of RI performance and propose a common approach at European level, including a core set of KPIs, which could serve as a basis for RIs and the national governance bodies to monitor their performance. The Group is expected to propose a refined methodology for the periodic review of ESFRI Landmarks as well as provide input to the design of general, useful and credible Key Performance Indicators for RIs, as requested by the Council Conclusions. Such KPIs must be easy to use, shall be adjustable to different systems and types of RIs, and yet robust to ensure high level of confidence. A comprehensive expertise of the members is a necessary element for formulating a commonly agreed European approach and effective recommendations to operationalise it. It is therefore crucial that the Group represents an in-depth knowledge of the current monitoring methodologies, funding models, governance strategies, management models and good practices at Member States level and at Research Infrastructures. It was noted that the timetable for the activities of the Group is fully compatible with the activities of the future EC High-Level Expert Group, which will take up the developed methodology and test it in its own assessment of the RIs. The Chair proposed the adoption of the Terms of Reference, revised based on comments made before and during the meeting. The Forum adopted the document, whose final version, together with the deadline for nominations, would be circulated by the end of September.

THE EUROPEAN SOUTHERN OBSERVATORY (ESO) – PRESENTATION

The ESO Director of Science – Mr. Rob Ivison – presented ESO and its scientific instruments, such as ALMA, stressing that each instrument is an individual pan-European Research Infrastructure. The Chair thanked the ESO Director for his presentation and underlined that Europe is ahead of the rest of the world in developing the next generation instruments. Mr. Rossi welcomed the willingness of ESO to further engage in ESFRI work and considered it a good practice that some International Organisations have an observer status in the ESFRI PSE SWG configuration.

THE ASSOCIATION OF EUROPEAN-LEVEL RESEARCH FACILITIES (ERF-AISBL) – PRESENTATION

THE ERF-AISBL Chair – Mr. Andrew Harrison – presented ERF activities as complementary to the EIROforum, representing smaller scale facilities and thematic initiatives such as LEAPS, LENS, etc.

Mr. Harrison underlined that ERF could be a forum where a broad range of RIs could have high-level strategic discussions on RI-related matters from the point of view of RI operators and then present it to decision makers, complementing the representation of, for example, EIROforum. The ESFRI Chair thanked Mr. Harrison for the interesting discussion.

NON-SESSION

The non-session discussion on reflection on the *Future of ESFRI* was concluded with an agreement that the incoming Chair would bring forward a reflection on the lessons learnt from the Roadmap 2018 and on the future orientation for ESFRI in the ESFRI Forum Meeting on 11th December 2018.

67th ESFRI FORUM

11th December 2018

Brussels, European Commission

The 67th ESFRI Forum Meeting took place on 11th December 2018 in Brussels and was hosted by the European Commission at the Madou Building.

REPORT FROM CHAIR

The Chair – Mr. Giorgio Rossi – provided a brief overview of his activities as ESFRI Chair since the last Forum meeting in Vienna.

The Chair noted the very successful Roadmap 2018 Launch Event, with interesting discussions and very significant visibility, also through live streaming.

The Chair informed the Forum that he presented the new Roadmap in the 39th ERAC Plenary meeting held on 17th-18th September 2018. The Roadmap was very well received by ERAC, with very high interest also in the printed copies. Apart from the ESFRI Research Infrastructures, particular attention was drawn to the *Landscape Analysis*, which provides an impressive and useful description of the available RIs in Europe, across different scientific fields.

The Chair informed the Forum that the ESFRI Roadmap and experience was once again showcased at GSO as an example of effective international collaboration in Research Infrastructures.

The Chair attended a celebration of the ESRF 30th Anniversary, which is a very good example of lasting collaboration of European countries, whose continuous development to stay on the frontier of science has required disruptive innovations.

UPDATE FROM DELEGATIONS

The National Delegations exchanged information on topics related to national RI policies.

REPORT FROM EUROPEAN COMMISSION

The European Commission Delegate – Mr. Jean-David Malo – informed the Forum about the H2020 Work Programme 2019 and the *European Open Science Cloud*.

Mr. Malo informed ESFRI that the Commission took a decision on the amendment of *H2020 Work Programme 2019*, with a total budget of 303 million euro for Research Infrastructures. Out of this amount, 84 million Euro will directly support ESFRI Infrastructures with deadline on 20th March 2019.

Mr. Malo provided the Forum with a short update on the development of the *European Open Science Cloud*. As first steps of the EOSC Implementation Roadmap, an interim EOSC governance had been established with the first meetings of the Governance Board and the Executive Board expected at the beginning of 2019.

NEW EB MEMBERS AND WORKING GROUP CHAIRS – OVERVIEW AND ELECTION OF CANDIDATES

The ESFRI Chair presented the overview of candidates as well as his recommendation for the new configuration of the EB Members and the new Working Group Chairs, explaining the motivation for an exceptional configuration exceeding by one member the maximum number stipulated by ESFRI Procedural Guidelines. The Commission proposed to adopt the suggested configuration if no Delegation was opposing to the proposal by the deadline of 19th December 2018. Then the new EB Members and WG Chairs would start their term on 1st January 2019.

ESFRI WORKSHOP ON MONITORING – CONCLUSIONS

The Chair recalled the purpose and the agenda of the *ESFRI Workshop on Monitoring of RIs, Periodic Update of Landmarks and use of KPIs* that took place on 19th-20th November 2018 in Milan, recognising the hard work that went into the workshop

by the organising team and the moderators who prepared each session, enabling very interesting and constructive discussions. The Chair concluded by saying that a general paper on monitoring is expected by the end of 2019.

ADDRESS OF JEAN-ERIC PAQUET

The ESFRI Chair welcomed the Director-General for Research & Innovation – Mr. Jean-Eric Paquet – to the Forum, mentioning previous bilateral discussions.

Mr. Paquet thanked ESFRI for the invitation to the meeting and acknowledged its achievements over the last years. He encouraged the Forum to consider which lessons we can draw from ESFRI for collaboration also in other areas of the ERA, as ESFRI has real impact on investments in Member States, which are also supported by the Commission.

The Chair thanked Mr. Paquet for sharing his thoughts with the Forum and thanked for the Commission's support to the work of ESFRI.

ESFRI BIENNIAL REPORT 2017-2018

The ESFRI Chair introduced the topic by showcasing the table of contents of the Biennial ESFRI activity report 2017-2018 to reflect main ESFRI activities over these two years and present an overview of the work developed by the Strategy Working Groups, the Implementation Group and the *ad hoc* Working Group on Long-term Sustainability. The Executive Board meetings and the plenaries would also be shortly described. The Forum agreed to the outline of the report and asked the StR-ESFRI Project to develop the content accordingly.

ESFRI WORKSHOP ON EOSC

The ESFRI Chair presented the main objectives of the workshop and the planned sessions. The Chair underlined that this event could serve as an expression of ESFRI engagement in the development of the EOSC, also due to the fact that ESFRI RIs are also expected to contribute to, align with, and to adopt/exploit the EOSC services. Mr. Rossi underlined

that the workshop aimed at developing a common understanding of the role of ESFRI RIs in the construction of the EOSC, to identify opportunities and bottlenecks for adopting FAIR data principles and protocols, and to increase the interactions between the cluster projects and with other EOSC stakeholders.

THE LEAGUE OF EUROPEAN ACCELERATOR-BASED PHOTON SOURCES (LEAPS) – PRESENTATION

The LEAPS Coordination Board Vice-Chair – Ms. Mirjam Van Dalen – presented the LEAPS initiative: LEAPS is a new consortium of excellence in Europe, composed of 13 European Synchrotron Radiation facilities and 6 Free Electron Laser facilities. The members are coordinating their activities, namely on the engagement with user communities, on their interaction with industry and on the landscape update, and will define a collective strategy across European facilities. Their 1st official Consortium Declaration was signed on 13th November 2017 in Brussels.

The Chair thanked for the presentation of such an interesting scientific coordination effort in Europe – a bottom-up initiative which could help shape the ERA.

InROAD PROJECT – PRESENTATION

The InROAD Coordinator – Mr. Martin Muller – presented main results of the project, a report on good practices and the challenges around Research Infrastructures roadmapping processes.

The ESFRI Chair thanked Mr. Muller for the clear presentation of the main outcomes of this very interesting and useful project.

NON-SESSION

The non-session discussion on reflection on the *Future of ESFRI* was concluded with an agreement on the main elements for discussion at the dedicated workshop in London on 31st January 2019.

ESFRI |
PUBLICATIONS

ESFRI SCRIPTA – VOL. 2

As a part of the complementary publications of the Roadmap 2018 the second volume of the ESFRI Scripta series has been edited and published with the title *Long-Term Sustainability of Research Infrastructures*. It is available in hard copy and online on the esfri.eu and the European Commission websites¹⁴.

The ESFRI Scripta Vol. 2 reproduces the concluding report of the *ad hoc* Working Group on Long-Term Sustainability of Research Infrastructures – LTS WG – mandated in 2016 to develop a thorough analysis of the Long-Term Sustainability of Research Infrastructures. ESFRI has previously developed its concept of lifecycle of the Research Infrastructures in the framework of the Roadmap evaluation exercise, and at all stages of the lifecycle different aspects of sustainability were identified. The LTS WG has analysed the Long-Term Sustainability of Research Infrastructures from a broad perspective taking the ESFRI viewpoint well beyond the mere economic analysis.

The LTS WG delivered its preliminary report in March 2017 and finalised it in June 2017 when the final report on Long-Term Sustainability was transmitted to the EU Council and shared with the European Commission. The ESFRI Scripta Vol. 2 was printed in October 2017 and launched on 13th December 2017 during the 63rd ESFRI Forum Meeting in Lund.

The ESFRI Scripta Vol. 2 was developed on behalf of ESFRI by the StR-ESFRI Project and with the support of the ESFRI Secretariat. Published by Dipartimento di Fisica – Università degli Studi di Milano in **October 2017**, this work was licenced under Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

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14. **Long-Term Sustainability of Research Infrastructures, ESFRI Scripta Vol.2**, October 2017

https://www.esfri.eu/sites/default/files/u4/ESFRI_SCRIPTA_TWO_PAGES_19102017_1.pdf

ESFRI SCRIPTA – VOL. 3

As a part of the complementary publications of the Roadmap 2018, the third volume of the ESFRI Scripta series has been edited and published with the title *Innovation-oriented Cooperation of Research Infrastructures*. It is available in hard copy and online on the esfri.eu and the European Commission websites¹⁵.

The ESFRI Scripta Vol. 3 reproduces the concluding report of the *ad hoc* Working Group on Innovation – INNO WG – created in 2013 to address the impact of Research Infrastructures on innovation. In 2015, the INNO WG was mandated to report to the Forum on how industrial R&D exploits the rich knowledge environment of Research Infrastructures, how the scientific results of RIs percolate into innovation value, how the industry benefits from access to RIs and to scientific data.

The INNO WG delivered its final report in March 2016 and additional revisions and update were completed in December 2017. The ESFRI Scripta Vol. 3 was printed in January 2018 and launched on 21st March 2018 during the 64th ESFRI Forum Meeting in Sofia.

The ESFRI Scripta Vol. 3 was developed on behalf of ESFRI by the StR-ESFRI Project and with the support of the ESFRI Secretariat. Published by Dipartimento di Fisica – Università degli Studi di Milano in **January 2018**, this work was licenced under Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

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15. **Innovation-oriented cooperation of Research Infrastructures, ESFRI Scripta Vol.3**, January 2018

https://www.esfri.eu/sites/default/files/ESFRI_SCRIPTA_VOL3_INNO_single_page.pdf

ESFRI ROADMAP 2018

The ESFRI Roadmap 2018 was edited and published as a unique volume including three different parts dedicated to the ESFRI Strategy and Methodology, the Landscape Analysis, the ESFRI Projects and the ESFRI Landmarks. The complete document can be consulted by downloading a pdf or by browsing a mini-site via an entry page hosted at the esfri.eu website. The ESFRI Roadmap 2018 is also available for downloading from the European Commission website¹⁶.

The fifth Strategy Report and ESFRI Roadmap 2018 is the result of an intense work conducted throughout 2016-2018. The complete document contains three parts comprising the Strategy Report, the Landscape Analysis, and the Projects and Landmarks cards. It was adopted on **28th-29th June 2018** during the **65th ESFRI Forum Meeting in Corfu** and officially presented on 11th September 2018 at Aula der Wissenschaften in Vienna under the Austrian Presidency in close cooperation with ESFRI and the European Commission. The event, also broadcasted on the web, provided an overview of the Roadmap 2018 including the new Projects and Landmarks, the extensive Landscape Analysis, the analysis of the Interconnections among RIs and strategy elements for the future.

The ESFRI Roadmap 2018 was developed on behalf of ESFRI by the StR-ESFRI Project and with the support of the ESFRI Secretariat. Published by Dipartimento di Fisica – Università degli Studi di Milano in August 2018, this work was licenced under Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. A second batch printing was prepared for distribution in December 2018.

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¹⁶. **ESFRI Roadmap 2018**, August 2018

<http://roadmap2018.esfri.eu>

https://ec.europa.eu/info/files/esfri-roadmap-2018_en



ESFRI |
EVENTS |

INFODAY

17th January 2017

Málaga, Spain

Following the official presentation of the ESFRI Roadmap 2018 process at ICRI 2016 in Cape Town (South Africa), an Information Day – InfoDay – was held on 17th January 2017 in Málaga (Spain), organised in collaboration with the StR-ESFRI Project and the European Commission, and hosted by the Spanish Secretariat of State for Research, Development and Innovation, Ministry of Economy, Industry and Competitiveness. It was aimed at providing a complete description of the requirements, the procedure and the methodology for the *Selection and Evaluation of New Proposals* and thus facilitating new submissions by ESFRI Delegations and EIROforum Members. The Roadmap *Landscape Analysis* of Research Infrastructures has also been presented along with information on its ongoing update process.

Attended by more than 130 people, the event was also broadcasted on the web. The presentations and the video are available online via this link:

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

2nd EXCHANGE OF EXPERIENCE WORKSHOP

MONITORING OF PROJECTS AND PILOT PERIODIC REVIEW OF LANDMARKS

18th January 2017

Málaga, Spain

The 2nd Exchange of Experience Workshop on *Monitoring of ESFRI Projects and Periodic Review of ESFRI Landmarks* took place on 18th January 2017 at the University of Málaga (Spain), organised in collaboration with the StR-ESFRI Project and the European Commission, and hosted by the Spanish Secretariat of State for Research, Development and Innovation, Ministry of Economy, Industry and Competitiveness. It was targeted to

ESFRI Projects & Landmarks to address issues related to the evaluation of the progress and challenges faced during their Implementation Phase and on the strengthening of the role and status of the ESFRI Landmarks.

More than 150 participants represented the target group comprising scientific leaders and managers of ESFRI Projects and ESFRI Landmarks preparing for the monitoring or periodic review process. The workshop was also open to other participants such as representatives of emerging projects, national ministries, the European Commission, national managing authorities, and ESFRI Members, multipliers of the scientific community and other ERA stakeholders or policy makers.

A document summarising the main thematic issues of the 2nd Exchange of Experience Workshop is downloadable here:

https://www.esfri.eu/sites/default/files/Report_v1_September_2017_final_22-11-2017.pdf

ROADMAP 2018 LAUNCH

11th September 2018

Vienna, Austria

On 11th September 2018, the updated Strategy Report and Roadmap 2018 of the European Strategy Forum on Research Infrastructures was officially announced in a vibrant and successful event which took place at the Jesuit Hall of the Aula der Wissenschaften in Vienna, organised by the Austrian Federal Ministry of Education, Science and Research – in close cooperation with the StR-ESFRI Project and the European Commission – under the Austrian Presidency.

Around 300 high-level participants from the world of science, policy-making, innovation and technology – EU officials, ESFRI Delegates, representatives of RI projects and policy bodies, national and regional authorities as well as media – came together to celebrate the announcement of the ESFRI Roadmap 2018, a vivid demonstration of the high merit and potential of European collaboration in developing visions and sustainable perspectives for an interoperable Research Infrastructure ecosystem as a key asset of Europe.

The ESFRI Chair – Mr. Giorgio Rossi – presented the ESFRI Roadmap 2018, which displays the ESFRI Landmark portfolio of 37 ESFRI Landmarks, long-term engagements in all fields of science, and 18 ESFRI Projects, with 8 new Landmarks and 6 new Projects entering the Roadmap to fill gaps in the diverse thematic domains, covering all fields of science and innovation. The new Projects were introduced by their coordinators and strategic issues on the European Research Infrastructure ecosystem were developed in panel discussions.

An interconnected Research Infrastructure ecosystem capable, as a whole, to address the great societal challenges was stressed as a key aspect of ESFRI strategy, building on the integration of knowledge produced at interoperable excellent Research Infrastructures by researchers from diverse disciplines. The issues of sustainability of Research Infrastructures, the impact on innovation, the construction of Open Science and the open data management were also addressed.

The video recording of the event and the presentations are available online at:

<https://www.esfri.eu/latest-esfri-news/launch-event-2018-esfri-roadmap-research-infrastructures-marks-big-day-european>

3rd EXCHANGE OF EXPERIENCE WORKSHOP

EFFECTIVE USE OF HORIZON 2020
PREPARATORY PHASE FUNDING

12th September 2018

Vienna, Austria

The 3rd Exchange of Experience Workshop on *Effective use of Horizon 2020 Preparatory Phase Funding* took place on 12th September 2018 at Hofburg Conference Centre in Vienna, hosted by the Austrian Federal Ministry of Education, Science and Research – in close cooperation with the StR-ESFRI Project and the European Commission – in the frame of the ESFRI events under the Austrian Presidency.

The Workshop was linked to the ESFRI Roadmap 2018 Launch Event which took place on 11th September and to the ICRI 2018 conference which started on the same day. Right after the workshop, bilateral meetings were organized to intensify discussions between successful RI Project applicants and representatives of ESFRI and the European Commission.

Altogether 75 participants succeeded in enabling high-level interaction, coordination and networking between ESFRI Projects and ESFRI Landmarks. The workshop reviewed the typical steps of an RI in the (up to) ten-year Preparation and early Implementation Phase. Participants in the Workshop were informed about the current ESFRI objectives for implementation and the (forthcoming) roadmap updates and discussed how to identify and overcome the main barriers in RI implementation and how to optimise the use of EU Preparatory Phase funding and other resources.

The video recording of the event and the presentations are available online at:

<https://www.esfri.eu/esfri-eeo-workshops/3rd-exchange-experience-workshop-eeo?qt-event=5#qt-event>

ESFRI WORKSHOP ON MONITORING OF RIs

MONITORING OF RIs, PERIODIC UPDATE
OF LANDMARKS AND USE OF KPIs

19th-20th November 2018

Milan, Italy

The Workshop on *Monitoring of RIs, Periodic Update of Landmarks and use of KPIs* was organised on 19th-20th November in Milan (Italy), in close cooperation with the StR-ESFRI Project and the European Commission. Drawing from the Pilot Periodic Review Exercise carried out with four Landmarks in 2017, and considering EU Council Conclusions of 29th May 2018 on developing a common methodology for monitoring of RIs and on the European Open Science Cloud, the workshop aimed in particular at addressing the need to develop a proper methodology for the *Periodic Update of ESFRI Landmarks*, therefore contributing to capture the potential issues of long-term sustainability.

Attended by around 90 participants, the Workshop was built on the lessons learnt from the Pilot Periodic Review Exercise with four Landmarks that underscored the need to develop a robust and practicable methodology for periodic update of the state of play of ESFRI Landmarks, also by introducing appropriate and flexible Key Performance Indicators (KPIs). Based on the practices and evidences from different RIs on the use of KPIs, the debate developed around the merits and limits of using pre-defined sets of KPIs and their use in a sound monitoring methodology. A reflection was also made on the e-Infrastructure aspects that ESFRI has monitored since 2014 – the concept of openness of data connected with the merit-based openness of access to the RIs, the development of advanced data management tools and policies, and the data quality checks before archiving and opening the datasets under proper rules. Further considerations were made on how the RIs are ready to implement the FAIR+R – Findable, Accessible, Interoperable, and Reusable, plus Reproducible – principles and contribute to the development of EOSC. A structured discussion was developed on the need for a better definition and harmonization of estimated RI costs and financial flow for different types of RIs through their lifecycle. Finally, a reflection developed on how the periodic updates could be translated into an effective feedback to the RIs for their continuous operation and development in the long run.

The results of the workshop provided a starting input to the *ad hoc* Working Group on Monitoring of Research Infrastructures, also in view of its foreseen interaction with the European Commission High-Level Expert Group on assessment of the progress of ESFRI and other World Class Research Infrastructures towards implementation and long-term sustainability.

The video recording of the event and the presentations are available online at:

<https://www.esfri.eu/esfri-events/esfri-workshop-monitoring-ris-periodic-update-landmarks-use-kpis?qt-event=5#qt-event>

ESFRI
**ACTIVITIES
IN ERAC**

ESFRI is one of the ERA-related Groups and is expected to contribute to the work of the European Research Area Committee upon specific mandate, namely the implementation of ERA Priority 2b on Research Infrastructures. The ESFRI Chair, *ex officio*, is member of the ERAC Steering Board, along with the Chairs of the other ERA-related Groups. The ESFRI Chair is not a member of the ERAC, but is often invited to ERAC Plenary meetings.

ERAC invited the ERA-related Groups to provide a contribution to the ERAC Annual Report 2017 and 2018.

CONTRIBUTION TO THE ERAC ANNUAL REPORT 2017

Executive summary

In 2017, ESFRI contributed to the progress in ERA Priority 2b primarily by four actions.

First, the 2018 update of the ESFRI Roadmap was launched. In scope of this exercise, ESFRI launched a call for proposals for new pan-European RIs, issued recommendations to six ongoing Projects on how to effectively boost their implementation and tested a methodology for a periodic review of Landmarks. The work on the Roadmap will be finalized in 2018.

Second, ESFRI published a report on Long-term Sustainability of Research Infrastructures, proposing concrete 7 high-level and 35 specific recommendations. This was an important voice in the discussion on this topic at European level, supporting the development of a targeted action plan.

Third, ESFRI published a report on 'Innovation oriented cooperation of Research Infrastructures', which provides a comprehensive analysis of the collaboration potential between RIs and industry, identifies concrete opportunities and makes a broad set of recommendations on how to overcome the existing bottlenecks.

Fourth, ESFRI prepared a 6-bullet-point position on EOSC in December 2017 indicating the willingness of ESFRI, according to its scope and mandates, to contribute to the shaping of the EOSC project.

Key achievements supporting the implementation of the group's specific ERA priority

Within its general mandate to support a coherent and strategy-led approach to policy making on Research Infrastructures in Europe, during 2017 ESFRI contributed to the progress of the ERA through the following actions:

1. ESFRI ROADMAP 2018

ESFRI launched the 2018 Roadmap update process in Málaga on 17-18 January 2017 with a dedicated InfoDay and an Exchange of Experience Workshop on 'Monitoring of ESFRI Projects and Pilot Review of Landmarks'. The InfoDay gathered over 180 participants setting the scene for the Roadmap update, which includes a call for new proposals, update of the Research Infrastructure landscape analysis, progress monitoring of Projects and on the ESFRI Roadmap and pilot review of ESFRI Landmarks. The Exchange of Experience Workshop served as a discussion forum with the Research Infrastructures from the ESFRI Roadmap about the objectives and scope of the progress monitoring exercise and the pilot review.

Call for proposals

The Málaga InfoDay launched the Call for Proposals for new pan-European Research Infrastructures which would play a strategic role in the ERA in the next decades. The Call closed on the 31st of August, with 12 proposals submitted by national governments. The evaluation of these proposals was ongoing until the end of 2017 and will be finalized by March 2018.

Monitoring of ESFRI Projects

Research Infrastructures included in the ESFRI Roadmap have 10 years to enter the implementation stage. ESFRI regularly monitors their progress to review the current situation, identify the most important challenges and facilitate their implementation.

During 2017 ESFRI carried out the monitoring of six Projects which entered the Roadmap in 2010. In result of this exercise ESFRI issued tailored recommendations to all the six Projects on how to improve their science case, impact on the ERA and boost their implementation in order to become fully-fledged research infrastructures within the next two years. ESFRI also observed in general, that carrying out the monitoring exercise in itself served as an important mobilizing factor and led to important organizational changes in some of the Projects.

This year ESFRI also started the monitoring exercise of 2008 Project, but the process will only be concluded in March 2018.

Pilot review of ESFRI Landmarks

The Competitiveness Council on 27 May 2016¹ requested ESFRI to 'periodically assess the scientific status of ESFRI Landmarks'. In order to establish an effective methodology for this process, which would be both useful to national governments and would bring an added value to ESFRI Research Infrastructures themselves, a pilot review was carried out in collaboration with five selected Landmarks that agreed to participate in the process. Initial conclusions have already been discussed in the Forum and the final methodology will be agreed upon by ESFRI in 2018, in broad consultation with the Research Infrastructures.

Landscape Analysis

For the 2018 ESFRI Roadmap, the Strategy Working Groups prepare an update of the Landscape Analysis of the Euro-

1. **Conclusions of the Council of the European Union of 27 May 2016 on FP7 and the Future Outlook:** Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16

<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

pean Research Infrastructure ecosystem, identifying the main facilities and initiatives, trends as well as the emerging areas where new Research Infrastructure could be needed in the future.

2. LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES

ESFRI created a Working Group on Long-term Sustainability of Research Infrastructures in order to comprehensively respond to the Competitiveness Council Conclusions of 27 May 2016, which underlined 'the importance of ensuring Long-Term Sustainability of Research Infrastructures and invites the Commission to prepare together with ESFRI and relevant stakeholders a targeted action plan'.

The Group issued a report approved by the Forum in June 2017, which was published as ESFRI Scripta Vol. 2², proposing 7 main recommendations covering the key aspects of this topic. These recommendations are expanded into 35 specific points covering issues such as securing of highly qualified and motivated human resources, realizing a robust transfer of information to society from the Research Infrastructures via a quality-controlled e-Infrastructure, building an effective interface between RIs and innovation activities, understanding the actual value of the diverse benefits to society, addressing the optimal governance and management structure and promoting coordination among RIs.

3. RELATIONSHIP OF RESEARCH INFRASTRUCTURES, INDUSTRY AND INNOVATION

In the course of 2017, ESFRI updated the report of its Working Group on Innovation, which was adopted by the Forum in early 2016. The report, entitled 'Innovation oriented cooperation of Research Infrastructures', was published as ESFRI

2. **Long-Term Sustainability of Research Infrastructures, ESFRI Scripta Vol.2**, October 2017

http://www.esfri.eu/sites/default/files/u4/ESFRI_SCRIPTA_TWO_PAGES_19102017_1.pdf

Scripta Vol. 3³, describes the different forms of industry and Research Infrastructure collaboration that generate innovation: industry as supplier for the construction / upgrade of the RIs, being instructed and guided in developing new technologies or production protocols; industry as partner of RIs and industry as user exploiting the specific dedicated access modes as well as through the academic access supported by research grants.

The open innovation model does include Research Infrastructures at the supply side of new knowledge and also as effective testbeds of innovative devices that can be benchmarked against mature technologies in performing research. Detectors of particles, X-rays, neutrons, and their associated ultrafast, low noise electronics are developed first and qualified later by their adoption by RI for advanced research, yielding very direct innovation in all field of applications in medical, environmental, information, production monitoring. Reference signal sources, from light emission devices to precision clocks, are again developed and qualified by adoption at RIs. In the bio-medical sector RIs make available samples, images, protocols that continuously enrich the knowledge basis for open innovation to flourish. In the broad-band communication of data and high power / high throughput computing, as well as in environmental observation and modelling, or in societal studies, the RIs provide again the most advanced testbeds for innovation. Updates statistics of the easily measurable facts, like usage by industry of analytical or medical-sciences RIs, show a larger and larger impact of RIs on innovation activities. Key aspects of the link between Research Infrastructures and innovation are also the training of scientists and research engineers and their mobility to and from basic science at the RI and innovation in the society. The growth of large hubs of science and innovation around large scale RIs are one of the effective models of open innovation, attracting economic activities and generating value.

3. **Innovation-oriented cooperation of Research Infrastructures, ESFRI Scripta Vol.3**, January 2018

http://www.esfri.eu/sites/default/files/u4/ESFRI_SCRIPTA_VOL3_INNO_single_page.pdf

4. **ESFRI MANDATE ON e-INFRASTRUCTURES**

On 20 February 2017, the Council of the EU approved ESFRI recommendation on coordination of Member States' investment strategies in e-Infrastructures⁴. In this light, a discussion was developed by ESFRI on the issues connected with the development of an optimal e-Infrastructure for science in Europe. Notably the proposal for the establishment of a European Open Science Cloud (EOSC Declaration) was analyzed in view of ESFRI's role of strategy hub of funders of RIs that does include the large effort in data management and data access infrastructure and related policies. A 6-bullet-point position on the EOSC was prepared by the Forum in December 2017 welcoming an ambitious and very important goal of the initiative, with potential structuring impact on European science and beyond. It was recognised that a close and effective dialogue between EOSC and ESFRI is needed at the strategy level as well further collaboration at all levels of implementation in order to ensure and enhance synergies and effectively promote convergence to advanced commons in science.

4. **List of 'A' items, Non-legislative activities, 3519th meeting of the Council of the European Union**, 20 February 2017, Brussels.

<https://www.consilium.europa.eu/media/22244/20-compet-a-items-non-legislative.pdf>

CONTRIBUTION TO THE ERAC ANNUAL REPORT 2018

Executive summary

In 2018, ESFRI contributed to the progress in ERA Priority 2b primarily by three actions:

First, the ESFRI Roadmap 2018 was published. The Roadmap consists of 18 ESFRI Projects, i.e. new initiatives requiring around €2,9 billion of investments in the coming years, and 37 key Research Infrastructures – ESFRI Landmarks – that are completed or under construction, representing a value of around €14,4 billion. It also analyses the European RI landscape and the interconnections across research domains.

Second, in response to the Competitiveness Council conclusions on *Accelerating knowledge circulation in the EU*, ESFRI established an *ad hoc* Working Group to develop a common approach for monitoring of Research Infrastructure performance.

Third, ESFRI published a position on EOSC indicating the willingness of ESFRI to contribute to the EOSC project. ESFRI also engaged in dialogue with Research Infrastructures on the opportunities and challenges linked to EOSC implementation.

Key achievements supporting the implementation of the group's specific ERA priority

Within its general mandate to support a coherent and strategy-led approach to policy making on Research Infrastructures in Europe, during 2018 ESFRI contributed to the progress of the ERA through the following actions:

1. ESFRI ROADMAP 2018

In 2018, ESFRI finalized its Roadmap update process, which started in 2017 and included a call for *New Proposals*, update of the Research Infrastructures *Landscape Analysis*, progress monitoring of Projects on the ESFRI Roadmap and pilot review of ESFRI Landmarks. The new Roadmap, adopted on 28 June 2018, consists of 18 'ESFRI Projects', which are new initiatives in development phase requiring around €2,9 billion of investments in the coming years, and 37 'ESFRI Landmarks', identifying key Research Infrastructures that have been completed or are under construction, representing an overall capital value of around €14,4 billion.

The Roadmap was publicly launched in a dedicated Austrian Presidency event on 11 September 2018, gathering around 250 participants in Vienna and some 600 viewers who joined live online. The Roadmap was welcomed by the Competitiveness Council in its conclusions of 30 November 2018.

New ESFRI Projects

ESFRI included 6 new Projects in the following areas:

- Energy
IFMIF-DONES: International Fusion Materials Irradiation Facility - DEMO Oriented NEutron Source (coordinated by Spain) – a facility for testing, validation and qualification of the materials to be used in a fusion reactor.

- **Environment**
DiSSCo: Distributed System of Scientific Collections (coordinated by The Netherlands) – an infrastructure integrating natural history collections of major European institutions.
- **eLTER**: Long-Term Ecosystem Research in Europe (coordinated by Germany) – an infrastructure integrating ecosystem research sites across Europe.
- **Health & Food**
EU-IBISBA: Industrial Biotechnology Innovation and Synthetic Biology Accelerator (coordinated by France) – a multidisciplinary research and innovation infrastructure for industrial biotechnology.
- **METROFOOD-RI**: Infrastructure for promoting Metrology in Food and Nutrition (coordinated by Italy) – an infrastructure for metrology services in food and nutrition throughout the value chain.
- **Social & Cultural Innovation**
EHRI: European Holocaust Research Infrastructure (coordinated by The Netherlands) – an infrastructure for research on Holocaust.

The new Roadmap also identified two areas with high potential for the development of new Research Infrastructures: religious studies and transition to open science.

New ESFRI Landmarks

Research Infrastructures included in the ESFRI Roadmap have 10 years to enter the implementation stage. ESFRI regularly monitors their progress to review the current situation, identify the most important challenges and facilitate their implementation. In result of this review, ESFRI identified 8 new Research Infrastructures which can be considered as being in the implementation phase and, due to their scope, specific reference role in their domains and their importance for the European Research Area, obtained the status of ESFRI Landmark:

- **CTA** – Cherenkov Telescope Array
- **ECCSEL ERIC**– European Carbon Dioxide Capture and Storage Laboratory Infrastructure

- **EISCAT_3D** – Next Generation European Incoherent Scatter Radar System
- **EMBRC ERIC**– European Marine Biological Resource Centre
- **EPOS** – European Plate Observing System
- **ERINHA** – European Research Infrastructure on Highly Pathogenic Agents
- **EU-OPENSOURCE ERIC** – European Infrastructure of Open Screening Platforms for Chemical Biology
- **Euro-Bioimaging** – European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences

Landscape Analysis

The updated *Landscape Analysis* (LA) is a key ingredient to the ESFRI Methodology. It captures the most relevant Research Infrastructures that are available to European scientists and to technology developers, and allows to appreciate the unique contribution brought by the ESFRI RIs. It is the prerequisite for the ESFRI strategy exercise, as any new Project or Landmark must be evaluated against its impact on the Landscape. Consequently, the LA is a key reference for the understanding of the Roadmap, its content and its analysis.

In particular, the LA describes the state of play of all RIs in the corresponding thematic area, their contributions to support frontier research and to provide key-data necessary to address the Grand Challenges. The gaps, challenges and future needs are analysed for each group of thematic RIs. As research develops both within disciplinary domains and across disciplinary borders, ESFRI identified the relevant connections that already exist among the ESFRI RIs, as well as the critical needs for new links and new practices, which would effectively support research on complex phenomena, such as e.g. climate change, population ageing or food and energy sustainability. In the final part, cross-cutting aspects

of the ensemble of RIs are addressed, such as education and training, needs for digital infrastructure, contribution to innovation, and socio-economic impact.

Pilot review of ESFRI Landmarks

The Competitiveness Council on 27 May 2016¹ requested ESFRI to 'periodically assess the scientific status of ESFRI Landmarks'. In order to establish an effective methodology for this process, which would be both useful to national governments and would bring an added value to ESFRI Research Infrastructures themselves, a pilot review was carried out in collaboration with four selected Landmarks that agreed to participate in the process. Initial conclusions have already been discussed in the Forum and the final methodology will be agreed upon by ESFRI in 2019, in broad consultation with the Research Infrastructures and within the context of ESFRI's activities on Monitoring of Research Infrastructures performance described below.

2. MONITORING OF RESEARCH INFRASTRUCTURES PERFORMANCE

The Competitiveness Council conclusions of 29th May 2018 on *Accelerating knowledge circulation in the EU* invited Member States and the Commission within the framework of ESFRI to develop a common approach for monitoring of Research Infrastructure performance².

In response to the Council mandate, ESFRI decided to establish an ad hoc Working Group on Monitoring, whose starting point was a dedicated Workshop on 'Monitoring of RIs, Periodic Update of Landmarks, use of KPIs', organised in Milan on 19-20 November 2018.

1. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16
<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

2. **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>

The workshop explored the rationale and perspectives for developing a common monitoring methodology. In particular, a number of topics posing specific challenges were discussed, such as merits and limits of Key Performance Indicators, implementation of FAIR+R data principles, EOSC-readiness and their implications on RIs' performance and sustainability as well as harmonisation of RI costs and financial flows reporting throughout the lifecycle.

The event was concluded with a formulation of a workable way forward for developing a common monitoring methodology, which should first collect evidence from existing processes, in particular those already developed by the Research Infrastructures themselves. A future methodology could include both key performance indicators and key impact indicators to be voluntarily applied by RIs in order to help them optimise their activities, investments and budget. Any method developed should be offered in particular to those RIs that have not yet developed their own, and should be helpful to the ones already established.

3. EUROPEAN OPEN SCIENCE CLOUD (EOSC)

Due to the importance of Research Infrastructures for the development and implementation of EOSC, and in its role as strategy hub of funders for e-Infrastructures, ESFRI formulated a position on EOSC, which was published in January 2018.

ESFRI underlined that a close and effective collaboration between EOSC and ESFRI Forum is needed in order to ensure convergence of strategies and implementation actions. A continuous dialogue between ESFRI and EOSC at the strategy level as well further collaboration at all levels of implementation will ensure and enhance synergies and will effectively promote the adoption of FAIR data principles.

ESFRI Landmarks and Projects are Research Infrastructures producing scientific data that are operated by highly competitive and broad research communities covering most areas of research. ESFRI RIs are amongst the key pillars of research that already perform quality check on the open access data and have data management plans agreed by the users. EOSC should recognize and take full advantage from these well performing data management plans and practices that already implement FAIR and Reproducibility criteria of the Data and operate open access portals. EOSC should fill

the gaps of unstructured areas, transparently display which and where services already exist, and help to develop meta-data standards for overall progressive alignment of different domains and their increasing integration.

EOSC should make high-level interoperability possible and workable. In this respect, the role of EOSC in facilitating and improving interoperability of existing well-developed data systems – including those of RIs – and guiding development of interoperable data systems in unstructured areas is crucial and irreplaceable.

ESFRI
**MANDATES
FROM THE EU
COUNCIL**

COORDINATION OF MEMBER STATES' INVESTMENT STRATEGIES IN e-INFRASTRUCTURES

Conclusions of the Council of the European Union of 29th May 2015 on *Open, data-intensive and networked research as a driver for faster and wider innovation*¹⁷.

The Council of the European Union,

16. STRESSES the importance of PRACE, a world-class European High Performance Computing (HPC) infrastructure for research that provides access to computing resources and services for large-scale scientific and engineering applications; ACKNOWLEDGES the need to develop the new generation of HPC technologies and CALLS for the reinforcement of the interconnected network of data processing facilities GEANT. In this respect, INVITES ESFRI to explore mechanisms for better coordination of Member States' investment strategies in e-Infrastructures, covering also HPC, distributed computing, scientific data and networks.

17. **Conclusions of the Council of the European Union of 29 May 2015** on Open, data-intensive and networked research as a driver for faster and wider innovation. Doc. 9360/15
<http://data.consilium.europa.eu/doc/document/ST-9360-2015-INIT/en/pdf>

Conclusions of the Council of the European Union of 27th May 2016 on FP7 and the *Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges*¹⁸.

The Council of the European Union,

RECALLING its Conclusions of 26th May 2014 on the *Implementation of the Roadmap for the European Strategy Forum on Research Infrastructure (ESFRI)* which welcomed the plans of ESFRI to update its roadmap in 2015/2016 and called on ESFRI to continue the prioritisation of all the Research Infrastructure projects of the ESFRI roadmap:

5. UNDERLINES the importance of Research Infrastructures for a functioning ERA and an innovative and competitive Europe, and WELCOMES the Strategy Report and Roadmap Update 2016 developed by the European Strategy Forum on Research Infrastructures (ESFRI);
 - a. ACKNOWLEDGES the efforts made by ESFRI to further prioritise Research Infrastructure projects on the ESFRI Roadmap, WELCOMES the identification of ESFRI Landmarks, RECOGNISES their continued strategic role in driving scientific excellence and innovation in Europe and CALLS on ESFRI to closely monitor the implementation of ESFRI projects, to periodically assess the scientific status of ESFRI Landmarks, and to prepare the next ESFRI Roadmap update in 2018; RECOGNISES that Research Infrastructures and e-Infrastructures are becoming more and more interlinked, STRESSES the need for intensified cooperation between ESFRI and other stakeholders and ENCOURAGES their joint efforts for coordination of the national e-Infrastructures investment strategies.

18. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16
<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

LONG-TERM SUSTAINABILITY OF RESEARCH INFRASTRUCTURES

Conclusions of the Council of the European Union of 27th May 2016 on *FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges*¹⁹.

The Council of the European Union:

RECALLING its Conclusions of 26th May 2014 on the *Implementation of the Roadmap for the European Strategy Forum on Research Infrastructure (ESFRI)* which welcomed the plans of ESFRI to update its roadmap in 2015/2016 and called on ESFRI to continue the prioritisation of all the Research Infrastructures projects of the ESFRI roadmap:

5. UNDERLINES the importance of Research Infrastructures for a functioning ERA and an innovative and competitive Europe, and WELCOMES the Strategy Report and Roadmap Update 2016 developed by the European Strategy Forum on Research Infrastructures (ESFRI);

a. ACKNOWLEDGES the efforts made by ESFRI to further prioritise Research Infrastructure projects on the ESFRI Roadmap, WELCOMES the identification of ESFRI Landmarks, RECOGNISES their continued strategic role in driving scientific excellence and innovation in Europe and CALLS on ESFRI to closely monitor the implementation of ESFRI projects, to periodically assess the scientific status of ESFRI Landmarks, and to prepare the next ESFRI Roadmap update in 2018; RECOGNISES that Research Infrastructure and e-Infrastructures are becoming more and more interlinked, STRESSES the need for intensified cooperation between ESFRI and other stakeholders and ENCOURAGES their joint efforts for coordination of the national e-Infrastructures investment strategies.

b. RECOGNISES the support of the Commission to the preparatory phases of the ESFRI projects and the need for continued support for development of ERIC consortia; INVITES the Member States to continue their efforts in developing and updating national roadmaps for Research Infrastructures compatible with the ESFRI roadmapping process and to secure appropriate funding in order to achieve their timely implementation; and ENCOURAGES the Member States to make use of EFSI to facilitate the implementation of these projects; UNDERLINES the importance of ensuring long-term sustainability of Research Infrastructures and INVITES the Commission to prepare together with ESFRI and relevant stakeholders a targeted action plan. WELCOMES the Charter for Access to Research Infrastructures as an open science instrument that enables a common understanding and harmonisation of access policies when disseminated widely in ERA and beyond.

19. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16
<http://data.consilium.europa.eu/doc/document/ST-9527-2016-INIT/en/pdf>

UPDATE OF THE ESFRI ROADMAP 2018

Conclusions of the Council of the European Union of 27th May 2016 on *FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges*²⁰.

The Council of the European Union:

RECALLING its Conclusions of 26th May 2014 on the *Implementation of the Roadmap for the European Strategy Forum on Research Infrastructure (ESFRI)* which welcomed the plans of ESFRI to update its roadmap in 2015/2016 and called on ESFRI to continue the prioritisation of all the Research Infrastructures projects of the ESFRI roadmap:

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a. ACKNOWLEDGES the efforts made by ESFRI to further prioritise Research Infrastructure projects on the ESFRI Roadmap, WELCOMES the identification of ESFRI Landmarks, RECOGNISES their continued strategic role in driving scientific excellence and innovation in Europe and CALLS on ESFRI to closely monitor the implementation of ESFRI projects, to periodically assess the scientific status of ESFRI Landmarks, and to prepare the next ESFRI Roadmap update in 2018; RECOGNISES that Research Infrastructures and e-Infrastructures are becoming more and more interlinked, STRESSES the need for intensified cooperation between ESFRI and other stakeholders and ENCOURAGES their joint efforts for coordination of the national e-Infrastructures investment strategies.

b. RECOGNISES the support of the Commission to the preparatory phases of the ESFRI projects and the need for continued support for development of ERIC consortia; INVITES the Member States to continue their efforts in developing and updating national roadmaps for Research Infrastructures compatible with the ESFRI roadmapping process and to secure appropriate funding in order to achieve their timely implementation; and ENCOURAGES the Member States to make use of EFSI to facilitate the implementation of these projects; UNDERLINES the importance of ensuring long-term sustainability of Research Infrastructures and INVITES the Commission to prepare together with ESFRI and relevant stakeholders a targeted action plan. WELCOMES the Charter for Access to Research Infrastructures as an open science instrument that enables a common understanding and harmonisation of access policies when disseminated widely in ERA and beyond.

20. **Conclusions of the Council of the European Union of 27 May 2016** on FP7 and the Future Outlook: Research and innovation investments for growth, jobs and solutions to societal challenges. Doc. 9527/16

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MONITORING OF RESEARCH INFRASTRUCTURES

Conclusions of the Council of the European Union of 29th May 2018 on *Accelerating knowledge circulation in the EU*²¹.

The Council of the European Union,

RECALLING the contribution of the Commission and those of ESFRI (European Strategic Forum on Research Infrastructures) and other relevant stakeholders to the debate on the long-term sustainability of Research Infrastructures and takes note of the discussion on the priority actions during the Bulgarian Presidency Flagship Conference *Research Infrastructures beyond 2020 – sustainable and effective ecosystem for science and society*:

17. ACKNOWLEDGES the positive role of ESFRI in fostering the development of the state-of-the-art Research Infrastructures in Europe and STRESSES the need for further strengthening and consolidation of the landscape of pan-European Research Infrastructures in view of their long term sustainability;

18. UNDERLINES the importance of further efforts within the framework of ESFRI for a better aligned decision making for setting-up and participating in ESFRI Research Infrastructures in particular by exchanging experience about national roadmaps procedures and their national budget lines practices;

19. Stresses the importance of human resources and training skills as key factors in the success for Research Infrastructures and ACKNOWLEDGES the need for Research Infrastructures to strengthen a service-driven approach; 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 gov-

ernance and explore options to support this through the use of Key Performance Indicators.

21. **Conclusions of the Council of the European Union of 29th 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>

EUROPEAN OPEN SCIENCE CLOUD (first mandate)

Conclusions of the Council of the European Union of 29th May 2018 on *European Open Science Cloud (EOSC)*²².

The Council of the European Union,

RECALLING the resolution of the European Parliament on the European Cloud Initiative, adopted in February 2017, supporting the European Open Science Cloud, and calling on the Commission and Member States, in cooperation with other stakeholders, to establish a roadmap to give as fast as possible a clear timescale for the implementation of the actions envisaged by the EOSC:

3. HIGHLIGHTS that the implementation and further development of advanced solutions for the effective provision and use of high quality scientific data, with effective descriptors, ease of access, interoperability and reusability, fully implementing the FAIR principles and developing and promoting Data Commons, should take into account already established practices by research communities, ESFRI Research Infrastructures, e-Infrastructures, as well as other relevant national infrastructures;

8. AGREES that the EOSC model should be based on a pan-European federation of data infrastructures in order to be flexible and adaptable to changing needs of the stakeholders; with regard to enabling this federation of national and European data infrastructures, ENCOURAGES Member States to invite their relevant communities, such as e-Infrastructures, Research Infrastructures, Research Funding Organisations (RFO's) and Research Performing Organisations (RPO's), to get organized so as to prepare them for connection to the EOSC and CALLS ON the Commission to make optimal use of ongoing projects, existing expertise and knowledge available via existing initiatives, such as ESFRI, eIRG, GO FAIR and others;

22. **Conclusions of the Council of the European Union of 29 May 2018** on European Open Science Cloud (EOSC). Doc. 9291/18 https://www.era.gv.at/object/document/4013/attach/CC_EOSC_final.PDF

11. UNDERLINES that the key factors for the success of EOSC are a sound governance and sustainable business model as well as training an adequate number of data professionals. SUPPORTS the two-stage approach for the EOSC governance that enables all Member States and the Commission to steer and oversee the initial development of the EOSC in the first phase. In the second phase the EOSC governance should become mainly stakeholder-driven, while maintaining a higher-level steering role for all Member States and the Commission. RECOMMENDS that effective coordination is established with ESFRI.

EUROPEAN OPEN SCIENCE CLOUD (second mandate)

Conclusions of the Council of the European Union of 30th November 2018 on *Governance of the European Research Area*²³.

The Council of the European Union,

RECALLING its Conclusions of 29th May 2018 on *Accelerating knowledge circulation in the EU* in which the Council expressed the importance of further advancing Open Access and Open Science policies within the Framework Programme and beyond, underlined the role of the European Open Science Cloud in knowledge dissemination and called for long-term sustainability of Research Infrastructures;

7. WELCOMES the Strategy Report and the ESFRI Roadmap update of 2018, and INVITES ESFRI to prepare the next ESFRI Roadmap update in 2021, strengthening its strategic role in the evolving Research Infrastructure landscape; equally WELCOMES the second Report on the implementation of the ERIC Regulation, and INVITES the Commission to present the next ERIC implementation Report by 2022; NOTES the need for appropriate measures to facilitate the use of the ERIC instrument, in particular as concerns an acceptable solution for the VAT exemption for in-kind contributions, to stimulate investments in ERICs and other ESFRI Roadmap Infrastructures, to increase transnational and open access to European Research Infrastructures and to enhance their financial sustainability; CALLS upon the Commission and Member States to implement these measures as soon as possible and upon the pan-European Research Infrastructures to promote their services at international level and to reach out, where appropriate, to new international members;

11. NOTES the steps taken, including the work of the ERAC Standing Working Group on Open Science and Innovation, towards launching the European Open Science Cloud (EOSC), which constitutes a major milestone to making all re-

search data in the ERA FAIR; STRESSES the need to design a sound governance framework for EOSC in coordination with Member States that empowers the scientific communities and can evolve over time; CALLS upon all involved parties to implement EOSC fully in due time, and NOTES the important role of Research Infrastructure in this context; **RECALLS the need for effective coordination between EOSC and ESFRI, including the governance level.**

23. **Conclusions of the Council of the European Union of 30 November 2018** on Governance of the European Research Area. Doc. 14989/18
<https://data.consilium.europa.eu/doc/document/ST-14989-2018-INIT/en/pdf>

UPDATE OF THE ESFRI ROADMAP 2021

Conclusions of the Council of the European Union of 30th November 2018 on *Governance of the European Research Area*²³.

The Council of the European Union,

RECALLING its Conclusions of 29th May 2018 on *Accelerating knowledge circulation in the EU* in which the Council expressed the importance of further advancing Open Access and Open Science policies within the Framework Programme and beyond, underlined the role of the European Open Science Cloud in knowledge dissemination and called for long-term sustainability of Research Infrastructure;

7. WELCOMES the Strategy Report and the ESFRI Roadmap update of 2018, and INVITES ESFRI to prepare the next ESFRI Roadmap update in 2021, strengthening its strategic role in the evolving Research Infrastructure landscape; equally WELCOMES the second Report on the implementation of the ERIC Regulation, and INVITES the Commission to present the next ERIC implementation Report by 2022; NOTES the need for appropriate measures to facilitate the use of the ERIC instrument, in particular as concerns an acceptable solution for the VAT exemption for in-kind contributions, to stimulate investments in ERICs and other ESFRI Roadmap Infrastructures, to increase transnational and open access to European Research Infrastructures and to enhance their financial sustainability; CALLS upon the Commission and Member States to implement these measures as soon as possible and upon the pan-European Research Infrastructures to promote their services at international level and to reach out, where appropriate, to new international members;

11. NOTES the steps taken, including the work of the ERAC Standing Working Group on Open Science and Innovation, towards launching the European Open Science Cloud (EOSC), which constitutes a major milestone to making all re-

search data in the ERA FAIR; STRESSES the need to design a sound governance framework for EOSC in coordination with Member States that empowers the scientific communities and can evolve over time; CALLS upon all involved parties to implement EOSC fully in due time, and NOTES the important role of Research Infrastructures in this context; RECALLS the need for effective coordination between EOSC and ESFRI, including the governance level.

24. **Conclusions of the Council of the European Union of 30 November 2018** on Governance of the European Research Area. Doc. 14989/18
<https://data.consilium.europa.eu/doc/document/ST-14989-2018-INIT/en/pdf>

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