EN

Horizon 2020

Work Programme 2018-2020

4. European research infrastructures (including e-Infrastructures)

IMPORTANT NOTICE ON THIS WORK PROGRAMME

This Work Programme covers 2018, 2019 and 2020. The parts of the Work Programme that relate to 2020 (topics, dates, budget) have, with this revised version, been updated. The changes relating to this revised part are explained on the Funding & Tenders Portal.

(European Commission Decision C(2020)4029 of 17 June 2020)

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Introduction

Research infrastructures are facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields. Where relevant, they may be used beyond research, e.g. for education or public services. They include: major scientific equipment (or sets of instruments); knowledge-based resources such as collections, archives or scientific data; e-infrastructures, such as data and computing systems and communication networks; and any other infrastructure of a unique nature essential to achieve excellence in research and innovation. Such infrastructures may be 'single-sited', ‘virtual’ or 'distributed'.

Research infrastructures play an increasing role in the advancement of knowledge and technology and their exploitation. By offering high quality research services to users from different countries, by attracting young women and men to science and by networking facilities, research infrastructures help to structure the scientific community and play a key role in the construction of an efficient research and innovation environment. Because of their ability to assemble a ‘critical mass’ of people, knowledge and investment, they contribute to national, regional and European economic development. Research infrastructures are also key in helping Europe to lead a global movement towards open, interconnected, data-driven and computer-intensive science and engineering. e-Infrastructures will make every European researcher *digital*, increasing creativity and efficiency of research and bridging the divide between developed and less developed regions.

While Member States remain central in the development and financing of most research infrastructures, the Union play a catalysing and leveraging role in this field. A European approach helps pooling resources across Europe in order to properly address the cost and complexity of new world-class research infrastructures. It also ensures wider and more efficient access to and use of the infrastructures existing in the different Member States.

Research infrastructures provide and open research opportunities and services to researchers in many areas also addressed by other Parts of Horizon 2020 within "Societal Challenges", "Leadership in Enabling and Industrial Technologies" (LEIT), and “Excellent Science”. This is also reflected in the close links between several of the topics in Research Infrastructures and certain Focus Areas. Research Infrastructures also contributes to other cross-cutting objectives of Horizon 2020, such as climate action and sustainable development, biodiversity, social sciences and humanities, and gender equality. Furthermore, production-level e-infrastructures are able to serve the computing and data needs of any project in the framework programme fostering economies of scale in the use of ICT systems by projects supported by Horizon 2020.

The Research Infrastructures Work Programme 2018-2020 contributes to the implementation of the ESFRI (European Strategy Forum on Research Infrastructures) Roadmap, through the support to the preparatory phase of the ESFRI projects identified in the Roadmap as well as targeted support to their implementation and operation. It will put wide emphasis on fostering

the long-term sustainability of research infrastructures and on expanding the role and impact of research infrastructures in the innovation chain.

E-infrastructures developments for the establishment by 2020 of a single and open European space for online research, including ubiquitous and reliable services for networking and computing, and seamless and open access to e-Science environments and global data resources, will help to free the potential of Big Data for the benefit of researchers, innovators and business, and to advance research and innovation, therefore contributing to the objectives of the Priority 2 of the Juncker Commission: A Connected Digital Single Market.

The Research Infrastructures Work Programme 2018-2020 will provide support to actions included in the 2016 Communication on the European Cloud Initiative, in particular to further integrate and consolidate e-infrastructure platforms, to connect the ESFRI infrastructures to the European Open Science Cloud, and to develop a European Data Infrastructures (EDI).

Research Infrastructure activities contribute also to widening participation in the programme by supporting the development of Regional Partner Facilities[1]. The use of European Structural and Investment Funds to build capacities and infrastructures at national and regional level in line with the relevant smart specialisation strategy is encouraged (further information can be found in section "Specific features for Research Infrastructures").

This Research Infrastructures Work Programme implements several overall recommendations expressed in the Horizon 2020 interim evaluation. It also addresses areas for improvement identified by the Research Infrastructures specific assessment of the interim evaluation of Horizon 2020, such as the need to reassess the balance between the support given to starting and advanced communities and to further develop actions to promote innovation. Specific measures to tackle overall and specific issues in the last Work Programme for 2018-2020 include an increase of the budget for starting communities, a better integration between research infrastructures and e-infrastructures actions, wider actions to promote innovation as well as large initiatives of international cooperation.

Open research data

Grant beneficiaries under this work programme part will engage in research data sharing by default, as stipulated under Article 29.3 of the Horizon 2020 Model Grant Agreement (including the creation of a Data Management Plan). Participants may however opt out of these arrangements, both before and after the signature of the grant agreement. More information can be found under General Annex L of the work programme

[1] A Regional Partner Facility (RPF) is a research infrastructure of national or regional importance in terms of socio-economic returns, training and potential for attracting researchers and technicians, that is recognised as a partner to a pan-European ESFRI or other world-class research infrastructure. The quality of the RPF, including the level of its scientific service, management and access policy, must meet the same standards required for pan-European research infrastructures.

Call - Development and long-term sustainability of new pan-European research infrastructures

H2020-INFRADEV-2018-2020

This call will support the development of new world-class research infrastructures which will help Europe to respond to grand challenges in science, industry and society. It will facilitate and support the implementation and long-term sustainability of the research infrastructures identified by the European Strategy Forum on Research Infrastructures (ESFRI) and of other world-class research infrastructures. In addition it will identify, through the design studies, the next generation of new research infrastructures.

Proposals are invited against the following topic(s):

INFRADEV-01-2019-2020: Design Studies

Specific Challenge: New leading-edge research infrastructures in all fields of science and technology are needed by the European scientific community in order to remain at the forefront of the advancement of research, and to be able to help industry strengthen its base of knowledge and its technological know-how. The aim of this activity is to support the conceptual and technical design for new research infrastructures which are of a clear European dimension and interest. Major upgrades of existing infrastructures may also be considered if the end result is intended to be equivalent to a new infrastructure.

Scope: Design studies should tackle all the key questions concerning the technical and conceptual feasibility of new or upgraded fully fledged user facilities (proposals considering just a component for research infrastructures are not targeted by this topic). A design study proposal should demonstrate the relevance and the advancement with respect to the state-of-art of the proposed infrastructure. It should indicate the gaps in the research infrastructure landscape the new facility will cover as well as the research challenges it will make possible to address. All fields of research are considered.

The main output of a design study will be the 'conceptual design report' for a new or upgraded research infrastructure, showing the maturity of the concept and forming the basis for identifying and constructing the next generation of Europe's and the world's leading research infrastructures. Conceptual design reports will present major choices for design alternatives and associated cost ranges, both in terms of their strategic relevance for meeting today's and tomorrow's societal challenges, and (where applicable) in terms of the technical work underpinning the development of new or upgraded research infrastructures of strategic importance for Europe.

The activities to be performed in a Design Study proposal should include both:

- Scientific and technical work, i.e. (1) the drafting of concepts, architecture and engineering plans for the construction, taking into due account resource efficiency and environmental (including climate-related) impacts, as well as, when relevant, the

creation of prototypes; (2) scientific and technical work to ensure that the scientific user communities exploit the new facility from the start with the highest efficiency; (3) plans to organise the efficient curation, preservation and provision of access to data collected or produced by the future infrastructure, in line with the FAIR principles.

- Conceptual work, i.e. (1) plans to coherently integrate the new infrastructure into the European landscape of related facilities in accordance, whenever appropriate, with the EU objective of a balanced territorial development; (2) the estimated budget for construction and operation, and initial ideas on how to achieve long-term sustainability; (3) plans for an international governance structure; (4) the planning of research services to be provided at international level, (5) procedure and criteria to choose the site of the infrastructure.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

Conceptual and technical designs of new leading edge research infrastructures are crucial to keep the European scientific community at the forefront of the advancement of research and to trigger the process leading to their establishment.

- Funding bodies for research infrastructures become aware of the strategic and funding needs of the scientific community.

- Policy bodies at the national level (e.g. funding bodies, governments), at European level (e.g. ESFRI) and internationally (e.g. the Group of Senior Officials on Research Infrastructures – GSO) have a sound decision basis to establish long-range plans for new research infrastructures of pan-European or global interest.

- The technical work carried out under this topic will contribute to strengthening the technological development capacity and effectiveness as well as the scientific performance, efficiency and attractiveness of the European Research Area.

- When relevant, the improvement of the environmental (including climate-related) impact as well as the optimisation of resource and energy use are integrated in the very early phase of development of new research infrastructures.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRADEV-02-2019-2020: Preparatory Phase of new ESFRI projects and early phase support to ESFRI high strategic potential areas[2]

Specific Challenge: The ESFRI roadmap, updated periodically, identifies the needs of the European scientific community in terms of research infrastructures. However, inclusion in the ESFRI roadmap does not guarantee that these needed infrastructures will be built. Before proceeding with the construction and/or implementation of the identified infrastructures, many preliminary decisions need to be taken with respect to issues such as the identification of funders, the financial plan for sustainability, the governance by involved stakeholders, the site and legal form of the managing organisation (and of the research infrastructure, if different), the architecture and the service policies. The aim of this activity is to provide catalytic and leveraging support for the preparatory phase of ESFRI projects, and to new initiatives in areas of high strategic potential, leading to the construction of new research infrastructures or major upgrades of existing ones.

Scope: Following the updates of the ESFRI Roadmap[3], support under this work programme will be provided to:

(a) Preparatory Phase for new research infrastructure projects which enter the ESFRI Roadmap in 2018 (***Coordination and Support actions)***

The preparatory phase aims to bring the project for the new or upgraded research infrastructure identified in the ESFRI Roadmap to the level of legal, financial, and, where applicable, technical maturity required for implementing it.

Proposal consortia should involve all the stakeholders necessary to move the project forward, to take the decisions, and to make the financial commitments, before construction can start (including, but not limited to, national/regional ministries/governments, research councils or funding agencies from the countries that have already declared their commitment in the application to ESFRI). Appropriate contacts with ministries and decision-makers should be continuously reinforced, thus further strengthening the consortia. Operators of research facilities, research centres, universities, and industry may also be involved whenever appropriate. Technical work should be carried out when necessary to complete the final technical design, providing a sound technical base for establishing a cost baseline and detailed financial planning. The financial needs of the project should be mapped out to the extent necessary for funding agencies to establish their own medium- and long-term financial planning. Societal and economic benefits of the infrastructure should be analysed to carry out a Cost-benefit analysis[4].

The preparation of the legal and financial agreements (including site, governance, internal rules, financing of the new research infrastructures) is one of the main activities and

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2 This topic will not be continued in 2020.

3 http://ec.europa.eu/research/infrastructures/index.cfm?pg=esfri

4 See for instance Guide to Cost-Benefit Analysis of Investment Projects for Cohesion Policy 2014-2020 (http://ec.europa.eu/regional_policy/en/information/publications/guides/2014/guide-to-cost-benefit-analysis-of-investment-projects-for-cohesion-policy-2014-2020)

deliverables and should be finalised before the end of the project (e.g., through the signature of a Memorandum of Understanding).

The detailed list of activities that can be included in a preparatory phase proposal is given in part A of the section "Specific features for Research Infrastructures". Proposals should explain any synergies and complementarities with previous or current EU grants.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 4 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(b) Support to Early Phase for research infrastructure initiatives in high strategic potential areas of research identified in the ESFRI Roadmap 2018 (***Research and Innovation Actions)***

This support aims to foster the development of pan-European research infrastructures in areas demonstrating particularly high strategic potential for the European Research Area, as identified in the ESFRI Roadmap 2018.

To this extent activities will include the needed scientific, technical and conceptual work: e.g. the drafting of the new research infrastructure architecture, including the role of the central coordination and the different nodes; the planning of research services to be provided at international level as well as user strategy and access policy; plans to coherently integrate the new infrastructure into the European landscape of related facilities; the estimated budget for construction and operation; plans for an international governance structure, specification of ICT and e-Infrastructure needs. Proposals should explain any synergies and complementarities with previous or current EU grants.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

<u>Expected Impact</u>:

All proposals:

- A landscape of first-class sustainable RIs and services, open to researchers, industry, and other interested groups such as policy makers and the public, is progressively established, which will impact on the acceleration of scientific discovery as well as on innovation and competitiveness.
- The technical work carried out under this topic will contribute to strengthening the technological development capacity and effectiveness as well as the scientific performance, efficiency and attractiveness of the European Research Area.
- Synergies and complementarity between the new and existing research infrastructures are developed, thus contributing to the development of a consistent European research infrastructures ecosystem.

(a) Preparatory Phase (*Coordination and Support actions*)

- The decision making processes leading to the construction and/or implementation of the research infrastructures identified in the ESFRI Roadmap is triggered.
- Funding bodies are able to take funding decisions and to conclude the legal agreements necessary for the construction of new research infrastructures.

(b) Support to Early Phase (*Research and Innovation actions)*

- Policy bodies at the national, European and international level have a sound decision basis to establish long-term plans and roadmaps for new research infrastructures of pan-European or global interest.
- New research infrastructure initiatives in areas of high strategic potential for the European Research Area are further developed and brought to maturity.

Type of Action: Coordination and support action, Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRADEV-03-2018-2019: Individual support to ESFRI and other world-class research infrastructures

Specific Challenge: The implementation phase of new pan-European research infrastructures, such as those identified in the ESFRI roadmap, is the most delicate and difficult as financial sustainability must be proved and the trust and awareness of users must be earned.

Scope: This topic targets the long-term sustainability of new research infrastructures, ESFRI and other world-class research infrastructures of European Interest, with established governance and legal structure, notably on the basis of the European Research Infrastructure Consortium (ERIC) or any other suitable structure with international membership. Infrastructures having submitted a first step application to the Commission for establishing an ERIC may also apply to this topic. Support will be provided to activities aimed at ensuring long-term sustainability, including enlargement of the membership, European coverage, international cooperation[5], limited pilots of access provision for testing and improving user services to increase reliability and create trust, definition of service level agreements and business/funding plan, outreach, and technology transfer activities. Proposals should explain any synergies and complementarities with previous or current EU grants.

Specific attention should be given to the interaction with industry and SMEs and the fostering of the innovation potential of the infrastructures. Activities may also facilitate the development of Regional Partner Facilities and their integration in the European research infrastructure landscape. The detailed list of activities that can be supported under this topic is given in part B of the section “Specific features for Research Infrastructures”.

[5] In line with the strategy for EU international cooperation in research and innovation (COM(2012)497)

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 and 5 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

This activity will:

- contribute to providing Europe with a comprehensive landscape of sustainable Research Infrastructures helping to respond to challenges in science, industry and society;
- strengthen the ERA position and role in the global research environment;
- reinforce the partnership between the Commission, Member States, Associated Countries and relevant stakeholders in establishing pan-European research infrastructures;
- enhance the role of the Union in international organisations and multilateral fora;
- support progress towards the development of global research infrastructures;
- enable researchers to address societal challenges with a global dimension;
- foster capacity-building and Research Infrastructure human capital development in targeted/relevant regions.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRADEV-04-2019: Fast track to the implementation of an ESFRI research infrastructure

Specific Challenge: The transition from construction to full operation of a new pan-European research infrastructure, can be slowed down by the difficulties to align the funding cycles of the different countries committed to contribute to its implementation. A significant EU contribution to support the preparation for full operation could trigger the alignment and accelerate the research infrastructure transition from the implementation to full operational phase and enhance its sustainability.

Scope: This topic aims to accelerate the implementation and initial operation (start-up phase) of the Extreme Light Infrastructure (ELI) project. This ESFRI project is the best example of the synergetic use of the European Structural and Investment Funds (ESIF), Horizon 2020 support and national funding for the construction and deployment of a research infrastructure. The Horizon 2020 support should complement investments coming from ESIF in order to expand the scope and impact of both funds in terms of scientific excellence and regional socio-economic development.

The support should foster the transformation of ELI from a construction project to a fully operational European user facility and the participation of all interested countries in the establishment of a legal entity in charge of the operation of ELI, which will most likely take the form of an European Research Infrastructure Consortium (ERIC). Proposals would have to demonstrate the involvement of the three ELI pillars and at least the other four ELI-DC (Delivery Consortium) members as well as the relations with other relevant laser initiatives in Europe, and should cover at least the following dimensions:

- Joint ramping-up of the operation of ELI, realistically compatible with the users' demands and with the related operational resources.
- Further definition of service level agreements and business/funding plans supporting a joint sustainable cost model based on an operational staffing optimisation.
- Joint development of associated services that should be used by scientists and industries and of a user base together with associated expected revenues for ensuring sustainable operations after the 'start-up' phase.
- Development of joint activities and mutual exchanges with relevant laser initiatives.
- Enlargement of the ELI membership.
- Limited pilots of access provision for testing and improving user services to increase reliability and create trust.
- Outreach and technology transfer activities.

Proposals should explain any synergies and complementarities with previous or current EU grants.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 20 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: This activity will:

- contribute to providing Europe with a comprehensive landscape of sustainable Research Infrastructures helping to respond to challenges in science, industry and society;
- strengthen the ERA position and role in the global research environment;
- reinforce the partnership between the Commission, Member States, Associated Countries and relevant stakeholders in establishing pan-European research infrastructures and in successfully operating them;
- enable researchers to address societal challenges with a global dimension;
- foster capacity-building and Research Infrastructure human capital development in targeted/relevant regions.

- ensure that the socio-economic impact of investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Conditions for the Call - Development and long-term sustainability of new pan-European research infrastructures

Opening date(s), deadline(s), indicative budget(s):[6]

Topics (Type of Action)	Budgets (EUR million)			Deadlines
	2018	2019	2020	
Opening: 05 Dec 2017				
INFRADEV-03-2018-2019 (RIA)	15.00			22 Mar 2018
Opening: 16 Oct 2018				
INFRADEV-04-2019 (RIA)		20.00		20 Mar 2019
Opening: 14 Nov 2018				
INFRADEV-02-2019-2020 (CSA)		20.00		20 Mar 2019
INFRADEV-02-2019-2020 (RIA)		4.00		
INFRADEV-03-2018-2019 (RIA)		40.00	5.00	
Opening: 25 Jul 2019				
INFRADEV-01-2019-2020 (RIA)		20.00	10.00	12 Nov 2019
Overall indicative budget	15.00	104.00	15.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

[6] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRADEV-01-2019-2020, INFRADEV-02-2019-2020, INFRADEV-03-2018-2019, INFRADEV-04-2019	*For the criterion Impact of Research and Innovation Actions* the second sub-criterion will be substituted by: • Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society;

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant guide published on the Funding & Tenders Portal.

Grant Conditions:

INFRADEV-01-2019-2020, INFRADEV-02-2019-2020, INFRADEV-03-2018-2019, INFRADEV-04-2019	For grants awarded under this topic capitalised and operating costs of 'large research infrastructures' as defined in the Article 6.2.D.4 of the Model Grant Agreement are not eligible.
INFRADEV-03-2018-2019, INFRADEV-04-2019	For grants awarded under this topic beneficiaries being 'access providers' must provide access to research infrastructures or installations. The respective options of Article 16.1, Article 16.3, Article 25.5 and Article 31.6 of the Model Grant Agreement will be applied.
INFRADEV-03-2018-2019, INFRADEV-04-2019	For grants awarded under this topic eligible costs may take form of unit costs for providing trans-national access to research infrastructure as defined in the Commission Decision

	C(2013)8199 of 10 December 2013.
INFRADEV-03-2018-2019, INFRADEV-04-2019	For grants awarded under this topic the depreciation costs of equipment, infrastructure or other assets for providing trans-national or virtual access to research infrastructure will be ineligible costs. The respective option of Art. 6.2.D.2 of the Model Grant Agreement will be applied.
INFRADEV-04-2019	For grants awarded under this topic beneficiaries being 'access providers' must provide virtual access to research infrastructures or installations. The respective options of Article 16.2 and Article 16.3 of the Model Grant Agreement will be applied.

Consortium agreement:

INFRADEV-01-2019-2020, INFRADEV-02-2019-2020, INFRADEV-03-2018-2019, INFRADEV-04-2019	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - Implementing the European Open Science Cloud

H2020-INFRAEOSC-2018-2020

This call will achieve the vision put forward by the European Cloud Initiative[7] *and it will make the* European Open Science Cloud *(EOSC) a reality. In order to realise an EOSC that truly supports interdisciplinary research and Open Science, a new pan-European model for research data and related services that is both scalable and flexible needs to be put in place, so that it can be adapted to the emerging needs of the scientific community and support the whole research data lifecycle. The new model will build on a pan-European service access mechanism* – the EOSC hub[8] – *providing access primarily to public e-infrastructure services supplied at national, regional and institutional levels. The Call will support the setup of an appropriate governance for such a relevant endeavour, which takes into account the outcomes of previous efforts and the active contribution of all scientific stakeholders. The Call will ensure strong positioning of EOSC in the context of similar initiatives in other world regions to enhance and 'open to the world' international collaboration.*

The Call will develop the EOSC ecosystem and the EOSC Portal providing all European researchers with seamless[9]*, non-discriminatory and secure access to public and commercial services and appropriate access modalities to a wider user community like industry, public sector, citizen scientists, etc. Capacity building for this ecosystem, in particular concerning storage, computing, software and other resources and services, could in the future allow piloting of innovative financial schemes and/or consider pan-European joint procurement facilitated by the EOSC governance - and implemented in close conjunction with the funders - for aggregation of demand. The coordination between national initiatives aiming at making data FAIR*[10] *as well as the connection*[11] *to the EOSC of priority European Research Infrastructures, in particular the ESFRI ones, will provide access from the EOSC entry point, to a wealth of services and curated resources in a wide range of scientific domains.*

Proposals are invited against the following topic(s):

INFRAEOSC-01-2018: Access to commercial services through the EOSC hub

Specific Challenge: To achieve excellence in their research activities, researchers need to use a broad range of state-of-the-art services that sometimes are not made available by their public e-infrastructure facilities, either because not offered by them or because they are developed more efficiently by commercial operators. The challenge is to set-up a legal and

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7 COM(2016) 178 final

8 EOSC hub refers to the single entry access mechanism to EOSC services that will be provided by the successful proposal resulting from the call EINFRA-12-2017.

9 Work on interoperability will take in due consideration the European Interoperability Framework.

10 Findable, Accessible, Interoperable and Re-usable

11 As indicated in the European Cloud Initiative Communication "The Commission will work with Member States to connect the priority European research infrastructures to the European Open Science Cloud". This will include the federation of the priority European research infrastructures with and accessibility through the EOSC.

technical mechanism to integrate these supplementary commercial services into the EOSC hub in order to make them available to the scientists.

Scope: The action will cover the following activities:

- research activities for understanding how various needs from researchers can be aggregated and the complementary commercial services required to maximise the impact of the tools already available in the EOSC catalogue of services which enable inter-disciplinary research;
- technical integration of the complementary commercial services into the EOSC catalogue of services, including management of the access rights and establishment of appropriate legal agreements (contracts, service level agreements, etc.) that are necessary to make accessible the commercial services to the EOSC users; due consideration should be given to the use of open standards and interoperability of the services;
- provision of access to the services through the EOSC catalogue of services.

Proposals will address the availability of both types of services listed below:

a) Commodity type commercial digital services that are necessary for interdisciplinary research activities including, but not limited to, e.g. cloud services (storage, computing, and applications), software licenses, simulation tools, collaboration and virtualization tools.

b) A wide variety of secure Earth Observation commercial services[12]. Proposals should address commercial services stemming from the use of Copernicus open data accessible through the 'DIAS' platforms and its smart integration into the service catalogue of the EOSC. These commercial services may include other space or non-space inputs.

The proposals should include:

1) an outline of the methods to be used for gathering specifications and requirements from scientists/users that would properly reflect the user-focused perspective of the EOSC;

2) the proposed criteria for the selection of the most relevant commercial services addressing the needs discussed under point (1) above, that can generate positive impact on research activities;

3) the proposed indicators for continuous monitoring of the quality of the service taking into account the feed-back received from the users as well as appropriate criteria for ensuring broad usage of the services.

4) a clear description of how the interoperability and use of open standards will be taken into account during the project execution.

[12] Copernicus is the Union Earth observation and monitoring programme. In this context, the Commission is setting up for Copernicus consolidated Data Access and Information Services (DIAS) platforms primarily addressing open data and other components from the EO Community that will eventually lead to (data-related) EO commercial services. The commercial services based on DIAS would become available to the scientific community also through the EOSC.

These services will have to be integrated in the EOSC via procurement. A specific target of this action is the development of a value-added capability for procuring and brokering commercial services for the EOSC. Public e-Infrastructures should act as aggregators of demand for such commercial services and provide access to the acquired resources through the EOSC hub for the benefit of the scientific community. The commercial services targeted by this action should complement the service offering of the EOSC catalogue of services. In order to limit the costs of integration into the EOSC catalogue of services, the action should focus on commercial services that are compliant with any available standards and guidelines set for the management of the EOSC services. The access mechanisms to the services proposed in this topic should be based on pan-European identity management and authentication services, aligned with those used in the EOSC framework and build on the experience and outcomes provided by the AARC project and its continuation, AARC2.

The Commission considers that proposals requesting a contribution from the EU of between EUR 11 and 12 million would allow this challenge to be addressed appropriately. A balanced allocation of the budget between the above two types of commercial services is expected (50% each). Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Set-up a value-added procurement mechanism for commercial services that creates economies of scale in procuring and brokering resources for the EOSC and helps optimising investments enabling long-term sustainability for the EOSC;
- Enable the creation of new market opportunities and new solutions by facilitating cross-fertilisation of heterogeneous data and services;
- Lower access barriers for scientific community to commercial services, including DIAS-supported added value services and enhance industry's potential to take advantage of scientific market opportunities.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEOSC-02-2019: Prototyping new innovative services

Specific Challenge: Develop an agile, fit-for-purpose and sustainable service offering accessible through the EOSC hub that can satisfy the evolving needs of the scientific community by stimulating the design and prototyping of novel innovative digital services. Innovative models of collaboration that genuinely include incentive mechanisms for a user oriented open science approach should be considered.

Scope: Research and Innovation Actions that target gaps in the service offering of the EOSC hub and develop innovative services that address relevant aspects of the research data cycle

(from inception to publication, curation, preservation and reuse), for example allowing implementation of new scientific data-related developments and intelligent linking and discovering of all research artefacts.

Whereas initially the new services would have to respond to specific needs of particular scientific communities by the end of the project they should be leveraged to foster interdisciplinary research, serving a wider remit of research needs, as well as new users like industry and the public sector. Scalability of the new solution should be tested by user communities from different disciplines during the project lifetime. These services should be based on systems and technologies that have reached TRL 6 before the start of the project and will be brought to at least TRL 8 by the end of the project. Proposals should demonstrate how the resulting services complement, enrich and could potentially be integrated into the EOSC hub. Proposals retained for funding under this topic should take due consideration of any accessibility requirements set under the projects funded under EINFRA-12-2017 topic that may be available at the time the call will be open, in view of their integration into the mainstream services of the EOSC hub.

Consortia are encouraged to include SMEs that are willing to develop or contribute to the development of new innovative interdisciplinary services with a view of future integration in the EOSC hub.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 and 6 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Integrating co-design into research and development of new services to better support scientific, industrial and societal applications benefiting from a strong user orientation;
- Supporting the objectives of Open Science by improving access to content and resources, and facilitating interdisciplinary collaborations;
- Fostering the innovation potential by opening up the EOSC ecosystem of e-infrastructure service providers to new innovative actors.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEOSC-03-2020: Integration and consolidation of the existing pan-European access mechanism to public research infrastructures and commercial services through the EOSC Portal

Specific Challenge: The phase of integration and consolidation of e-infrastructure platforms initiated under the Research Infrastructures Work Programme 2016-2017 (in particular,

through the EOSC-hub) as well as the work carried out by other EU funded projects and initiatives[13], has set the ground for the development of the EOSC Portal. Through its main components, the EOSC website, catalogue of services and marketplace[14], researchers and other users can find and use research-enabling services and resources, get technical support, integrated solutions from the EOSC providers, participate in co-design, and be informed about and engaged with, the EOSC vision and policy initiatives.

Building on this work, the challenge is now to consolidate and scale up the EOSC Portal and its underlying service platform in order to: 1) strengthen the EOSC Portal so that it continues to provide an increasing portfolio of high quality standard compliant and interoperable services of proven user interest and scientific relevance from a wide range of national, regional and institutional public research infrastructures in Europe as well as from commercial service providers in its catalogue; 2) reinforce the role of the marketplace as the access channel to integrated, composable and reliable services; 3) attract more users, within the research community and beyond, by enhancing the user experience and seamlessly accommodating their needs; and 4) ensure its long-term sustainability taking into account all the relevant governance and business frameworks.

Scope: Building on the outcomes of the projects awarded under topics EINFRA-12-2017[15], INFRAEOSC-06-2019 (a), INFRAEOSC-05-2018 (a), INFRAEOSC-04-2018 and other relevant EU funded projects and initiatives[16] (including the thematic clouds), proposals should address the following activities all together:

a. Operation, maintenance and enhancement of the EOSC Portal (the website, the catalogue of services and the marketplace)

- Enhance operational aspects of the EOSC Portal: proposals should include tools and activities to ensure the basic functionalities underpinning the portal, such as the support, quality, security, reliability and traceability of services, effective monitoring of usage and evaluation of performance, messaging and usage accounting. A user-friendly interface, offering integrated information on the EOSC vision and process, should be also ensured, encouraging constant learning and alignment in all disciplines and Member States.

- Engage with the supply side of EOSC: proposals should provide a framework to interact with all service and resources providers[17], in order to ensure that their services are integrated into the catalogue of services and, where appropriate, the marketplace. They

13 In particular, those mentioned in the SWD for the Implementation Roadmap of the EOSC Commission Staff Working Document, SWD(2018) 83 final.

14 The EOSC marketplace is conceived as a platform integrated into the EOSC Portal where users are able to access, order and compose different services and resources: https://marketplace.eosc-portal.eu/

15 http://www.eosc-hub.eu/, https://www.openaire.eu/, and https://eosc-portal.eu/

16 In particular, those mentioned in the Implementation Roadmap of the EOSC Commission Staff Working Document, SWD(2018) 83 final.

17 Including with service providers in the grant awarded under topics INFRAEOSC-02-2019, INFRAEOSC-04-2018 and the thematic clouds developed under other parts of the Horizon 2020 programme.

should also ensure the alignment of the providers with future EOSC principles, standards and values including compliance with the Rules for Participation and FAIR principles[18] and the reduction of the complexity barrier to users. Consortia should address issues related to the adoption of common standards by all suppliers, the implementation of Application Programming Interfaces (APIs), the automatic collection and exchange of information related to service updates, the mechanisms for reporting usage, the support for virtual access accounting mechanisms[19], etc.

- Interact with the EOSC end users and provide a highly usable service platform: proposals should foresee the necessary feedback mechanisms (including a user panel) and user behaviours' analysis within the EOSC Portal environment to allow for constant improvement of the features of the different EOSC Portal components and their usability easing the way users can interact and evaluate the service. The analysis should include gender sensitive issues, when relevant. Proposals should also put in place the necessary mechanisms to elicit users' needs requiring new services (including commercial ones).

b. Fostering and enabling secure service composability

To allow for a higher level of service integration within the EOSC marketplace, proposals should take due consideration of the need for secure composition of services and resources from different providers. Researchers and other EOSC end users should be able to discover services and combine them to compose new, more complex services, tailored to their specific needs. By enabling EOSC users to compose reliable, secure and scalable services, the EOSC marketplace will become more flexible and adaptable, maximising its impact and benefit for the research community.

In this context, proposals should provide a framework, including specific pilot scenarios, for exposing, integrating and managing a wide-range of standard and policy compliant cross-domain and domain-specific research enabling services and resources from pan-European horizontal and thematic research infrastructures as well as from commercial providers. In particular, they should:

- Allow for user friendly discovery, access and re-use of major public research outputs (e.g. publications or datasets) and data processing capabilities, analytical tools or any other added-value quality service from various providers;

- Provide and evolve service management tools that support the provider's participation to the EOSC federation;

- Foster secure composability of services and interoperability of datasets and other outputs by supporting the use of common interfaces, standards, ICT specifications and best

[18] See for reference: SWD(2018) 83 final – Implementation Roadmap for the European Open Science Cloud.

[19] See description of Virtual access activities in part D of the section "Specific features for Research Infrastructures".

practices that not only allows for services to be reused in multiple service compositions but also ensures the reliability, flexibility and scalability of those services.

c. User enhanced experience using Artificial Intelligence (AI) techniques

Proposals should describe how the EOSC Portal would be enhanced with AI-based services in order to exploit usage patterns and to advise researchers and other EOSC users on the most suitable EOSC services according to their research profiles and needs. In this way, researchers that have completed their EOSC user profile (including their affiliation, research interests and needs) can get suggestions based on what services other EOSC users with similar interests and access rights have used to address their research needs. The advice will have to be continuously updated, based on the actual activity of the users at the EOSC Portal enhancing quality and improving predictive response to cover evolving needs and ensure engagement. The quality of the advice of such AI-based services should improve with the increase of the number of EOSC users and services available.

d. Widening the EOSC user base

Proposals should include strategies and well-defined structures for gathering needs from potential new user communities and propose methods outlining the operational requirements to be satisfied by the EOSC Portal to effectively attract and integrate new users. This includes the possibility of federating and/or integrating heterogeneous and hybrid research clouds into the EOSC Portal.

In order to enable users from non-research communities to access EOSC services through the EOSC Portal, the AAI[20] federated architecture implemented in the EOSC Portal should be fully aligned with the legal and interoperability framework set by the eIDAS Regulation[21].

Proposals shall include the development of APIs or any other necessary feature that allow third parties such as Open Data Initiatives or other initiatives under the European Common Data Space to become users of the EOSC services and to access the available services in the EOSC Portal from their own environments.

Proposals should include an outline of the legal, technical and business processes to be implemented through contractual agreements between the EOSC Portal and user institutions that are interested in providing increased accessibility to EOSC services and resources to their affiliated members.

e. Widening the service offer with commercial services

Proposals should address both of the following activities:

- Proposals should incorporate commercial services into the EOSC marketplace and expand it, by building further on the work carried out under the topic INFRAEOSC-01-

[20] Authentication and Authorization Infrastructure. Based on the work of AARC, AARC2 and the EOSC-hub projects.

[21] Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market.

2018[22] and under the EOSC-hub project. In particular, proposals should (1) through the EOSC Portal feedback mechanisms[23], aggregate the various needs of EOSC users for commercial services that are complementary to the services offered by public infrastructures, (2) procure preferably green[24] innovative commercial services addressing the aggregated user demand and (3) make available the purchased services to EOSC users. Proposals will make the procured capacity available for access - together with other capabilities of interest - through the portal access channel. Service capacity shall be allocated to projects and initiatives through a selection process that ensures excellence, fair distribution across scientific communities and removal of digital divides across communities and countries. The procurement mechanism should be compatible with the Green Public Procurement initiative[25]. Examples of commercial services that could be incorporated include commodity type commercial digital services that are necessary for interdisciplinary research activities or secure Earth Observation commercial services stemming from the use of Copernicus open data, etc. The inclusion of such added-value commercial services will enrich the existing catalogue, generate positive impact on cross-disciplinary research activities in the EOSC environment and improve user experience with the overall EOSC service offering. A maximum amount of EUR 10 million of the total budget for this sub-topic is foreseen for this procurement activity.

- Building on the work of the EOSC-hubproject, proposals should collaborate with private sector entities, in particular with SMEs, in the context of digital innovation hubs initiatives, in order to stimulate an ecosystem of innovation and knowledge transfer that fosters the development of commercial services to continuously cover the needs of EOSC users[26].

f. Support activities

Proposals shall also cover all the following activities aiming at boosting the impact and outreach of the EOSC Portal:

i. Outreach and skills

Leveraging on existing networks and actions for training on and outreach of the EOSC and in strong collaboration with the awarded grants under topic INFRAEOSC-07-2020, proposals should include activities to:

- Foster the EOSC initiative's uptake and spread both geographically and across scientific disciplines and communities (including long tail of science). Moreover, proposals should include measures and dissemination activities for closing the gap between European

22 OCRE project: https://cordis.europa.eu/project/rcn/219198/factsheet/en
23 See point a1) on user feedback.
24 For more information about the green public procurement initiative: http://ec.europa.eu/environment/gpp/index_en.htm
25 http://ec.europa.eu/environment/gpp/index_en.htm
26 See point a1) on user feedback.

countries with higher and lower EOSC uptake, including the EU candidate countries and the Western Balkans.

- Develop the necessary skills of EOSC users for sharing resources, managing data and applying the FAIR principles in the context of the EOSC Portal, by e.g. providing researchers and data practitioners with consolidated cross-infrastructure training packages for data skills, data science and data stewardship.

ii. Support to the Research Data Alliance's contribution to the EOSC:

- Proposals retained for funding should directly support the contribution of RDA to the EOSC initiative and, in particular, in the context of the EOSC Portal.

- Proposals should also provide financial support to third parties wishing to engage and participate in the Research Data Alliance processes and activities, including RDA outputs adoption fostering the interoperability and service composition in the EOSC Portal[27].

Grants awarded under this topic will be complementary to the actions awarded under topic INFRAEOSC-07-2020. The main purpose of the collaboration agreements referred to in Article 41.4 of the Model Grant Agreement is to describe the terms and conditions for the provision of services through the EOSC Portal.

Grants awarded under this topic will be complementary to the action awarded under topic INFRAEOSC-06-2019 (a) and should conclude a collaboration agreement.

For grants awarded under this topic, beneficiaries will be subject to the following additional obligations aiming at ensuring exploitation of its results: proposals must necessary state the participants' commitment to: a) use open source software, b) make tools, standards, specifications and all other relevant outputs generated in the action available, through a well-defined mechanism, to the EOSC governance and any other institution responsible for the continuity of the EOSC Portal beyond the lifespan of the Grant Agreement.

Grants awarded under this topic are expected to carry out an analysis regarding energy consumption and environmental impact of technologies used in the context of the project. The analysis should include an action plan in order to limit the carbon and energy footprint with a specific reference to the standard EN 50600-4[28] together with a timeline for implementation of the defined milestones and KPIs.

As the scope of this activity is to consolidate a single EOSC Portal, at most one single proposal covering all the described activities (a. to f. included) is expected to be funded.

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27 In line with the conditions set out in part K of the General Annexes. A maximum amount of EUR 1M is foreseen for the total financial support to third parties under this point while the maximum amount per third party may not exceed EUR 60 000.

28 EN 50600-4: Information technology: Data centre facilities and infrastructures. For the link to the latest published version, tools and resources regarding the standard, check: https://ictfootprint.eu/en-50600-4-factsheet-0

The Commission considers that proposals requesting a contribution from the EU of up to EUR 40.9 million and a 30 months duration would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts and durations.

Expected Impact:

- Provide pan-European access to state-of-the-art secure, interoperable and scalable EOSC services and resources enabling the emergence of genuine Open Science, enhancing data skills and boosting data intensive research in Europe.
- Enable researchers and other users to compose secure and scalable services that respond to actual and evolving needs, in a secure, flexible and scalable environment.
- Build an agile EOSC and increase the uptake of its services by public and private sectors stakeholders, across Europe, exploiting solutions and technologies for the benefit of all areas of economy and society.
- Reduce the burden for research organisations and other service users to engage in complex procurement processes, support cross-analysis of data from heterogeneous sources and create market opportunities for innovative research data services.
- Increase the overall value of open research data and ensure that EOSC contributes to the global playing field of open FAIR data.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEOSC-04-2018: Connecting ESFRI infrastructures through Cluster projects

Specific Challenge: Research Infrastructures such as the ones on the ESFRI roadmap and others, are characterised by the very significant data volumes they generate and handle. These data are of interest to thousands of researchers across scientific disciplines and to other potential users via Open Access policies. Effective data preservation and open access for immediate and future sharing and re-use are a fundamental component of today's research infrastructures and Horizon 2020 actions but researchers are still confronted with a fragmented research data landscape. The European Open Science Cloud (EOSC) will help addressing the current situation. Major stakeholders, such as the pan-European research infrastructures, must actively contribute to the setting up of its services.

Scope: This topic will ensure the connection of the research infrastructures identified in the ESFRI Roadmap to the EOSC. Support to this activity will be provided through cluster projects gathering ESFRI projects and landmarks in each of the following large thematic domains: Biomedical Science, Environment and Earth Sciences, Physics and Analytical Facilities, Social Science and Humanities, Astronomy, Energy. While the ESFRI

infrastructures represent the core component of any cluster, other relevant world class research infrastructures with a European dimension, established as ERICs or International Organisations, can also be involved in a cluster. Each infrastructure should participate to only one cluster.

Proposals will address the stewardship of data handled by the involved research infrastructures according to the FAIR[29] principles and in line with the objectives of Open Science. This will include the definition of domain specific data policies (e.g. acquisition, deposit, curation, preservation, access, sharing and re-use), addressing any legislative or interoperability issues which affect data handling across geographical and discipline borders, as well as the development of appropriate tools for depositing, curating and analysing data. Research infrastructures will have to expose their data and tools under the EOSC catalogue of services and take all the necessary steps to ensure that the used repositories are compliant with the FAIR principles. In doing so proposals should develop synergies and complementarity in data handling between research infrastructures, optimise technological implementation, and ensure integration and interoperability of data and tools within the EOSC.

Proposals may address the development of domain specific skills for data stewardships and the specific training of research infrastructure staff. Activities should contribute to a faster adoption of best practices and foster the use of open standards and interoperability in data and computing services. The detailed list of activities that can be supported under this topic is given in part C of the section "Specific features for Research Infrastructures".

Consortia should include key participants of the involved infrastructures and/or the infrastructure legal entities as well as other partners needed to address the challenges or develop the required solutions. Proposals should build upon the state of the art in ICT and e-infrastructures for data, computing and networking and work in cooperation with e-infrastructure service providers.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 and 24 million would allow this challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. The requested contribution should however be in line with the number of pan-European research infrastructures[30] *the cluster aims to connect to the EOSC.*

<u>Expected Impact</u>:

- In line with the objectives of Open Science, improve access to data and tools enabling new and interdisciplinary research leading to new insights and innovation for the society at large

[29] Findable, Accessible, Interoperable and Re-usable

[30] A fair indication would be that the requested contribution does not exceed EUR 1.5 million for each ESFRI project and EUR 2 million for each ESFRI landmark or other established pan-European research infrastructure involved in the cluster.

- Facilitate access of researchers across all scientific disciplines to the broadest possible set of data and to other resources needed for data driven science to flourish.
- Contribute to the creation of a cross-border and multi-disciplinary open innovation environment for research data, knowledge and services with engaged stakeholders and organisations.
- Rise the efficiency and productivity of researchers thanks to an easier and seamless access to reliable and open data services and infrastructures for discovering, accessing, and reusing data;
- Foster the establishment of global standards, ontologies and interoperability for scientific data.
- Develop synergies and complementarity between involved research infrastructures, thus contributing to the development of a consistent European research infrastructures ecosystem.
- Research communities adopt common approaches to the data management lifecycle (data and metadata curation), which leads to economies of scale.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEOSC-05-2018-2019: Support to the EOSC Governance

Specific Challenge: The main objective of this topic is to set up an operational framework for supporting the overall governance of the EOSC, including the coordination between relevant national initiatives.

Subject to the finally agreed content of the EOSC roadmap[31], the governance of the EOSC should rely on the interplay between three components: a body of representatives of the Member States, the Associated Countries and of the Commission that will decide and oversee the EOSC strategy, setting the broad orientations and the funding of the EOSC; an Executive Board constituted of high-level representatives of the stakeholders that will oversee the EOSC implementation, advising on the way forward and implementing the strategic and funding orientations of the Member States and the Commission; and a Stakeholders Forum open to all relevant stakeholders willing to provide input, e.g. on strategy setting or operational implementation.

The operational framework includes 1) setting up a coordination structure supporting the activities of the EOSC Executive Board that will oversee the EOSC implementation; 2)

[31] The EOSC roadmap, to be presented for consultation with the Member States and the Associated Countries by the end of 2017 in view of its endorsement, will include a description of the EOSC governance with the mandate and procedure for selecting the members of its governing bodies.

ensuring coordination between relevant national initiatives/data infrastructures/e-Infrastructures and their federation into the EOSC; 3) fostering FAIR data culture and the uptake of good practices in making data FAIR.

This topic aims to support a decisive shift in service provisioning from the current fragmented setting of national and European e-Infrastructures and thematic data infrastructures to a new federated European ecosystem for research data, fully taking into account the global environment; the new model should be underpinned by a business/funding model and a governance which provide organizational and financial sustainability in the long-term, thus offering added value services to science and innovation actors in Europe.

Scope: The projects funded under this topic should establish clear links among themselves and with all relevant and EOSC related projects funded under previous and current Horizon 2020 Work Programmes, in order to collaborate and address potential synergies, overlaps and gaps in the overall service offering. As such, these projects will constitute a 'dedicated and mandated effort or instrument to coordinate EOSC-type activities across Member States', a need highlighted by the EOSC HLEG report[32], as also endorsed in the Competitiveness Council of 30 May 2017.

Proposals will address one of the following sub-topics:

(a) Setup of an EOSC coordination structure - Coordination and Support actions

This sub-topic aims to set-up a coordination structure to support the EOSC implementation. It will initially support the EOSC Executive Board that will be set up in 2018[33] to advise the EU on the EOSC implementation and assist with the transition by 2020 to the stable and fully-fledged EOSC Executive Board that will oversee the EOSC implementation. The coordination structure will work in close relation with the EOSC Executive Board to ensure the implementation of the strategic and funding orientations that will be set by the Member States and the European Commission, taking into account the views expressed by the EOSC community of stakeholders through the EOSC Stakeholders Forum.

The EOSC coordination structure should therefore be the vehicle that funnels the outcomes of all activities encompassed by this call, and other actions and initiatives on cloud for science and research, into a single operational cloud-based service environment enabling open science, excellent research and knowledge production. For this, the proposals will build on the results of previous Horizon 2020 projects, on the outcomes of the High Level Expert Group on the EOSC and of the Open Science Policy Platform, helping coordinate all EOSC-relevant activities funded under Horizon 2020 and beyond. In particular, the proposal will liaise with the project resulting from Call INFRAEDI-03-2018 as regards collaboration on areas of common interest with HPC stakeholders, taking into account the different level of maturity and pace of advancement of the two initiatives.

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32 Report "Realising the European Open Science Cloud", October 2016

33 After agreement between the Commission and the Member States on the mandate and appointing mechanism

The EOSC coordination structure will notably (a) support decision making processes regarding EOSC core functions – e.g. standard setting and certification for metadata, specifications for making data FAIR, certifications for data service providers; identification of services needed by scientists to find, store, share and process research data; provision of core common services, ensuring affordable and sustainable access to data analytics and computation to all researchers; identifying priorities at EU level for new/upgraded research data infrastructures and services; (b) support the development of innovative business models for the delivery of these EOSC core functions; (c) help set the rules and methods of participation through which user communities, research infrastructures, e-Infrastructures providers can co-develop and implement cloud based solutions and services accessible to end users through the EOSC hub (e.g. including 'long-tail of science', PhD students at European Universities, Horizon 2020 individual grantees), including the terms and conditions for contributing to and benefitting from these data services; (d) help structure the EOSC community of stakeholders, e.g. by convening the EOSC Stakeholders Forum annually, by building on the outcomes of the June 2017 EOSC Summit and by supporting and integrating activities carried out today by the EOSCpilot Governance Forum and other relevant fora; (e) help ensure liaise with non-EU countries in policy and technical developments compatible with EOSC, and support multilateral and global initiatives on FAIR research data and clouds.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 10 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(b) Coordination of EOSC-relevant national initiatives across Europe and support to prospective EOSC service providers - Research and Innovation Actions

This sub-topic aims to support the coordination, convergence and federation of EOSC-relevant national and/or thematic initiatives for open research data and services through the development of appropriate common tools and mechanisms. The aim is, on the one hand, to support the gradual alignment of policies and practices of EOSC-relevant national and/or thematic initiatives to EOSC standards and, on the other hand, to enable EOSC-relevant, non-commercial services to be accessed through the EOSC portal.

Only EOSC-relevant initiatives and services of wide European interest and at appropriate maturity level, and which are not addressed by other topics under this call, should be considered. The successful proposals will also be called to interact closely among themselves and with the EOSC coordination structure (see sub-topic a). Proposals will exploit synergies with grants resulting from other topics of this call and will build on and complement related work on the EOSC hub undertaken by projects resulting from EINFRA-12-2017 topic, to facilitate the development and adoption of common rules and best practices for harmonising the delivery and take-up of the EOSC core functions, supporting interoperability with other EOSC services, and enabling cost efficiency. Building on the activities supported by sub-topic (c), successful proposals should enable the mainstreaming of standards for data management and of certification schemes for data repositories, and all relevant supporting activities (e.g. technical, organisational and legal training and capacity building); it should also develop and

promote incentives for the uptake of FAIR data practices across national scientific communities.

The successful proposals will contribute to the mapping and harmonisation of the procedures regulating the delivery of horizontal services related to research data by prospective EOSC service providers and by national initiatives located in different Member States and Associated Countries, including in areas such as Service Level Agreements, seamless access policies, alignment of procurement practices, user support, certification and compliance with the EU General Data Protection Regulation and with EU Directive on security of network and information systems. Evolution, training and adoption of standards for federated services and interoperability at all levels, as indicated in the European Interoperability Framework, should also be addressed. Proposals should involve real user communities and research infrastructures in the testing and fine-tuning of the solutions proposed.

Close collaboration with projects resulting from ICT-21-2019 calls is also recommended.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 and 6 million, would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. The requested contribution should however directly related to the number of prospective EOSC providers and/or EOSC-relevant national initiatives the proposal aims to connect to the EOSC[34].

(c) FAIR data uptake and compliance in all scientific communities - Coordination and Support actions

This sub-topic aims to develop and support the implementation of a common scheme to ensure data development, wide uptake of and compliance with FAIR data principles and practices by national and European research data providers and repositories through the EOSC. As this scheme should constitute a key tool for ensuring effective EOSC governance, the successful proposals will be called to interact closely with the EOSC coordination structure to be established through sub-topic (a).

Proposals should:

- facilitate coordination of initiatives, across Member States and Associated Countries or global initiatives (e.g. GO-FAIR initiative, CODATA, RDA, WDS), to make research data findable, accessible, interoperable and re-usable.
- develop and implement measures on FAIR data policy addressing, among others, data stewardship and curation and the creation and interconnection of metadata catalogues.
- support the organisation and participation to European and international activities (e.g. via RDA) on FAIR data uptake and compliance.

[34] A fair indication would be that the requested contribution does not exceed EUR 2 million per prospective EOSC provider and/or EOSC-relevant national initiative.

- support the co-development and implementation of standards for data management and of certification schemes for data repositories, and all relevant supporting activities (e.g. technical, organisational and legal training and capacity building).

- organise FAIR competence centres for different thematic areas and disciplines not supported by other initiatives.

- address the establishment of a European data science competence framework for inclusion in academic curricula, by building on outcome of current and past projects (e.g. EDISON). This framework should include a complementary Data Science professional certification programme for professionals willing to acquire additional competencies.

The successful proposals will be called to interact closely between them, with successful projects resulting from INFRAEOSC-04-2018 topic and with the EOSC coordination structure, particularly to foster adoption of FAIR data practices and in the context of international collaboration.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 10 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Pursue, under sub-topic (a), the identification and setup of an appropriate legal vehicle to enable the EOSC core functions (taking into account work done by the EOSCpilot project), the definition of statute and role of a EOSC coordination structure for the EOSC implementation, the rules of participation and decision making, and the governance mechanisms.

- Providing a recognized governance and implementation framework to identify priorities at EU level for new or upgraded research data services, thus avoiding proliferation of isolated, separated and overlapping initiatives.

- Streamlining advice to policy making and funding authorities concerning the EOSC, including preparation of financial plans and regular update of the EOSC roadmap initially developed by the European Commission.

- Achievement of a sustainable support to the EOSC governance via the coordination structure enabling the networking, harmonisation and federation of EOSC related initiatives with capacity of delivering the EOSC core functions to a wide range of users across Europe.

- Piloting and establishing future (co)funding strategies and business/usage models to ensure long-term sustainability.

- Wide adoption of processes and practices for optimal use of the resources ensuring open, fair and unbiased access of services through the EOSC hub.

- Progressive removal of technical and organisational barriers to ensure findability, accessibility, interoperability and re-use of research data.
- Enhancement of FAIR data uptake and contribute to harmonisation of related policies in Europe and facilitate alignment with international initiatives on research data sharing.

Type of Action: Coordination and support action, Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEOSC-06-2019-2020: Enhancing the EOSC portal and connecting thematic clouds[35]

Specific Challenge: The aim of this topic is to facilitate wide, user-friendly and cross-disciplinary access to the data and services of the EOSC through the development of the necessary interfaces. The EOSC aims to offer a trusted and open environment for research users of all scientific disciplines across the whole lifecycle of scientific data. This requires concrete solutions to address the current fragmentation of entry points, to avoid duplication of efforts across thematic initiatives and from different scientific disciplines (e.g. multiple portals, web-platforms, websites, etc.). The consolidation of the EOSC hub as the point of access for researchers to help and guide them in finding easily the resources they need, is also crucial for the effective delivery of the EOSC services.

Scope: ***(a) Support to the EOSC Portal***

This sub-topic aims to provide a fully functional, sustainable and comprehensive user interface that can serve as a universal entry point to the EOSC services.

The proposals will build on the work produced by the eInfraCentral project and provide additional support for the implementation of the EOSC hub to further develop and optimise the functions and interface offered via the EOSC portal. In particular, the successful proposal should incorporate existing scientific gateways and thematic portals developed under FP7 and Horizon 2020 across all work programmes. As the scope of this activity is to provide a single user interface to the EOSC services, at most one proposal is expected to be funded in this area.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Establish the EOSC as the open-to-all, cross-border and cross-discipline access point for data driven science involving the whole European Scientific Community including the "long-tail" of science.

[35] This topic will not be continued in 2020.

- Expanding the relevance of the EOSC as enabler of excellent science and multiplier of impact across disciplines to tackle current and emerging societal challenges

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEOSC-07-2020: Increasing the service offer of the EOSC Portal

Specific Challenge: While the overall management and operation of the activities of the EOSC Portal is addressed in INFRAEOSC-03-2020, the challenge in this topic is to effectively coordinate at pan-European level the provision through the EOSC Portal of state-of-the-art research enabling services from a wide range of national, regional and institutional public infrastructures in Europe, covering diverse thematic domains, and further non-research resources in order to: 1) scale up the EOSC Portal; and 2) set-up a model for interaction between service providers and the EOSC Portal operators through pan-European e-infrastructure entities, based on transparency and effectiveness of cost compensation.

Scope: In order to coordinate the provision through the EOSC Portal of state-of-the-art research purely enabling services across Europe, proposals should build on the competences of pan-European e-Infrastructures of diverse domains to ensure multidisciplinary research and synergies with national and regional programmes. The progressive federation of the services and resources under the awarded proposals, together with the progressive connection of ESFRI research infrastructures[36] and thematic clouds developed under other parts of the Horizon 2020 programme, should allow the EOSC Portal to provide a catalogue that increasingly meets the researchers' needs covering the full research life cycle.

All the grants awarded under this topic will be implemented in the same period so that they can work on potential synergies, and coordinate in the overall service offering as well as in the communication and dissemination activities to avoid overlaps and fragmentation. To this extent, proposals should foresee dedicated activities for cooperation with the other selected projects and earmark appropriate resources.

Proposals should clearly identify one and only one of the following areas:

(a1) Distributed and cloud computing resources enabling researchers and other users to process and analyse data in a distributed computing environment. The services should include, but not be limited to, running virtual machines on demand with complete control over computing services, executing compute and data-intensive workloads, analysing large datasets and executing parallel computing tasks, utilizing large amount of processing capacity over long periods of time, sharing resources and enabling collaborative research.

(a2) Data services providing cost-effective and interoperable solutions for data management and long-term curation and preservation. The needs for discoverability, accessibility,

[36] INFRAEOSC-04-2018.

interoperability, text and data mining, transfer of data between data resources and computational facilities, storing, managing and accessing persistent identifiers (PIDs) and essential metadata (PID records), reusability, annotation and integrity across disciplines should be accommodated in multi-disciplinary and multi-sectoral contexts. All these services should be aligned with the EOSC rules, considering also ethical and regulatory requirements for sensitive data.

(a3) Services supporting scholarly communication and open access: based on existing initiatives across Europe (institutional and thematic repositories, aggregators, etc.), the services should empower researchers and research communities and initiatives with the necessary tools and functionalities for systematic publishing, analysing and re-using of scientific results beyond publications (data, software and other artefacts), as well as supporting long-term preservation and curation. The services should also enable scientific workflows with adequate metrics and monitoring mechanisms supporting career development and the monitoring of funding and research impact. Support to a catch-all repository for open research should be provided.

(a4) Above the net services are added-value applications and services that enable users to communicate, interact and collaborate effectively in a heterogeneous and distributed federated environment. The scope of the "Above-the-net" services is broad and may range from simple tools to complex collaborative platforms (including real-time communications and media) that empower the work of cross-border virtual teams with different affiliation members. Above-the-net services make use of the underlying connectivity infrastructure and its core building blocks (such as security and AAI[37]).

(a5) Services and resources from non-research public sector data providers (such as Open Data initiatives/EU Open Data Portal and other initiatives under the European Common Data Space): funding should cover the integration of the services and resources so that they are accessible through the EOSC Portal.

(a6) Additional research enabling services that are not covered under any of the areas described in areas a1 to a5 and that do not overlap with existing services accessible through the EOSC Portal. Services should be of a generic value to the whole research community, such as text and data mining or Copernicus services.

Grants awarded under this topic will be complementary to the actions awarded under topic INFRAEOSC-03-2020. The main purpose of the collaboration agreements referred to in Article 41.4 of the MGA is to describe the terms and conditions for the provision of services through the EOSC Portal. The proposals have to be flexible in order to take into account all the relevant governance and business models, rules for participation, operational requirements, standards, etc. in accordance with topic INFRAEOSC-03-2020. For the areas from a1 to a4, proposals should be built on the capacity of established pan-European e-Infrastructures to act as interlocutor with the EOSC Portal operators.

[37] Authentication and Authorization Infrastructure.

Funding should cover, in particular, the costs incurred by service providers when their services are accessed through the EOSC Portal. Service providers in the consortia must be able to determine the cost of a unit of access and to account for the unit of access consumed by users beyond their usual user community. The reimbursement mechanism shall be in line with the provisions of Article 16.2 of the MGA regarding virtual access activities[38] and with the Decision authorising the use of unit costs for the actions involving virtual access[39] under the Research Infrastructures Part of the Horizon 2020 Framework Programme. Contributions to the capital investments of the infrastructure is an eligible category of costs solely when declared on the basis of unit costs and only for the portion used to provide virtual access under the awarded grant. For areas a1 to a4, it is expected that a substantial part of the total budget per awarded grant will be dedicated to cover the costs of EOSC users accessing the services.

Only platforms and services based on mature systems and technologies[40] will be supported. An initial phase to reach the maturity needed for the integration to the EOSC Portal may be foreseen. The services have to be persistent and adapt to the emerging needs of the EOSC users and the underlying technologies. They also need to be modular in order to be used with heterogeneous ICT services such as cloud, data management services, data archives, data processing, etc. They should be intuitive to be used by various users with different profiles and digital competence levels. They need to demonstrate added value to the EOSC Portal users and quality/reliability, through the use of certified mechanisms and standards including any accreditation and certification schemes anticipated under EOSC. They should comply with FAIR (findable, accessible, interoperable and reusable) principles and standards produced under well-established initiatives (e.g. RDA). To the extent possible, services should facilitate the re-use of research data for innovation by diverse stakeholders, including the public and commercial sectors.

Grants awarded under this topic will be subject to the following additional dissemination obligations for interoperability: consortia must make active efforts to freely share, in a timely manner and as appropriate, standards, specifications and methodologies from their activities with the other projects awarded under the same topic in order to foster to the maximum extent interoperability between the different services. Applicants must acknowledge and incorporate these obligations in their proposal, outlining the efforts they will make towards this in Annex I.

Grants awarded under this topic are expected to carry out an analysis regarding energy consumption and environmental impact of technologies used in the context of the project. The analysis should include an action plan in order to limit the carbon and energy footprint with a

38 See description of Virtual access activities in part D of the section "Specific features for Research Infrastructures".

39 http://ec.europa.eu/research/participants/data/ref/h2020/other/legal/unit_costs/unit-costs_virtual-access_infra.pdf

40 See point G. Technology readiness level of the General Annexes for further references.

specific reference to key performance indicators and the standard EN 50600-4[41] together with a timeline for implementation of the defined milestones.

The Commission considers that proposals requesting a contribution from the EU of up to:

- EUR 8 million would allow the challenge in area a1 to be addressed appropriately;

- EUR 7 million would allow the challenge in area a2 to be addressed appropriately;

- EUR 4 million would allow the challenge in area a3 to be addressed appropriately;

- EUR 2 million would allow the challenge in area a4 to be addressed appropriately.

- EUR 1 million would allow the challenge in area a5 to be addressed appropriately.

- EUR 2 million would allow the challenge in area a6 to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

The Commission considers that proposals requesting a duration of 30 months would allow the challenge in this topic to be addressed appropriately.

Expected Impact:

- Scale up the EOSC Portal through a growing catalogue to the broadest possible set of high quality services and resources supporting the whole research life cycle from service providers across Europe and beyond.
- More scientific communities across Europe are equipped and have access to state-of-the-art services (including storage and computing) for their research activities, increasing data-intensive research.
- Facilitate Open Science practices across the research community in Europe with services to connect, share and re-use all type of research outputs, fostering collaboration and enhancing scientific discovery.
- Support the collaboration in data provision and exchange across regional and national related infrastructures allowing the integration of data from a myriad of resources and research communities.
- Foster synergies between pan-European e-infrastructures operators, leading to harmonised services, improved use of resources and economies of scale across Europe.

[41] EN 50600-4: Information technology: Data centre facilities and infrastructures. For the link to the latest published version, tools and resources regarding the standard, check: https://ictfootprint.eu/en-50600-4-factsheet-0

- Coordinate and incentivise institutional and public actors so that they open up their services and resources to researchers across Europe, through a transparent and quality assured process.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Conditions for the Call - Implementing the European Open Science Cloud

Opening date(s), deadline(s), indicative budget(s):[42]

Topics (Type of Action)	Budgets (EUR million)			Deadlines
	2018	2019	2020	
Opening: 05 Dec 2017				
INFRAEOSC-04-2018 (RIA)	95.00			22 Mar 2018
INFRAEOSC-01-2018 (RIA)	12.00			22 Mar 2018
Opening: 08 Feb 2018				
INFRAEOSC-05-2018-2019 (CSA)	20.00			19 Jun 2018
Opening: 26 Jul 2018				
INFRAEOSC-05-2018-2019 (RIA)	15.00	15.00		21 Nov 2018
Opening: 16 Oct 2018				
INFRAEOSC-02-2019 (RIA)		28.50		29 Jan 2019
Opening: 14 Nov 2018				
INFRAEOSC-06-2019-2020 (RIA)		2.00		20 Mar 2019
Opening: 19 Nov 2019				
INFRAEOSC-03-2020 (RIA)			40.90	22 Apr 2020
INFRAEOSC-07-2020 (RIA)			24.00	

[42] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

Overall indicative budget	142.00	45.50	64.90	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRAEOSC-01-2018	*For the criterion Excellence t*he third and fourth sub-criteria are substituted by: • The extent to which the proposed mechanism to aggregate demand by scientific community and manage the procurement process and the resulting contracts is fit-for-purpose • Appropriate consideration of researchers' needs and interdisciplinary approaches
INFRAEOSC-02-2019	*For the criterion Excellence* the third and fourth sub-criteria are substituted by: • The extent to which the proposed work is beyond the state of the art, builds on technologies at TRL 6 or above, and demonstrates innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models). • Appropriate consideration of interdisciplinary approaches and use of stakeholder knowledge to enrich the existing EOSC service offering *For the criterion Impact* the second and third sub-criteria are substituted by: • Potential to enhance capacity for innovation and production of new knowledge.

	• Quality of the proposed measures to: Exploit the project results (including IPR), and more specifically ensure the integration of services in the EOSC for the benefit of a broader set of user communities; Enhance EOSC's potential to support multidisciplinary research; Manage research data where relevant; Effectively disseminate and communicate the project activities and results to appropriate target audiences.
INFRAEOSC-04-2018	*For the criterion Impact of Research and Innovation Actions* the second sub-criterion will be substituted by: • Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society;
INFRAEOSC-03-2020, INFRAEOSC-07-2020	*For the criterion Impact of Research and Innovation Actions* the third sub-criterion will be substituted by: Quality of the proposed measures to: • Exploit and disseminate the project results (including management of IPR), and to manage research data where relevant. • Communicate the project activities to different target audiences • Effectively support and enhance the capacity of the project to limit the future carbon and energy footprint, including the ability to adopt relevant standards, KPIs and best practices.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme. The following exceptions apply:

INFRAEOSC-05-2018-2019	Grants will be awarded to proposals according to the ranking list. However, in order to ensure a balanced portfolio of supported actions, at least the highest-ranked proposal per sub-topic will be funded provided that it attains all thresholds.
INFRAEOSC-07-2020	Grants will be awarded to proposals according to the ranking list. However, in order to ensure a balanced portfolio of

	supported actions, at least the highest-ranked proposal per area will be funded provided that it attains all thresholds.

The full evaluation procedure is described in the relevant guide published on the Funding & Tenders Portal.

Grant Conditions:

INFRAEOSC-04-2018, INFRAEOSC-05-2018-2019, INFRAEOSC-06-2019-2020	For grants awarded under this topic capitalised and operating costs of 'large research infrastructures' as defined in the Article 6.2.D.4 of the Model Grant Agreement are not eligible.
INFRAEOSC-05-2018-2019	Grants awarded under this topic will be complementary between them. The respective options of Article 2, Article 31.6 and Article 41.4 2 of the Model Grant Agreement will be applied.
INFRAEOSC-03-2020, INFRAEOSC-07-2020	Grants awarded under these topics will be complementary between them. The respective options of Article 2, Article 31.6 and Article 41.4 2 of the Model Grant Agreement will be applied.
INFRAEOSC-03-2020	Grants awarded under this topic will be complementary to the action awarded under topic INFRAEOSC-06-2019 (a). The respective options of Article 2, Article 31.6 and Article 41.4 2 of the Model Grant Agreement will be applied.
INFRAEOSC-03-2020	For grants awarded under this topic, beneficiaries will be subject to the additional exploitation obligations: a) use open source software, b) make tools, standards, specifications and all other relevant outputs generated in the action available, through a well-defined mechanism, to the EOSC governance and any other institution responsible for the continuity of the EOSC Portal beyond the lifespan of the Grant Agreement. Applicants must necessary state the participants' commitment to these obligations in the proposal and Annex I to the Grant Agreement. The respective option of Article 28.1 (and Articles 9 and 30.2) of the Model Grant Agreement will be applied.

INFRAEOSC-03-2020	For grants awarded under this topic beneficiaries may provide support to third parties as described in part K of the General Annexes of the Work Programme. The support to third parties can only be provided in the form of grants. The respective options of Article 15.1 and Article 15.3 of the Model Grant Agreement will be applied.
INFRAEOSC-03-2020, INFRAEOSC-07-2020	For grants awarded under this topic beneficiaries being 'access providers' must provide virtual access to research infrastructures or installations. The respective options of Article 16.2 and Article 16.3 of the Model Grant Agreement will be applied. As an exception for grants awarded under this topic costs of capital investments for virtual access to research infrastructure declared on the basis of unit costs, are eligible only for the portion used to provide virtual access under the awarded grant.
INFRAEOSC-07-2020	Grants awarded under this topic will be subject to the following additional dissemination obligations for interoperability: consortia must make active efforts to freely share, in a timely manner and as appropriate, standards, specifications and methodologies from their activities with the other projects awarded under the same topic in order to foster to the maximum extent interoperability between the different services. Applicants must acknowledge and incorporate these obligations in their proposal, outlining the efforts they will make towards this in Annex I. The respective option of Article 29.1 of the Model Grant Agreement will be applied.

Consortium agreement:

INFRAEOSC-01-2018, INFRAEOSC-02-2019, INFRAEOSC-03-2020, INFRAEOSC-04-2018, INFRAEOSC-05-2018-2019, INFRAEOSC-06-2019-2020, INFRAEOSC-07-2020	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - Integrating and opening research infrastructures of European interest

H2020-INFRAIA-2018-2020

This call will open up key national and regional research infrastructures to all European researchers from both academia and industry as well as ensure their optimal use and joint development.

In addition to serving basic science challenges, Integrating Activities target research infrastructures, ranging across all fields of science and technology, needed to support the EU political priorities and address the Societal Challenges, including Focus Areas. They also target research infrastructures needed to gain leadership in the industrial and enabling technologies.

ESFRI and other world-class research infrastructures are not specifically targeted by this call. Nevertheless, where relevant, they can participate in an integrating activity together with other key national and regional research infrastructures.

Proposals are invited against the following topic(s):

INFRAIA-01-2018-2019: Integrating Activities for Advanced Communities

Specific Challenge: European researchers need effective and convenient access to the best research infrastructures in order to conduct research for the advancement of knowledge and technology. The aim of this action is to bring together, integrate on European scale, and open up key national and regional research infrastructures to all European researchers, from both academia and industry, ensuring their optimal use and joint development.

Scope: 'Advanced Communities' are scientific communities whose research infrastructures show an advanced degree of coordination and networking at present, attained, in particular, through Integrating Activities awarded under FP7 or previous Horizon 2020 calls.

An Integrating Activity will mobilise a comprehensive consortium of several key research infrastructures in a given field as well as other stakeholders (e.g. public authorities, technological partners, research institutions) from different Member States, Associated Countries and other third countries [43] when appropriate, in particular when they offer complementary or more advanced services than those available in Europe.

Funding will be provided to support, in particular, the trans-national and virtual access provided to European researchers (and to researchers from Third Countries under certain conditions [44]), the cooperation between research infrastructures, scientific communities, industry and other stakeholders, the improvement of the services the infrastructures provide,

[43] See the Eligibility and admissibility conditions for this call.
[44] See part D of the section “Specific features for Research Infrastructures”.

the harmonisation, optimisation and improvement of access procedures and interfaces. Proposals should adopt the guidelines and principles of the European Charter for Access to Research Infrastructures.

To this extent, an Integrating Activity shall combine, in a closely co-ordinated manner:

(i) Networking activities, to foster a culture of co-operation between research infrastructures, scientific communities, industries and other stakeholders as appropriate, and to help develop a more efficient and attractive European Research Area;

(ii) Trans-national access or virtual access activities, to support scientific communities in their access to the identified key research infrastructures;

(iii) Joint research activities, to improve, in quality and/or quantity, the integrated services provided at European level by the infrastructures.

All three categories of activities are mandatory as synergistic effects are expected from these different components.

Access should be provided only to key research infrastructures of European interest, i.e., those infrastructures able to attract significant numbers of users from countries other than the country where they are located. Other national and regional infrastructures in Europe can be involved, in particular in the networking activities, for the exchange of best practices, without necessarily being beneficiaries in the proposal.

Proposals from advanced communities will have to clearly demonstrate the added value and the progress beyond current achievements in terms of integration and services, of a new grant. The strongest impact for advanced communities is expected typically to arise from focusing on innovation aspects and widening trans-national and virtual access provision, both in terms of wider and more advanced offer of scientific services, than in terms of number of users and domains served. Furthermore, in particular for communities supported in the past under three or more integrating activities, the creation of strategic roadmaps for future research infrastructure developments as well as the long-term sustainability of the integrated research infrastructure services provided at European level, need to be properly addressed. The latter requires the preparation of a sustainability plan beyond the grant lifecycle as well as, where appropriate, the involvement of funders.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), Integrating Activities should, whenever appropriate, pay due attention to any related international initiative (i.e. outside the EU) and foster the use and deployment of global standards.

Integrating Activities should also organise the efficient curation, preservation and provision of access to the data collected or produced under the project, defining a data management plan, even when they opt out of the extended Pilot on Open Research Data. Data management (including ethics and privacy issues), interoperability, as well as advanced data and computing services should be addressed where relevant. To this extent, proposals should build

upon the state of the art in ICT and e-infrastructures for data, computing and networking, and ensure connection to the European Open Science Cloud.

Integrating Activities should in particular contribute to fostering the potential for innovation, including social innovation, of research infrastructures by reinforcing the partnership with industry, through e.g. transfer of knowledge and other dissemination activities, activities to promote the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies.

Integrating Activities are expected to duly take into account all relevant ESFRI and other world-class research infrastructures to exploit synergies, to reflect on sustainability and to ensure complementarity and coherence with the existing European Infrastructures landscape.

Proposals should include clear indicators allowing the assessment of the progress towards the general and specific objectives, other than the access provision.

As the scope of an integrating activity is to ensure coordination and integration between all the key European infrastructures in a given field and to avoid duplication of effort, advanced communities are expected to submit one proposal per area.

Further conditions and requirements that applicants should fulfil when drafting a proposal are given in part D of the section “Specific features for Research Infrastructures”. Compliance with these provisions will be taken into account during evaluation.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 10 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

On the basis of a multiannual plan drafted taking into account the assessment and the timing of previous grants as well as strategic priorities and needs, in term of research infrastructures services, emerging from other parts of Horizon 2020, this work programme invites proposals addressing the following areas listed under the different domains. A balanced coverage of the various domains, in line with the distribution of areas per domain, is expected as outcome of this topic.

(a) 2018 deadline

Biological and Medical Sciences

Microbial Resource Centres. This activity aims at integrating the key Microbial Resource Centres and opening them up to European researchers for biotechnology research and development. Emphasis should be on widening the user base, enlarging and strengthening the offered services, sharing resources at global level, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Facilities for high throughput DNA sequencing. This activity aims at integrating the key research infrastructures in Europe as well as leading-edge research infrastructures located in third countries, to open them up to European researchers and offer services beyond the state-

of-art which is already ensured by commercial providers. Adequate consideration should be taken of the produced data and its availability for research.

Centres for replacement, reduction and refinement (3 Rs) of non-human primate testing. This activity aims at integrating the key non-human primate centres in Europe promoting 3 Rs, i.e. replacement, reduction, and refinement. The proposal will contribute to the objective of 3Rs, reinforcing the implementation of ethical and good practices at European level, and the protection of animals used in scientific experiments[45]. The proposal should also develop the necessary collaborations outside Europe.

High throughput facilities for proteome analysis. This activity aims at integrating the key high throughput facilities in Europe for proteome analysis, based on state-of-the-art proteomics techniques and tools for data handling and analysis, including structural proteomics and structural bioinformatics. Emphasis should be on widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Energy

Research Infrastructures for solar energy: concentrating solar power. This activity should bring together the key European research infrastructures in solar concentrating systems (solar concentrators and relating research infrastructures) for carrying out energy and materials research as well as research in other fields using the extreme temperature conditions in solar concentrators, e.g. thermal storage equipment and reuse of stored energy. This topic would support the European Strategic Energy Technology Plan (SET-Plan).

Research Infrastructures for solar energy: photovoltaic. This activity aims at integrating and opening the key research infrastructures in Europe for all aspects of photovoltaic research: buildings, transport, new materials, grid connection, efficiency, etc. This topic would support the European Strategic Energy Technology Plan (SET-Plan).

Environmental and Earth Sciences[46]

Research infrastructures for forest ecosystem and resources research. This activity aims at further integrating and facilitating broad access to forest research facilities, methodologies and data on genetic and species diversity to enable environmental and biological research including biological effects of air pollution, mitigation and adaptation to climate change, and development of forest management approaches. Emphasis will be on widening the user base and ensuring long term sustainability to the service integration.

Natural history collections. This activity aims at integrating and improving access to key European Natural History collections and to their related instrumentation facilities. Emphasis should be on improving accessibility to collections to a wide range of scientists, on

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45 As framed by the directive 86/609/EEC, and by the Commission proposal for its revision, COM(2008)543

46 When appropriate, proposals addressing areas under this domain are encouraged to develop synergies with Copernicus data and information as well as with GEO/GEOSS.

developing innovative research services to answer the needs of a broader scientific community of users from climate change to human health and food security, and on ensuring long term sustainability of the integrated services.

Research aircrafts for environmental and geo-science research. This activity aims at integrating key research aircrafts and improving their availability to European researchers from larger multidisciplinary scientific communities. It should develop a long-term strategy towards sustained integrated services and innovative synergies with complementary observing systems and models to study atmospheric processes and the Earth's surface.

Research vessels. This activity aims at further providing, integrating and improving access to the key European research vessels and associated major equipment. It should include innovative initiatives to ensure a more efficient and coordinated operation of European fleets, to develop synergies with complementary observing systems and infrastructures and to set-up sustained integrated services to the user communities.

Research infrastructures for Earth's climate system modelling. This activity aims at further integrating and opening the research infrastructures (e.g. data repositories, models) used by the climate modelling community in Europe, promoting the ongoing development of a common distributed modelling infrastructure. Emphasis should be on widening the user base, expanding the interdisciplinary research fields addressed, enlarging and strengthening the offered services, and ensuring long term sustainability to the service integration.

Sites and experimental platforms of anthropogenic impacts for ecosystem functioning and biodiversity research. This activity aims at bringing together highly instrumented experimental, analytical and modelling facilities, across all major European ecosystem types and all major pressures on them. It will optimise the collaborative use of these sites by a wider scientific community and develop efficient methods and techniques for rapid data sharing and processing at the European level.

Mathematics and ICT

Visualisation facilities. This activity aims at further integrating and opening key virtual reality visualisation facilities, holographic image processing facilities and other computer graphics and animation facilities for advanced visualisation of scientific information and massive data, either resulting from academic research or being produced in collaboration with the industrial sector. Emphasis should be on widening the user base, enlarging and strengthening the offered services, and fostering the innovation role of such infrastructures.

Material Sciences, Analytical facilities and Engineering

Electron Microscopies for advanced imaging, diffraction, spectroscopy and metrology of materials. This activity aims at further integrating and opening advanced electron microscopies for material research and technological development. Emphasis should be on widening the user base, strengthening and enlarging the offered services, stimulating new scientific activities, facilitating access, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

High and low energy ion beam labs. This activity aims at further integrating and opening key ion beam facilities for material, biomedical and environmental research and technological development. Emphasis should be on widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Infrastructures for Neutron Scattering and Muon Spectroscopy. This activity will provide and facilitate wider access to the key research infrastructures in Europe for Neutron scattering and Muon Spectroscopy. It should present a long-term sustainable perspective on the integration of these facilities and related resources.

Facilities for research on materials under extreme temperature conditions. This activity aims at integrating research facilities in physics and materials science dealing with extreme low and high temperature conditions, e.g. nanoscience at microkelvin temperatures. Emphasis should be on widening the user base, enlarging the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Infrastructures for studying turbulence phenomena and applications. This activity aims at further integrating key facilities enabling the study of high turbulence phenomena in various areas of science and technology. Emphasis should be on combining modelling and experimental in situ testing, widening the user base, enlarging the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Physical Sciences

Research Infrastructures for hadron physics. This activity will provide and facilitate access to key research infrastructures in Europe for studying the properties of nuclear matter at extreme conditions, turning advances in hadron physics experimentation into new applications. It should present a long-term sustainable perspective on the integration of relevant facilities and related resources.

Research Infrastructures for high resolution solar physics. This activity aims at further integrating and opening key research infrastructures in the field of high resolution solar physics. It should foster cooperation between theory and observations.

Social Sciences and Humanities

Research infrastructures for the assessment of science, technology and innovation policies. This activity aims at further integrating and opening research data infrastructures in the field of science, technology and innovation (including social innovation). Emphasis should be on facilitating trans-national access and widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such infrastructures and ensuring long term sustainability to their integration.

Digital archives and resources for research on European history. This activity aims at further integrating and opening key data collections and services in Europe for European

History. Emphasis should be on widening the user base, enlarging and strengthening the offered services, e.g. by covering further historical periods, and ensuring long term sustainability to their integration.

Archaeological data infrastructures for research. This activity aims at further integrating and opening key archaeological data infrastructures to facilitate research in all fields of archaeology (from prehistory to contemporary society). Emphasis should be on widening the user base, enlarging and strengthening the offered services, including fields such as paleo-anthropology, bioarchaeology and environmental archaeology, sharing resources at global level, and ensuring long term sustainability to their integration.

(b) 2019 deadline

Biological and Medical Sciences

Virus collections including for high-risk animal/human/plant pathogens. This activity aims at improving the access to high-quality authenticated collections of both human, animal and plant viruses including those requiring high-biosafety level laboratories (BSL 3 and 4), to support upstream virology, microbiology and immunology research as well as translational internationally-driven research aiming at drug and vaccine development, and to support epidemiological studies targeting disease and epidemics control in order to enhance the preparedness of countries to control their own emerging viral outbreaks.

Structural biology research infrastructures for health and food research. This activity should expand the availability of structural biology services (such as X-ray and neutron scattering, advanced NMR and advanced imaging technologies) to new communities of users, and in particular to scientists with backgrounds other than structural biology, including from SMEs, to benefit translational research in drugs discovery, informed drugs design and other fields like biotechnology and biomaterials for health and food.

Nanomedicine characterisation infrastructures. This activity aims at further integrating and opening key reference facilities for characterisation and engineering of nanoparticles for medical applications. It should offer access to a coherent set of tools, resources and expertise to support academic research teams and industry in their chemical, physical and biological research and innovation on medical applications. Emphasis should be on widening the user base and the services, ensuring long term sustainability to their integration.

Research infrastructures in aquaculture. This activity aims at further integrating highly diverse aquaculture research facilities and providing to research teams easy access to them. Specific attention should be given to dedicated facilities for new species, disease aspects and contribution to sustainable aquaculture. Emphasis should be on widening the user base, enlarging and strengthening the offered services, and fostering the innovation role of such infrastructures.

Energy

European smart grids research infrastructure. High shares of renewable energy and more decentralised energy supply require a grid with sufficient hosting capacity and the ability to manage the power fluctuation of the renewable sources. This activity should further integrate and open laboratory environments that enable the development and testing of different smart grid configurations without influencing end-customers of the electrical power supply. Emphasis should be on widening the user base, enlarging the offered services, fostering the innovation role of such facilities and ensuring long term sustainability to their integration.

Environmental and Earth Sciences[47]

Research infrastructures for long-term ecosystem and socio-ecological research. This activity should further integrate and open LTER (Long Term Ecological Research) facilities and critical zone observatories, in different terrestrial, freshwater and transitional water environments. It should include relevant socio-ecological research platforms as well as integrate research field sites, associated data management and numerical simulation tools to address ecosystem and socio-ecological research issues such as biodiversity loss, climate change adaptation and mitigation, land use and management, food security and threats to soil and water.

Coastal and shelf seas observing research infrastructures. This activity aims at integrating and improving access to coastal observatories as well as developing innovative monitoring strategies to address better the complexity of coastal seas (such as the coupling of physics, biogeochemistry and biology). It should also promote harmonisation and seamless interface with open seas observing systems notably the relevant ESFRI infrastructures. It should foster innovation and societal impact including through effective synergies with European and global initiatives such as COPERNICUS, EMODNET, GEO/GEOSS.

Multidisciplinary Marine Data Centres for ocean and marine data management. This activity aims to further integrate in a cloud environment and open key data centres for in-situ and remote sensing data for marine (including coastal) research. It must present a long-term sustainable perspective on the facilities and related resources integration, and develop appropriate connection to the EOSC. It should enhance and innovate the services offered to an expanded multidisciplinary community and promote the adoption of the developed protocols and standards for interoperability to other key downstream initiatives in the field.

Mesocosms facilities for research on marine and freshwater ecosystems. This activity aims at further integrating and opening leading mesocosm infrastructures in Europe enabling in particular research on impact of climate change, pollution and other disturbance on ecosystems, from Mediterranean to Arctic. Emphasis should be on widening the user base, and on enlarging and strengthening the offered services.

Research infrastructures for terrestrial research in the Arctic. As an international network for terrestrial research and monitoring in the Arctic, this activity should further

[47] When appropriate, proposals addressing areas under this domain are encouraged to develop synergies with Copernicus data and information as well as with relevant global initiatives such as GEO/GEOSS and ILTER.

integrate and open key research stations and large research field sites throughout the circumpolar Arctic and adjacent northern countries, to provide capacity for research, monitoring and education. The project should include work on best practices for managing stations, and (international) logistics and establish links with relevant ESFRI infrastructures.

Research Infrastructures for earthquake hazard. This activity aims at further integrating and opening the key research infrastructures in Europe for natural and anthropogenic earthquake risk assessment and mitigation. More integrated services from seismic and engineering infrastructures would contribute to supporting the reduction of vulnerability of European citizens and constructions to earthquakes. International collaboration activities and the further integration of the research field are encouraged.

Research infrastructures for environmental hydraulic research. This activity aims at further integrating and opening the key hydraulic infrastructures in Europe in order to optimise their use to help solve climate change adaptation problems. Particular attention to harmonising and organising the flux of data is expected. Emphasis should be on widening the user base, and on enlarging and strengthening the offered services including through synergies with relevant (emerging) ESFRI infrastructures.

Mathematics and ICT

Distributed, multidisciplinary European infrastructure on Big Data and social data mining. This activity should further integrate and open large social data repositories, social data mining methods and tools, and supercomputing facilities for conducting large-scale analytical processing. This integrated infrastructure should enable performing complex processes to extract social knowledge. Emphasis should be on enlarging and strengthening the offered services, widening the user base, fostering the innovation role of such facilities and ensuring long term sustainability to their integration as well as connection to the EOSC.

Material Sciences and Analytical facilities

Research infrastructures for advanced research in nanoelectronics. This activity aims at further integrating and opening key infrastructures in the field to enable a smooth and consistent transition of the European industry to a new era of nanoelectronics. Emphasis should be on enlarging and strengthening the offered services, widening the user base, fostering the innovation role of such facilities and ensuring long term sustainability to their integration.

Advanced laser sources for leading-edge research. This activity aims at further integrating and opening key laser infrastructures enabling a wide range of novel applications with high industrial and social impact, such as nanoscience, bio- and nanophotonics, (bio)material analyses, (bio)medical diagnosis and treatment, advanced imaging, communication and data processing. It should widen the user base, enlarge the offered services, foster the innovation role of such facilities, ensure long term sustainability to their integration, stimulate international cooperation and new scientific activities exploiting new possibilities offered by relevant ESFRI infrastructures.

Physical Sciences

Research Infrastructures for Nuclear Physics. This activity aims at further integrating the key research infrastructures for studying the properties of nuclear matter at extreme conditions, using advances in nuclear physics experimentation to open new scenarios for fundamental research and employ them for new societal and industrial applications. It must present a long-term sustainable perspective on the integration of relevant facilities and related resources. Furthermore, it should also target new users and stimulate new scientific activities to take full advantage of new possibilities offered by relevant ESFRI infrastructures.

Research infrastructures for high-energy astrophysics. This activity aims at further integrating and opening facilities for developing, calibrating and testing technologies and individual instruments developed for supporting ground and space based experiments and missions in an environment representative of space conditions. In order to foster the creation of a European multi-messenger astrophysics platform, emphasis should be on enlarging the offered services, including in particular gravitational wave, electromagnetic wave and other high energy particle (e.g. neutrinos) observatories. Access to the infrastructures and data needs to be optimised in order to develop a wider multi-disciplinary community and foster a better exploitation of the results.

Research Infrastructures for planetary science. This activity aims at furthering the integration and opening of the key research infrastructures in Europe for studying planetary science by drawing in new partners and by providing access to the facilities to a larger number of users, taking into account the multi- and trans-disciplinary nature of the field. Emphasis should be on enlarging and strengthening the offered services, widening the user base, and ensuring long term sustainability to their integration.

Social Sciences and Humanities

European research infrastructures for cultural heritage restoration and conservation. This activity aims at further integrating and opening facilities, located in research centres, universities and important culture institutions, for advanced diagnostics, restoration and conservation of cultural heritage. Emphasis should be on strengthening and enlarging the offered services to cover restoration and conservation in fields such as palaeontology, widening the user base, and fostering the innovation role of such facilities.

Contemporary European history: European Holocaust research infrastructure. This activity aims at further integrating and opening existing research infrastructures for research on Holocaust and expanding their services to include new material and new techniques in order to offer distributed and harmonised access of researchers to scattered material. Emphasis should be on enlarging and strengthening the offered services, widening the user base and ensuring long term sustainability to their integration.

Expected Impact:

- Researchers will have wider, simplified, and more efficient access to the best research infrastructures they require to conduct their research, irrespective of location. They benefit from an increased focus on user needs.

- New or more advanced research infrastructure services, enabling leading-edge or multidisciplinary research, are made available to a wider user community.

- Operators of related infrastructures develop synergies and complementary capabilities, leading to improved and harmonised services. There is less duplication of services, leading to an improved use of resources across Europe. Economies of scale and saving of resources are also realised due to common development and the optimisation of operations.

- Innovation is fostered through a reinforced partnership of research organisations with industry.

- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.

- Closer interactions between larger number of researchers active in and around a number of infrastructures facilitate cross-disciplinary fertilisations and a wider sharing of information, knowledge and technologies across fields and between academia and industry.

- For communities which have received three or more grants in the past, the sustainability of the integrated research infrastructure services they provide at European level is improved.

- The integration of major scientific equipment or sets of instruments and of knowledge-based resources (collections, archives, structured scientific information, data infrastructures, etc.) leads to a better management of the continuous flow of data collected or produced by these facilities and resources.

- When applicable, the integrated and harmonised access to resources at European level can facilitate the use beyond research and contribute to evidence-based policy making.

- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAIA-02-2020: Integrating Activities for Starting Communities

Specific Challenge: European researchers need effective and convenient access to the best research infrastructures in order to conduct research for the advancement of knowledge and

technology. The aim of this action is to bring together, integrate on European scale, and open up key national and regional research infrastructures to all European researchers, from both academia and industry, ensuring their optimal use and joint development.

Scope: A 'Starting Community' has never been supported for the integration of its infrastructures under FP7 or Horizon 2020 calls, in particular within an integrating activity.

An Integrating Activity will mobilise a comprehensive consortium of several key research infrastructures in a given field as well as other stakeholders (e.g. public authorities, technological partners, research institutions) from different Member States, Associated Countries and other third countries [48] when appropriate, in particular when they offer complementary or more advanced services than those available in Europe.

Funding will be provided to support, in particular, the trans-national and virtual access provided to European researchers (and to researchers from Third Countries under certain conditions [49]), the cooperation between research infrastructures, scientific communities, industry and other stakeholders, the improvement of the services the infrastructures provide, the harmonisation, optimisation and improvement of access procedures and interfaces. Proposals should adopt the guidelines and principles of the European Charter for Access to Research Infrastructures.

To this extent, an Integrating Activity shall combine, in a closely co-ordinated manner:

(i) Networking activities, to foster a culture of co-operation between research infrastructures, scientific communities, industries and other stakeholders as appropriate, and to help develop a more efficient and attractive European Research Area;

(ii) Trans-national access or virtual access activities, to support scientific communities in their access to the identified key research infrastructures;

(iii) Joint research activities, to improve, in quality and/or quantity, the integrated services provided at European level by the infrastructures.

All three categories of activities are mandatory as synergistic effects are expected from these different components.

Access should be provided only to key research infrastructures of European interest, i.e., those infrastructures able to attract significant numbers of users from countries other than the country where they are located. Other national and regional infrastructures in Europe can be involved, in particular in the networking activities, for the exchange of best practices, without necessarily being beneficiaries in the proposal.

The research infrastructures of a 'Starting Community' usually show a limited degree of coordination and networking at present. The strongest impact of an integrating activity is

[48] See the Eligibility and admissibility conditions for this call.
[49] See part D of the section “Specific features for Research Infrastructures”.

expected typically to arise from a focus on networking, standardisation and establishing a common access procedure for trans-national and/or virtual access provision.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), Integrating Activities should, whenever appropriate, pay due attention to any related international initiative (i.e. outside the EU) and foster the use and deployment of global standards.

Integrating Activities should also organise the efficient curation, preservation and provision of access to the data collected or produced under the project, defining a data management plan, even when they opt out of the extended Pilot on Open Research Data. Data management (including ethics and privacy issues), interoperability, as well as advanced data and computing services should be addressed where relevant. To this extent, proposals should build upon the state of the art in ICT and e-infrastructures for data, computing and networking, and ensure connection to the European Open Science Cloud.

Integrating Activities should, when relevant, contribute to fostering the potential for innovation, including social innovation, of research infrastructures by reinforcing the partnership with industry, public administrations and/or other stakeholders, through e.g. transfer of knowledge and other dissemination activities, activities to promote the use of research infrastructures by industrial researchers or policy-makers, involvement of industrial associations and other stakeholders in consortia or in advisory bodies.

Integrating Activities are expected to duly take into account all relevant ESFRI and other world-class research infrastructures to exploit synergies, to reflect on sustainability and to ensure complementarity and coherence with the existing European Infrastructures landscape.

Proposals should include clear indicators allowing the assessment of the progress towards the general and specific objectives, other than the access provision.

As the scope of an integrating activity is to ensure coordination and integration between all the key European infrastructures in a given field and to avoid duplication of effort, at most one proposal per field is expected to be submitted.

Further conditions and requirements that applicants should fulfil when drafting a proposal are given in part D of the section “Specific features for Research Infrastructures”. Compliance with these provisions will be taken into account during evaluation.

Integrating activities for starting communities range across all areas of science and technology. Proposals should not restrict their services to too narrow research fields and should address the wider scientific communities, even multidisciplinary ones, which can be served by the involved sets of research infrastructures.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Researchers will have wider, simplified, and more efficient access to the best research infrastructures they require to conduct their research, irrespective of location. They benefit from an increased focus on user needs.
- New or more advanced research infrastructure services, enabling leading-edge or multidisciplinary research, are made available to a wider user community.
- Operators of related infrastructures develop synergies and complementary capabilities, leading to improved and harmonised services. , . Economies of scale and improved use of resources across Europe are also realised due to less duplication of services, common development and the optimisation of operations.
- When applicable, innovation is fostered through a reinforced partnership of research infrastructures with industry.
- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.
- Closer interactions between larger number of researchers active in and around a number of infrastructures facilitate cross-disciplinary fertilisations and a wider sharing of information, knowledge and technologies across fields and between academia and non-academic stakeholders, including industry.
- The integration of major scientific equipment or sets of instruments and of knowledge-based resources (collections, archives, structured scientific information, data infrastructures, etc.) leads to a better management of the continuous flow of data collected or produced by these facilities and resources.
- When applicable, the integrated and harmonised access to resources at European level can facilitate the use beyond research and contribute to evidence-based policy making.
- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAIA-03-2020: Pilot for a new model of Integrating Activities

Specific Challenge: European researchers need effective and convenient access to the best research infrastructures in order to conduct research for the advancement of knowledge and technology. The aim of this action is to facilitate access to the best research infrastructures of different but close communities gathered in larger domains, ensuring their optimal use and the common improvement of their services.

Scope: The main objective of this topic is the provision of access to research infrastructures and the harmonisation of national and European procedures for providing access. Proposals will mobilise a comprehensive group of several key research infrastructures in a given large domain as well as other stakeholders (e.g. public authorities, funding agencies, technological partners, research institutions) from different Member States, Associated Countries and other third countries[50] when appropriate, in particular when they offer complementary or more advanced services than those available in Europe.

Proposals should include a plan and effective commitment towards the optimum integration of the research infrastructure services of the different but close communities under the Pilot scheme, as well as activities to monitor the related progress. This integration will be an element of the evaluation of the Pilot scheme and will help developing this scheme in Horizon Europe.

Funding will be provided to support, in particular, the trans-national and virtual access provided to European researchers (and to researchers from Third Countries under certain conditions[51]) including training for the users, if required, as well as some joint activities to facilitate and integrate the access procedures, to improve the services the infrastructures provide and to further develop on-line services. Data management (including ethics issues), interoperability, as well as advanced data and computing services should then be addressed where relevant. Synergistic effects are expected from these different components. Proposals should adopt the guidelines and principles of the European Charter for Access to Research Infrastructures. They should define a data management plan, even when they opt out of the extended Pilot on Open Research Data. When they address the curation, preservation and provision of access to the data collected or produced under the project, proposals should build upon the state of the art in ICT and e-infrastructures for data, computing and networking, and ensure connection to the European Open Science Cloud.

Access should be provided only to research infrastructures of European interest, i.e., those infrastructures able to attract users from countries other than the country where they are located (or group of countries in case of distributed infrastructures). Research infrastructures can be involved as beneficiaries or as third parties, the latter usually structured under a national access provision coordinator or a pan-European research infrastructure. The services they open for trans-national and virtual access under the project and, when relevant, the amount of units of access they make available, must be included in the catalogue of services to which the project will offer access. Projects are encouraged to extend their catalogues under their lifetime, selecting, on the basis of the excellence of their offer of access provision, new research infrastructures of European interest to be involved in the grant. The new research infrastructures should specify, for each of their installations, the services offered and their quality level. In addition for trans-national access, they should also indicate the unit of access, the number of users to be served and the amount of units to be provided to them as well as the related access costs and users' travel and subsistence costs for visiting the infrastructure. The selected research infrastructures can be included in the grants through

50 See the Eligibility and admissibility conditions for this call.
51 See part D of the section “Specific features for Research Infrastructures”.

amendments. To this extent proposals should describe the procedure to select the new infrastructures and earmark appropriate resources.

Proposals should also map and analyse the access modalities adopted by different infrastructures and different countries, and develop and trial models, mechanisms and practices to establish the optimal conditions for the long-term engagement of funders in making trans-national access sustainable beyond the EU funding.

In particular, in line with the excellence-driven access defined in the European Charter for Access to Research Infrastructures, the research infrastructures offering access under the proposals and/or their funding agencies, should aim at adapting their national calls for access (if they launch such calls) to the same excellence based selection procedure used, at European level, in the project.

As the main objective of this topic is the provision of access, at least 60% of the contribution from the EU should be used to cover the related costs (access costs and travel and subsistence of selected users).

Projects shall publicise widely the access offered under the grant to ensure that researchers who might wish to have access to these infrastructures are made aware of the possibilities open to them and, for trans-national access, open specific calls to invite applications for access to all the installations listed in the catalogue. Trans-national and virtual access provision shall follow the rules specified for *integrating activities* under point (ii) "Trans-national and/or virtual access activities" in part D of the section "Specific features for Research Infrastructures". Compliance with these provisions will be taken into account during evaluation.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), proposals should, whenever appropriate, pay due attention to any related international initiative (i.e. outside the EU) and foster the use and deployment of global standards.

Proposals are expected to duly take into account all relevant ESFRI and other world-class research infrastructures as well as relevant major European initiatives, to exploit synergies, to reflect on sustainability and to ensure complementarity and coherence with the existing European Infrastructures landscape.

Proposals should include clear indicators allowing the assessment of the progress towards the general and specific objectives, other than the access provision.

As the scope of this topic is to ensure integration and access to key European infrastructures in a given domain and to avoid duplication of effort, at most one proposal per domain is expected to be submitted.

On the basis of a multiannual plan drafted taking also into account the assessment and the timing of previous grants, this work programme invites proposals addressing the following three domains.

Facilities for research on Atmosphere This activity aims to provide integrated access to and improve the services, included on-line services, of state-of-the-art European ground-based stations for long term observations of aerosols, clouds and short lived gases, key observation and monitoring infrastructures for non-CO2 gas, and instrumented environmental chambers for atmospheric simulation.

Research infrastructures for research in micro-nano technologies for materials. This activity aims to provide integrated access to and improve the services, included on-line services, of key infrastructures (e.g. experimental installations for micro- and nanofabrication, analytical and modelling/simulation facilities) for research in material nanoscience and nanotechnology, ranging from synthesis and nanolithography to advanced characterization and theoretical modelling/numerical simulation. Safety issues of nanoparticles should be taken into account.

Research Infrastructures for advanced optical/IR and radio astronomy. This activity aims to provide integrated access to and improve the services, included on-line services, of the key research infrastructures in Europe for optical/infrared astronomy and advanced radio astronomy, including Very Long Baseline Interferometry.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 15 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Harmonisation of national and European procedures for providing access and coordination of national and European funders for the provision oftrans-national access to research infrastructures is fostered.
- Models, mechanisms and practices to establish the optimal conditions for the long-term engagement of funders in making trans-national access sustainable beyond the EU funding are assessed, tested and/or developed
- Researchers will have simplified and more efficient trans-national access to a wider and integrated set of advanced research infrastructure services, from different but close communities, to conduct leading-edge, multidisciplinary research. They benefit from an increased focus on user needs.
- Operators of related infrastructures develop synergies and complementary capabilities, leading to improved and harmonised services. Economies of scale and improved use of resources across Europe are also realised due to less duplication of services, common development and the optimisation of operations.
- A new generation of researchers is educated that is ready to optimally exploit all the essential tools for their research.

- Closer interactions between larger number of researchers active in and around a number of research infrastructures, in different but close fields, facilitate cross-disciplinary fertilisations and a wider sharing of information, knowledge and technologies across fields and between academia and industry.
- The integration of major scientific equipment or sets of instruments and of knowledge-based resources (collections, archives, structured scientific information, data infrastructures, etc.) leads to a better management of the continuous flow of data collected or produced by these facilities and resources.
- When applicable, the integrated and harmonised access to resources at European level can facilitate the use beyond research and contribute to evidence-based policy making.
- When applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Conditions for the Call - Integrating and opening research infrastructures of European interest

Opening date(s), deadline(s), indicative budget(s):[52]

Topics (Type of Action)	Budgets (EUR million)			Deadlines
	2018	2019	2020	
Opening: 05 Dec 2017				
INFRAIA-01-2018-2019 (RIA)	101.50	15.00		22 Mar 2018
Opening: 14 Nov 2018				
INFRAIA-01-2018-2019 (RIA)		110.00	15.00	20 Mar 2019
Opening: 28 Nov 2019				
INFRAIA-02-2020 (RIA)			99.50	17 Mar 2020
INFRAIA-03-2020 (RIA)			45.00	

[52] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

Overall indicative budget	101.50	125.00	159.50	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme. The following exceptions apply:

INFRAIA-01-2018-2019, INFRAIA-02-2020	Given the specific nature of this topic, specific eligibility conditions, in addition to the standard eligibility conditions for Research and Innovation Action, apply: all the three types of activities: networking, access and joint research activities shall be included in the proposal. Please read carefully the provisions under the part D of the section "Specific features for Research Infrastructures" before the preparation of your application. Legal entities established in Australia, Brazil, Canada, China, India, Japan, Mexico, New Zealand, Republic of Korea, Russia and USA, which provide, under the grant, access to their research infrastructures to researchers from Members States and Associated countries, are eligible for funding from the Union.
INFRAIA-03-2020	Given the specific nature of this topic, specific eligibility conditions, in addition to the standard eligibility conditions for Research and Innovation Action, apply: the access activities shall be included in the proposal. Legal entities established in Australia, Brazil, Canada, China, India, Japan, Mexico, New Zealand, Republic of Korea, Russia and USA, which provide, under the grant, access to their research infrastructures to researchers from Members States and Associated countries, are eligible for funding from the Union.

Exceptional page limits to proposals/applications:

INFRAIA-01-2018-2019, INFRAIA-02-2020, INFRAIA-03-	As proposals need to give information on the research infrastructures providing access, specific page limits apply. The page limits for a full proposal is 100 pages.

2020	

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRAIA-01-2018-2019	*For the criterion Excellence*, in addition to its standard sub-criteria, the following aspects will also be taken into account; • The extent to which the Networking Activities will foster a culture of co-operation between the participants and other relevant stakeholders. • The extent to which the Access Activities (Trans-national Access and/or Virtual activities) will offer access to state-of-the-art infrastructures, high quality services, and will enable users to conduct excellent research. • The extent to which the Joint Research Activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures. *For the criterion Impact* the second sub-criterion is substituted by: • Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society;
INFRAIA-02-2020	*For the criterion Excellence*, in addition to its standard sub-criteria, the following aspects will also be taken into account; • The extent to which the proposal integrates the related community and ensures complementarity and coherence with the existing European Research Infrastructures landscape, including ESFRI infrastructures and existing integrating activities for advanced communities. • The extent to which the Networking Activities will foster a culture of co-operation between the participants and other relevant stakeholders. • The extent to which the Access Activities (Trans-national Access and/or Virtual activities) will offer access to state-of-the-art infrastructures, high quality services, and will

	enable users to conduct excellent research. • The extent to which the Joint Research Activities will contribute to quantitative and qualitative improvements of the services provided by the infrastructures. *For the criterion Impact* the second sub-criterion is substituted by: • Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society;
INFRAIA-03-2020	*For the criterion Excellence*, in addition to its standard sub-criteria, the following aspects will also be taken into account; • The extent to which the Access Activities (Trans-national Access and/or Virtual activities) will offer access to the state-of-the-art infrastructures of European interest in the field, high quality services, and will enable users to conduct excellent research. • The extent to which the project will contribute to facilitate and integrate the access procedures, to improve the services the infrastructures provide and to further develop their on-line services. *For the criterion Impact* the second sub-criterion is substituted by: • Where relevant, any substantial impacts not mentioned in the work programme, that would enhance innovation capacity; create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, or bring other important benefits for society;

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme. The following exceptions apply:

INFRAIA-01-2018-2019, INFRAIA-02-2020	The following approach will be applied successively for every group of *ex aequo* proposals requiring prioritisation, starting with the highest scored group, and continuing in descending

	order: (i) Proposals that address scientific domains or areas not otherwise covered by more highly-ranked proposals will be considered to have the highest priority. (ii) The proposals identified under (i), if any, will themselves be prioritised according to the scores they have been awarded for the criterion *excellence*. When these scores are equal, priority will be based on scores for the criterion *impact.* If necessary, any further prioritisation will be based on the following factors, in order: total number of users to whom trans-national access to research infrastructures will be provided, size of EU budget allocated to SMEs; gender balance among the personnel named in the proposal who will be primarily responsible for carrying out the research and/or innovation activities. If a distinction still cannot be made, the panel may decide to further prioritise by considering how to enhance the quality of the project portfolio through synergies between projects, or other factors related to the objectives of the call or to Horizon 2020 in general. These factors will be documented in the report of the Panel.

The full evaluation procedure is described in the relevant guide published on the Funding & Tenders Portal.

Grant Conditions:

INFRAIA-01-2018-2019, INFRAIA-02-2020, INFRAIA-03-2020	For grants awarded under this topic beneficiaries being 'access providers' must provide trans-national access to research infrastructures or installations. The respective options of Article 16.1, Article 16.3, Article 25.5 and Article 31.6 of the Model Grant Agreement will be applied.
INFRAIA-01-2018-2019, INFRAIA-02-2020, INFRAIA-03-2020	For grants awarded under this topic beneficiaries being 'access providers' must provide virtual access to research infrastructures or installations. The respective options of Article 16.2 and Article 16.3 of the Model Grant Agreement will be applied.
INFRAIA-01-2018-2019, INFRAIA-02-2020, INFRAIA-03-	For grants awarded under this topic the depreciation costs of equipment, infrastructure or other assets for providing trans-national or virtual access to research infrastructure will be

2020	ineligible costs. The respective option of Art. 6.2.D.2 of the Model Grant Agreement will be applied.
INFRAIA-01-2018-2019, INFRAIA-02-2020, INFRAIA-03-2020	For grants awarded under this topic capitalised and operating costs of 'large research infrastructures' as defined in the Article 6.2.D.4 of the Model Grant Agreement are not eligible.

Consortium agreement:

INFRAIA-01-2018-2019, INFRAIA-02-2020, INFRAIA-03-2020	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - European Data Infrastructure

H2020-INFRAEDI-2018-2020

This call will support the creation of a world-class European Data Infrastructure (EDI) offering high performance computing and data capabilities, and fast connectivity.

A synergetic approach for EDI technologies is promoted, which is complementary to relevant activities covered in the LEIT-ICT and FET work programmes 2018-2020, and implemented around the following topics:

- *Support to a Pan-European High Performance Computing (HPC) infrastructure and services (PRACE)*
- *Supporting Centres of Excellence that promote the use of upcoming exascale computing capabilities*
- *Supporting the governance of the HPC and data infrastructure*

The topic INFRAEDI-04-2020 (Support to Public Procurement of innovative HPC infrastructure systems) has been removed from the work programme in view of the transfer of High Performance Computing activities in 2019 and 2020 to the EuroHPC Joint Undertaking.

Proposals are invited against the following topic(s):

INFRAEDI-01-2018: Pan-European High Performance Computing infrastructure and services (PRACE)

Specific Challenge: To create a world-class pan-European High Performance Computing (HPC) infrastructure and to provide state-of-the-art services accessible by users independently of their location, by pooling, integrating and rationalising the HPC resources at EU level.

Scope: *Proposals should address all the following activities:*

- Provide a seamless and efficient Europe-wide Tier-0[53] service to users, based on promoting research excellence and innovation; this includes peer-review procedures for the allocation of computing time; transparent billing; and specific services adapted to the needs of academia and industry users, including Centres of Excellence on HPC;
- Support software implementations (i.e. through high level support teams), helping Tier-0 users and communities in adapting and adopting novel software solutions to cope with the rapidly evolving HPC architectural and programming environment landscape;

[53] Tier-0 are those services provided at pan-European level with machines devoted to the pan-European infrastructure for a significant fraction of cycles (to be agreed with the Commission) and having a minimum performance level to be periodically defined by the consortium.

- Collaborate with Centres of Excellence on HPC and other national and EU funded activities that focus on similar or complementary activities for HPC codes and applications;

- Identify and support new user needs and ensure openness to new user communities and new applications; reach out to scientific and industrial communities, promoting industrial take-up of HPC services in particular by SMEs;

- Carry out activities (such as service prototyping, software development, etc.) that build on national HPC capabilities (Tier-1) and are necessary to support Tier-0 services and a functional European HPC ecosystem;

- Run training and skills development programmes tailored to the research needs of academia and industry and relevant public services and transfer of know-how for the use of HPC; Coordinate at European level such programmes in cooperation with the Centres of Excellence on HPC;

- Implement inclusive and equitable governance and a flexible business model to ensure long term financial sustainability;

- Support the development of the strategy for the deployment of a rich HPC environment of world-class systems with different machine architectures - evolving towards exascale -, including the implementation roadmap at EU and national level, in particular in the context of EuroHPC;

- Coordinate activities with the European Technology Platform for HPC (ETP4HPC) and the Centres of Excellence in HPC applications in support of the European HPC strategy towards the next generation of computing systems, technologies and applications. In particular, the mechanisms to be put in place by PRACE for the provision of technical specifications to guide research activities for future exascale prototypes and systems and for the testing and demonstration of such exascale solutions;

- Develop an international cooperation policy and associated activities in the area of HPC.

The PRACE infrastructure should provide core and basic services in coordination with other e-infrastructure providers to promote interoperability and a seamless user experience. Interworking with other computing infrastructures such as clouds and grids should be ensured. Appropriate KPIs should be provided addressing all the above activities and allowing the assessment of the progress towards the objectives, both in terms of outputs and ultimate impact.

The Commission considers that proposals requesting a contribution from the EU of between EUR 22 and 24 million would allow this this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts or duration.

<u>Expected Impact</u>:

- Improved services and procedures for large user access, fostering openness to new users and applications, to world-class HPC infrastructure resources and services.
- Increased amount of computing cycles available to researchers at European level through user-friendly and efficient procedures for helping Europe staying at the forefront of scientific breakthroughs and innovation.
- Increased number of research communities, industrial organisations (in particular SMEs), and institutional users benefiting from access to services including training in HPC.
- Increased investment in HPC infrastructure in Europe (national, regional and EU), long term financial sustainability through flexible business models and inclusive governance, better coordination between demand and supply in the European HPC ecosystem, with improved collaboration of the users and procurers with technology developers and suppliers to foster innovation.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEDI-02-2018: HPC PPP - Centres of Excellence on HPC

Specific Challenge: This topic covers two interrelated and synergic areas:

(a) *Supporting Centres of Excellence (CoE)* that promote the use of upcoming exascale and extreme performance computing capabilities in areas where user communities in collaboration with other HPC stakeholders can develop or scale up existing parallel codes towards exascale and extreme scaling performance, resulting into tangible benefits for addressing scientific, industrial or societal challenges.

(b) *Addressing the fragmentation of activities for excellence in HPC applications*, and fostering the widening of the use of HPC codes in the EU, by establishing a focal point for the consulting skills and training available from the CoE, and from other HPC centres or organisations, including PRACE.

Scope:

(a) Research and Innovation Actions

CoEs will be user-driven and inherently committed to co-design activities so as to ensure that future HPC architectures are well-suited for the applications and their users, providing them with a high performance and scalable application base. CoEs will federate capabilities around Europe, exploiting available competences, and ensuring multidisciplinarity (combining application domain and HPC system, software and algorithm expertise) and synergies with national/local programmes.

Proposals for CoEs should clearly identify one of the following areas as the main focus of their work and the challenges addressed:

1. Engineering: aeronautics, automotive and/or new combustion engines;
2. Environmental sciences: climate and weather simulation, natural hazards forecast and prevention;
3. Biomolecular research: combined research in chemical, biological, physical and computational science;
4. Health/medicine:, computational methods and simulation in the biomedical domain;
5. Materials science and engineering: materials design, simulation and modelling;
6. Energy: optimising energy consumption and supporting the transition to a reliable and low carbon and clean energy supply;
7. Big Data and Global Challenges: Big Data analytics for strategic global issues;
8. Performance optimisation: optimisation and productivity services for HPC academic and industrial code(s) (including support to selected Centres of Excellence)
9. Other domains (with a focus not addressed by any of the areas above)

Proposals should address all the following points:

- Research in HPC applications towards highly scalable, optimised codes and the path to exascale performance (both computing and extreme data);
- The provision of services supporting different usage models for the community needs, and contributing to the potential convergence of HPC, High Throughput Computing (HTC), and HPDA (High-Performance Data Analytics). This includes developing, maintaining, optimising (if needed re-design) and scaling HPC application codes, addressing the full scientific/industrial workflow, particularly covering data aspects; testing and validating codes and quality assurance;
- Commitment to the co-design approach (hardware, software, codes), including the identification of suitable applications relevant to the development of HPC technologies towards exascale;
- In collaboration with PRACE, address the skills gap in computational science in the targeted domain by specialised training and capacity building measures to develop the human capital resources for increased adoption of advanced HPC in industry (including SMEs) and academia;
- Data management and long term data stewardship, in particular towards exascale;

- Widening the access to codes and fostering transfer of know-how to user communities, including specific and targeted measures for industry and SMEs;
- Business plans for long-term sustainability embracing a wide range of service models and funding options;
- In collaboration with the support action foreseen for CoEs (specific challenge (b) of this topic), addressing the fragmentation of HPC activities for excellence in applications, and fostering the widening of the use of HPC codes in the EU

Proposals should include clear KPIs allowing the assessment and monitoring of the progress towards the objectives, both in terms of outputs and ultimate impact.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 and 8 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(b) Coordination and Support Action

Proposals will address the following activities:

- Coordinate the services (including e.g. consultancy to other organisations), training and skills development, and outreach activities for the CoE projects and potentially other initiatives and HPC stakeholders (e.g. PRACE), ensuring that best practices are shared;
- Act as a clearing house for HPC training and consultancy, working with relevant stakeholders to ensure gaps are filled and overlaps avoided where possible;
- Promote outreach to industry and SMEs, especially targeting specific industrial sectors and their events, and in view of supporting the INFRAINNOV-01-2019 action for stimulating the innovation potential of SMEs as users of advanced HPC services.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 2 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

(a) *Research and Innovation Actions*

- European leadership in exascale and extreme-scale -oriented codes and innovative algorithms/solutions that address societal challenges or are important for key scientific and industrial applications;
- Improved access to computing applications and expertise that enables researchers and industry to be more productive, leading to scientific excellence and economic and social benefit;

- Improved competitiveness for European companies and SMEs through access to CoE expertise and services;
- Federating capabilities and integrating communities around computational science in Europe;
- A large number of scientists and engineers, in particular female and young ones, trained in the use of computational methods and optimisation of applications.

(b) *Coordination and Support Action*

- Access to consultancy and services (including training) offered by CoEs for external potential users and learners;
- Maximise visibility and outreach of Centres of Excellence, in particular to industry;
- Promoting the use of HPC by identifying industrial and SMEs users in the different business areas, and matching their needs with the available expertise in the CoEs;
- Improved coordination and increased availability of training activities on HPC in Europe, in particular with PRACE.

Type of Action: Research and Innovation action, Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEDI-03-2018: Support to the governance of High Performance Computing Infrastructures

Specific Challenge: Support the governance of the High Performance Computing Infrastructures and the coordination of the relevant public and private stakeholders.

Scope: *The following activities should be addresses:*

- Promote the objectives of the European Cloud Initiative and of a sound governance structure for the management and the development of the computing and data infrastructures and services, decision making on funding, long-term sustainability and security;
- Establish a communication platform for the dialogue of stakeholders involved in the implementation of the governance of HPC infrastructures across Europe;
- Linking with relevant national and pan-European activities in the field;
- Organize outreach events.
- The action should involve users, implementers and funders, participating in the EU funded activities of HPC and Big Data.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 0.9 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Efficient governance for the implementation of the HPC infrastructures, and spreading of excellence on HPC and Big Data across Europe, increased awareness of European activities in the field.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAEDI-05-2020: Centres of Excellence in exascale computing

Specific Challenge: Supporting Centres of Excellence (CoE) that advance and promote the use of upcoming exascale computing capabilities in areas where user communities in collaboration with other High Performance Computer (HPC) stakeholders can develop or scale up existing parallel codes towards exascale performance, resulting into tangible benefits for scientific, industrial or societal challenges.

CoEs must be user-driven and inherently committed to co-design activities to ensure that future HPC architectures are well suited for the applications and their users (both from academia and industry), providing with a high performance and scalable application base. CoEs will federate existing resources around Europe, exploiting available competences, and ensuring multidisciplinarity (combining application domain and HPC system, software and algorithm expertise) and synergies with national/regional programmes. CoEs must further enlarge and expand these capabilities all over in Europe, in particular by including users communities from EU countries currently developing and advancing their HPC infrastructure and ecosystem (e.g. countries not currently hosting Tier 0 and/or Tier 1 supercomputing facilities).

This topic builds and complements the INFRAEDI-02-2018 HPC PPP - Centres of Excellence on HPC applications call.

Scope: Proposals should clearly identify the target area/domain that will be the focus of their work, which must have great potential to achieve exascale performance in Europe, (e.g. Materials Science, Engineering, Artificial Intelligence, Cybersecurity, Personalised Medicine, etc.). Proposals must convincingly demonstrate this potential and the need for exascale requirements. Proposals must also develop synergies with existing CoEs and show European added value. Should the proposed work target an area or domain already covered by existing CoEs, proposals must clearly elaborate on how their proposal further expands and develops progress beyond what existing CoEs are implementing (e.g. different/new codes upgraded,

new user communities, etc.) and demonstrate that they shall cooperate with existing CoEs (if relevant) and avoid any kind of overlaps/duplication in the selected area of work.

Proposals must address:

- Research in HPC applications towards highly scalable, optimised codes and the path to exascale performance (both computing and extreme data)
- The provision of services supporting different usage models for the community needs, and contributing to the potential convergence of HPC, High Throughput Computing (HTC), and HPDA (High-Performance Data Analytics). This includes developing, maintaining, optimising (if needed re-designing) and scaling HPC application codes, addressing the full scientific/industrial workflow, particularly covering data aspects; testing and validating codes and quality assurance
- Commitment to the co-design approach (hardware, software, codes), including the identification of suitable applications relevant to the development of European HPC technologies towards exascale
- Enlarging and expanding HPC applications development and use, in particular for new users communities in EU countries currently developing and advancing their HPC infrastructure and ecosystem
- Ensure wider access to codes and foster their uptake by user communities, in particular industry and SMEs
- In collaboration with the support action foreseen in the INFRAEDI-02-2018 HPC PPP - Centres of Excellence on HPC call, address the skills gap in computational science in the targeted domain by specialised training and capacity building measures to develop the human capital resources for increased adoption of advanced HPC in industry and academia

Proposals must include clear KPIs allowing the assessment of the progress towards the objectives, both in terms of outputs and ultimate impact.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

The Commission considers that proposals requesting a duration from 24 to 36 months would allow this specific challenge to be addressed appropriately.

<u>Expected Impact</u>:

- European leadership in exascale-oriented codes and innovative algorithms/solutions that address societal challenges or are important for key scientific and industrial applications;

- Improved access to computing applications and expertise that enables researchers and industry to be more productive, leading to scientific excellence and economic and social benefit;
- Increased access to and uptake of applications by relevant user communities in those countries currently developing and advancing their HPC infrastructure and ecosystem;
- Improved competitiveness for European companies and SMEs;
- Federating capabilities and integrating communities around computational science in Europe;
- Complementarity and synergy with existing Centres of Excellence on HPC applications;
- A large number of female and male scientists and engineers trained in the use of computational methods and optimisation of applications.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Conditions for the Call - European Data Infrastructure

Opening date(s), deadline(s), indicative budget(s):[54]

Topics (Type of Action)	Budgets (EUR million)		Deadlines
	2018	2020	
Opening: 05 Dec 2017			
INFRAEDI-01-2018 (RIA)	24.00		22 Mar 2018
INFRAEDI-02-2018 (RIA)	72.00		
INFRAEDI-02-2018 (CSA)	2.00		
INFRAEDI-03-2018 (CSA)	0.90		
Opening: 09 Jul 2019			
INFRAEDI-05-2020 (RIA)		20.00	13 Nov 2019

[54] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

Overall indicative budget	98.90	20.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme. The following exceptions apply:

INFRAEDI-02-2018	***(a)*** *Research and Innovation actions* Grants will be awarded to proposals according to the ranking list. However, in order to ensure a balanced portfolio of supported actions, at least the highest-ranked proposal per area will be funded provided that it attains all thresholds and within the limits of the budget available for this topic.

The full evaluation procedure is described in the relevant guide published on the Funding & Tenders Portal.

Grant Conditions:

INFRAEDI-02-2018, INFRAEDI-05-2020	For grants awarded under this topic the Commission may object to a transfer of ownership or the exclusive or non-exclusive licensing of results to a third party established in a third country not associated to Horizon 2020. The respective option of Article 30.3 of the Model Grant Agreement will be applied.

Consortium agreement:

INFRAEDI-01-2018, INFRAEDI-02-2018, INFRAEDI-03-2018, INFRAEDI-05-2020	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - Demonstrating the role of Research Infrastructures in the translation of Open Science into Open Innovation

H2020-INFRAINNOV-2019-2020

This call will foster the innovation potential of research infrastructures by making industry more aware of the opportunities offered by research infrastructure to improve their products, e.g. as experimental test facilities, innovation hubs, knowledge-based centres. By working with research infrastructures on the development of advanced technologies industry can raise its technological level and competitiveness.

Innovation activities by research infrastructures are, in addition to this call, also supported in all relevant parts of the work programme.

The topic INFRAINNOV-01-2019 (Stimulate the innovation potential of SMEs) has been removed from the work programme in view of the transfer of High Performance Computing activities in 2019 and 2020 to the EuroHPC Joint Undertaking.

Proposals are invited against the following topic(s):

INFRAINNOV-02-2019: Network of research infrastructure Industrial Liaison and Contact Officers

Specific Challenge: The concept of industry as a full partner of Research Infrastructures (both as supplier and as user) should be proactively put in practice; this implies to promote a more extensive partnerships on joint research and development projects, addressing the development of advanced technologies, as well as specific activities fostering collaboration such as innovation, training and exchange programmes.

Industrial Liaison [55] and Contact [56] Officers (ILOs/ICOs) engaged with Research Infrastructures play an essential role for stimulating effective and tighter links with industry as suppliers or users. Mutual learnings among ILOs/ICOs and exchange of information on various aspects such as: awareness and communication strategies, procurements activities, industry requirements and marketing of new technologies developed for their facility, will help to raise the level of innovative actions arising from Research Infrastructures and maximise the impact of their activities.

Scope: Proposals will aim at establishing a European network of Industrial Liaison and Contact Officers (ILOs/ICOs) engaged with pan-European research infrastructures, including ESFRI landmarks and projects, as well as of other relevant world class research

[55] Industry Liaison Officers (ILO) are officially appointed by the Member States and Associated Countries to stimulate the collaboration among the national industry and the international research infrastructures, providing advice on business opportunities, R&D collaborations, call for tenders and industrial services.

[56] Industry Contact Officers (ICO) are research infrastructure staff in charge of developing business relations with all potential industrial suppliers of innovative components or services as well as encouraging the economical use of their facility by private players.

infrastructures of European interest. ILOs/ICOs, with different degrees of experience and representing a broad range of scientific domains should be actively involved in the action. Proposals should address:

- training sessions and exchange of best practises across various research domains;
- enhanced cross-border and cross-thematic brokerage events such as innovation exhibitions and industry-research infrastructures showcases;
- joint awareness campaigns towards industry (including SMEs) on the potential added-value of engagement with research infrastructures for their activities. This could include specific support to industrial partners in acquiring the know-how on procurement actions related to Research Infrastructures.
- the analysis of national indicators to measure the performances of ILO/ICOs' activities.

The development and maintenance of portals providing information on research infrastructures' calls, tenders, future needs and technology transfer opportunities, could also be considered.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

This activity will:

- Increase the awareness of industry (including SMEs) regarding opportunities offered by research infrastructures and its involvement in the development of research infrastructures technologies and services, thus raising the technological level and competitiveness of European companies;
- Improve the efficiency and effectiveness of the services provided by the ILO and ICOs;
- Help research infrastructures to develop more business oriented activities, including specific support and services dedicated to industry, and the promotion of skills to manage any resulting intellectual property right;
- Provide a better insight into the return of investment in and societal impact of Research Infrastructures.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAINNOV-03-2020: Co-Innovation platform for research infrastructure technologies

Specific Challenge: Research infrastructures, as providers of advanced services and as procurers of leading-edge technologies, have an innovation potential that has not always been sufficiently exploited. Opportunities provided by the development of components, instruments, services and knowledge for the implementation and upgrade of research infrastructures, could be better exploited to push the limits of existing technologies. There is a clear innovation potential associated with procurement from industry during the construction and upgrade of research infrastructures.

A co-innovation approach to continuously generate, scale and deploy breakthrough technologies with market and social value needs to be adopted by research infrastructures.

Scope: The aim is the establishment of an open initiative oriented towards a novel research and innovation collaborative framework engaging both the research communities in Europe using Research Infrastructures and the industry (including SMEs), for the mutual benefit of these stakeholders and the European society at large.

Under the previous Work Programme, through a pilot action, support has been provided to a wide number of proofs of concept demonstrating the potential for industrial application and exploitation of innovative solutions based on research infrastructure technologies. Proposals under this topic should focus on the most promising outcomes of the past pilot action[57] as well as on other valuable opportunities of exploitation of research infrastructure technologies for industrial applications, to further support their development and substantially raise their TRL. These opportunities should have breakthrough potential across Europe, be feasible and scalable, as well as exploitable for industrial applications having societal value.

This action allows for the provision of financial support to third parties in line with the conditions set out in Part K of the General Annexes. Being the financial support to third parties the primary aim of the action, at least 80% of the EU contribution should be used to this scope. Due to the nature of the work to be supported and taking into account that the support for the proofs of concept was already in the order of EUR 100 000 each, the contribution to a third party will go beyond EUR 60 000. The selection of the third parties to be supported under the grant will be based on an external independent peer review of their proposed work.

The calls to be launched within the grant for the selection of third parties should respect the rules and conditions laid out in Annex K of the Work Programme, in particular as regard transparency, equal treatment, conflict of interest and confidentiality.

While the past pilot action mainly addressed the industrial applications of detection and imaging technologies in the fields of medicine, manufacturing industry, aerospace, ICT, engineering, environmental sciences, proposals under this topic can also encompass different research infrastructure technologies.

[57] https://attract-eu.com/

Particular attention should be given to impact, dissemination strategy and the appropriate management of the IPR of the involved research infrastructures as well as to the cost efficiency and transparency of project administration. Proposals should enable the best conditions for the full exploitation by industrial partners of the innovation potential of research infrastructures and support technology and innovation transfer and joint development of high-tech products

Proposals should include clear indicators to monitor and assess the progress towards the action objectives.

Grants awarded under this topic should cooperate with the actions awarded under topic INFRAINNOV-04-2020 to identify and better exploit related synergies and to avoid overlaps. To this extent, proposals should foresee a dedicated task or work package and earmark appropriate resources. Cooperation with the projects funded under topic INFRAINNOV-02-2019 is also encouraged.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 35 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: This activity will:

- establish a co-innovation platform to transparently promote the use of research infrastructure technologies for industrial applications across Europe
- increase the capacity to generate, absorb and use new technologies in Europe;
- enhance the innovation capability of European Research Infrastructures;
- raise the awareness of industry (including SMEs) regarding opportunities offered by research infrastructure to improve their products, e.g. as experimental test facilities, innovation hubs, knowledge-based centres;
- support the integration of research infrastructures into local, regional and global innovation systems;
- when applicable, the socio-economic impact of past investments in research infrastructures from the European Structural and Investment Funds is enhanced.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRAINNOV-04-2020: Innovation pilots

Specific Challenge: Pan-European Research Infrastructures use more and more sophisticated technologies not available on the market, which require ad-hoc developments and often the

use of large-scale platforms combining R&D (Research and Development), integration and validation. These platforms can also provide longer-term visibility and involvement of European industry in scientific and technological advancements and therefore ensure greater socio-economic impact.

Scope: Funding will be provided to research infrastructure networks to kick-start the implementation of a common strategy/roadmap for technological developments required for improving their services through partnership with industry. Proposals should then involve research infrastructures, industry and SMEs to promote innovation and knowledge sharing through co-creation of needed technical solutions and make use, when appropriate, of large-scale platforms combining R&D (Research and Development), integration and validation for the technological developments.

Proposals should address:

- if not already done,the identification of key techniques and trends which are crucial for future construction and upgrade of the involved Research Infrastructures and the definition of roadmaps and/or strategic agendas for their development, in close partnership with the industrial partners, especially with innovative SMEs;
- the development of the identified fundamental technologies or techniques underpinning and arising from the efficient and joint use of the involved research infrastructures, taking into due account resource efficiency and environmental (including climate-related) impacts.
- the prototyping of higher performance methodologies, protocols, and instrumentation, including the testing of components, subsystems, materials, and dedicated software, needed to upgrade the involved research infrastructures, construct their next generation, or develop new advanced applications.

As the grant will not cover the full implementation of the common strategy/roadmap for technological developments, proposals should define a sustainability plan for its further implementation. Proposals should contribute to fostering the potential for innovation of research infrastructures by reinforcing the partnership with industry, through e.g. transfer of knowledge and other dissemination activities, activities to promote the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies.

Proposals may include PCP subcontracting activities as described in part E of the General Annexes of the Work Programme.

In order to exploit synergies, share results and avoid overlaps, grants awarded under this topic will be complementary between them. The respective options for complementary grants of Article 2, Article 31.6 and Article 41.4 of the Model Grant Agreement (MGA) will be applied. In addition, grants awarded under this topic should cooperate with the actions awarded under topic INFRAINNOV-03-2020 to identify and better exploit related synergies and to avoid overlaps. To this extent, proposals should foresee a dedicated task or work

package and earmark appropriate resources. Proposals should also build on results from past/ongoing projects, such as AMICI, or the one funded under topic INFRAINNOV-02-2019.

This topic targets 'Advanced Communities' which have reached a high level of integration and can focus on joint research developments. On the basis of a multiannual plan drafted taking also into account the assessment and the timing of previous grants, this work programme invites proposals addressing the following three domains:

- Innovation in light source technologies
- Innovation in detector technologies for accelerators
- Innovation in accelerator technologies

The Commission considers that proposals requesting a contribution from the EU of up to EUR 10 million would allow this topic to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: This activity will:

- Enhance the scientific competitiveness of European Research Infrastructures in the long-term and the further development of innovative companies;
- Facilitate the creation of both large and viable markets and structuring industrial partners in a critical mass to enable European industry to respond to demands from international Research Infrastructures;
- Support the integration of research infrastructures into local, regional and global innovation systems.

Type of Action: Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Conditions for the Call - Demonstrating the role of Research Infrastructures in the translation of Open Science into Open Innovation

Opening date(s), deadline(s), indicative budget(s):[58]

Topics (Type of Action)	Budgets (EUR million)	Deadlines

[58] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts for the 2020 budget are indicative and will be subject to separate financing decisions to cover the amounts to be allocated for 2020.

	2019	2020	
Opening: 14 Nov 2018			
INFRAINNOV-02-2019 (CSA)	1.50		20 Mar 2019
Opening: 28 Nov 2019			
INFRAINNOV-03-2020 (RIA)		35.00	17 Mar 2020
INFRAINNOV-04-2020 (RIA)		30.00	
Overall indicative budget	1.50	65.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme. The following exceptions apply:

INFRAINNOV-04-2020	*For the criterion Excellence*, in addition to its standard sub-criteria, the following aspect will also be taken into account; • The extent to which the proposed work will contribute to quantitative and qualitative improvements of the services provided by the infrastructures.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme.

The full evaluation procedure is described in the relevant guide published on the Funding & Tenders Portal.

Grant Conditions:

INFRAINNOV-03-2020	For grants awarded under this topic beneficiaries may provide support to third parties as described in part K of the General Annexes of the Work Programme. The support to third parties

	can only be provided in the form of grants. The respective options of Article 15.1 and Article 15.3 of the Model Grant Agreement will be applied.
INFRAINNOV-04-2020	Grants awarded under these topics will be complementary between them. The respective options of Article 2, Article 31.6 and Article 41.4 2 of the Model Grant Agreement will be applied.
INFRAINNOV-04-2020	For grants awarded under this topic the respective options for actions involving pre-commercial procurement (PCP) or procurement of innovative solutions (PPI) of the Article 13.1.1 of the Model Grant Agreement will be applied.
INFRAINNOV-02-2019, INFRAINNOV-03-2020, INFRAINNOV-04-2020	For grants awarded under this topic capitalised and operating costs of 'large research infrastructures' as defined in the Article 6.2.D.4 of the Model Grant Agreement are not eligible.

Consortium agreement:

INFRAINNOV-02-2019, INFRAINNOV-03-2020, INFRAINNOV-04-2020	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Call - Support to policy and international cooperation

H2020-INFRASUPP-2018-2020

This call will reinforce European research infrastructures policy and international cooperation. Pooling and sharing of resources at European level requires the development of well defined policies and agreed mechanisms of cooperation and assessment. The global dimension of the scientific challenges addressed by European research infrastructures makes increasingly relevant their international cooperation with research infrastructures in other world regions as well as the development of global research infrastructures.

The development of policy and international cooperation activities are, in addition to this call, encouraged in any proposal submitted to other parts of this work programme, where they appear to be relevant.

Proposals are invited against the following topic(s):

INFRASUPP-01-2018-2019: Policy and international cooperation measures for research infrastructures

Specific Challenge: High-quality, accessible research infrastructures are at the heart of the knowledge triangle of research, education and innovation. They enable tens of thousands of researchers in academia and industry to develop innovative ideas, products and services that foster European competitiveness and help tackle societal challenges facing our continent. However, ensuring the availability of state-of-the-art facilities requires multi-billion Euro long-term investments across the European Research Area. In the context of implementing the ERA Roadmap, the focus of this action is to set the conditions for effective investment and optimise the use of research infrastructures of European interest.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation for research infrastructures is needed with a number of key partners located in third countries/regions seen as strategic both for the development, exploitation and management of world-class research infrastructures and for ensuring the necessary complementarities on the international scene required to address research challenges with a global dimension by optimising the use of the available resources.

Scope: Proposals will address one of the following sub-topics:

(a) Research and Innovation actions for the 2018 deadline

The objective of this sub-topic is to support the development and installation of a dedicated beam-line in SESAME. The proposal should help strengthening the links to the European network of analytical facilities with particular reference to new synchrotrons currently under development. The consortium will work with the SESAME Scientific Advisory Committee to define the scope of the beam-line more appropriate for the scientific community of reference. It should involve European partner laboratories having similar energy and technical

specifications in the design and development of the beam-line components and the related instrumentation. The action will cover the installation of the beam-line and its initial commissioning. The action should also address how SESAME will secure the necessary human and financial resources for the operation of the beam-line.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 6 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(b) Coordination and Support actions for 2018 deadline

(b1) ERIC network

The growing number of established and upcoming European Research Infrastructure Consortia [59] (ERICs) will have to address similar issues on different procedural and administrative levels such as for example employment of staff, procurement rules, evaluation procedures, access policy, financial accounting, economic activities etc. A more formal and structural collaboration and coordination between them would allow for a more effective approach and mutual benefit for addressing common hurdles. Actions selected under this sub-topic will:

- aim at strengthening coordination and networking reinforcing the informal ERIC network or its successor framework;
- support the organisation of specific meetings, targeted thematic workshops focussing on common challenges such as the development of internal procurement rules, harmonised reporting, VAT exemption practices, insurances and pensions policies and training of governance bodies representatives;
- support ERICs in preparation, on the basis of best practices;
- support common communication and outreach activities and strengthening external representation of ERICs' as a stakeholder in consultations and other policy actions that could affect them.

(b2) International visibility of European research infrastructures

The long-term sustainability consultation process highlighted that there is a need to establish international strategic partnerships with third-countries and also to improve the relationship between European research infrastructures and industry. The purpose of this sub-topic is to improve the international visibility of European research infrastructures and of their service. To attain these objectives, the selected action should:

- organise thematic workshops and brokerage events covering the various scientific disciplines. These events would bring together the relevant European and international

[59] Council Regulation (EC) No 723/2009 on the Community legal Framework for a European Research Infrastructure Consortium

players (research infrastructures / funding agencies / Ministries) and set the conditions for new collaboration opportunities to be explored. A brokerage based approach and organization of a science market place would be expected;

- develop concrete tools which Research Infrastructures could use to improve their communication/outreach strategy;

Proposals should build on the European research infrastructures landscaping analysis performed by ESFRI and published in the 2016 update of the ESFRI Roadmap, and establish links with the ongoing RISCAPE project which is conducting an international landscaping exercise.

The activity will have to put in place measures to facilitate exchange of information at international level (e.g. web-portals).

(b3) Catalogue of research infrastructure services

This sub-topic addresses the development of an on-line dynamic catalogue of relevant research infrastructure services at national and European levels, starting from the ones offered under Horizon 2020 grants. Research infrastructures should be able to apply for registering their services and to update the already registered services. Researchers should be cleverly guided in their quest for the needed infrastructure services. Procedures to review and validate registrations as well as a rating system from users should be foreseen. The catalogue should be complementary and tightly linked to the EOSC catalogue, therefore its focus will be more on physical than digital services. Proposals should address and find solutions for the catalogue long term sustainability.

(b4) Support to ESFRI

Actions selected under this sub-topic will support partnerships between policy makers, funding bodies and the scientific community in the context of the European Strategy Forum on Research Infrastructures (ESFRI) to foster the priority setting and implementation of pan-European research infrastructures. In particular, the foreseen actions will:

- support the development and publishing of the ESFRI Roadmap;
- support the implementation of ESFRI activities;
- support the ESFRI communication and outreach strategy;
- support effective review and monitoring of research infrastructures on the ESFRI Roadmap through appropriate analytical tools;
- foster cooperation, exchange of experiences and good practices between the research infrastructures, their managers and stakeholders, as well as the funding bodies and policy makers;

- foster the cooperation between ESFRI and e-IRG, as well as between research infrastructures and e-infrastructures, in the area of data management to strengthen the integration of research infrastructure user communities.

The proposal should demonstrate the added-value of the activities proposed, in comparison with the activities and responsibilities of national ESFRI delegations as well as previous EU grants, such as CoPoRi and STR-ESFRI.

(b5) Support to the e-Infrastructure Reflection Group (e-IRG)

Actions selected under this sub-topic will support the activities of the e-Infrastructure Reflection Group (e-IRG) aiming to foster the integration of pan-European e-Infrastructures within the European Research Area.

The following activities should be addressed:

- Contribute to the implementation of the European Open Science Cloud (EOSC) and the European Data Infrastructure (EDI):

- by fostering the cooperation between European research communities and e-Infrastructures;

- by facilitating interoperability leading to integration and consolidation of e-Infrastructures;

- by increasing the engagement of user communities in the EOSC and the EDI/EuroHPC;

- and by offering an independent view on the implementation of relevant EU policies by collecting and aggregating views from the relevant actors;

- Support cooperation with the ESFRI;

- Promote a change of culture of research communities towards open data, robust data management and data sharing practices;

- Organize outreach events to assist the Commission, Member States and Associated Countries in communication activities on role, mission and implementation of the EDI/EuroHPC and the EOSC.

Proposals should demonstrate the value added of the activities proposed in comparison with the activities of other advisory bodies and previous EU grants. To best enable the realisation of the above activities, the independence of the e-IRG group members is paramount. Therefore, proposals should also demonstrate independence and absence of conflict of interest in the membership of the e-IRG group receiving support.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 1.5 million for the first four sub-topics and of EUR 0.6 million over a duration of up to 30 months for sub-topic (b5) would allow these activities to be addressed appropriately.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(c) Research and Innovation actions for the 2019 deadline

The purpose of this sub-topic is to support the further structuring of the cooperation with the Russian Federation in the Research Infrastructure domain.

Proposals will have to demonstrate the involvement of relevant entities on both European and Russian side and will cover the following 3 dimensions:

i. Building on the strategic recommendations deriving from the CREMLIN project, support the strengthening of the complementarity between Russian Mega Science initiatives and their European counterparts. Proposals will specifically address:

- Joint development and acquisition of specific instrumentation to be used by the European and Russian Infrastructures. This activity will specifically target the NICA and PIK initiatives and their European counterparts.
- Joint conceptual and technical design of Russian Infrastructures of European interest. This activity will particularly target the SSRS-4 initiative and its European counterparts.
- Joint development of future technologies required for Research Infrastructures' instrumentation;

ii. Contribute to overcoming the barriers that prevent European scientists from accessing Russian Research Infrastructures of European interest. The project will support Russian Facilities in setting-up the appropriate access conditions and cover the travel and subsistence costs that European researchers would sustain in accessing the facilities. In this context, the project will have to also take into account the list of Research Infrastructures open to International collaboration produced by the Russian Federation and the European Charter for Access to research infrastructures.

iii. The proposal will develop a staff exchange programme and thematic courses and workshops (e.g. summer schools), aimed at fostering exchanges of best practices on management practices, access procedures and scientific collaboration between infrastructure Staff and Scientists belonging to both the Russian Federation and European Union.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 25 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

(d) Coordination and support actions for the 2019 deadline

Actions under this sub-topic, in line with the EU-CELAC SOM[60]strategic approach[61], will concretely build on the outputs of the newly established EU-CELAC Research Infrastructure Working Group, and will:

1. support the identification of priorities for regional and bi-regional cooperation based on the respective strategic road-mapping exercises;
2. foster the exchange of best practices between the EU and CELAC on issues of common strategic relevance such as regional road-mapping processes, research infrastructure management, RI staff development.
3. support the identification of a limited number of Research Infrastructures of bi-regional interest on which the project will have to conduct pilot cooperation demonstrators comprising:

- The organisation of dedicated workshops and meetings between the EU and CELAC involved communities (research infrastructures, ministries, funding agencies). This can also be supported by bi-regional staff exchange activities, dedicated thematic training programmes (e.g. summer schools);
- The development of specific roadmaps for cooperation for each of the pilot thematic dimensions and the initial implementation of identified actions, such as supporting reciprocal access to Research Infrastructures in the two regions by covering travel and subsistence costs;
- The regular reporting to the EU-CELAC RI WG on the progress, for which an advisory board should be set up.

Under this sub-topic, legal entities established in Brazil and Mexico are eligible for funding from the Union.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 1.5 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

(a) *Research and Innovation actions for 2018 deadline*

- Consolidating research activity in SESAME, increasing the amount of research time available for the users' community.
- Strengthening SESAME's profile in the region, helping it to become more sustainable by enhancing its capacity for attracting the necessary resources for further deployment of extra beam-lines.

60 The Senior Officials Meeting (SOM) on Science and Technology of the EU-CELAC Joint Initiative on Research and Innovation (JIRI)

61 See http://ec.europa.eu/research/iscp/index.cfm?pg=latin-americ-carib

- Provide a tangible example of the European Commission's support of the SESAME initiative as a catalyser for international collaboration in the region.

(b) *Coordination and Support actions for 2018 deadline*

(b1) *ERIC network*

- strengthen the structured cooperation between ERICs;
- facilitate the preparation of ERICs to be established;
- strengthen the capacity of ERICs of developing where appropriate harmonised internal regulations and policies based on best practices;
- enhance the visibility of ERICs vis-à-vis stakeholders and policy makers.

(b2) *International visibility of European research infrastructures*

- Develop cooperation with key international partners for research infrastructures;
- Facilitate the exchange of experiences and good practices between the European research infrastructure and their international counterparts;
- Contribute to the long-term sustainability of European Research Infrastructures;

(b3) *Catalogue of research infrastructure services*

- Improve visibility of the research infrastructure services
- Support research infrastructure structuring their service orientation;
- Increase efficiency in research infrastructure service management;
- Facilitate the identification of potential gaps of services in Europe

(b4) *Support to ESFRI*

- strengthen the development of a consistent and dynamic European Research Area policy for research infrastructures;
- strengthen long-term sustainability of the European research infrastructure ecosystem and increase its effectiveness and coherence;
- strengthen a service-oriented culture in the research infrastructures towards user communities and industry partners;
- facilitate the pooling of resources between infrastructure operators at European level in order to face the grand challenges and to foster a culture of co-operation between them, spreading good practices and encouraging infrastructures to develop in complementary ways;

- increase ESFRI operational capacity by establishing durable and coherent support structures for the Forum.

(b5) *Support to the e-Infrastructure Reflection Group (e-IRG)*

Proposals should address the following impact criteria, providing metrics to measure success where appropriate:

- Increased interoperability of e-Infrastructures and wider engagement of user communities in the EOSC and EUROHPC;
- Rigorously established and evidence-based e-IRG proposals addressing the implementation of existing EU policies and/or the design of new EU policies and the improved ecosystem of European Research Infrastructures and e-infrastructures, encompassing the EOSC, EDI and EuroHPC;
- Increased visibility and outreach of e-Infrastructure policies related to EOSC, EDI and EuroHPC, and for changing the culture of research communities towards open data.

(c) *Research and Innovation actions for the 2019 deadline*

- strengthen the structured cooperation between European and Russian Research Infrastructures;
- promote the harmonisation of procedures and framework conditions for access;
- develop the framework conditions to improve access of European Scientists to Russian Research Infrastructures;
- promote the participation of Russian researchers in EU projects.

(d) *Coordination and Support actions for the 2019 deadline*

- strengthen the development of a consistent cooperation agenda with CELAC;
- develop the international outreach of the European research infrastructures' ecosystem;
- foster a global research area vision and the development of global research infrastructures;
- contribute to capacity building and research infrastructures human capital development in targeted/relevant regions;
- enhance the role of the Union in multilateral fora;

Type of Action: Coordination and support action, Research and Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

INFRASUPP-02-2020: Strengthening the human capital of research infrastructures

Specific Challenge: The complexity of research infrastructures and the exploitation of their full potential require adequate skills for their managers, engineers and technicians, as well as users. Research infrastructures are built and operated at the cutting edge of what is technologically feasible, involving a high associated risk that needs to be managed. They may involve a wide consortium of partners for their funding, construction and operation, either because they are distributed research infrastructures, or because certain problems are of a scale that can only be tackled by means of European and international cooperation. This renders their governance and the associated financial and legal issues a complex problem. The skills and expertise specifically needed to effectively construct, operate and use research infrastructures are therefore not widely available.

While the human capital dimension will be embedded under other lines of activity of the research infrastructures work programme, specific actions will be needed to foster coordination across domains and types of infrastructures.

Scope: The activity will support the training of both female and male staff managing and operating research infrastructures, the exchange of staff and best practices between facilities, and the adequate supply of skilled human resources, including through the development of specific education curricula and courses. A proposal under this topic should build on the past activities and the experience gained in projects such as RAMIRI (Realising and Managing International Research Infrastructures) and RItrain (Research Infrastructures Training Programme and presents a clear evolution. The activities should include the promotion of existing good practises at research infrastructures as well as dissemination and exploitation of successful experiences to a wider set of relevant stakeholders. It should continue engaging with universities and developing specific curricula and courses for pan-European research infrastructures, taking into account their intercultural and interdisciplinary nature as well as their diversity (global, highly distributed, single site etc.). Strategic planning for the sustainability of training and exchange programmes should be addressed, with the involvement of national agencies, ERICs, international organisations, and other relevant stakeholders. An increased use of interactive online training material should be explored. Particular emphasis should be put on the development of data management, exploitation and stewardship skills, in line with the FAIR principles, including the mastering of the data protection legislation features.

Expected Impact: This activity will improve and professionalise the training of the staff managing and operating research infrastructures of European interest, strengthen the human capital of the involved research infrastructures, stimulating their efficient management and therefore promoting their development and competitiveness at national, European and international level. An improvement of existing specific university curricula as well as a more widespread dissemination in the European university landscape is expected.

Type of Action: Coordination and support action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Conditions for the Call - Support to policy and international cooperation

Opening date(s), deadline(s), indicative budget(s):[62]

Topics (Type of Action)	Budgets (EUR million)			Deadlines
	2018	2019	2020	
Opening: 05 Dec 2017				
INFRASUPP-01-2018-2019 (CSA)	6.60			22 Mar 2018
INFRASUPP-01-2018-2019 (RIA)	6.00			
Opening: 14 Nov 2018				
INFRASUPP-01-2018-2019 (RIA) INFRASUPP-01-2018-2019 (CSA)		27.00		20 Mar 2019
Opening: 28 Nov 2019				
INFRASUPP-02-2020 (CSA)			2.00	17 Mar 2020
Overall indicative budget	12.60	27.00	2.00	

Indicative timetable for evaluation and grant agreement signature:

For single stage procedure:

- Information on the outcome of the evaluation: Maximum 5 months from the final date for submission; and
- Indicative date for the signing of grant agreements: Maximum 8 months from the final date for submission.

Eligibility and admissibility conditions: The conditions are described in General Annexes B and C of the work programme. The following exceptions apply:

INFRASUPP-01-2018-2019	***(d)*** *Coordination and Support actions for the 2019 deadline*

[62] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

	Legal entities established in Brazil and Mexico are eligible for funding from the Union.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in General Annex H of the work programme.

Evaluation Procedure: The procedure for setting a priority order for proposals with the same score is given in General Annex H of the work programme. The following exceptions apply:

INFRASUPP-01-2018-2019	***(b)*** *Coordination and Support actions for 2018 deadline* Grants will be awarded to proposals according to the ranking list. However, in order to ensure a balanced portfolio of supported actions, at least the highest-ranked proposal per sub-topic will be funded provided that it attains all thresholds.

The full evaluation procedure is described in the relevant guide published on the Funding & Tenders Portal.

Grant Conditions:

INFRASUPP-01-2018-2019, INFRASUPP-02-2020	For grants awarded under this topic, for all types of action, capitalised and operating costs of 'large research infrastructures' as defined in the Article 6.2.D.4 of the Model Grant Agreement are not eligible.
INFRASUPP-01-2018-2019	***(a)****Research and Innovation actions for the 2018 deadline* As an exception, for grants awarded under this sub-topic,full purchase costs of equipment, infrastructure or other assets are eligible. The respective option of the Article 6.2.D.2 of the Model Grant Agreement will be applied.

Consortium agreement:

INFRASUPP-01-2018-2019, INFRASUPP-02-2020	Members of consortium are required to conclude a consortium agreement, in principle prior to the signature of the grant agreement.

Other actions[63]

1. External expertise

This action will support:

1. The use of appointed individual independent experts for the monitoring of actions (grant agreement, grant decision, procurements) including, where appropriate, ethics checks.

2. The use of appointed individual experts to monitor and assess complementarities and potential synergies of retained proposals for topics with complementary grants. The experts will be highly qualified independent experts selected on the basis of their competence and knowledge of the field. A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest.This amount is considered to be proportionate to the specific tasks to be assigned to the experts.

3. The use of individual experts to advise on, or support, the design and implementation of EU research policy, including the preparation of future programmes. The activities carried out by the experts will be essential to the development and monitoring of the Union policy on Research, Technological development and demonstration. The experts will be highly qualified, specialised, independent experts selected on the basis of their competence and knowledge of the field. A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest. This amount is considered to be proportionate to the specific tasks to be assigned to the experts, including the number of meetings to be attended and possible preparatory work.

4. The use of individual experts for the assessment of ERIC applications, as required under the ERIC Regulation[64]. The experts will be highly qualified independent experts selected on the basis of their specific competence. The experts will provide a report for each of the assessed ERIC application. A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest. This amount is considered to be proportionate to the specific tasks to be assigned to the experts.

5. The setting-up of a Commission expert group to assess the progress of ESFRI infrastructures towards their implementation and long-term sustainability. The Commission will ensure complementarity with other ongoing evaluations and assessments of ESFRI projects and/or landmarks. The activities carried out by the

63 The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

64 Council Regulation (EC) No 723/2009 of 25 June 2009 on the Community Legal Framework for a European Research Infrastructure Consortium.

experts will be essential to the monitoring and development of the Union policy on Research Infrastructures. The experts will provide an assessment report for each of the targeted ESFRI infrastructures. The experts will be highly qualified, specialised, independent experts selected on the basis of objective criteria, following a call for applications published in accordance with Article 10 of Decision C(2016)3301. They will be paid a special allowance of EUR 450/day for each full working day spent assisting the Commission, in terms of Article 21 of Decision C(2016)3301. This amount is considered to be proportionate to the specific tasks to be assigned to the experts, including the number of meetings to be attended and possible preparatory work.

6. The setting-up of an informal Commission expert group to assess the implementation of the ERIC Regulation as requested by the Council in its conclusions adopted on 30/11/2018, which "*invites the Commission to present the next ERIC implementation Report by 2022"*. The expert group will provide a report on the implementation of the ERIC Regulation, including independent advice and recommendations on specific issues highlighted by the Council, which affect the implementation of the ERIC Regulation. The activities carried out by the experts will be essential to the monitoring and development of the Union policy on Research Infrastructures. The experts will be highly qualified, specialised, independent experts selected on the basis of objective criteria in compliance with the Horizon 2020 Rules for participation and dissemination (OJ 2013/L 347/81), and with the terms of the Call for Applications issued on 22 November 2013 (OJ 2013/C 342/03). The group is expected to consist of approximatively eight experts. A special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity who act independently and in the public interest, in compliance with Article 21.2 of Decision C(2016)3301. This amount is considered to be proportionate to the specific tasks to be assigned to the experts, including the number of meetings to be attended and possible preparatory work.

Type of Action: Expert Contracts

Indicative budget: EUR 0.80 million from the 2018 budget and EUR 0.90 million from the 2019 budget and EUR 0.80 million from the 2020 budget

2. Fostering transnational cooperation between National Contact Points (NCP) in the area of Research Infrastructures: follow-up project[65]

The action will facilitate transnational cooperation between Horizon 2020 NCPs in the area of Research Infrastructures (including e-infrastructures), with a view to identifying and sharing good practices and raising the general standard of support to programme applicants, taking into account the diversity of actors that make up the constituency of the Research Infrastructures sector. It will involve one consortium of NCPs focussing on transnational

[65] This grant will be awarded without call for proposals in line with Article 190(1)(e) of the Rules of applications of Regulation (EU, Euratom) 966/2012, Regulation No 1268/2012 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

cooperation on issues specific to the Research Infrastructures sector, within the context of Horizon 2020 calls for proposals.

All activities must be tailored according to the nature of this sector.

The proposal should show that the activities put forward will deliver tangible benefits to potential applicants. Activities should capitalise on relevant work of the previous NCP network project in this sector, and of the 'NCP Academy'. Various mechanisms may be included, such as benchmarking, joint workshops, enhanced cross-border brokerage events, and specific training linked to the Research Infrastructures sector.

Where relevant, activities should make use of commonly available tools (e.g. for brokerage and partner search, benchmarking tools, guidebooks, promotional tools etc).

To help close the innovation divide, a substantial component of the proposed activities must be devoted to activities aimed at helping NCPs in those countries that have been participating at low levels in the programme up to now. These activities should help these NCPs rapidly acquire the know-how on NCP operations accumulated in other countries including, for example, training, mentoring, and twinning. They may also include awareness raising actions aimed at increasing visibility of well-qualified potential applicant organisations in the above mentioned countries.

The legal entities listed below are the host organisations of NCPs from EU Member States and Associated Countries who have been officially appointed by the relevant national authorities, and who have expressed a willingness to participate in this proposal. NCPs opting not to be a beneficiary are nevertheless invited and encouraged to participate in the project activities (e.g. workshops), and costs for such participation (e.g. travel costs paid by the consortium) may be included in the estimated budget and be eligible for funding by the Commission.

In line with Articles 2, 31.6 and 41.4 of the Model Grant agreement, the project arising from this grant will complement other NCP network projects. This means that the beneficiaries and those of the complementary grants must cooperate and provide access to their results. They must conclude a written collaboration agreement regarding the coordination of the complementary grants and the work of the action.

The project must end by August 2020.

Expected impact:

- An improved, more consistent and professionalised NCP service across Europe, thereby helping simplify access to Horizon 2020 calls, and lowering the entry barriers for newcomers,
- An increase in the quality of proposals submitted, including those from countries where success rates are currently lower than average.

Legal entities:

Agenzia per la Promozione della Ricerca (APRE), Via Cavour n.71, 00184 Roma, Italy.

Fundação para a Ciência e a Tecnologia (FCT), Avenida D Carlos I 126, 1249-074 Lisboa, Portugal

Verein Euresearch (EURESEARCH), Effingerstrasse 19, 3008 Bern , Switzerland

Technologické Centrum Akademie věd České Republiky (TC AV CR), Ve Struhách 1076/27, 160 00 Praha 6, Czech Republic

Ethniko Idryma Erevnon (EKT), Vas Konstantinou 48, 11635 Athina, Greece

Österreichische Forschungsförderungsgesellschaft mbH (FFG), Sensengasse 1, 1090 Vienna, Austria

Deutschen Zentrums für Luft- und Raumfahrt e.V. (DLR), Linder Höhe, 51147 Köln, Germany

Instituto de Salud Carlos III (ISCIII), Avda. Monforte de Lemos 5, 28029 Madrid, Spain

Institute of Fundamental Technological Research, Polish Academy of Sciences (IPPT PAN), Adolfa Pawińskiego 5B, 108 02-106 Warszawa, Poland

Valsts izglītības attīstības aģentūra (VIAA), Vaļņu Iela 1, 1050 Rīga, Latvia

Innovation Centre of the National Academy of Sciences of Ukraine (NASU), 54 Volodymyrska St., 01601 Kyiv, Ukraine

Icelandic Centre for Research (RANNIS), Borgartún 30, 105 Reykjavik, Iceland

Commissariat à l'énergie atomique et aux énergies alternatives (CEA), Rue Leblanc 25, 75015 Paris, France

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: Third quarter of 2018

Indicative budget: EUR 0.35 million from the 2018 budget

3. GÉANT Partnership projects[66]

Within the GÉANT Framework Partnership Agreement (GÉANT2020) awarded under topic EINFRA-8-2014 of the e-Infrastructures call, the consortium will be invited to submit proposals for two Specific Grant Agreements (SGA) addressing the objectives defined in the Framework Partnership Agreement (FPA) and action plan. The proposals will be evaluated according to the criteria established in the invitation from the Commission, complying with the Horizon 2020 general requirements of evaluation and selection procedures.

[66] Awarding of specific grants in a FPA will follow the rules and procedures established in the Financial Regulation.

Proposals will address part (a) or (b), but not both.

SGA (a) Research and Education Networking – GÉANT *(the proposal will cover all points below)*

The aim of this SGA is to establish GÉANT and NREN[67] ecosystem as the networking substrate for other e-infrastructures as well as the provider of services and applications underpinning the EOSC, exascale and any other research centric vertical solution.

The services and resources that the EOSC will make available to research communities and academia require reliable high speed network connectivity and trusted access mechanisms. Services offered will address the requirements of an ever increasing mobile work force that demands seamless and secure access to resources and collaboration tools wherever they are located. These should be state-of-the-art and support the vision of "*Making Europe the Best Place for Research and Innovation*".

The proposal will cover actions A to F as described in the FPA; it will also address all the points a.1) to a.3) as described below.

a.1) Provision of Operational Services (TRL 8 or above):

- Further develop the next-generation GÉANT network so as to ensure it remains the most advanced international network and maintains the EU's leadership in research by providing a secured, safe, open and flexible, high-capacity, highly-available, user-empowered infrastructure and preventing potential security breaches, cyber-attacks or misuse of personal data, especially when large amounts of data are collected, stored and processed.

- Continue the evolution of the network and its related infrastructures by defining, developing and implementing new functionalities - including those relating to network virtualisation, software defined networking and network management and monitoring systems - which will improve the quality, flexibility and cost-effectiveness of end-user orientated services.

- Upgrade infrastructure for trust and identity services for the benefit of the research and education community and research collaborations, in order to meet commercial-grade operational standards and community expectations in support of business-critical applications. Align with the proposals retained under EINFRA-12-2017 in the use of pan-European identity federated services and facilitate their full integration into INFRAEOSC-03-2020.

- Improve the minimum service level of the smaller European NRENs and their users by ensuring connectivity speeds of 100 Gpbs (where technically and economically feasible) and by continuing the successful principle of European cost-sharing.

[67] The National research and education network (NREN) organisations are specialised internet service providers dedicated to supporting the needs of the research and education communities within their own country.

- Build a professional test environment for the testing and prototyping of new services that may evolve to a full operational service.

- Identify and deploy above-the-net services including those suitable for inclusion into the EOSC hub. The proposal will have to include coordination mechanisms with proposals retained under the topic INFRAEOSC-03-2020 and prepare an integration plan for those services.

The services offered under this point must be adequately documented in an open catalogue of services and will be periodically assessed by an external board approved by the Commission and common to all EU funded e-infrastructure services.

Access to facilities, resources and services will be funded in accordance with the conditions set out in Article 14.2 for virtual access to research infrastructures of the Model Specific Agreement for Framework Partnerships (identical to Article 16.2 of the General Grant Agreement). Capital investments (i.e. costs of renting, leasing, purchasing depreciable equipment, infrastructure or other assets) will be eligible costs for this specific partnership project, in accordance with the general eligibility conditions of the Model Grant Agreement.

a.2) Prototyping and piloting of new services (TRL6 or above):

- Enhance future generations of GÉANT platform by prototyping network components, modules, services and applications accessing wired/wireless infrastructures and networked resources (for example those may address software-defined security (SDSec), quantum encryption, Software Defined Networks (SDN) orchestration or blockchain-enabled services).

- Respond to the needs of extreme-scale systems (e.g. requiring massive data transfer capacity) and ultra-low latency applications (e.g. e-health, real-time performance). Keep pushing network performance to the limits.

- Support the piloting and prototyping of initiatives that will contribute to expand to the public sector and to industry the use of resources initially focused on the scientific community (e.g. like bringing the related services of projects like WiFi4EU [68] to operational state)

- Bring to mainstream the use of collaborative technologies (e.g. virtual collaborative environments) based on interoperable standards in order to enable collaboration of virtual teams geographically dispersed, always operated in a secured and trusted manner.

a.3) International Cooperation, skills and dissemination

- Establish new collaboration agreements and develop further existing ones with NRENs or associations of NRENs outside the EU in order to foster cooperation in the domain of research and education and dedicate special attention to leading organizations in the

[68] https://ec.europa.eu/digital-single-market/en/wifi4eu-free-wi-fi-europeans

domain of next generation Internet. Enable access to world-class research infrastructures necessary to address research challenges with a global dimension and promote the use of standards to allow seamless access to digital resources.

- Maintain support to highly visible ongoing initiatives in the domain of International Cooperation (like BELLA submarine cable and the successful ANA collaboration) by promoting the uptake in use of e-Infrastructures and showing tangible benefits for the EU and its partners.

- Elaborate analysis or studies over targeted countries or regions where NRENs are less developed. Assess the *status quo* of the research and education networks concerned and offer scenarios for future development taking a comprehensive stakeholder approach. Assess the impact of those scenarios.

- Strengthen the GÉANT community programme (task forces, special interest groups, workshops), including more openness to industry, public services and all e-Infrastructures.

- Improve compliance between GÉANT's and Member States' network infrastructures, processes and policies to established best-practice business standards for information security and IT service management.

- Evolve the GÉANT training offerings to the research and education community and beyond, to enhance skills in key areas including SDN, very high-speed networking monitoring, cybersecurity, software quality training, trust & identity

- Together with the NRENs, conduct a series of workshops on end user network services requirements to inform future product portfolio pipelines and help understand demand for new services.

- Strengthen the value proposition of the NREN network within the research and academic communities, emphasize the value proposition of GÉANT and the NRENs and the differentiated services they bring vs commodity services.

- Organize and participate in international events, fora or symposia to disseminate the value of the NRENs and e-Infrastructures at large and their contribution to the Open Science principles.

<u>Expected Impact:</u>

- Contribute to the development of the European high-speed connectivity layer, targeting collaboration with other European e-Infrastructure providers through the seamless availability of network, data and computing services.

- Provide to researchers and academia ubiquitous access to resources and collaboration tools regardless of their physical location or institution of affiliation.

- Ensure availability of advanced services for research and education across all regions of Europe by taking into consideration the actual and foreseeable regional demands and feasibility aspects.

- Extended service offer that will be reflected in an open digital repository or catalogue of services for NREN's, end user institutions and scientists, as well as new users like public services and industry.

- Improve connections between European communities and third countries / regions enabling international research and education, and advancing Open Science policy

SGA (b) Increase of long-term backbone capacity

The aim of this SGA is to go beyond the state-of the-art by restructuring the backbone network through exploration and procurement of long-term *Indefeasible rights of use* (IRUs) and associated equipment to increase the footprint, stimulating the market in cross-border communications infrastructure whilst decreasing the digital divide and reducing costs.

At least EUR 16 million from the total indicative budget is foreseen for point (b).

Considering the prospect of acquiring a long term indefeasible right of use, the option for full cost of purchasing equipment, infrastructure or other assets of Article 5.2.D.2 of the Model Specific Agreement for Framework Partnerships (identical to Article 6.2.D.2 of the General Grant Agreement)may be used instead of the standard model of depreciation costs.

Expected Impact:

- Contribute to the creation of sustainable eco-system by securing access to capacity and services in the long term and providing a stable and reliable environment for communities to embark in long run endeavours.

ToA text:

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes with the following exceptions for the evaluation criteria of:

SGA (a) Research and Education Networking – GÉANT

For the criterion Excellence the third and fourth sub-criteria are substituted by:

- The extent to which the activities addressing the point "Provision of Operational Services" demonstrate that the concerned platforms and services are based on systems and technologies that have reached at least TRL 8.

- The extent to which the activities addressing the point "Provision of Operational Services" will offer access to state-of-the-art infrastructures and high quality services, and will enable users to conduct excellent research as demonstrated, inter-alia, by both

the quality of the associated catalogue of services and the baseline and expected future benchmarking of related KPIs.

- The extent to which the activities addressing the point "Prototyping and piloting of new services" demonstrate that the concerned platforms and services are based on systems and technologies that have reached TRL 6 before the start of the project and will be brought to at least TRL 8 by the end of the project.

- The extent to which the activities addressing the point "Prototyping and piloting of new services" will improve, in quality and/or quantity, the services provided by state of the art e-infrastructures and enhance capacity for innovation and production of new knowledge.

Type of Action: Specific Grant Agreement

Indicative timetable: Third quarter of 2018

Indicative budget: EUR 16.00 million from the 2018 budget and EUR 112.00 million from the 2019 budget (A total of EUR 128 million is foreseen for parts (a) and (b))

4. International Conference on Research Infrastructures[69]

Following the International Conference on Research Infrastructures (ICRI 2018), held in Vienna in September 2018, under the Austrian Presidency, the Research Infrastructure action would support in the second semester 2020 one major *International Conference on Research Infrastructures* jointly organised by the European Commission and Canada. The objectives of the conference are (1) to provide an international forum for the discussion on the development of global research infrastructures as well as on issues of common interest such as the long-term sustainability of Research Infrastructures and their innovation potential; (2) to facilitate strategic international cooperation between European Research Infrastructures and their International counterparts.

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in General Annexes D and H of the work programme.

Legal entities:

Canada Foundation for Innovation (CFI), Queen Street 230, suite 450, K1P 5E4 Ottawa, Canada;

Natural Sciences and Engineering Research Council (NSERC), Albert Street 350, K1A 1H5 Ottawa, Canada;

[69] This grant will be awarded without call for proposals in line with Article 195(e) of the Financial Regulation, Regulation (EU, Euratom) No 1046/2018 and Article 11(2) of the Rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)", Regulation (EU) No 1290/2013.

Social Sciences and Humanities Research Council (SSHRC), Albert Street 350, PO Box 160, K1P 6G4 Ottawa, Canada;

Canadian Institutes for Health Research (CIHR), Elgin Street 160, K1T 4H8 Ottawa, Canada;

National Research Council Canada (NRC), Montreal Road 1200, K1A 0R6 Ottawa, Canada.

Type of Action: Grant to identified beneficiary - Coordination and support actions

Indicative timetable: First quarter of 2019

Indicative budget: EUR 0.30 million from the 2019 budget

5. Mobilisation of Research Infrastructures for the COVID-19 Public Health Emergency

As part of the EU response to the COVID-19 pandemic, for activities specifically linked to COVID-19, grants may be awarded without a call for proposal in accordance with Article 195(b) of the Financial Regulation 2018/1046, to address this exceptional emergency. The Funding & Tenders Portal will open a dedicated section where applications can be received. The invitation to apply for funding may also be limited to targeted entities. Entities will be targeted taking into account the need to achieve the underlying objectives in a quick and efficient manner considering the exceptional circumstances ("extreme urgency" due the COVID 19 pandemic).

Proposals should concern the setting-up of a *Population Health Information Research Infrastructure*, to collect and make available population health and relevant non-health data in MS and at EU level that can support research and policy decisions regarding the COVID-19 public health crisis. It should ensure, to the extent possible and in full respect of the GDPR, interoperability with other relevant administrative data infrastructures, for analytical purposes and to support policy-making, including in the areas of employment and social policy. It should thus form a cornerstone of the emerging *European Health Data Space*, and properly connect with the *EU COVID19 Data Platform*. It will provide a comprehensive view on health data (including from in-depth analyses of patients' biospecimen), data on social and physical environment (including behavioural data) and on health care services (promotion-prevention-cure and care), thus informing on the dynamics of human health, diseases and mortality. It will build on the EU Member States Joint Action on Health Information (INFACT).

The research infrastructure will involve and/or ensure full synergy with different types of actors and initiatives such as European research networks in the domain of population health; relevant national population data owners/curators (e.g. MS Health Data Space); national population health co-ordination entities; and EU and international data collectors and registries relevant for COVID-19 and future epidemics, notably ECDC, WHO, OECD, EEA, ESAF, JRC, EOSC, and European research infrastructures. Participation of experts in ethics and law as well as patient representatives is strongly encouraged.

The proposal should already present a number of research use cases that are of immediate relevance for public health policies or aspects of clinical management of the COVID-19 epidemic and disease, respectively.

The Commission considers that proposals requesting a contribution from the EU of up to EUR 5 million would allow this activity to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Given the nature of the expected project and in order to ensure that appropriately mandated entities from Member States, at EU and at international level are all duly involved, at most one proposal is expected to be funded.

Expected Impact:

- Provision of high quality and standardised COVID-19 relevant population health and care institutions data across EU Member States to inform policy-making and feed into pertinent health data registries, collections and statistics at EU and international levels.
- Identification of best practices for handling the COVID-19 epidemic at public health and clinical management level.
- Enable advanced research to address and find solutions to COVID-19 and other health crises, in connection to the EOSC and the related *EU COVID19 Data Platform*.
- Contribute to the formation of a true European Health Data Space thus responding to the EU's Digital Health agenda.

The standard eligibility and admissibility criteria, evaluation criteria, thresholds, weighting for award criteria and maximum rate of co-financing for this type of action, are provided in the General Annexes of the work programme.

Additional funding may also be awarded in ongoing grant agreements selected under the European Research Infrastructures Work Programme Part to cover additional activities specifically linked to COVID-19 without a call for proposals, according to the Financial Regulation 2018/1046, Article 195(b). The additional funding will support the deployment and running of the *EU COVID19 Data Platform* within grants already developing the European life science Infrastructure for Biological Information or creating an open, digital and collaborative space for biological and medical research, as well as the provision of specific and customised research infrastructures services in support to COVID-19 research, by vaccine development facilities, high-risk pathogen safety laboratories and virus archives, as such services represent a major fraction or a significant scaling-up of the service provision planned by these infrastructures under ongoing grants involving them. Providing such additional funding to ongoing grants that can support pertinent short- and mid-term research efforts to confront the COVID-19 crisis will allow us to address the current situation with the appropriate urgency.

Specific derogations and additional conditions may be announced or communicated to the potential applicants and to the beneficiaries which would like to receive additional funding to

the grant agreements. Such conditions will include additional exploitation obligations to ensure that the resulting products will be available and accessible as soon as possible including an obligation to license on a non-exclusive basis and at fair and reasonable conditions, additional dissemination obligations, such as open access for research data needed to address the public health emergency, and the right of the Commission to object to the transfer or licensing of the results. They may also include justified derogations from the standard limits to financial support to third parties. Where applicable, the relevant grant agreement options will be applied.

Type of Action: CSA, RIA and IA - Grants awarded without a Call for Proposals (Article 195 (b) of the Financial Regulation)

Indicative timetable: Second, third and fourth quarter 2020

Indicative budget: EUR 15.50 million from the 2020 budget

Budget[70]

	Budget line(s)	2018 Budget (EUR million)	2019 Budget (EUR million)	2020 Budget (EUR million)
Calls				
H2020-INFRADEV-2018-2020		15.00	104.00	15.00
	from 08.020103	*15.00*	*104.00*	*15.00*
H2020-INFRAEOSC-2018-2020		142.00	45.50	64.90
	from 08.020103	*130.00*	*17.00*	
	from 09.040102	*12.00*	*28.50*	*64.90*
H2020-INFRAIA-2018-2020		101.50	125.00	159.50
	from 08.020103	*101.50*	*125.00*	*159.50*
H2020-INFRAEDI-2018-2020		98.90		20.00
	from 09.040102	*98.90*		*20.00*
H2020-INFRAINNOV-2019-2020			1.50	65.00
	from 08.020103		*1.50*	*65.00*
H2020-INFRASUPP-2018-2020		12.60	27.00	2.00
	from 08.020103	*12.00*	*27.00*	*2.00*
	from 09.040102	*0.60*		
Other actions				

70 The budget figures given in this table are rounded to two decimal places.
The budget amounts for the 2020 budget are subject to the availability of the appropriations provided for in the draft budget for 2020 after the adoption of the budget 2020 by the budgetary authority or, if the budget is not adopted, as provided for in the system of provisional twelfths.

Expert Contracts		0.80	0.90	0.80
	from 09.040102	*0.40*	*0.40*	*0.40*
	from 08.020103	*0.40*	*0.50*	*0.40*
Grant to Identified beneficiary		0.35	0.30	
	from 08.020103	*0.35*	*0.30*	
Specific Grant Agreement		16.00	112.00	
	from 09.040102	*16.00*	*112.00*	
CSA, RIA and IA - Grants awarded without a Call for Proposals (Article 195(b) of the Financial Regulation)				15.50
	from 08.020103			*15.50*
Estimated total budget		387.15	416.20	342.70

Specific Features for Research Infrastructure

This section provides, for different types of projects supported under the Research Infrastructures calls for proposals, further conditions and requirements that applicants should fulfil when drafting a proposal. The compliance to these provisions will be taken into account during evaluation. Information on synergies with the European Structural and Investment Funds (ESIF) and on the Responsible Research and Innovation dimension is also provided below.

The European Structural and Investment Funds will invest up to EUR 90 billion in innovation and research in the period 2014-2020, including into the development of research and innovation capacities and infrastructures. Therefore, Article 20 of the Horizon 2020 Regulation and Article 37 of the Rules for Participation encourage synergies between Horizon 2020 and other European Union funds, such as European Structural and Investment Funds.

Synergies do not mean to replace national or private funding by ESIF or to combine them for the same cost item in a project. Synergies mean to expand the scope and impact of both funds in terms of scientific excellence and place-based socio-economic development respectively. Examples could be the development and equipment of innovation infrastructures or the fostering of innovation skills through ESIF that enable the participation in a Horizon 2020 project. ESIF can also be used to expand the support and advisory services for potential Horizon 2020 participants. ESIF can also help deploying innovative solutions stemming from Horizon 2020, e.g. through public procurement in the fields of environment, transport, health and energy.

Applicants are therefore invited to identify the smart specialisation fields of their EU Member State or region[71] and explore potential for synergies with the relevant Managing Authorities in charge of the ESI Funds in their territory[72].

In addition, activities carried out under this Work Programme should be in respect with the Responsible Research and Innovation policy (RRI) engaging society, integrating the gender and ethical dimensions, ensuring the access to research outcomes and encouraging formal and informal science education. The alignment with the values, needs and expectations of the society will allow to identify and to deliver new solutions to the objectives of this Work Programme.

The ethical dimension of the activities undertaken should be analysed and taken into account, including relevant socioeconomic implications. This implies the respect of ethical principles and related legislation during the implementation. Whenever possible, the activities should also include in their objectives a better understanding and handling of the ethical aspects as well as the promotion of the highest ethical standards in the field and among the actors and

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71 see: http://s3platform.jrc.ec.europa.eu/eye-ris3

72 see: http://ec.europa.eu/regional_policy/indexes/in_your_country_en.cfm). For more details on ESIF investments in research and innovation see: http://ec.europa.eu/regional_policy/activity/index_en.cfm

stakeholders. The most common issues to be considered include: personal data protection and privacy, protection of participants and researchers, ensuring informed consent, dual use and potential misuse of the research results, fair benefit sharing when developing countries are involved, environment protection etc.

A. Preparatory phase proposals

Preparatory phase proposals should cover one or more of the following activities:

- Legal work, i.e. (1) for the setting-up, construction and operation of the research infrastructure; and (2) for drafting an agreement between committed countries, in the form of a 'signature-ready' document for the setting-up and the actual implementation.

- Management and logistical work, i.e. (1) plans, in terms of construction (or major upgrade) and operation of the new research infrastructure; (2) planning (timing, resources) of staff recruitment to operate the new facility; (3) organisation of the logistic support for researchers, including informatics, etc.;

- Governance work, i.e. plans, in terms of decision-making, management structure, advisory body, IPRs, ethical issues, access rules for researchers, etc.;

- Financial work, i.e. (1) the financial arrangements for the construction, operation and decommission of the facility, using notably the complementarities between national and EU instruments (such as the European Structural and Investment Funds or the European Investment Bank); (2) studying new mechanisms, e.g. pre-commercial procurement processes, by which public authorities may develop new approaches for financing innovative solutions;

- Strategic work, i.e. (1) analysis of the socio-economic impact of the new infrastructure; (2) plan to integrate harmoniously the new entity in the European fabric of related facilities in accordance with the objective of balanced territorial development; (3) development of synergies with GEOSS, Copernicus and other relevant European initiatives, when appropriate; (4) to create or consolidate centres of excellence and/or 'regional partner facilities'; (5) the identification of the best possible site(s) to set up the new facility(-ies) and its next generations;

- Technical work, i.e. (1) final prototypes for key enabling technologies and implementation plans for transfer of knowledge from prototypes to the new facility, taking into due account resource efficiency and environmental (including climate-related) impacts; (2) technical work to ensure that the beneficiary research communities exploit the new facility from the start with the highest efficiency, including the introduction of new processes or software; (3) plans to organise the efficient curation, preservation and provision of access to data collected or produced by the infrastructure, in line with the FAIR principle.

B. Individual support to ESFRI projects and other world class research infrastructures

Individual support to ESFRI projects and other world class research infrastructures should cover one or more of the activities listed below. If combined support with the European Structural and Investment Funds (ESIF) is foreseen for such infrastructure, the proposal should specify which activities will not be funded by Horizon 2020, but by ESIF (and by which Operational Programme of ESIF).

- organisation of the logistic support for researchers, definition of access policies for researchers and management of IPRs and ethical issues;
- integration of the new entity in the European landscape of related facilities, and in the local context;
- promotion of long-term sustainability, including e.g. the involvement of funders, enlargement of the membership, the preparation of business plans beyond the end of the grant, clear assessment of the costs for serving a user and for dealing with and making available the produced data, in line with the FAIR principles;
- development of regional partner facilities (RPF) aiming at a more balanced development of the European Research Area. The supported activities should help the RPF to meet the same standards required for pan-European Research Infrastructures, in particular regarding the quality of services, management and open access policy;
- limited pilots of trans-national access provision to research communities following the rules specified for *integrating activities*, in order to test reliability, increase user trust and widen the user base;
- outreach across borders and disciplines to create awareness about the services provided;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field; development of synergies with GEOSS, Copernicus and other relevant European initiatives, when appropriate;
- mapping of infrastructures, users, investments, etc., in the specific field for supporting policy developments;
- activities to increase the potential for innovation, including social innovation, of the related infrastructure, such as networking with industries (including SMEs), facilitating their involvement as partners of the research infrastructures for technological developments, developing customised services for industry and SMEs, dissemination of research outcome and technology transfer.

C. Cluster projects for connecting ESFRI infrastructures to the EOSC

Proposals for the clusters of ESFRI infrastructures should cover one or more of the following activities:

- stewardship of data handled by the involved research infrastructures according to the FAIR[73] principles,
- definition and/or harmonisation of domain specific data policies and management of IPRs and ethical issues; addressing legislative or interoperability issues which affect data handling across geographical and discipline borders;
- definition and adoption of common open standards for interoperability;
- common innovative solutions for data collection, management, processing, curation, annotation, and deposition, including relations with publishers for supporting data and sample deposition services;
- development of domain specific skills for data stewardships, spreading of good practices, exchange of personnel and specific training of research infrastructure staff;
- exposure of thematic data services and tools under the EOSC catalogue of services and of other infrastructure services under the catalogue developed under INFRASUPP-01-2018-2019 (b3);
- exposure of thematic data services and tools under the EOSC catalogue of services;
- activities to ensure that the used repositories are compliant with the FAIR principles.
- activities to work with other cluster projects selected under this topic as well as with other integrating activity grants on interoperability issues and common solution for data stewardships;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
- activities to increase the potential for innovation, including social innovation, of the related infrastructures, such as networking with industries (including SMEs), dissemination of outcomes and technology transfer, common R&D work jointly with industry and users; common pre-commercial procurement processes.

D. Integrating Activities

An Integrating Activity shall cover three types of activities: Networking activities, Trans-national and/or virtual access activities, and Joint Research activities.

(i) **Networking activities**. To foster a culture of co-operation between the participants in the project, the scientific communities benefiting from the research infrastructures, industries and other stakeholders, and to help developing a more efficient and attractive European Research Area. Networking activities could include (non-exhaustive list):

- joint management of access provision and pooling of distributed resources;

[73] Findable, Accessible, Interoperable and Re-usable

- dissemination and /or exploitation of project results and knowledge, contribution to socio-economic impacts, promotion of innovation;
- reinforcing partnership with industry: outreach and dissemination activities, transfer of knowledge, activities to foster the use of research infrastructures by industrial researchers, involvement of industrial associations in consortia or in advisory bodies;
- strengthening of virtual research communities;
- definition of common standards, protocols and interoperability; benchmarking;
- registering research infrastructures services under the catalogue developed under INFRASUPP-01-2018-2019 (b3);
- development and maintenance of common databases for the purpose of networking and management of the users and infrastructures;
- activities to improve the efficiency of the research infrastructures' management and of their service provision;
- spreading of good practices, exchange of personnel and training of staff, consultancy;
- outreach and training courses to new users, with specific attention to increase participation of women to science;
- activities to attract young people to science careers;
- foresight studies for new instrumentation, methods, concepts and/or technologies;
- promotion of clustering and coordinated actions amongst related projects;
- coordination with national or international related initiatives and support to the deployment of global and sustainable approaches in the field;
- promotion of long-term sustainability, including the involvement of funders and the preparation of a business plan beyond the end of the project;
- definition of data management plans to organise the efficient curation, preservation and provision of access to data collected or produced under the project, in line with the FAIR principles;
- relations with publishers for supporting data and sample deposition services;
- mapping of infrastructures, users, investments, etc., in the specific field for supporting policy developments.

(ii) **Trans-national and/or virtual access**[74] **activities**.

[74] As defined in the Article 16 of the Model Grant Agreement

Trans-national access activities

To provide 'free of charge' trans-national access to researchers or research teams including from industry to one or more infrastructures among those operated by participants. These access activities should be implemented in a coordinated way such as to improve the overall services available to the research community. Access may be made available to external users, either in person ('hands-on') or through the provision of remote scientific services, such as the provision of reference materials or samples, the performance of sample analysis or sample deposition.

The research infrastructures shall publicise widely the access offered under the grant agreement to ensure that researchers who might wish to have access to the infrastructure are made aware of the possibilities open to them. To this extent, the research infrastructures are also invited to exploit the proper feature put in place by the EURAXESS platform to highlight the research job/hosting related to a position/project within a Research Infrastructure. The research infrastructures shall promote equal opportunities in advertising the access and take into account the gender issues when defining the support provided to visitors. They shall maintain appropriate documentation to support and justify the amount of access reported. This documentation shall include records of the names, nationalities, and home institutions of the users within the research teams, as well as the nature and quantity of access provided to them. To this extent a unit of access to the infrastructure shall be identified and precisely defined in the Grant Agreement.

The selection of researchers or research teams shall be carried out through an independent peer-review evaluation of their research projects. The research team, or its majority, must work in countries other than the country(ies) where the infrastructure is located (when the infrastructure is composed of several research facilities, operated by different legal entities, this condition shall apply to each facility) except in the case of a distributed set of resources or facilities offering remote access to the same services or when access is provided by an International organisation, the Joint Research Centre (JRC), an ERIC or similar legal entities. User teams where all or the majority of users works in third countries can be supported as far as the cumulative access provided to them is below 20% of the total amount of units of access provided under the grant. In exceptional and well justified cases a higher percentage of access to third-country user teams can be foreseen in the Grant Agreement. Only research teams, including industrial users, which are entitled to disseminate the knowledge they have generated under the project are eligible to benefit from research services to the infrastructure under the grant agreement. Exception to this condition is foreseen when users work for SMEs. The duration of stay at a research infrastructure shall normally be limited to three months, unless otherwise provided for in the Grant Agreement.

EU financial support to trans-national access will cover the *access costs*[75] incurred by the access provider for the provision of access to the selected researchers as well as the travel and subsistence incurred to support the visits to the infrastructure of these researchers.

The *access costs* charged to the grant will never include capital investments while they may cover the running costs of the infrastructure as well as the cost for the logistical, technological and scientific support to users' access, including costs for ad-hoc training needed by users to use the infrastructure and for preparatory and closing activities that may be necessary to carry out users' work on the infrastructure.

Virtual access activities

To provide virtual access to a research infrastructure or installation through communication networks without selecting the users to whom access is provided. Examples of virtual access activities are provision of access to databases available via Internet, or data deposition services.

When access is provided without identifying users, the virtual access activities will be supported through the reimbursement of the operating costs incurred by the infrastructure or installation for providing virtual access to their services over the duration of the project. Only eligible costs that can be clearly attributed to the provision of virtual access can be reimbursed.

Under the 2020 topics, when the access policy requires the identification of users, the EU financial support to virtual access will cover the *access costs*[76] incurred by the infrastructure or installation for the provision of access to the identified users under the project. The unit of access to each research infrastructure or installation should be identified and precisely defined in the proposal. The proposal can also define eligibility criteria (e.g. affiliation to a research or academic institution) for the users to whom access will be provided under the project. The provision of virtual access during the project lifetime will be measured through the units of access defined in the Grant Agreement.

In both cases, the EU financial support may cover the technological and scientific support needed by researchers to effectively use the services. Capital investments will not be eligible

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75 Access costs can be supported through the reimbursement of the eligible costs specifically incurred for providing access to the research teams selected for support under the project, or on the basis of unit costs calculated according to the methodology indicated in the Commission Decision C(2013)8199. In the latter case the access costs will be calculated multiplying the unit cost by the quantity of access provided under the grant. The cost of the unit of access to the infrastructure, the unit cost, shall then be indicated in the proposal. A combination of the two methods mentioned above will also be possible.

76 Access costs can be supported through the reimbursement of the eligible actual costs specifically incurred by a research infrastructure or installation for providing virtual access to identified users under the project, or on the basis of unit costs calculated according to the methodology indicated in the Decision authorising the use of unit costs for the actions involving virtual access under the Research Infrastructures Part of the Horizon 2020 Framework Programme. In the latter case, the access costs will be calculated multiplying the unit cost by the quantity of access provided under the grant. The cost of the unit of access to the research infrastructure, the unit cost, shall then be indicated in the proposal. A combination of the two methods mentioned above will also be possible.

costs unless otherwise specified in the Work Programme, in which case only the portion used to provide virtual access under the project can be eligible.

When access is provided without identifying users, the research infrastructure virtual services to be supported by the EU must be widely used by the European research community[77]. Therefore the services offered under a project shall be periodically assessed by an external board and statistics on the provision of virtual access shall be given to the Commission.

(iii) **Joint Research activities**. These activities should be innovative and explore new fundamental technologies or techniques underpinning the efficient and joint use of the participating research infrastructures. They should involve, whenever appropriate, industries and SMEs to promote innovation and knowledge sharing through co-creation of needed technical solutions. In order to improve, in quality and/or quantity, the services provided by the infrastructures, the joint research activities could address (non-exhaustive list):

- higher performance methodologies and protocols, higher performance instrumentation, including the testing of components, subsystems, materials, techniques and dedicated software, taking into due account resource efficiency and environmental (including climate-related) impacts;
- integration of installations and infrastructures into virtual facilities;
- innovative solutions for data or sample collection, management, curation, annotation, and deposition;
- creation of specific services for supporting research addressing large research challenges

Digital services developed under the joint research activities should be exposed under the EOSC catalogue.

[77] Under the H2020-INFRAEOSC-2018-2020 call, other communities could be considered in order to widen the user base.