H2020 Research Infrastructure – Integrating Activities for Advanced Communities

According to the European Commission Horizon 2020 work programme, *Advanced Communities* are "scientific communities, whose research infrastructures already show an advanced degree coordination and networking at present, attained, in particular, through Integrating Activities awarded under FP7 or previous H2020 calls."

The *H2020 Research Infrastructure - Integrating Activities for Advanced Communities* H2020 INFRA-IA) provides funding to: support transnational and virtual access for European researchers to Research Infrastructure critical to their research activities. It also supports the long-term sustainability needs of the RIs by encouraging cooperation between research infrastructures, and sharing of infrastructure across scientific communities, industry and other stakeholders. More specifically, funding is provided to support networking activities; trans-national access or virtual access activities; and joint research activities to improve the quality and/or quantity of the integrated services provided at a European level by the infrastructures.

The following indicative dates have been announced for the H2020 INFRA-IA:

- Call launch: November 2018
- Call deadline: March 2019.

While the work programme is still not finalised, Table 1 provides a list of topics that may feature in the H2020 RI Integrating Activities 2019 deadline call. A brief description of each of these topics is outlined below to provide an indication of the strategic priorities and needs within each specific research area.

Seven Advanced Community areas are identified: Biological and Biomedical Sciences (BBS); Energy (E); Environmental and Earth Sciences (ENV); Mathematics, Information Communication and Technology (ICT); Materials and Analytical Facilities (MAF); Physical Sciences (PS); Social Sciences and Humanities (SSH).

It is expected that Category A applicants to the SFI RI call will seek a Letter of Support from these consortia, who as previously stated are most likely to be in a position to lead the winning bid under this call topic. Advanced Community topics listed in Table 1 are likely to be topics proposed for funding in the H2020 INFRA-IA 2018/2019 call.

Table 1

Biological and Medical Sciences

- Virus collections including for high-risk animal/human/plant pathogens.
- Research Infrastructures for the control of vector-borne diseases.
- Structural biology research infrastructures for health and food research
- Nanomedicine characterisation infrastructure
- Research infrastructures in aquaculture

Energy

- European smart grids research infrastructure

Environmental and Earth Sciences

- Research infrastructures for long-term ecosystem and socio-ecological research.
- Coastal and shelf seas observing research infrastructures.
- Multidisciplinary Marine Data Centres for ocean and marine data management.
- Mesocosms facilities for research on marine and freshwater ecosystems
- Research infrastructures for terrestrial research in the Arctic.
- Research Infrastructures for earthquake hazard.
- Research infrastructures for environmental hydraulic research.

Mathematics and ICT

- Distributed, multidisciplinary European infrastructure on Big Data and social data mining

Materials and Analytical Facilities

- Research infrastructures for advanced research in nanoelectronics.
- Advanced laser sources for leading-edge research.

Physical Sciences

- Research Infrastructures for Nuclear Physics
- Research Infrastructure for High- Energy Astrophysics
- Research Infrastructures for Planetary science

Social Sciences and Humanities

- European research infrastructures for cultural heritage restoration and conservation.
- Contemporary European history: European Holocaust research infrastructure.

Description of 2019 deadline topics for Integrating Activities for Advanced Communities

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 research aiming at drug and vaccine development, and to support epidemiological studies targeting disease and epidemics control.

Research Infrastructures for the control of vector-borne diseases. This activity aims at further integrating and opening specialised facilities, such as large scale production of mosquitoes and P3 secure insectaries for research on vectors and pathogens, for the study of insect-transmitted disease, The provided services should allow to validate and roll out new control measures targeting insect vectors that pose threats to human health and animal industries and to support research and product development.

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, links to high-throughput sequencing 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 opening 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[1]

Research infrastructures for long-term ecosystem and socio-ecological research. This activity should further integrate and opening LTER (Long Term Ecological Research) site-based and properly instrumented facilities and critical zone observatories, in different terrestrial and aquatic environments. It should incorporate relevant research platforms as well as integrate research field sites, associated data management and numerical simulation tools to address ecosystem 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 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 integrate and opening 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 practises for managing stations, and (international) logistics and establish links with relevant ESFRI infrastructures.

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

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 opening 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 furthering the integration and opening of state-of-the art laser technology enabling a wide range of novel applications with high industrial and social impact, such as bio-and nanophotonics, (bio)material analyses, (bio)medical diagnosis and treatment, communication and data processing. Emphasis should be on widening the user base, enlarging and strengthening the offered services, fostering the innovation role of such facilities and ensuring long term sustainability to their integration. Furthermore, it should also stimulate new scientific activities aimed at taking full advantage of new possibilities which will be offered by relevant initiatives on the ESFRI Roadmap

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, turning advances in nuclear physics experimentation into new 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 up facilities for developing, calibrating and testing both generic technologies as well as individual instruments developed for space missions in an environment representative of space conditions. Access should be provided in particular to scientists without national access, stimulating scientific and technological exchanges among European teams. Emphasis should be on enlarging and strengthening the offered services, widening the user base, and ensuring long term sustainability to their integration.

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 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.

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.