



European  
Commission

# Horizon 2020 and the Research Infrastructures Landscape

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*Research and  
Innovation*

# Horizon 2020 and the Research Infrastructures Landscape

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## Introduction

Developing new pan-European research infrastructures or integrating and opening national research infrastructures is a long-lasting process.

In addition, depending on the scientific field and type of infrastructures, the level of development or integration is different and requires a specific approach.

Research Infrastructures activities under **Horizon 2020** are therefore targeting different development phases, in line with a continuously evolving European Research Infrastructures landscape.

Complementary to the 2016 ESFRI roadmap<sup>1</sup>, this document gives a **snapshot** of Horizon 2020 contribution to structuring the **Research Infrastructures landscape** and will be updated on a regular basis. It covers the main scientific fields<sup>2</sup>:

- ENVIRONMENTAL AND EARTH SCIENCES
- BIOLOGICAL AND MEDICAL SCIENCES
- ENERGY
- MATERIAL SCIENCES AND ANALYTICAL FACILITIES
- PHYSICAL SCIENCES
- SOCIAL SCIENCE AND HUMANITIES
- MATHEMATICS AND ICT

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<sup>1</sup> New (and major upgrades of) research infrastructures of pan-European interest prioritised by the European Strategy Forum on Research Infrastructures.

<sup>2</sup> Multi-disciplinary Research Infrastructures are reported only once according to a core scientific field.

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## **ENVIRONMENTAL and EARTH SCIENCES**

ATMOSPHERE			
Type/Area	Infrastructure	Development Phase	ESFRI
Ground-based stations	Aerosols, Clouds, and Trace gases Research InfraStructure ( <b>ACTRIS-2</b> )	Integration	
	Aerosols, Clouds and Trace gases Preparatory Phase Project ( <b>ACTRIS PPP</b> )	Preparatory Phase	Project
Ground-based stations	Readiness of ICOS for Necessities of integrated Global Observations ( <b>RINGO</b> )	Implementation	Landmark
Ground-based radar	EISCAT_3D: Preparation for Production ( <b>EISCAT3D_PfP</b> )	Implementation	Project
Multi-platforms	Atmospheric dynamics Research InfraStructure in Europe ( <b>ARISE2</b> )	Design	
Simulation chambers	Integration of European Simulation Chambers for Investigating Atmospheric Processes – Towards 2020 and beyond ( <b>EUROCHAMP-2020</b> )	Integration	

BIOSPHERE			
Type/Area	Infrastructure	Development Phase	ESFRI
Terrestrial sites	European Long-Term Ecosystem and socio-ecological Research Infrastructure ( <b>eLTER</b> )	Integration	
	Advancing the European Long-Term Ecosystem, critical zone and socio-ecological Research Infrastructure towards ESFRI ( <b>Advance_eLTER</b> )	Early phase	Emerging
Terrestrial stations	International Network for Terrestrial Research and Monitoring in the Arctic ( <b>INTERACT</b> )	Integration	
Trees resources	Research Infrastructure for Circular Forest Bioeconomy ( <b>ERIFORE</b> )	Design	
Multi-platforms	GLOBal Infrastructures for Supporting Biodiversity research ( <b>GLOBIS-B</b> )	International outreach	

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GEOSPHERE			
Type/Area	Infrastructure	Development Phase	ESFRI
Solid Earth science	EPOS Implementation Phase <b>(EPOS IP)</b>	Implementation	Landmark

HYDROSPHERE Marine and freshwater			
Type/Area	Infrastructure	Development Phase	ESFRI
Mesocosms	Network of Leading European AQUatic MesoCOSM Facilities Connecting Mountains to Oceans from the Arctic to the Mediterranean ( <b>AQUACOSM</b> )	Integration	
Hydraulic experimental facilities	HYDRALAB+ Adapting to climate change ( <b>HYDRALAB-PLUS</b> )	Integration	
Multi-Platforms	Preparatory phase for the pan-european research infrastructure Danubius-RI "The International centre for advanced studies on river-sea systems ( <b>DANUBIUS-PP</b> )	Preparatory phase	Project
Marine			
Coastal observatories	Joint European Research Infrastructure network for Coastal Observatory – Novel European eXpertise for coastal observatories ( <b>JERICO-NEXT</b> )	Integration	
Deep sea observatories	EMSO implementation and operation: DEvelopment of instrument module ( <b>EMSODEV</b> )	Implementation	Landmark
	Implementation of the Strategy to Ensure the EMSO ERIC's Long-term Sustainability ( <b>EMSO-Link</b> )		
Marine data centres	Extending the Ocean Data Interoperability Platform ( <b>ODIP 2</b> )	International outreach	
	SeaDataCloud - Further developing the pan-European infrastructure for marine and ocean data management ( <b>SeaDataCloud</b> )	Integration	

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Interdisciplinary Platforms and Services			
Type/Area	Infrastructure	Development Phase	ESFRI
Multi-platforms	Environmental Research Infrastructures Providing Shared Solutions for Science and Society ( <b>ENVRI PLUS</b> )	Implementation	(Cluster)
Multi-platforms	Cooperation of Research Infrastructures to address global challenges in the environment field ( <b>COOP_PLUS</b> )	International outreach	

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## **BIOLOGICAL AND MEDICAL SCIENCES**

Biological Resource Centres			
Type/Area	Infrastructure	Development Phase	ESFRI
Biobanks	implemEntation and OPERation of the gateway for health into BBMRI-ERIC ( <b>ADOPT BBMRI-ERIC</b> )	Implementation	Landmark
	Bridging Biobanking and Biomedical Research across Europe and Africa ( <b>B3Africa</b> )	International outreach	
Virus Archive	European Virus Archive goes global ( <b>EVAg</b> )	Integration	
Insect repositories	Research Infrastructures for the control of vector-borne diseases ( <b>INFRAVEC2</b> )	Integration	
Mouse archive and Phenotyping centre	Towards enduring mouse resources and services advancing research into human health and disease ( <b>INFRAFRONTIER2020</b> )	Implementation	Landmark
	Research Infrastructures for Phenotyping, Archiving and Distribution of Mouse Disease Models - Promoting International Cooperation and User Engagement to Enhance Biomedical Innovation ( <b>IPAD-MD</b> )	International outreach	
Marine biology resource	European Marine Biology Resource Centre preparatory phase 2 ( <b>pp2EMBRC</b> )	Preparatory Phase	Project
	European Marine Biological Research Infrastructure Cluster to promote the Blue Bioeconomy ( <b>EMBRIC</b> )	Implementation	(Cluster)

Genomics and proteomics facilities			
Type/Area	Infrastructure	Development Phase	ESFRI
Structural biology facilities	Infrastructure for NMR, EM and X-ray crystallography for translational research ( <b>iNEXT</b> )	Integration	
	Releasing the full potential of Instruct to expand and consolidate infrastructure services for integrated structural life science research ( <b>INSTRUCT-ULTRA</b> )	Implementation	Landmark

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Imaging Facilities			
Type/Area	Infrastructure	Development Phase	ESFRI
Cell and medical imaging facilities	Euro-BioImaging Preparatory Phase II – Project ( <b>EuBI PPII</b> )	Preparatory Phase	Project
	Global BioImaging Project - International imaging infrastructure services for the life science community ( <b>Global BioImaging</b> )	International outreach	

Medical Research Facilities			
Type/Area	Infrastructure	Development Phase	ESFRI
BSL4 Laboratories	European Research Infrastructure on Highly Pathogenic Agents 2 ( <b>ERINHA2</b> )	Preparation phase	Project
Nanomedicine Characterization Laboratory	European Nanomedicine Characterization Laboratory ( <b>EU-NCL</b> )	Integration	
Paediatric facilities	Paediatric Clinical Research Infrastructure Network ( <b>PedCRIN</b> )	Implementation	

Food and agriculture research facilities			
Type/Area	Infrastructure	Development Phase	ESFRI
Aquaculture research facility	AQUAculture infrastructures for EXCELlence in European fish research towards 2020 ( <b>AQUAEXCEL2020</b> )	Integration	
Plants phenomics and food security facilities	Preparation for EMPHASIS: European Infrastructure for multi-scale Plant Phenomics and Simulation for food security in a changing climate ( <b>EMPHASIS-PREP</b> )	Preparatory Phase	Project
Food security facilities	Supporting EU-African Cooperation on Research Infrastructures for Food Security and Greenhouse Gas Observations ( <b>SEACRIFOG</b> )	International outreach	
Metrology in food facilities	Progressing towards the construction of <b>METROFOOD-RI</b> (PRO-METROFOOD)	Preparatory Phase	Emerging

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Bioinformatics resources			
Type/Area	Infrastructure	Development Phase	ESFRI
Bioinformatic resources	ELIXIR-EXCELERATE: Fast-track ELIXIR implementation and drive early user exploitation across the life-sciences ( <b>ELIXIR EXCELERATE</b> )	Implementation	Landmark
Health and Food data infrastructure	Research Infrastructure on Consumer Health and Food Intake using E-science with Linked Data Sharing ( <b>RICHFIELDS</b> )	Design	

Interdisciplinary Platforms and Services			
Type/Area	Infrastructure	Development Phase	ESFRI
Biological and medical facilities	Coordinated Research Infrastructures Building Enduring Life-science services ( <b>CORBEL</b> )	Implementation	<i>(Cluster)</i>



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## **ENERGY**

Energy			
Type/Area	Infrastructure	Development Phase	ESFRI
CO <sub>2</sub> capture and storage	European Carbon Dioxide Capture and Storage Laboratory Infrastructure ( <b>ECCSEL</b> )	Implementation	Project
Electrical laboratories	European Research Infrastructure supporting Smart Grid Systems Technology Development, Validation and Roll Out ( <b>ERIGrid</b> )	Integration	
Underground storage facilities	Design Study for the European Underground Research Infra-structure related to Advanced Adiabatic Compressed Air Energy Storage ( <b>RICAS2020</b> )	Design	
Offshore renewable energy	Marine Renewable Infrastructure Network for Enhancing Technologies 2 ( <b>MARINET2</b> )	Integration	
	Marine Renewable Energy Research Infrastructure ( <b>MARINERGI</b> )	Preparatory Phase	Emerging

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## MATERIAL SCIENCES AND ANALYTICAL FACILITIES

Type/Area	Infrastructure	Development Phase	ESFRI
Micro and nanotechnology facilities	Nanoscience Foundries And Fine Analysis – Europe ( <b>NFFA</b> -Europe)	Integration	
Lasers for Laser Science	The Integrated Initiative of European Laser Research Infrastructures ( <b>LASERLAB</b> -EUROPE)	Integration	
Neutron scattering facilities	Building a research infrastructure and synergies for highest scientific impact on ESS ( <b>BrightnESS</b> )	Implementation	Landmark
Micro and nanoelectronics labs	Access to European Nanoelectronics Network ( <b>ASCENT</b> )	Integration	
Novel Materials and biomaterial facilities	ACCELERATING Europe's Leading Research Infrastructures ( <b>ACCELERATE</b> )	Implementation	
Accelerators and magnets resources	Accelerator and Magnet Infrastructure for Cooperation and Innovation ( <b>AMICI</b> )	Technological infrastructure	
Neutrons facilities	World class Science and Innovation with Neutrons in Europe 2020 ( <b>SINE2020</b> )	Implementation	(Cluster)
Neutron facilities	Solid-State Neutron Detector - A new Neutron Detector for High-Flux Applications ( <b>SoNDe</b> )	Design	
Laser facilities	ELITRANS-Facilitating the transformation of ELI from ERDF funded, distributed infrastructures towards a unified ELI-ERIC ( <b>ELITRANS</b> )	Implementation	Landmark
Laser physics instruments	European Cluster of Advanced Laser Light Sources ( <b>EUCALL</b> )	Implementation	(Cluster)

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## PHYSICAL SCIENCES

Accelerators and colliders			
Type/Area	Infrastructure	Development Phase	ESFRI
Particle Detectors	Advanced European Infrastructures for Detectors at Accelerators ( <b>AIDA-2020</b> )	Integration	
Accelerators resources	Accelerator Research and Innovation for European Science and Society ( <b>ARIES</b> )	Integration	
Particle accelerators	Proposal for a Horizon 2020 Design Study on the "European Plasma Research Accelerator with eXcellence In Applications" ( <b>EuPRAXIA</b> )	Implementation	
Particle accelerators	European Circular Energy-Frontier Collider Study ( <b>EuroCirCol</b> )	Design	
Particle accelerators	QUAdrupoleCOrrector ( <b>Quaco</b> )	Innovation	
Physics	Connecting Russian and European Measures for Large-scale Research Infrastructures ( <b>Cremlin</b> )	International Outreach	
Nuclear physics facilities	European Nuclear Science and Application Research 2 ( <b>ENSAR2</b> )	Integration	
Nuclear physics facilities	International Development of gAnil-spirAL2 ( <b>IDEAAL</b> )	Implementation	
Optical fiber clock services	CLOck NETwork Services: Strategy and innovation for clock services over optical-fibre networks ( <b>CLONETS</b> )	Technological Infrastructure	
Neutrons facilities	The Future of ILL 2030 ( <b>FILL2030</b> )	Implementation	

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Astronomy			
Type/Area	Infrastructure	Development Phase	ESFRI
Solar telescopes	Getting Ready for EST ( <b>GRESt</b> )	Design	Project
	Preparatory Phase for the European Solar Telescope ( <b>PRE-EST</b> )	Preparatory Phase	
Gamma-Ray observatories	Cherenkov Telescope Array: Infrastructure Development and Start of Implementation ( <b>CTA-DEV</b> )	Preparatory Phase	Project
Radio telescopes	Square Kilometre Array: Infrastructure Detailed Design for SKA Phase 1 ( <b>IN-SKA</b> )	Implementation	Landmark
Astronomy facilities	Astronomy ESFRI and Research Infrastructure Cluster ( <b>ASTERICS</b> )	Implementation	<i>(Cluster)</i>
Astroparticles and oscillations facilities	Astroparticle and Oscillations Research with Cosmics in the Abyss - ARCA and ORCA- ( <b>KM3NeT 2.0</b> )	Preparatory Phase	Project
Radio astronomy facilities	Advanced Radio Astronomy in Europe ( <b>RadioNet</b> )	Integration	
Optical Infrared facilities	Optical Infrared Coordination Network for Astronomy ( <b>OPTICON</b> )	Integration	
High-energy astrophysics facilities	Integrated Activities for the High Energy Astrophysics Domain ( <b>AHEAD</b> )	Integration	
Planetary research facilities	EUROPLANET 2020 Research Infrastructure ( <b>EPN2020-RI</b> )	Integration	
Infrared telescopes	Innovative infrastructure for astronomical research based on stratospheric balloons ( <b>ORISON</b> )	Innovation	

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## **SOCIAL SCIENCE AND HUMANITIES**

Social Sciences			
Type/Area	Infrastructure	Development Phase	ESFRI
Data infrastructure	Strengthening and widening the European infrastructure for social science data archives ( <b>CESSDA-SaW</b> )	Implementation	Landmark
European survey	European Social Survey Sustainability ( <b>ESS-SUSTAIN</b> )	Implementation	Landmark
European survey	Achieving world-class standards in all SHARE countries ( <b>SHARE-DEV3</b> )	Implementation	Landmark
Social sciences facilities	Synergies for Europe's Research Infrastructures in the Social Sciences ( <b>SERISS</b> )	Implementation	(Cluster)
Generation and gender data	Generations and Gender Programme: Evaluate, Plan, Initiate ( <b>GGP-EPI</b> )	Early Phase	Emerging

Arts and Humanities			
Type/Area	Infrastructure	Development Phase	ESFRI
Data infrastructure	DARIAH ERIC Sustainability Refined ( <b>DESIR</b> )	Implementation	Landmark
	Humanities at Scale: Evolving the DARIAH-ERIC ( <b>HaS-DARIAH</b> )		
Analytical facilities	Integrated Platform for the European Research Infrastructure ON Cultural Heritage ( <b>IPERION CH</b> )	Integration	
Inter-disciplinary services	Pooling Activities, Resources and Tools for Heritage E-research Networking, Optimization and Synergies ( <b>PARTHENOS</b> )	Implementation	(Cluster)

Linguistics			
Type/Area	Infrastructure	Development Phase	ESFRI
Data infrastructure	Strengthening the CLARIN Infrastructure ( <b>CLARIN-PLUS</b> )	Implementation	Landmark

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## MATHEMATICS AND ICT

Type/Area	Infrastructure	Development Phase	ESFRI
Cloud	The European Open Science Cloud for Research Pilot Project ( <b>EOSCpilot</b> )	Pilot	
Data infrastructures	SoBigData Research Infrastructure ( <b>SoBigData</b> )	Integration	